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Review on ADHD Children and their Parents

Mohsin Masud Jan
Editor

Attention-deficit hyperactivity disorder (ADHD) is a serious public health problem affecting a large number of children and adults. Difference in brain development and brain activity that affect attention. The ability to sit still and self control. ADHD can affect the child at school, at home and in friends. CDC conducts research to expand on what is known about ADHD. The information learned will improve knowledge about the factors that increase the risk for ADHD, as well as the causes, and best treatments, and will aid the development of resources to help people living with ADHD.

Attention deficit Hyperactivity disorder (ADHD) is among the most prevalent mental disorder in children, and is characterised by three core symptoms of inattention, hyperactivity, and impulsivity. It is one of the most difficult diagnoses to categorize as evident from changing definition criteria observed in the revisions of Diagnostic and statistical manual.

Kids with ADHD can face a lot of hardship – but their parents do too. These tips could help.

- Consistent negative messages not only impact children and teens with ADHD, but also their parents
- Parents of children with ADHD have more frequent and less positive interactions with their child's school
- Improved understanding of the nature of ADHD and the impacts will improve understanding and support

CDC uses data from national surveys to understand the number of children with ADHD, other concerns and conditions they might experience, and the kind of treatment they might receive. Surveys that have data on children and on ADHD include, National Survey of Children's Health since 2016.

- National Survey of Children's Health 2003-2012.
- National Survey of the Diagnosis and Treatment of ADHD and Tourette Syndrome (NS-DATA).
- National Health Interview Survey.
- National Survey on Children with Special Health Care Needs.

CDC's National Center on Birth Defects and Developmental Disabilities (NCBDDD) supported large community-based, epidemiologic studies of ADHD in the United States. These studies

- Enhance what is known about ADHD and the co-occurring conditions in children and
- Increase the opportunity to make the most informed decisions and recommendations about potential public health prevention and intervention strategies for children with ADHD.

In 2016, the National Household Education Survey collected by the U.S. Census Bureau captured information regarding educational involvement from parents of children with ADHD compared to parents without a child with ADHD. Results from this study found that parents with a child diagnosed with ADHD were more likely to receive phone calls from school about their child, and three times more likely to meet with a guidance counselor. It is safe to say that many of these calls, notes, and meetings were being used to address emotional, behavioral, or academic concerns within the classroom and are negative and stressful for parents.

Many parents who feel anxious prior to family gatherings, birthday parties, class field trips, or a simple trip to the playground. These situations can create anxiety for a parent who may anticipate a potential meltdown or conflict with peers and subsequent judgments from other parents or adults. Often this anticipatory anxiety or previous negative experiences can ultimately create avoidance. Similar to the school statistic, it may be that parents of children with ADHD have less opportunity to have fun, socialise, and receive support than other parents.

Research from the Journal of Abnormal Child Psychology identified that parents of children with ADHD experience higher stress levels, less satisfaction as a parent, and higher rates of depression than parents of other children. When a child or family feels included, supported, and understood, they fare better and we fare better as a community. A broader and more accurate understanding of ADHD as a deficit in regulation (attention, emotions, energy, other executive functions, etc.) vs. only a deficit in attention will help build more accurate interpretations of children's behaviour, more targeted and specific supports, and greater empathy for the challenges that people with ADHD face at each day.

Parents of children with ADHD and also school teachers keep educating themself on ADHD.

It is not known what causes ADHD. ADHD is often seen in families, and genes appear to play a role, but other factors may contribute or make symptoms worse. For example, some environmental exposures have been linked to increased ADHD symptoms, but the evidence has been inconsistent. Knowing more about these factors would help with planning how to decrease the risk for ADHD. A comprehensive literature review of studies that investigate a large range of factors that might increase the risk for ADHD. The results will increase the ability of public health professionals to make the most informed decisions and recommendations about potential public health prevention strategies.

ADHD can cause problems in how well children do in school, in their ability to make and keep friends, and in how they function in society. Although there are treatments to improve ADHD symptoms, more information is needed about managing ADHD so that children can learn and grow into adulthood without being impaired by their symptoms.

ADHD can cause problems in how well children do in school, in their ability to make and keep friends, and in how they function in society. Although there are treatments to improve ADHD symptoms, more information is needed about managing ADHD so that children can learn and grow into adulthood without being impaired by their symptoms.

The criteria used to diagnose ADHD have changed over time. Researchers who study ADHD have used different definitions to diagnose ADHD. This has led to different estimates for the number, characteristics, and outcomes of children with the disorder. Although the exact causes of ADHD are not known, research shows that genes play a role, but other factors may contribute or make symptoms worse. There are many unanswered questions about ADHD, and there is more we need to learn about how ADHD affects people throughout their life.

The treatment costs of ADHD and the personal and societal costs can be significant. Researchers estimate that in the United States, $31.6 billion is the combined annual cost for health care for persons with ADHD specifically related to the diagnosis.

Health care for family members of persons with ADHD specifically related to their family member's diagnosis, and work absences among adults with ADHD and adult family members of persons with ADHD.[5]

According to a research Gender differences were not found in impulsivity, academic performance, social functioning, fine motor skills, parental education, or parental depression.

However, compared with ADHD boys, ADHD girls displayed greater intellectual impairment, lower levels of hyperactivity, and lower rates of other externalizing behaviors; it was not possible to evaluate the extent to which referral bias affected these findings. Some gender differences were clearly mediated by the effects of referral source; among children with ADHD identified from non-referred populations, girls with ADHD displayed lower levels of inattention, internalizing behavior, and peer aggression than boys with ADHD, while girls and boys with ADHD identified from clinic-referred samples displayed similar levels of impairment on these variables.

ADHD is a chronic disorder with significant behavioral and emotional sequela. There is significant resistance and controversy regarding the use of stimulant medication both on part of physicians and parents.

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Original Article

Comparison of LEF with MTX and Hydroxychloroquine for RA

Comparison of Leflunomide Monotherapy with Combination of Methotrexate and Hydroxychloroquine in Active Rheumatoid Arthritis

Muhammad Muddasser Khan Panezai, Zia Ul Haq, Shahzad Gul, Obaid Ur Rehman, Somaya Shah and Saira Tahir

ABSTRACT

Objective: We compared the clinical outcomes of Leflunomide (LEF) monotherapy with combination therapy of methotrexate (MTX) plus hydroxychloroquine for managing moderate to severe rheumatoid arthritis (RA).

Study Design: Comparative study

Place and Duration of Study: This study was conducted at the rheumatology clinic of Pakistan Institute of Medical Sciences (PIMS) Islamabad from June-2020 to July-2022.

Methods: Patients were divided in two groups as per the given treatment, either in group L or group MH. In group L, 20 mg LEF per day was given for 3 months. In group MH, 200 mg hydroxychloroquine was given for 3 months, along with hydroxychloroquine, in these patients 7.5 mg/week MTX was given for first week after that the dose was increased 2.5mg/week until it reached 25 mg/week. Patients' follow-up was done for 3 months, data of biochemical markers and clinical outcomes was noted at each follow-up.

Results: The mean age was 42.64±13.7 years in group L and 43.15±10.2 years in group MH. Majority of studied patients were females, 27 (67.5%) in group L and 29 (72.5%) in group MH (p-value 0.62). DAS-28 after 3 months of treatment was 4.36±1.5 in group L and 4.24±1.3 in group MH (p-value 0.70). The ESR and SJC scores after 3 months of treatment was 27.3±14.5 in group L versus 26.1±11.4 and 5.1±4.9 in group L versus 5.05±4.2 in group MH. The SJC score, DAS-28 score and ESR levels reduced at each follow- up post- treatment with statistically significant difference with $P < 0.001$.

Conclusion: Leflunomide (LEF) monotherapy has similar efficacy in comparison to combination of methotrexate and hydroxychloroquine for managing moderate to severe RA.

Key Words: Rheumatoid arthritis, Leflunomide, methotrexate, Hydroxychloroquine

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INTRODUCTION

Rheumatoid arthritis (RA) is one the commonest auto-immune disease. RA cause inflammation in synovial joints resulting in joints erosion[1]. These patients presents with painful swelling of synovial joints limiting physical functioning and reduction in quality of life (QOL). The prevalence of RA is 0.5% to 1.0%, with 2 to 3 times higher incidence in females.[2,3]

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The pathogenesis of RA is still under clear, therefore still no definitive treatment exists. The aim of RA treatment is mainly to stop and reduce the disease severity.[4] Disease modifying anti-rheumatic drugs (DMARD's) are the mainstay for management of RA. The commonly used drugs for RA are methotrexate (MTX), sulfasalazine (SSZ) and hydroxychloroquine (HCQ). While the steroids and nonsteroidal anti-inflammatory drugs (NSAIDs) can be used as adjuvants.[5,6]

Leflunomide (LEF) is gaining popularity among rheumatologists for treating RA. LEF is well-tolerated and has rapid onset of action (about 4 weeks) and has reported to be effective for early and advanced stages of RA.[6] Studies have reported that LEF is beneficial in decreasing the levels of erythrocyte sedimentation rate (ESR), c-reactive proteins (CRPs) and significant improvements in severity and signs of RA, QOL and minimize the joint damage.[7] Kaidan et al. conducted a long follow-up study regarding long term (5 years) efficacy of LEF, reported that LEF efficacy achieved in

early periods is examined over longer periods of time.[8]

To our knowledge, there is no study available that reported the efficacy of LEF monotherapy with combination therapy of MTX plus hydroxychloroquine for RA patients in Pakistani population. Keeping in view the existing literature we aimed to compare the efficacy and safety of LEF monotherapy with combination therapy of MTX plus hydroxychloroquine for managing RA.

METHODS

In this quasi-experimental study, a total of 80 patients of RA (DAS28 >5.1 and CDAI >22) who presented in the rheumatology clinic of PIMS Islamabad were included from June-2020 to July-2021. The patients were recruited by non- probability convenient sampling. Patients having co-morbidities such as renal disease, liver disease, uncontrolled diabetes and hypertension, or pregnant females were excluded. Hospital IRB approval was obtained for study protocol (Approval Number; ECPIMS/(2.01). Written consent was obtained from each patient by first counselling them about study protocol and benefits. Non-probability consecutive sampling was used for data collection.

Detailed history and clinical examination of patients was done and all related investigations such as CBC, serum creatinine, and radiologic investigations were advised. Patients were divided in two equals half's. In group L, 20 mg LEF per day was given for 3 months. In group MH, 200 mg hydroxychloroquine was given for 3 months along with hydroxychloroquine. In these patients, 7.5 mg/week MTX was given for first week after that the dose was increased 2.5mg/week until it reached 25 mg/week. Patients follow-up was done for 3 months. Disease activity score (DAS) using DAS28 questionnaire was calculated at baseline, 6 weeks and 3 months follow-up. There was no lost in follow-up period. At follow-up, the side effects of each drug and biochemical markers of recovery were noted. For data analysis we used SPSS version 25. Independent sample t-test and chi-square test was applied to compare quantitative variables and qualitative variables respectively between the groups. P-value ≤0.05 was taken as significant difference.

RESULTS

In this study of 80 patients, 40 patients received LEF and 40 patients received methotrexate plus hydroxychloroquine. Mean age was 42.94±10.7 years in group L and 43.15±10.2 years in group MH (p-value 0.92). Majority of studied patients were females, 27 (67.5%) in group L and 29 (72.5%) in group MH (p-value 0.42). Baseline DAS-28 score was 6.5±0.9 in group L and 6.6±1.0 in group MH (p-value 0.62). Mean baseline SJC score was 11.8±8.3 in group L and 12.19±8.1 in group MH (p-value 0.87). Mean baseline ESR levels were 43.7±18 in group L and 43.8±20 in group MH (p-value 0.65) (Table 1)

The mean DAS-28 score at 6 weeks of treatment was 5.19±1.2 in group L and 5.14±1.1 in group MH (p-value 0.84). DAS-28 after 3 months of treatment was 4.36±1.5 in group L and 4.24±1.3 in group MH (p-value 0.70). ESR at 6 weeks of treatment was 36.18±17.4 in group L versus 34.7±14.3 in group MH (p-value 0.64). ESR at 3 months treatment was 27.3±14.5 in group L versus 26.1±11.4 (p-value 0.68). SJC score at 6 weeks treatment 6.4±5.3 in group L versus 6.3±6.1 in group MH (p-value 0.94). SJC at 3 months of treatment was 5.1±4.9 in group L versus 5.05±4.2 in group MH (p-value 0.96) [Table 2].

On repeated measures ANOVA we found significant reduction in DAS score, SJC score and ESR within the group at 6 weeks and 3 months from baseline, for both patients receiving LEF alone plus hydroxychloroquine group with p-value of <0.0001 and <0.0001 respectively.

Table No.1: Baseline study variables:

	Group L	Group MH	p-value
Age (Years)	42.94±10.7	43.15±10.2	0.92
Male	13 (32.5%)	11 (27.5%)	0.62
Female	27 (67.5%)	29 (72.5%)	
RA Duration	2.71±1.2	2.94±1.3	0.41
Swollen Joints count (SJC)	11.8±8.3	12.19±8.1	0.87
DAS-28	6.5±0.9	6.6±1.0	0.62
ESR	43.7±18	43.8±20	0.65

Table No. 2: Comparison of Study Outcomes:

	Group L	Group MH	P-value
DAS-28 at 6 weeks	5.19±1.2	5.14±1.1	0.84
DAS-28 at 3 months	4.36±1.5	4.24±1.3	0.70
ESR at 6 weeks	36.18±17.4	34.7±14.3	0.67
ESR at 3 months	27.3±14.5	26.1±11.4	0.68
SJC at 6 weeks	6.4±5.3	6.3±6.1	0.94
SJC at 3 months	5.1±4.9	5.05±4.2	0.96

DISCUSSION

The early aggressive treatment is the current recommended treatment for RA.[9] the updated EULAR guidelines recommended that the treatment of RA should be based on severity of disease and associated co-morbidities keeping in view the safety concerns of drugs with ultimate goal to relief patient symptoms of

RA.[10] MTX is the initial standard treatment for RA.[11] In patients with inadequate response to MTX, combination of drugs is advised in comparison to single. Hydroxychloroquine is the commonly prescribed drug along with MTX. Recently, LEF has gained popularity as standalone treatment for severe cases of RA. In this study, we compared the outcomes of MTX plus hydroxychloroquine treatment with LEF for managing RA and overall treatment cost.

LEF suppresses the immune cell reactions and therefore is effective in treating RA. Smolen et al. determined the efficacy of LEF in a placebo controlled trial and reported significantly better clinical outcomes at 3 months follow-up using LEF. the recommended dose of LEF is 20 mg/day. However, a recent study has suggested that lower dose of LEF can also be adopted the study did not report any significant difference in 3 months outcomes using 10/day LEF and 20 mg/days LEF. In this study we used only recommended dose of 20 mg/day.

El-Sayed in a non-randomized observational study on effects of LEF alone reported that LEF is an effective treatment option for patients with resistant RA, and how get inappropriate treatment response using other DMARDs.[12]

Dang et al. in a large trial observing different treatment options of RA, including LEF+MTX, LEF+hydroxychloroquine, LEF+MTX+hydroxychloroquine and LEF alone reported no significant difference in DAS-28 scores, ESR, CRP, TJC and QOL scores between the groups and reported that LEF monotherapy is no inferior to combination therapy so LEF alone can be prescribed for severe RA.[13] Mathur et al. in another study of 12 weeks follow-up including patients of moderate to severe RA, on efficacy of LEF monotherapy in comparison to combination of MTX+hydroxychloroquine reported no significant difference in DAS-28 scores at 12 weeks follow-up. [14] The results of present study were similar to above mentioned studies. However, a study by Zhang et al. conducted in China reported that combination of MTX+LEF is inferior to MTX+ hydroxychloroquine group. The results of these studies are contrary to above mentioned studies.[15]

The shorter follow-up period is the major limitation of present study, we followed the patients only for 3 months. Studies with larger sample sizes and longer follow-up are needed to determine the safety profile and sustained efficacy of LEF in moderate to severe RA patients.

CONCLUSION

Leflunomide (LEF) monotherapy has similar efficacy in comparison to combination of methotrexate and hydroxychloroquine for managing moderate to severe RA. So it can be considered for initial sole therapy in RA patients instead of combination drugs.

Author's Contribution:

Concept & Design of Study:	Muhammad Muddasser Khan Panezai
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Original Article

Comparison Between Non-Opioid Versus Opioid Analgesia in Neuro-Surgery

Jawad Hameed, Amjid Ali, Muhammad Sheharyar Ashraf, Abid Haleem Khattak, Ahmad Ali and Haseeba Naeem

ABSTRACT

Objective: To compare effect of opioids and non-opioids pain management protocol in patients underwent neurosurgical procedure.

Study Design: Randomized controlled trial study.

Place and Duration of Study: This study was conducted at the Anesthesia department of Lady Reading Hospital, Peshawar, from January 2023 to June 2023.

Methods: A total of 200 patients were enrolled in study and divided into two groups 112 in opioid group and 88 in non-opioid group by simple randomization method. In opioid group patient were given oral hydrocodone and intravenous morphine. In non-opioid group patient s were given NSAIDs. Preoperative variables, including body mass index, age of patients, gender, history of prior surgeries and opioid use and the any medical comorbidities such as hypertension, diabetes mellitus, anxiety and depression. Postoperative data comprised postoperative hemorrhage/bleeding, postoperative pain scores and length of stay.

Results: Morphine equivalent units opioid group was greater than the non opioids group at 6, 12 and 24 hours, ($p<0.001$). According to primary outcomes, the pain at 6, 12 and 24 hours in opioid patients was 4.04±0.42, 3.63±0.22 and 3.40±0.30, respectively. The pain at 6, 12 and 24 hours in non opioid patients was 3.13±0.55, 3.11±0.18 and 2.63±0.28, respectively.

Conclusion: Non-opioid medications were found to significantly reduce pain compared to opioids, and there were no observed increases in hemorrhagic complications in the non-opioid group. Non-opioid medications may be a viable alternative for managing postoperative pain in neurosurgery patients, potentially with fewer associated complications.

Key Words: Neurosurgery, Pain management, Opioids, Non opioids, Pain score, Post-operative hemorrhage.

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INTRODUCTION

Managing post-operative pain after cranial surgery presents a unique challenge, primarily due to the delicate nature of the surgical site and the need for accurate neurological assessments.[1] While opioids have traditionally been the go-to choice for pain management, there is a growing awareness of their limitations and the potential risks associated with their use, such as sedation.[2] A multimodal approach combines various analgesic techniques to reduce the reliance on opioids.

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Intravenous (IV) morphine or hydromorphone are potent opioid analgesics that can be administered as needed or via patient-controlled analgesia (PCA) devices.[3] PCA allows patients to self-administer a predetermined dose of medication, which can be helpful in tailoring pain relief to individual needs.[4]

This approach can include non-opioid medications such as non-steroidal anti-inflammatory, acetaminophen, muscle relaxants, and anticonvulsants.[5] These drugs can be used in combination to provide effective pain relief while minimizing opioid use. Depending on the nature of the cranial surgery, regional anesthesia techniques, such as scalp blocks or local anesthetics, may be employed to target specific pain pathways. These techniques can reduce the need for systemic opioids.[6]

Pain management following neurosurgical procedures is a critical aspect of postoperative care. The statistics show 89% and 48% of patients reporting significant uncontrolled pain during the 1st and 2nd day's after surgery, respectively, suggest that pain management in this context may not be optimal.[7] Inadequate pain control can lead to patient discomfort and potentially hinder their recovery. Several factors can contribute to

postoperative pain, including the type of cranial procedure, individual patient factors, and the analgesic regimen used. However, combining NSAIDs and opioids can make it challenging to attribute the efficacy of NSAIDs alone in managing postoperative pain. This is because the combination may mask the individual contributions of each medication. It's often used in clinical practice to achieve a balanced pain management strategy that takes advantage of the benefits of both classes of drugs.

METHODS

This randomized clinical trial conducted at Anesthesia department of Lady Reading Hospital, Peshawar, from January 2023 to June 2023 in duration of six months after written consent from patients and permission from hospital ethical board. The assessment was conducted using the Defense and Veterans Pain Rating Scale (DVPRS) at 6th hour, 12th hour, and 24th hour after surgery.

Individuals with allergies to non-steroidal anti-inflammatory drugs (NSAIDs), patients who have reached the final stage of kidney failure, individuals with chronic kidney disease and a baseline serum creatinine level higher than 1.5 mg/dL were excluded from the study. Opioid analgesics were hydrocodone and intravenous morphine. Preoperative variables, including body mass index, age of patients, gender, history of prior surgeries and opioid use and the any medical comorbidities such as hypertension, diabetes mellitus, anxiety and depression were examined, while operative data involved the type and length of surgery, with all procedures involving cranial access, dura opening, and surgery within the brain parenchyma. Postoperative data comprised postoperative hemorrhage/bleeding, postoperative pain scores (DVPRS) at 6th, 12th, and 24th hour and length of stay. The DVPRS pain scores, ranging from 0 to 10, are assessed hourly by nursing staff and are re-evaluated before and after the administration of medications. Additionally, CT scan and MRI was used to assess postoperative bleeding. Educational meetings were conducted with surgical team including ancillary staff, nursing, pharmacy professionals, and intensive care providers to ensure mutual collaboration. Availability of all study medicines was assured. Patients received preoperative counseling regarding what to expect in terms of pain after surgery. Education was provided on the use of non-steroidal anti-inflammatory drugs (NSAIDs) and acetaminophen as the first-line treatments for pain.

Continuous variables were assessed using Student t-tests, while categorical variables were compared using the chi-square. Mean pain scores between opioid (OP) and non-opioid groups were compared using an independent t-test, with a 95% confidence interval to determine non inferiority, employing a margin of 1 point on the DVPRS. All statistical analyses were conducted using SPSS, version 26.0 (IBM, Armonk, NY), and a significance level of $P < 0.05$ was considered.

RESULTS

Three hundred patients were included in this study. There were 212 (70.7%) patients treated with opioid and 88 (29.3%) patients treated with opioid-sparing protocol (OSP). The mean age, BMI and procedure time of opioid was 62.13±3.79 years, 27.53±2.34 kg/m^2 and 3.95±1.23 hours, respectively. Diabetes was observed in 46 (21.7%) patients. Whereas, hypertension was noted in 57 (26.9%) patients. There were 46 (21.7%) in depression and 33 (15.6%) patients in anxiety. Craniotomy was observed in 53 (25.9%) patients and preoperative opioid was used in 48 (22.6%) patients. The mean age, BMI and procedure time of non-opioids was 64.82±6.14 years, 28.18±2.36 kg/m^2 and 4.18±1.28 hours, respectively. Diabetes was observed in 20 (22.7%) patients. Whereas, hypertension was noted in 26 (29.5%) patients. There were 24 (27.3%) in depression and 17 (19.3%) patients in anxiety. Craniotomy was observed in 18 (20.5%) patients and preoperative opioid was used in 16 (18.2%) patients. The differences of demographic and baseline characteristics among both the groups were almost equal. ($p>0.050$). (Table 1)

The distribution of pain score of non-opioids and opioid groups were shown in figure 1. The pain score was high in opioid group as compare to the non-opioid group at 6, 12 and 24 hours, ($p<0.001$). Morphine equivalent units opioid group was greater than the non-opioids group at 6, 12 and 24 hours, ($p<0.001$). (Figure 2)

Table No. 1: Demographic and baseline characteristics of the study groups

Characteristic	Opioid 212 (70.7%)	Non-Opioid 88 (29.3%)	P-value
Age (years)	62.13±3.79	64.82±6.14	0.024
Sex			
Male	149 (70.3)	63 (71.6)	0.821
Female	63 (29.7)	25 (28.4)	
BMI	27.53±2.34	28.18±2.36	0.029
Procedure time (hour)	3.95±1.23	4.18±1.28	0.188
Diabetes status	46 (21.7)	20 (22.7)	0.845
Hypertension	57 (26.9)	26 (29.5)	0.629
Depression	46 (21.7)	24 (27.3)	0.269
Anxiety	33 (15.6)	17 (19.3)	0.427
Craniotomy	55 (25.9)	18 (20.5)	0.313
Opioid used (preoperative)	48 (22.6)	16 (18.2)	0.391

Table No. 2: Primary and secondary outcomes of the study groups

Outcome	Opioid	Non-Opioid	p-value
Primary outcome			
6 hours pain	4.04±0.42	3.13±0.35	<0.001
12 hours pain	3.67±0.22	3.11±0.18	<0.001
24 hours pain	3.43±0.30	2.63±0.28	<0.001
Postoperative hemorrhage	24 (11.3)	8 (3.4)	0.022
Secondary outcome			
LOS (days)	3.12±1.31	2.98±1.18	<0.001

According to primary outcomes, the pain at 6, 12 and 24 hours in opioid patients was 4.04±0.42, 3.67±0.22 and 3.43±0.30, respectively. The pain at 6, 12 and 24 hours in non-opioid patients was 3.13±0.35, 3.11±0.18 and 2.63±0.28, respectively. Whereas, the mean length of stay in hospital of opioid patients was greater than the non-opioid patients, 3.12±1.31 days and 2.98±1.18 days, respectively, (p<0.001). (Table 2)

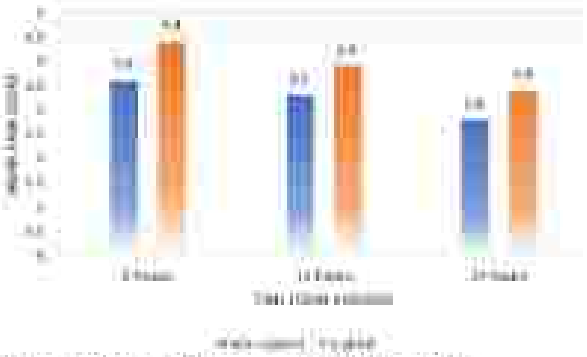

Figure No. 1: Pain score among the groups.

Figure No. 2: MEU among the groups.

DISCUSSION

After low risk surgeries more than 80% of patients receive opioids perioperatively. This statistic underscores the common practice of using opioids to manage pain following surgical procedures[6]. Many patients who are discharged from hospitals after surgery leave with opioid prescriptions. This implies that the use of opioids for pain management extends beyond the hospital setting and continues into the postoperative recovery period[7].

In this trial pain score was high in opioid group as compare to the non-opioid group at 6, 12 and 24 hours, (p<0.001). Morphine equivalent units opioid group was greater than the non opioids group at 6, 12 and 24 hours, (p<0.001). A study by Moore et al[8] reported that opioids are not necessarily superior to non-opioid drugs, such as NSAIDs (Nonsteroidal Anti-Inflammatory Drugs), acetaminophen, or combinations of these drugs, in managing acute or postoperative pain.

A study was conducted by Kaafarani et al[9] indicates that 95% of patients undergoing surgery in the USA were prescribed opioids after discharge. In contrast, only 5% of patients in the mentioned European and Asian countries received opioid prescriptions in a similar post-surgery context. In a study Shay et al[10] concluded that opioids are powerful analgesic medications commonly used to manage moderate-to-severe pain, but their side effects and potential impact on postoperative outcomes have been a subject of discussion and concern.

In this study postoperative hemorrhage was occurred in 11.3% of patients in opioid group and 3.4% in non opioids group. In a meta-analysis Gobble et al[11] did not find a significant increase in postoperative bleeding when ketorolac was compared with control groups. It was also observed that ketorolac is effective in managing postoperative pain, and its effectiveness is comparable to opioids. Another study by Cassinelli et al[12] reported that patients who were randomized to receive non-opioid medications immediately after surgery and at specific time points (4, 12, and 16 hours postoperative) had significantly lower Visual Analog Pain Scores compared to another group that presumably did not receive non-opioid medications.

Incidence of anxiety was 10.9% in opioid group and 19.5% in non opioids group. Counselling of patients about procedure and post-operative pain management was key component of our study which is proved by previous literature. Studies conducted by Sheldon et al[13] reported significant portion of individuals 88% did not use all of the prescribed opioids, and a high percentage 81% reported excellent or good pain control during their postoperative recovery with NSAIDS. Syeling et al[14] reported that adequate preoperative counseling may contribute to lower postoperative pain and anxiety levels. When patients have realistic expectations about postoperative pain and are prepared for it, they may experience less anxiety.

Another study by Ahmad et al[15] in 2021 reported that opioid-sparing cohort had lower pain scores at different time points after surgery compared to the control group. Specifically, the pain scores were lower at 6 hours (3.45 vs 4.19; P = 0.036), 12 hours (3.21 vs 4.00; P = 0.006), and 24 hours (2.90 vs 3.53; P = 0.010). This suggests that the opioid-sparing pain management protocol

provided better pain control in the first 24 hours post-surgery.

CONCLUSION

Non-opioid medications were found to significantly reduce pain compared to opioids, and there were no observed increases in hemorrhagic complications in the non-opioid group. Non-opioid medications may be a viable alternative for managing postoperative pain in neurosurgery patients, potentially with fewer associated complications.

Limitations: The study may not account for other interventions or medications that patients receive concurrently. This could confound the results and make it difficult to attribute observed effects solely to the non-opioid or opioid analgesia.

Author's Contribution:

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Original Article

Efficacy of Intravenous Nalbuphine for Managing Post-Anesthesia Shivering

Amjid Ali, Jawad Hameed, Abid Haleem Khattak, Muhammad Sheharyar Ashraf, Haseeba Naeem and Ahmad Ali

ABSTRACT

Objective: To investigate the efficacy of intravenous nalbuphine in managing post anesthesia shivering.
Study Design: Cross sectional.
Place and Duration of Study: This study was conducted at the Anesthesia department of Lady Reading Hospital, Peshawar from January 2022 to December 2022.
Methods: A total of 86 patients who were planned for surgery under anesthesia were enrolled. Patients were divided into two groups. Group Nalbuphine: Patients in this group received nalbuphine at a dose of 0.08 mg/kg, administered via the intravenous (IV) route. The nalbuphine was mixed with 5 mL of saline. Group placebo: This is the control group, where patients received only saline (5 mL) via the IV route.
Results: After 5 minutes of treatment, nalbuphine was effective more than placebo, 76.0% and 16.0%, respectively ($p<0.001$). After 15 minutes of treatment, nalbuphine was more effective than placebo, 76.0% and 6.7%, respectively ($p<0.001$). Similarly, after 30 minutes of treatment, nalbuphine was most effective than placebo 80.0% and 20.0%, respectively ($p<0.001$).
Conclusion: The intravenous administration of nalbuphine, a kappa-receptor agonist provides potent antishivering effect on the peripheral nervous system. Nalbuphine can be used in post anesthesia shivering in different surgeries.

Key Words: Anesthesia, Efficacy, Nalbuphine, Placebo, Shivering.

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INTRODUCTION

Post-anesthesia shivering (PAS) refers to the involuntary shaking or shivering that occurs in some patients after they undergo anesthesia[1]. This phenomenon is common and can occur during the recovery period in the post-anesthetic care unit (PACU) or in the operating room[2]. Several factors contribute to post-anesthesia shivering, including temperature regulation disruption, peripheral vasodilation, loss of heat from surgical exposure, drug induced and longer duration of surgery[3].

Research studies have reported varying incidence rates of post-anesthesia shivering. Generally, it is estimated that the overall incidence ranges from 20% to 70%, with some studies suggesting rates as high as 80% in certain patient populations[4].

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The variability in reported incidence can be attributed to differences in study populations, anesthesia techniques, and definitions of shivering. Severe or prolonged shivering can lead to various complications[5]. Some potential complications associated with post-anesthesia shivering include increase oxygen consumption, cardiovascular stress, pain and discomfort, delayed recovery, compromised wound healing, fluid imbalance and patient's anxiety[6].

Management of post-anesthesia shivering typically involves addressing its underlying causes and providing interventions to increase the patient's core temperature[7]. This may include warming blankets, warm intravenous fluids, and adjusting the ambient temperature in the recovery room. Medications such as meperidine, clonidine, and nefopam may also be used to control shivering[8]. Among these medications nalbuphine is a mixed agonist-antagonist opioid that exhibits both agonist and antagonist activity at opioid receptors[9]. It has a high affinity for the kappa-opioid receptors and a lower affinity for the mu-opioid receptors. Theoretically, its kappa-opioid receptor agonism could contribute to certain effects, including potential anti-shivering effects[10].

The findings of this study may inform clinical practice by providing evidence-based recommendations for the incorporation of intravenous nalbuphine into post-operative care protocols.

METHODS

Study was conducted at Anesthesia department of Lady reading hospital, Peshawar from January 2022 to December 2022 after approval from hospital ethical board. Informed written consent was taken from all patients after detailed description of study to all patients. Patients at low risk, ASA status I and II, age 20-45 years, planned surgery under general anesthesia and who developed shivering within 10 minutes after shifting to recovery room were included. Patients with neuromuscular disorder, cardiopulmonary illness, contraindications of nalbuphine and hyperthyroidism were excluded from the study. A scale used to grade postoperative shivering (PS), grading system validated by Crossley and Mahajan. The scale ranges from 0 to 4, with each grade describing different levels of shivering severity based on observed muscular activity. No shivering was graded as "0", no visible shivering but vasoconstriction and piloerection was graded as "1", if only one muscle group involved in muscular activity it was graded as "2". Not generalized shivering but more than one muscle group were involved means "3" grade shivering and whole body shivering graded as "4". The study focused on patients who experienced grade 3 or 4 shivering for at least 5 minutes in the recovery room. This indicates a specific threshold for shivering severity and duration that was used to select participants for further investigation or analysis in the study. Recovery room temperature was Maintained at 21±2°C. This indicates that the recovery room is kept at a temperature between 21 degrees Celsius, with a possible variation of ±2 degrees Celsius and humidity of approximately 35%±65%.

Heat reflective blankets were used for to cover patients, this is likely done to help maintain the patient's body temperature and prevent heat loss after surgery. Patients receive oxygen at a rate of 3 liters per minute via a Hudson face mask. This is a common practice to ensure patients receive adequate oxygenation during the recovery period. Random numbering tables were used for allocation of patients in groups. This is a common method to ensure that the assignment of patients to different treatment groups is unbiased.

Group Nalbuphine: Patients in this group received nalbuphine at a dose of 0.05 mg/kg, administered via the intravenous (IV) route. The nalbuphine was mixed with 5 mL of saline. Group placebo: This is the control group, where patients received only saline (5 mL) via the IV route. This group is often included to compare the effects of the active treatments against a placebo or no-treatment condition.

Response of shivering treatment drugs was assessed at specific time points: 0, 5, 15, and 30 minutes after treatments. Shivering response was categorized as follows: Not change in shivering status labelled as Null, decrease in shivering labelled as improvement and stop of shivering labelled as successful treatment.

Body temperature (tympanic temperature) was assessed upon entry into the study using an ear thermometer (Insta-Temp 9000, WelchAllyn, San Diego, CA). Throughout a 30-minute observation period, vital signs, including respiratory rate, heart rate and blood pressure were regularly monitored at 5-minute intervals. Additionally, arterial oxygen saturation was continuously monitored using pulse oximetry.

A study population comprising 30 patients in each group was determined to yield 90% statistical power at a significance level of 0.05 (two-tailed) for detecting a 25% difference in success rates compared to the saline group in response to nalbuphine treatment for PS (presumably referring to a medical condition).

RESULTS

Sixty patients were included in this study, both genders. Half of the patients treated by nalbuphine and half of the patients treated by placebo. The distribution of age, sex, weight, duration of surgery, tympanic temperature and shivering grade were almost equal, and differences were statistically insignificant, (p>0.050). (Table. I).

After 5 minutes of treatment, nalbuphine was effective more than placebo, 21 (70.0%) and 3 (10.0%), respectively, (p<0.001). After 15 minutes of treatment, nalbuphine was more effective than placebo, 21 (70.0%) and 2 (6.7%), respectively, (p<0.001). Similarly, after 30 minutes of treatment, nalbuphine was most effective than placebo 24 (80.0%) and 6 (20.0%), respectively (p<0.001) (Table. 2)

Nalbuphine had a strong effect to produce anti-shivering than the placebo. After 5 minutes of treatment, arterial blood pressure and heart rate were lower for nalbuphine than the placebo, (p<0.001). After 15 minutes of treatment, arterial blood pressure and heart rate were lower for nalbuphine than the placebo, (p<0.001). After 30 minutes of treatment, arterial blood pressure was lower for nalbuphine than the placebo, (p<0.001). (Table. 3)

Table. No. 1: Demographic and baseline characteristics of the study groups

Characteristic	Nalbuphine 30 (50.0%)	Placebo 30 (50.0%)	p-value
Age (years)	[illegible]	[illegible]	[illegible]
Sex			
Male	[illegible]	[illegible]	[illegible]
Female	[illegible]	[illegible]	
Weight (kg)	[illegible]	[illegible]	[illegible]
Duration of surgery (min)	[illegible]	[illegible]	[illegible]
Tympanic temperature (°C)	[illegible]	[illegible]	[illegible]
Shivering grade			
3	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	

Table No. 2: Post anesthetic shivering response after treatment of the study groups

Response	Nalbuphine 30 (50.0%)	Placebo 30 (50.0%)	p-value
5 minutes			
Nall effect	5 (16.7)	22 (73.3)	<0.001
Improvement	4 (13.3)	5 (16.7)	
Success	21 (70.0)	3 (10.0)	
15 minutes			
Nall effect	3 (10.0)	23 (76.6)	<0.001
Improvement	6 (20.0)	5 (16.7)	
Success	21 (70.0)	2 (6.7)	
30 minutes			
Nall effect	1 (3.3)	12 (40.0)	<0.001
Improvement	5 (16.7)	12 (40.0)	
Success	24 (80.0)	6 (20.0)	

Table. No. 3:Vital signs at different time interval of the study groups

Vital sign-	Nalbuphine 30 (50.0%)	Placebo 30 (50.0%)	p-value
5 minutes			
Arterial blood pressure (mm Hg)	[illegible]	[illegible]	[illegible]
Heart rate (bpm)	[illegible]	[illegible]	[illegible]
Respiratory rate (breath/min)	[illegible]	[illegible]	[illegible]
Oxygen saturation	[illegible]	[illegible]	[illegible]
15 minutes			
Arterial blood pressure (mm Hg)	[illegible]	[illegible]	[illegible]
Heart rate (bpm)	[illegible]	[illegible]	[illegible]
Respiratory rate (breath/min)	[illegible]	[illegible]	[illegible]
Oxygen saturation	[illegible]	[illegible]	[illegible]
30 minutes			
Arterial blood pressure (mm Hg)	[illegible]	[illegible]	[illegible]
Heart rate (bpm)	[illegible]	[illegible]	[illegible]
Respiratory rate (breath/min)	[illegible]	[illegible]	[illegible]
Oxygen saturation	[illegible]	[illegible]	[illegible]

DISCUSSION

Positive pressure ventilation leads to heightened oxygen consumption and elevated carbon dioxide production. Additionally, it results in an augmented intracranial pressure, disrupts electrocardiographic monitoring, and induces a general sense of discomfort, often accompanied by a perception of coldness.

After 30 minutes of treatment, nalbuphine was most effective then placebo 80.0% and 6 20.0%, respectively. (p<0.001) In a study Megalla et al[11] observed a mean response time for shivering control in the nalbuphine group to be 3.36±0.02 minutes, with a success rate of 92% and a relapse rate of 8.7% in patients after spinal anesthesia. Tawfik P et al[12] administered nalbuphine at a dose of 0.3 mg/kg for managing shivering following spinal anesthesia in cesarean sections, achieving a 90% response rate to shivering with a 20% recurrence of shivering observed in patients. In our study we used nalbuphine dose 0.05 mg/kg.

Another study by Nizria et al[13] reported that nalbuphine resulted in a significantly shorter time for the cessation of shivering compared to tramadol ($P < 0.05$). This suggests that nalbuphine may be more effective in stopping shivering in a quicker time frame. A study conducted by Sun et al[14] regarding the use of nalbuphine for the treatment of shivering. According to this study the mean time to cessation of shivering with 0.07 mg kg−1 nalbuphine was 3.5 ± 2.7 with use of 0.06 mg kg−1.

In another study, found that the administration of 10 mg nalbuphine effectively reduced postoperative shivering, demonstrating a comparable and prompt efficacy to meperidine. The suppression of shivering was achieved within an average time of 4.6 ± 4.1 minutes following the injection of nalbuphine. Author demonstrated that nalbuphine exhibited a swift and efficient antishivering effect on postanesthetic shivering, achieving high response rates of 80% and 90% at 5 minutes and 30 minutes after treatment, respectively.

A study was conducted by Tahmilla et al[15] in 2021 and reported both intravenous nalbuphine (at a dose of 0.05 mg/kg) and intravenous tramadol (at a dose of 1 mg/kg) are effective in treating shivering that occurs after spinal anesthesia. Tramadol is reported to have a quicker onset of action in controlling shivering compared to nalbuphine. Our findings are also in agreement with Eskandr et al[16], who observed that intrathecal nalbuphine demonstrated effective and safe prevention of shivering in patients undergoing knee arthroscopy during spinal anesthesia.

CONCLUSION

The intravenous administration of nalbuphine, a kappa-receptor agonist provides potent antishivering effect on the peripheral nervous system. Nalbuphine can be used in post anesthetic shivering in different surgeries.

Author's Contribution:

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Original Article

Achilles Tenotomy in Patients with Congenital Talipes Equinovarus (CTEV) Treated with Ponseti Technique

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ABSTRACT

Objective: To determine the frequency and outcome of percutaneous Achilles tenotomy in the treatment of congenital clubfoot using the Ponseti method.

Study Design: Prospective study.

Place and Duration of Study: This study was conducted at the Orthopedic Department of Nishtar Hospital, Multan from October 2022 to September 2023.

Methods: All patients were assessed at the time of presentation and scoring was done by using Pirani scoring system. Ponseti method was used initially to treat clubfoot and cases of persistent equinus deformity were treated with Percutaneous Achilles tenotomy. SPSS version 23 was used for data analysis.

Results: The total Pirani score, mid-foot contracture score and hind-foot contracture score of the patients was 4.11±1.15, 2.52±0.98 and 1.35±1.08, respectively. Percutaneous tenotomy was noted in61.2% patients. No association was found for percutaneous tenotomy with sex, age, Pirani score and laterality of deformity, (p>0.050).

Conclusion: Achilles tenotomy is a safe and effective component of ponseti method of clubfoot treatment. Frequency of percutaneous Achilles tenotomy can be predicted by evaluating the Pirani scores at presentation. If the Pirani scores are low and the condition is detected early, the rate of percutaneous Achilles tenotomy is generally reduced.

Key Words: Achilles tenotomy, Clubfoot, Congenital, Pirani scoring system, Ponseti method.

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INTRODUCTION

Clubfoot or Congenital Talipes Equinovarus (CTEV) is a condition that affects the development of the foot during fetal growth[1]. It is characterized by an abnormal positioning of the foot, with the heel turned inward and the forefoot pointing downward. CTEV is a combination of environmental and genetic factors[2]. The condition occurs in about 1 in 1,000 live births and is more common in boys than girls. Treatment for CTEV typically involves a series of casting and bracing to gradually reposition the foot into a normal position[3]. In some cases, surgery may be necessary to correct the condition.

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With proper treatment, most children with CTEV are able to walk normally and participate in physical activities without any significant limitations[4].

Achilles Tenotomy is a surgical procedure used to treat Achilles tendonitis. It is primarily used to treat chronic cases of tendonitis that have not responded to conservative treatment such as rest, anti-inflammatory medications, and physical therapy[5]. The Achilles tendon is a thick and strong tendon that connects the calf muscles to the heel bone[6]. When the Achilles tendon is too tight or shortened, it can cause pain, stiffness, and difficulty walking. Achilles tenotomy is often used to treat conditions such as clubfoot a conditions that result in a tight Achilles tendon[7].

The Ponseti Technique involves a series of gentle manipulations and casting to gradually move the foot into a corrected position[8]. The technique was developed by Dr. Ignacio Ponseti in the 1950s and has become the standard of care for clubfoot treatment[9]. The Ponseti Technique has a high success rate, with most babies achieving a fully corrected foot with no need for surgery. It is a safe and effective approach to treating clubfoot, and is now used around the world as the standard of care[10].

METHODS

This study was conducted at Orthopedic Department of Nishtar Hospital, Multan from October 2022 to September 2023 in one year duration. Study was approved by the ethical committee. Confidence interval 95, absolute precision 7%, proportion of previous study 96.36%. Sample size was 250. Non probability, consecutive sampling was used. Patients of age 0-6 months, patients diagnosed on clinical finding and both genders were included. Patients with complex CTEV foot associated with syndromes excluded from study.

Patients presented at outpatient's department of orthopedic unit with clubfoot and age less than six months were enrolled. Signed written consent was taken from parents of children. Study ID number was allotted to ensure confidentiality of data. The researcher of this study assisted to manipulate during application of Ponseti casting while cast was applied by the Assistant professor or above of orthopedic department. Patients were asked for follow up on every week and assessment of patient's mobility was recorded by another observer who is unaware of study participants even he is not allowed to see the procedure performed. At 6th week final outcomes were measured and defined.

Data entry and analysis was done on SPSS (version 27). All variables (numerical or categorical) were analyzed for mean ± SD and frequency percentages. P-value ≤0.05 was considered as significant.

RESULTS

Overall, 250 patients were included in this study, both 167 (66.8%) males and 83 (33.2%) females. The average age of the patients was 8.54±5.41 months. Majority of the patients 108 (43.2%) were between age 0-6 months. There were 61 (24.4%) patients had right laterality, 72 (28.8%) patients had left laterality whereas, 117 (46.8%) patients had bilateral (Figure 1). The total Pirani score, mid-foot contracture score and hind-foot contracture score of the patients was 4.21±1.25, 2.13±0.98 and 2.35±1.08, respectively (Table 1).

Percutaneous tenotomy was noted in133 (61.2%) patients. (Figure 2). No association was found for percutaneous tenotomy with sex, age, Pirani score and laterality of deformity. (p>0.050) (Table 2).

Table No. 1: Demographic and baseline characteristics of the patients

Variable	Observed value
Sex	
Male	167 (66.8)
Female	83 (33.2)
Age (month) Mean ± SD	8.54±5.41
0-6	108 (43.2)
7-12	81 (32.4)
13-18	47 (18.8)
19-24	14 (5.6)
Laterality	
Right	61 (24.4)
Left	72 (28.8)
Bilateral	117 (46.8)
Total Pirani score	4.21±1.25
Mid-foot contracture score	2.13±0.98
Hind-foot contracture score	2.35±1.08

Table No. Association of percutaneous tenotomy with sex, age, Pirani score and laterality of deformity

Variable	Tenotomy 133 (61.2%)	No Tenotomy 97 (38.8%)	p-value
Sex			
Male	102 (66.7)	65 (67.0)	0.955
Female	51 (33.3)	32 (33.0)	
Age (month)			
0-6	67 (43.8)	41 (42.3)	0.548
7-12	45 (29.4)	36 (37.1)	
13-18	32 (20.9)	15 (15.5)	
19-24	9 (5.9)	5 (5.2)	
Initial Total Pirani Score			
≤2.5	7 (4.6)	5 (5.2)	0.981
2.5-4.0	59 (45.0)	43 (44.3)	
4.5-6.0	65 (49.4)	49 (50.5)	
Laterality			
Right	36 (24.8)	22 (22.7)	0.978
Left	44 (28.8)	28 (28.9)	
Bilateral	71 (46.4)	46 (47.4)	

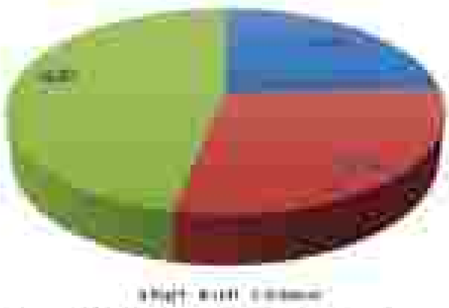

Figure No.1: Laterality Distribution

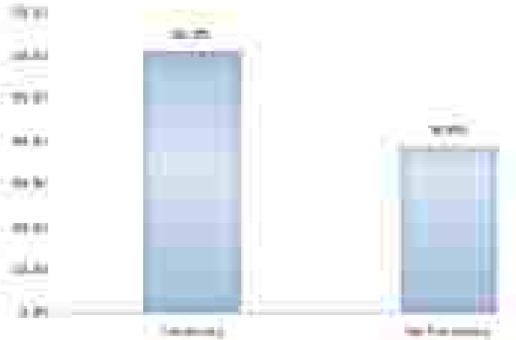

Figure No. 2: Percutaneous Tenotomy distribution of the patients

DISCUSSION

Clubfoot is a congenital deformity that affects one in 1000 live births. The Ponseti method is a non-invasive strategy that has gained popularity in recent years as an alternative to extensive soft-tissue release surgery. This method involves a series of manipulations and casts, an Achilles tenotomy, and foot abduction bracing. Both short and long term data have demonstrated the success of this method, making it a viable option for the treatment of clubfoot.

In this study there were 66.8% males and 33.2% females and average age of the patients was 8.34±5.41 months. Majority of the patients 108 (43.2%) were between age 0-6 months. The study conducted by Hussain et al focused on identifying the prevalence of bilateral and unilateral deformities in patients. The results indicated that out of the 40 patients studied, 12 (30%) had bilateral deformities. Further analysis showed that 5 (12.5%) of these patients were male while 7 (17.5%) were female. On the other hand, the remaining 28 (70%) patients had unilateral deformities, with 16 (40%) being male and 12 (30%) being female. Noam Bor and Julie's study on clubfoot recorded 74 patients with a total of 117 clubfeet, 59 of which were left feet and 58 were right feet. There were 26 girls and 48 boys, with 43 patients having bilateral clubfoot and 31 having unilateral clubfoot (15 right feet, 16 left feet). The mean age for treatment presentation was 47.1 days with a median of 7.5 days and a range of 1-630 days. This study provides valuable information on the prevalence and characteristics of clubfeet, which can aid in the development of effective treatment plans.

The total Pirani score, mid-foot contracture score and hind-foot contracture score of the patients was 4.21±1.23, 2.32±0.98 and 2.35±1.08, respectively. The study conducted by Hussain AS et al focused on the prevalence of clubfoot in a local population. The study included a total of 70 patients, with 38 males and 32 females, aged between 6 months to 3 years. Out of these patients, 23 had bilateral deformity, with 9 being male and 14 being female, while the remaining 47 had unilateral deformity, with 29 being male and 18 being female. The study provides insight into the prevalence of clubfoot in the local population, indicating that it affects both males and females, with a higher prevalence in males. In a study conducted by Elshenawy and Hassanen, 95.3% correction of clubfoot was achieved using the Ponseti method. This highlights the effectiveness of the method in treating clubfoot and reducing the need for extensive corrective surgery. Moreover, the Ponseti method is a safe and efficient treatment that has revolutionized the management of clubfoot.

It has been found to be highly effective, even in children as young as one year old, and can be used as a first-line treatment before resorting to surgery. In a study by Kampa R et al, the Ponseti method successfully corrected the deformity in 95% of feet studied, with a follow-up period of 31 months. This highlights the effectiveness of this method in treating clubfoot. According to a study by Abbas and Qureshi, the Ponseti technique achieved correction in 97% of clubfeet cases, making posteromedial soft tissue release unnecessary for most cases of idiopathic clubfoot. The Pirani scoring system can be used to monitor the treatment progress, with a higher score indicating a need for more casts to correct the deformity.

The Ponseti method is a non-invasive treatment for clubfoot, a condition where the foot is twisted out of shape or position. Gupta et al treated 154 feet in 96 children using this method, which involves gentle manipulation and casting of the foot. After six months of treatment, the Pirani score, which measures the severity of clubfoot, was reduced to zero for all patients.

In this study percutaneous tenotomy was noted in 61.2% patients. No association was found for percutaneous tenotomy with sex, age, Pirani score and laterality of deformity, (p>0.050). Maria G's study found that 83% of the 108 feet treated required tenotomy, while in a different study by Nogueira and Amaral, the success rate of the Ponseti method was reported to be 93%, which included treatment of recurrence by recasting and/or Achilles tenotomy. It is important to note that Achilles tenotomy is only recommended when necessary to achieve full correction, and can be predicted using factors such as the initial Pirani scores.

CONCLUSION

Achilles tenotomy is a safe and effective component of ponseti method of clubfoot treatment. Frequency of

percutaneous Achilles tenotomy can be predicted by evaluating the Pirani scores at presentation. If the Pirani scores are low and the condition is detected early, the rate of percutaneous Achilles tenotomy is generally reduced.

Author's Contribution:

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Revisiting Critically:	Muhammad Kamran Shafi, Ghulam Qadir Khan
Final Approval of version:	Muhammad Kamran Shafi

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Original Article

Comparison of Shear Bond Strength of Different Methods of Orthodontic Bonding

Shear Bond Strength of Different Methods of Orthodontic Bonding

Iqra Gaffar and Zubair Hassan Awaisi

ABSTRACT

Objective: The study objectives to assess the impact of deproteinization with 5.25% sodium hypochlorite (NaOCl) before acid etching on the shear bond strength of orthodontic brackets adhered to fluorosed teeth.

Study Design: Randomized clinical trial study

Place and Duration of Study: This study was conducted at the Orthodontic Department of the Nishtar Institute of dentistry, Multan from June 2020 to Dec 2020.

Methods: The included 40 fluorosed teeth were collected in 6 months. These premolars were extracted for orthodontic purposes from patients seeking fixed orthodontic treatment at the Department of Orthodontics. Upon completion of the required sample, the 40 teeth were divided into two groups consisting of 20 teeth each. In the control group (Group I), brackets were bonded to 20 teeth using composite resin without prior deproteinization, and the bonding process involved etching the teeth with 37% phosphoric acid. In the experimental group (Group II), brackets and fluorosed teeth were bonded after 5.25% NaOCl deproteinization using composite resin.

Results: The mean megapascals (MPa) in Group I and Group II was 9.59±1.06 and 13.34±2.58, respectively. MPa was higher in Group II than the Group I, and this difference was statistically significant, ($p<0.001$). (Table. I) The modified ARI score 3 was most common in Group II and Group I, 9 (60.0%) and 6 (40.0%), respectively ($p=0.749$).

Conclusion: Prior to acid etching, the use of 5.25% NaOCl for deproteinization significantly enhances the shear bond strength of brackets adhered to fluorosed teeth, offering a convenient and effective option in orthodontic bonding procedures for such cases.

Key Words: Shear Bond Strength, Orthodontic Bonding, NaOCl, deproteinization, Brackets

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INTRODUCTION

The shear bond strength (SBS) of orthodontic bonding refers to the resistance of the adhesive bond between the orthodontic bracket and the tooth surface to shear forces[1]. Various methods and materials are used in orthodontic bonding, and researchers often conduct studies to compare their shear bond strength[2]. Light-cured adhesives are commonly used in orthodontics. They are applied to the tooth surface, and the orthodontic bracket is then positioned and cured with a light source. Similarly, chemically cured adhesives are cured through a chemical reaction without the need for a light source[3,4].

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The importance of bond strength in fix appliance at active orthodontic treatment was emphasizing the need for successful bonding to ensure good treatment progress[5]. The typical duration of active orthodontic treatment with fixed appliances is mentioned as 2.5-3 years. Efforts are continuously made to improve bond strength, particularly in challenging situations such as bonding to different materials like gold, porcelain, and amalgam[6]. In orthodontic treatments, brackets are often bonded to the tooth surface using an adhesive that requires proper etching of the enamel to ensure a strong bond[7]. However, in the case of fluorosed teeth, the hypermineralized and acid-resistant nature of the enamel makes it challenging to achieve effective etching. Acid etching is an important step as it creates a microscopically rough surface on the enamel, providing better adhesion for the bonding material[8].

Micromechanical retention is important in orthodontics for ensuring the stability and effectiveness of orthodontic appliances like braces. Several methods like adhesion promoters, enamel conditioning with phosphoric acid, air abrasion and microetching are in practice in these days[9]. These methods have been traditionally used, it's worth noting that advancements in orthodontic technology and materials continue to evolve. Researchers and practitioners are exploring alternative techniques that may be less invasive or more

efficient. Some of these alternatives may include the use of laser technology for enamel conditioning or the development of new adhesive materials with improved properties[12].

METHODS

Study conducted in the Orthodontic Department of the Nishtar Institute of dentistry, Multan from June 2020 to Dec 2020. Study was started after ethical approval from board of ethics and informed consent was obtained from patients. Simple convenient sampling technique was used. The included 60 fractured teeth were collected in 6 months. These premolars were extracted for orthodontic purposes from patients seeking fixed orthodontic treatment at the Department of Orthodontics. The study excluded individuals outside the age range of 14 to 25 years, as well as teeth exhibiting visible defects, caries, apparent damage cracks, abrasion resulting from forceps extraction, surface defects, malformed teeth, restored teeth, teeth with root canal, dentinogenesis imperfect and those previously subjected to chemical treatment.

The teeth were removed, possibly for various reasons such as decay, damage, or other dental issues. The teeth after extraction were washed thoroughly in tap water. This step aims to remove any blood, debris, and tissues that might be still attached to the teeth. Following the cleaning process, the surface of the teeth was dried. This is likely done to prepare the teeth for further examination or analysis. Classification of fluorosed teeth were made according to the Thylstrup and Fejerskov index (TFI) as category 4[13]. The Thylstrup and Fejerskov index is a system used to assess the severity of dental fluorosis, which is a cosmetic issue is caused by excessive fluoride intake during tooth development. Category 4 of the TFI likely represents a specific level of severity in fluorosis and the classification provides a standardised way to describe the condition.

Storage of specimens was made at room temperature in a 0.1% thymol and distilled water solution for disinfection and inhibiting growth of bacteria. Thymol is a natural compound with antiseptic properties, and it is commonly used for its antimicrobial effects. Upon completion of the required sample, the 60 teeth were divided into two groups consisting of 30 teeth each. Subsequently, the teeth underwent a cleaning and polishing procedure for 10 seconds using a rubber prophylactic cup and a non-fluoride pumice, followed by thorough washing with water and drying. Following the cleaning process, all teeth were bonded. Treated teeth were embedded in acrylic resin block after bonding with the aid of a jig, ensuring that the buccal surface of each tooth was aligned parallel to the cylinder base. In the control group (Group I), brackets were bonded to 30 teeth using composite resin without prior demineralization, and the bonding process involved etching the teeth with 37% phosphoric acid. In the experimental group (Group II), brackets and fluorosed teeth were bonded after 5.25% NaOCl demineralization using composite resin. After the bracket bonding process, the teeth underwent distilled water storage at room temperature until they were subjected to a shear test for debonding. The shear test was conducted using a universal test machine equipped with a 500 N load cell.

After debonding, the study assessed whether any adhesive material remained on the surface of the teeth. The evaluation of adhesive remnants was done using the Adhesive Remnant Index (ARI). The ARI is a scoring system, and the modified version from[] was likely used. This index helps quantify and categorize the amount of adhesive left on the tooth surface after bracket removal. SPSS version 23 was used for data analysis. After basic analysis of numerical and categorical values student t test used in table I variables and chi-square was used in table 2.

RESULTS

Overall, 60 teeth were included in this study and divided into two equal groups: Group I and Group II, 30 (50.0%) in each. The mean bond strength value megapascals (MPa) in Group I and Group II was 9.59±1.06 and 13.34±2.18, respectively. MPa was higher in Group II than the Group I (Table 1).The modified ARI score 3 was most common in Group II and Group I, 9 (60.0%) and 6 (40.0%), respectively (p=0.744) (Table 2).

Table No. 1: Megapascals distribution among the study groups

Variable	Group I	Group II	p-value
Mean bond strength value (MPa)	9.59±1.06	13.34±2.18	<0.001

Table No. 1: Distribution of modified ARI scores among the study groups

Modified ARI scores	Group I	Group II	p-value
1	3 (20.0%)	1 (6.7%)	0.744
2	3 (20.0%)	3 (20.0%)	
3	6 (40.0%)	9 (60.0%)	
4	1 (6.7%)	1 (6.7%)	
5	2 (13.3%)	1 (6.7%)	

DISCUSSION

Bond strength is a critical factor in orthodontic treatment success and efficiency. The ability of orthodontic brackets to effectively adhere to teeth influences the overall outcome of the treatment[]. Orthodontists in this area are reportedly dealing with

frequent bracket failures. This can lead to prolonged treatment durations and inconvenience for both the orthodontic practitioner and the patient. In this study mean MPa in Group I and Group II was 9.39±1.06 and 13.34±2.53, respectively. MPa was higher in Group II than the Group I, and this difference was statistically significant, (p<0.001). A study was conducted by Sharma et al on this topic and reported that shear bond strength of Group II (11.75 ± 2.83 MPa) was measured, and it was found to be higher than that of Group I (7.44 ± 2.43 MPa). SEM was used to examine the etching pattern. The statement "the etching pattern was more of type 1 and 2 in Group II" suggests that the microscopic surface features or patterns resulting from the etching process were different between the two groups.

In a study Espinosa et al demonstrated that pre-treatment with NaOCl (deproteinization) prior to etching effectively removes organic substances from the surface of enamel. This process theoretically enhances orthodontic bond strength by increasing the total etched area and promoting predominantly Type 1 and Type 2 etching patterns. In a study conducted by Nazari et al reported that reducing the etching time to 10 and 5 seconds on intact enamel yielded some beneficial effects. This is noteworthy, especially considering the previous lack of a definitive factor that determines the bonding ability of self-etch (SE) and total-etch adhesives on enamel, whether it's ground or unground. Similar findings were reported by Pivetta et al that reduction in etching time suggests that the altered treatment duration has a positive impact on the bonding capabilities of the adhesives. Some contrast studies are also in practice as in this study MPa was 13.34±2.53 was not considered suitable. In a study conducted by Scougall Vilchis et al reported that exceeding the fracture strength of enamel (approximately 14 MPa) in bracket shear bond strengths is considered undesirable, as it may compromise the structural integrity of the enamel. Similar findings were also reported that Lamper et al and Bakhtinian et al that Orthodontic practitioners often aim for a balance in bond strength. Sufficient bond strength is necessary to ensure that the brackets remain attached during the course of treatment, but it should not be excessively high to the extent that it causes enamel damage during bracket removal.

In contrast to the findings of the present study, another investigation by Shafiei et al assessing various resin removal techniques for bracket bond strength observed notably lower MPa is more beneficial as compared to higher MPa methods.

CONCLUSION

Prior to acid etching, the use of 5.25% NaOCl for deproteinization significantly enhances the shear bond strength of brackets adhered to fluorosed teeth, offering a convenient and effective option in orthodontic bonding procedures for such cases.

Author's Contribution:

Concept & Design of Study:	Iqra Gaffar
Drafting:	Zubair Hassan Awaisi
Data Analysis:	Zubair Hassan Awaisi
Revisiting Critically:	Iqra Gaffar,
Final Approval of version:	Iqra Gaffar

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Original Article

Comparing Diagnostic Accuracy of Minimum Rim Width (MRW) and Retinal Nerve Fibre Layer (RNFL) in Detection of Glaucoma

MRW and RNFL in Detection of Glaucoma

Muhammad Saad Ullah, Kamran Haider Shaheen and Mahmood Riaz

ABSTRACT

Objective: To evaluate and compare the diagnostic accuracy of minimum rim width and Retinal Nerve Fiber Layer in detection of glaucoma by taking cup-to-disc ratio as gold standard.

Study Design: Descriptive observational study

Place and Duration of Study: This study was conducted at the Ophthalmology department of Ghazi Hospital Dera Ghazi Khan from March 2022 to August 2022.

Methods: The study enrolled healthy individuals and those identified as glaucoma suspects based on criteria such as cup-to-disc ratio or elevated intraocular pressure exceeding 21 mmHg, who were attending the eye clinic. Main variables of study were co-morbidities (diabetes and hypertension), cup to disc ratio, diagnostic accuracy, sensitivity and specificity.

Results: A total of 100 patients were enrolled. There were 98.3% patients diagnosed with glaucoma by using cup to disk ratio, 95.3% were diagnosed with glaucoma by using RNFL and 87.7% patients diagnosed with glaucoma by using MRW. Sensitivity was 87.9%, 90.3%, specificity 81.8%, 81.8%, PPV 92.2%, 92.2%, NPV 20.5%, 24.3% and accuracy 87.7%, 90% of RNFL and MRW with cup to disk ratio using as a gold standard.

Conclusion: The diagnostic sensitivity for glaucoma is higher with retinal nerve fiber layer (RNFL) measurements compared to minimum rim width (MRW), but the specificity is equal for both. In myopic eyes, Bruch's membrane opening minimum rim width is comparable to RNFL thickness, making it a valuable diagnostic tool for identifying glaucoma in patients with myopic optic discs.

Key Words: Glaucoma, Minimum Rim Width, Retinal Nerve Fibre Layer, Diagnostic accuracy, Cup to disc ratio

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INTRODUCTION

Glaucoma is a medical illness of eye that affects the optic nerve. Glaucoma can lead to a gradual and irreversible loss of vision if not detected and treated early.[1] The incidence of glaucoma in Pakistan, as well as globally, varies, with estimates suggesting that it affects approximately 4.5 million people in Pakistan and over 80 million people worldwide.[2] The advent of automated computerized software has markedly enhanced the early diagnosis of glaucoma by facilitating precise detection of nerve supply to the retina fiber layer and pathologic damage to optic nerve head.[3]

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Glaucoma, primarily targets the intricate retinal ganglion cells (RGCs), which are large neurons characterized by dendrites forming synapses in the inner plexiform layer (IPL) with amacrine and bipolar cells within the retina.[4] The ganglion cell layer (GCL) consists of the cell bodies of RGCs, while their axons collectively make up the retinal nerve fiber layer (RNFL), converging at the optic nerve head (ONH) to create the neuroretinal rim.[5] Optical Coherence Tomography, initially introduced in 1991, initially exhibited lower reproducibility in its early iterations. Subsequent refinements addressed this issue, and for the evaluation of the optic nerve head, additional parameters such as neuro-retinal rim and (BMO-MRW) were introduced to enhance accuracy.[6] The distance between ILM and opening of MRW offers a geometrically stable and more accurate assessment of the neuroretinal rim, contrasting with the less precise evaluation provided by ophthalmoscopy.[7]

This approach considers anatomical and geometrical aspects, incorporating the ONH-BMO-MRW topographic parameter.[8] BMO-MRW offers an advantage in accurately representing neuro-retinal rim tissue orientation, with regionalized data relative to the axis between BMO and the fovea, enabling precise analysis.[9] The study aims to identify which parameter

(MRW or RNFL) provides more reliable and accurate information in the context of glaucoma diagnosis. This information can contribute to refining diagnostic protocols and ultimately enhance patient care.[10]

METHODS

This descriptive cross-sectional study, approved by the institutional review board, was carried out at Ophthalmology department of Ghari Hospital, Dera Ghazi Khan from March 2022 to August 2022. The study aimed to determine the prevalence of glaucoma, which was found to be 60.6%. The sample size of 344 was calculated based on a sensitivity of 81.7% for the measurement of macular retinal thickness (MRW) at a fixed specificity of 99.7%, with a confidence interval of 95% and a desired precision of 5%. The study enrolled healthy individuals and those identified as glaucoma suspects based on criteria such as cup-to-disc ratio or elevated intraocular pressure exceeding 21 mmHg, who were attending the eye clinic at Ghazi Hospital in DG Khan. Inclusion criteria comprised participants of both genders, aged between 25 to 60 years. Exclusion criteria encompassed individuals with a history of ocular trauma, prior ocular surgeries like trabeculectomy or vitrectomy affecting the retina, evident ocular pathologies such as diabetes-related retinopathy and macular degeneration of older age, as well as neurological disorders like multiple sclerosis that could impact the structure of retina and normality of visual function pathways.

In this study, data was systematically collected using a pre-designed proforma, following the acquisition of informed consent. A comprehensive examination protocol was implemented, encompassing a detailed patient history, refraction with best-corrected visual acuity assessment, dilated fundoscopy, slit-lamp examination, and tonometry. The diagnostic procedures involved the expertise of an experienced technician who conducted imaging, including spectral domain OCT utilizing Spectral GANPE software version 6.0, and an OCT machine from Heidelberg Engineering with version 2.0. Both eyes of each participant met the eligibility criteria for inclusion in the study. In this study, confounders were controlled through strict adherence to inclusion and exclusion criteria. Diabetes and hypertension were identified as effect modifiers. Glaucoma status (positive or negative) based on MRW, RNFL, and optic disc cupping served as the outcome variable. SPSS Version 25 was utilized for data compilation and analysis. Diagnostic accuracy for MRW and RNFL, using cup-to-disk ratio as the gold standard, was determined. Post-stratification analysis assessed specificity, sensitivity, PPV, NPV, and diagnostic accuracy of MRW and RNFL, with stratification by age and gender to examine the impact of these modifiers on accuracy.

RESULTS

Overall, 500 patients were included in this study, with mean age 58.44±8.84 years. There were 218 (72.7%) males and 82 (27.3%) females. There were 61 (20.3%) patients diabetic and 161 (53.7%) patients were hypertensive. The mean cup to disk ratio was 0.57±0.17 (Table I).

There were 338 (94.3%) patients diagnose with glaucoma by using cup to disk ratio, 254 (84.3%) diagnose with glaucoma by using RNFL and 262 (87.7%) patients diagnose with glaucoma by using MRW. The sensitivity, specificity, PPV, NPV and accuracy of RNFL and MRW with cup to disk ratio using as a gold standard were shown in table II, with significant effect. (p<0.001) (Table 2).

Table No. 1: Demographic and baseline variables of the study patients

Variable	N (%)
Sex	
Male	218 (72.7)
Female	82 (27.3)
Diabetes status	61 (20.3)
Hypertension	161 (53.7)
Cup to disk ratio Mean±SD	0.57±0.17

Table No. 2: Accuracy measures of diagnosis of glaucoma cup to disk ratio with RNFL and MRW

		Cup to disk ratio		Total	p-value
		Positive	Negative		
RNFL	Positive	254 (99.2)	2 (0.8)	256 (85.3)	<0.001
	Negative	35 (79.4)	9 (20.6)	44 (14.7)	
Sensitivity	Specificity	PPV	NPV	Accuracy	
87.9%	81.8%	99.2%	20.3%	87.7%	
MRW	Positive	261 (99.2)	2 (0.8)	263 (87.7)	<0.001
	Negative	28 (75.7)	9 (24.3)	37 (12.3)	
Sensitivity	Specificity	PPV	NPV	Accuracy	
90.3%	81.8%	99.2%	24.3%	90.0%	

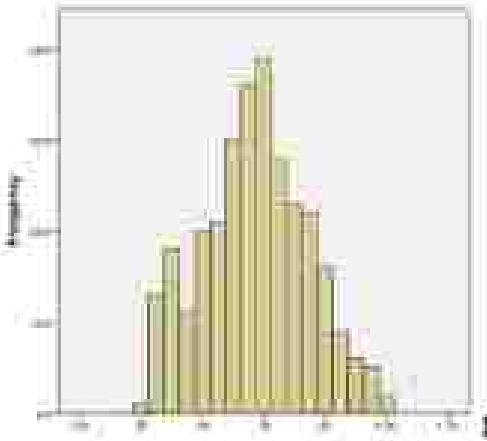

Figure No. 1: Distribution of cup to disk ratio

DISCUSSION

Early diagnosis is important for controlling the progression of glaucoma, which is second leading cause of irreversible blindness globally. Various technologies have been developed to aid in early screening and prevent damage to optic nerve fibers[17]. Quigley and Green in 1979, showed that optic disc cupping resulted from ganglion cell axon loss. Monitoring optic disc longitudinal diameter over time can reveal progressive damage before noticeable visual field loss occurs[18].

In this study sensitivity was 87.9%, 90.3%, specificity 91.3%, 91.3%, PPV 92.2%, 92.2%, NPV 20.5%, 24.9% and accuracy 87.7%, 90% of RNFL and NRW with cup to disk ratio using as a gold standard. In a study Chauhan et al[19] found that while both BMO-MRW and RNFL thickness exhibited lower sensitivity overall, these parameters demonstrated increased specificity and sensitivity at 81% and 85%, respectively, particularly in cases of myopia exceeding 6 diopters. Moreover, the researchers concluded that structural abnormalities in myopic eyes did not significantly impact the overall diagnostic performance of imaging devices.

Similarly, Khan et al[20] reported that the sensitivity of retinal nerve fiber layer (RNFL) in diagnosing glaucoma was found to be smaller 96% than that of minimum rim width (MRW) 96.7%, whereas the specificity of both RNFL and MRW demonstrated a similar 77.8% performance. In a study conducted by Gandal et al[21] reported that the mean retinal nerve fiber layer (RNFL) thickness demonstrated a sensitivity of 92% and specificity of 96%. When assessing the outcome of RNFL thickness, it is crucial to consider the age of the patient, as there is a progressive deterioration observed in the values of RNFL thickness with advancing age.Kim et al[22] demonstrated that OCT detected retinal nerve fiber layer (RNFL) defects in early glaucoma cases, while in a similar study Leung et al[23] found that OCT identified RNFL defects in glaucoma progressed. Difference in time period of glaucoma development and its chronicity also matters.

Parikh et al[24] conducted a study in which they demonstrated that Stratus OCT (Optical Coherence Tomography) exhibited a sensitivity of 73% and specificity of 89.8% in diagnosing early glaucoma. The positive predictive value (PPV) was reported as 79%, indicating the probability of a positive test accurately identifying early glaucoma, while the negative predictive value (NPV) was notably high at 93%, indicating the reliability of a negative test result in ruling out early glaucoma. These findings underscore the diagnostic accuracy and utility of Stratus OCT, particularly in its ability to reliably exclude the presence of early glaucomatous conditions. Another author conducted a study on clinically detectable retinal nerve fiber layer (RNFL) defects, employing red-free photography, clinical examination, and automated visual fields on a cohort of 19 glaucoma patients and 14 controls, utilizing optical coherence tomography (OCT). The study yielded a sensitivity of 63% and specificity of 81% in establishing reliable results for detecting RNFL defects.

In the study conducted by Ondeset al[25] a disparity was identified in the measured Retinal Nerve Fiber Layer (RNFL) thickness between the group of patients diagnosed with glaucoma and the cohort comprising individuals with normal ocular health. This discrepancy in RNFL thickness serves as a key indicator of structural variations in the retinal nerve fibers, potentially contributing valuable insights into the pathophysiology of glaucoma and highlighting the importance of such quantitative assessments in distinguishing between glaucomatous and normal eyes.

CONCLUSION

The diagnostic sensitivity for glaucoma is higher with retinal nerve fiber layer (RNFL) measurements compared to minimum rim width (MRW), but the specificity is equal for both in myopic eyes. Bruch's membrane opening minimum rim width is comparable to RNFL thickness, making it a valuable diagnostic tool for identifying glaucoma in patients with myopic optic discs.

Limitations: Glaucoma prevalence and characteristics can vary among different ethnic groups and geographic locations. This study conducted in South Punjab region of Punjab, Pakistan so the study's findings might not be universally applicable if these factors are not taken into account.

Practical Implications: Clinicians can use the study results to educate patients about the diagnostic methods available for glaucoma detection, helping them understand the importance of regular eye examinations and the significance of specific measurements.

Author's Contribution:

Concept & Design of Study:	Muhammad Saad Ullah
Drafting:	Kamran Haider Shaheen, Mehmood Riaz
Data Analysis:	Mehmood Riaz
Revisiting Critically:	Muhammad Saad Ullah, Kamran Haider Shaheen
Final Approval of version:	Muhammad Saad Ullah

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Original Article

Echocardiographic Evaluation Reveals the Prevalence and Patterns of Congenital Heart Disease in Pediatric Populations: Insights from a Peripheral Cardiac Center in Azad Jammu and Kashmir

Saeed Ahmed[1] and Amad[2]

ABSTRACT

Objective: The objective of this study to assess the pattern of congenital heart disease in patients who were referred for echocardiogram by pediatrician

Study Design: Prospective Observational study

Place and Duration of Study: This study was conducted at the Kashmir Institute of Cardiology Mirpur and Department Biochemistry of Mohtarma Benazir Bhutto Shaheed Medical College, Mirpur, AJK from March 2021 to October 2022.

Methods: The study's primary objectives were to investigate the potential presence of congenital heart disease in patients referred by pediatricians, gather socio-demographic information, document echocardiographic findings, and evaluate the final outcomes of these patients, with the assistance of statistical analysis conducted through SPSS version 21.

Results: The study identified a total of 341 CHD cases out of 3,800 cases seen in our hospital, making CHD approximately 8.97% of the total cases. A breakdown of CHD subtypes revealed that ASD secundum was the most common, followed by sinus venosus ASD2, ASD primum, and sinus venosus ASD.

Conclusion: The pattern of congenital heart disease (CHD) observed in our dataset diverges from that reported in the CDC's data. It's important to note that our data was exclusively collected by adult cardiologists who have received specialized training in pediatric echocardiography.

Key Words: congenital heart disease, echocardiogram pattern

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INTRODUCTION

There are estimated 2 million adults in USA living with congenital heart disease. Congenital heart disease affects nearly 1% of about 40,000—births per year in the United States. The prevalence or mild type congenital heart diseases is increasing, while the prevalence of other types has remained stable.[1-3] Cardiovascular Disorders: A Major Cause of Mortality in Developed Regions and the Prevalent Form of Congenital Defects in Humans

Challenges in Advancing Human Heart Organoid Models for Cardiovascular Disease Research Compared to Other Organs (e.g., Kidney, Colon, Intestine, Brain)[4-6]

Unlocking the Potential of Human Pluripotent Stem Cells (hPSCs) for Cardiac Cell Differentiation: Addressing the Discrepancy in Structural and Cellular Complexity Compared to Native Tissues. Overcoming Isolated Cell Type Focus and Neglected Interactions for Enhanced In Vitro Models of the Human Heart in Research and Translational Medicine.[7-12]

Heart disease were found to be of serious and life threatening nature. In our study we have tried to find out the pattern of congenital heart disease in children and adults who were referred for echocardiogram by pediatrician and in adults who presented to us in our outdoor clinic at Kashmir Institute of Cardiology. Total of 3800 echos performed.

The majority of these defects exhibit a multifactorial inheritance pattern, arising from the interplay of genetic and environmental factors, with a smaller proportion associated with chromosomal aberrations.[13] Notably, the pattern of risk factors for congenital heart disease (CHD) varies across different regions of the world. In

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developing countries, consanguinity is relatively common, and a significant portion of mothers are homemakers, non-smokers, and non-drinkers.[10] It is regrettable that only a limited number of studies have explored parental risk factors within these populations.

METHODS

The research project centered on a group of patients who were specifically referred by pediatricians to undergo echocardiograms due to suspicions of congenital heart disease. This referral was based on a thorough assessment of the patients' medical history and clinical evaluations. The study collected and analyzed various types of data, including socio-demographic information, echocardiographic findings, and the eventual outcomes of these patients. The analysis of this data was conducted using statistical software, specifically SPSS version 21.

In summary, the study's primary objectives were to investigate the potential presence of congenital heart disease in patients referred by pediatricians, gather socio-demographic information, document echocardiographic findings, and evaluate the final outcomes of these patients, with the assistance of statistical analysis conducted through SPSS version 21.

RESULTS

Out of a total of 3,800 cases that were examined in our hospital, 341 cases were diagnosed with congenital heart disease (CHD). This means that CHD constituted approximately 8.97% of all cases seen in our hospital.

Specifically, among the CHD cases, there were four distinct subtypes of atrial septal defects (ASD) that were identified. These subtypes and their respective frequencies were as follows.

Table No. 1: Percentage of CHD seen in our hospital

	Frequency	Frequency of congenital heart diseases	Percentage of CHD seen in our hospital
Total Cases	3800	341	8.97%

Table No. 2: Prevalence of congenital heart diseases

ASD Types	Frequency	Total percentage of CHD
ASD secundum	311	32.53%
ASD Primum	4	1.17%
Sinus venosus ASD	8	2.34%
Total	123	36%

Table No. 3: CDC data for Coronary heart disease

Disease	Percentage by CDC	Percentage of CHD in our Data
ASD	10%	36%
VSD	25%	19%
PDA	9.5	10.2%
COA	5%	0.29%
EAV	2.4%	3%
TGA	3.4%	1.46%
TOF	5%	4.10%

Atrial septal defect (ASD) secundum: This subtype was observed in 120 patients, representing approximately 32.5% of the total CHD cases. ASD primum: Four patients were diagnosed with ASD primum, accounting for about 1.17% of the total CHD cases. Sinus venosus ASD: Five patients were found to have sinus venosus ASD, making up around 1.46% of the total CHD cases. Sinus venosus ASD2: Another subtype of sinus venosus ASD was detected in 2.34% of the total CHD cases. In summary, the study identified a total of 341 CHD cases out of 3,800 cases seen in our hospital, making CHD approximately 8.97% of the total cases. A breakdown of CHD subtypes revealed that ASD secundum was the most common, followed by sinus venosus ASD2, ASD primum, and sinus venosus ASD.

DISCUSSION

Congenital heart disease (CHD) stands as a relatively prevalent congenital anomaly, with reported prevalence rates ranging from 3.5 to 17.5 per 1000 live births. Notably, it has become an increasingly significant contributor to pediatric mortality, particularly in developing nations.[11]

The clinical manifestation of CHD is remarkably versatile and varies depending on the age of presentation. Asymptomatic cases are commonplace and are often incidentally discovered during routine checkup visits. In contrast, other presentations span a spectrum from poor suckling, cyanosis, and shortness of breath to more severe presentations such as overt heart failure.

A comprehensive examination of the epidemiology of congenital heart defects (CHDs) serves as a crucial foundation for the improved understanding of the factors contributing to cardiac dysmorphogenesis. This understanding, in turn, enables the development of effective prenatal prevention strategies.

Regrettably, the epidemiology of CHDs has not been extensively explored in the context of Egyptian children. Consequently, this study was undertaken with the objective of assessing the portfolio of risk factors, the relative frequencies of various CHD types, demographic characteristics, age distribution, and modes of clinical presentation among Egyptian children with CHDs. The intention behind this investigation is to facilitate the implementation of appropriate alterations in preventive healthcare policies and ensure the delivery of optimal care for these patients.[12]

The clinical presentation of congenital heart disease (CHD) is multifaceted and varies with the patient's age, necessitating a heightened level of suspicion to enable early diagnosis and timely intervention.

Prevalence of different CHD types. For instance, we observed a higher incidence of atrial septal defects (ASD) at 36% in our data, as opposed to the 18% reported in the CDC dataset. In contrast, ventricular septal defects (VSD) were lower at 19% in our data compared to the 28.8% reported by the CDC. The percentage of patent ductus arteriosus (PDA) in our dataset closely resembled the CDC data, while coarctation of the aorta was much lower at 0.29% in our hospital, whereas it was 3.7% in the CDC dataset.

Moreover, bicuspid aortic valve was more prevalent in our data at 7.3% compared to the 2.4% reported by the CDC. Transposition of the great arteries (TGA) had a lower occurrence in our data at 1.46% as opposed to 3.4% in the CDC dataset. On the other hand, tetralogy of Fallot (TOF) had a similar prevalence in both our cases and the CDC data.

CONCLUSION

The pattern of congenital heart disease (CHD) observed in our dataset diverges from that reported in the CDC's data. It's important to note that our data was exclusively collected by adult cardiologists who have received specialized training in pediatric echocardiography. To ascribe this variance in CHD patterns to our institution, further investigations are warranted. Possible factors contributing to this divergence could include racial disparities and environmental influences.[9]

Author's Contribution:

Concept & Design of Study:	Saeed Ahmed
Drafting:	Asmad
Data Analysis:	Asmad
Revisiting Critically:	Saeed Ahmed, Asmad
Final Approval of version:	Saeed Ahmed

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Original Article

Relationship Between Pelvic Organ Prolapse and Urinary Symptoms in Women

Pelvic Organ Prolapse and Urinary Symptoms in Women

Azra Aleem[1], Kamran Aziz[1], Muhammad Khalid[1], Sadia Nazir[2] and Muhammad Hammad Hassan

ABSTRACT

Objective: To investigate the relationship between pelvic organ prolapse (POP) and urine symptoms in women.

Study Design: Descriptive cross-sectional study

Place and Duration of Study: This study was conducted at the Dera Ghazi Khan Medical College and Hospital from August 2022 to April 2023.

Methods: 140 women over the age of 18 who visited the urology outdoor clinic at Dera Ghazi Khan Medical College and Hospital with urogynecology concerns participated in the study. A standardized questionnaire was used to gather demographic and medical data. The presence and severity of urine symptoms were evaluated using a structured questionnaire created with the help of the International Consultation on Incontinence Questionnaire-Urinary Incontinence Short Form (ICIQ-UI SF) and the Overactive Bladder Symptom Score (OABSS). The POP-Q system was used to gauge the severity of POP.

Results: The women were 52.61±12.7 years old on average. The majority of the women were Saraiki ethnic, married, from low socioeconomic backgrounds, lacked a basic education, and came from rural areas. The majority of the women claimed that their POP was mild. About 39.1% of POP-affected women claimed to have lost a few drops during a urine incontinence episode. About 77.5% of the female participants reported feeling embarrassed or self-conscious about their urinary symptoms.

Conclusion: POP was a significant problem for women in Dera Ghazi Khan, Pakistan, according to the study's findings. The findings of this study suggest that urinary symptoms, feelings of embarrassment or self-consciousness, and a willingness to seek medical assistance are all related to the severity of POP. While ethnicity and POP severity did not significantly correlate, education level was revealed to be a significant predictor of POP severity.

Key Words: pelvic organ prolapse, urine symptoms, embarrassment, self-consciousness, Dera Ghazi Khan, Pakistan

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INTRODUCTION

Stress urinary incontinence (SUI), the involuntary leakage of urine in response to physical exertion, and pelvic organ prolapse (POP), the descent of the pelvic organs from their normal locations in the pelvis, are common medical conditions that affect 30–40% of women in their lifetime[1]. While POP is brought on by varying degrees of weakening in the endopelvic fascia and the levator ani muscle complex, SUI is caused by a loss of support from the pelvic floor and the vaginal connective tissue surrounding the bladder neck and urethra[2].

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Because the pathophysiology of concurrent SUI and POP is similar, women with POP frequently have it[3]. Pelvic organ prolapse (POP) is a typical clinical condition that can significantly affect a patient's quality of life as a result of symptoms such pelvic pressure, vaginal bulge, urine and bowel difficulties, or sexual dysfunction[4]. Little is known about POP from Low and Middle Income Countries (LMIC), including its frequency and risk factors[5]. A review conducted in 2011 of research on pelvic floor diseases in LMICs found 13 papers with data on POP, with prevalence estimates ranging from 3.4 to 56.4% and a mean of 19.7%[6]. Women frequently experience urine incontinence, and between 15 and 55% of them are thought to experience symptoms in the lower urinary tract. The most prevalent types of urinary incontinence associated with stress are urge urinary incontinence and mixed urinary incontinence[7]. It is a significant public health concern due to the physical, psychological, and social effects it has on women's quality of life[8]. The purpose of this investigation is to comprehend the connection between POP and urinary symptoms in a tertiary care setting, in order to offer clinicians useful

information to help them recognize and treat urinary problems in POP patients more successfully.

METHODS

In urology outdoor at Data Ghasi Khan Medical College and Hospital, we did a cross-sectional study with women who were 18 years of age and older and had urogynecology issues. Recruitment occurred between August 2022 to April 2023. Women who had hysterectomy for any reason and those with existing mental health disorder were excluded. Participants were recruited after taking informed consent, through a convenience sampling method. The estimated sample size required for this study, considering a 95% confidence level, margin of error of 5% and an estimated proportion of 10.1%, is approximately 140 participants[7]. Demographic and clinical data was collected using a structured questionnaire including age, parity, menopausal status, and medical history. A standardized questionnaire was used to evaluate the presence and severity of urinary symptoms, designed with the help of the International Consultation on Incontinence Questionnaire-Urinary Incontinence Short Form (ICIQ-UI SF) (10) and the Overactive Bladder Symptom Score (OABSS)[11] and Pelvic Organ Prolapse Quantification (POP-Q) system for assessment of the presence and severity of POP[12].

RESULTS

The mean age of the women in the study was 52.61 years (SD = 12.730). The majority of the women were married 88.94%,(133), had a low socioeconomic status *4.3%(122), did not have a basic education 61.67%(92), were of Baloch ethnicity 66.2%(100) and had an rural background 90.1%(136). The majority of the women reported that their POP was mild 43% (65). Approximately 24.5 % (37) of the women had any surgical procedure for POP. 39.1 % (59) of the women with POP reported to loose a few drops in an episode of urinary incontinence. Approximately 77.5 %(117) of the women felt embarrassed or self-conscious about their urinary symptoms. POP severity and feelings of embarrassment or self-consciousness about urine symptoms were significantly correlated, $\chi^2(2) = 13.43$, $p < .001$. Approximately 89.4 % (135) of the women had sought treatment for their urinary symptoms. The most common type of treatment that the women received was medication along with pelvic exercises 46.4 %(70). The degree of pelvic organ prolapse (POP) and the volume of urine lost during an episode of urinary incontinence were compared using the Chi-square test. The Chi-square test's findings were significant, $\chi^2(6) = 25.506$, $p < .001$, suggesting that the two variables are related to one another.

Table No. 1: Chi-Square test

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	18.506	6	.000
Likelihood Ratio	35.830	6	.000
Linear-by-Linear Association	.867	1	.352
N of Valid Cases	91		

To determine whether there is a connection between ethnicity and the severity of POP, a Chi-square test was used. The Chi-square test's findings were not significant, $\chi^2(2) = 3.234$, $p = .19$. This suggests that the two variables have no link to one another. There was a significant correlation ($2(1) = 5.66$, $p = .003$) between seeking medical attention for urine symptoms and feeling embarrassed or self-conscious about them.

The link between education and the degree of pelvic organ prolapse (POP) was determined using a Chi-square test. The findings were significant, $\chi^2(4) = 14.044$, $p = .007$. This suggests that the two variables are related to one another. Particularly, women with more education reported mild POP more frequently, but those with lower education reported moderate or severe POP more frequently.

Table No. 2: Chi-Square detail

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	14.044	4	.007
Likelihood Ratio	19.729	4	.001
Linear-by-Linear Association	.887	1	.346
N of Valid Cases	140		

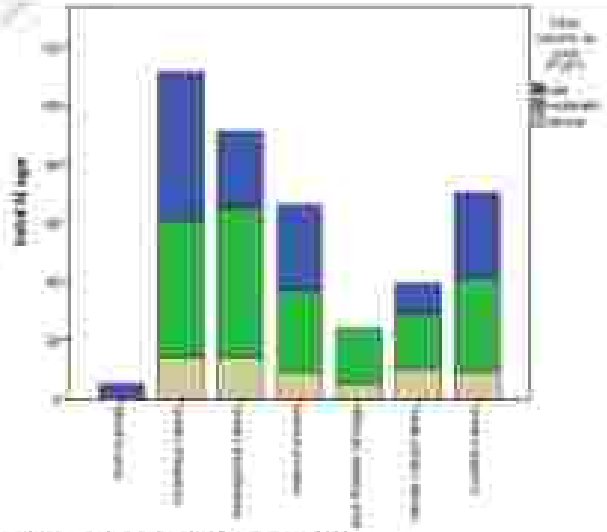

Figure No. 1: Urinary Symptoms.

DISCUSSION

The current study suggest that there is a statistically significant link between education and the degree of pelvic organ prolapse (POP). Particularly, women with more education reported mild POP more frequently, but those with lower education reported moderate or severe POP more frequently. In Turkish population the level of education was found to be significantly lower in women with prolapse compared to women without prolapse[11]. Ethnicity was a significant predictor of the kind of prolapse, according to an observational research of Caucasian and East Asian women who visited a tertiary urogynecology clinic with POP symptoms[12]. The diverse POP experiences among various racial ethnic groups were also highlighted by a systematic review[13]. However, we could not find any significant relation between ethnicity and severity of POP. Similar to our study's findings, another study found that older women living in rural locations were more negatively impacted by urinary incontinence on their quality of life[14]. It is probable that older women from rural areas with lesser levels of education are less knowledgeable about UI as a medical problem. A study conducted in Thailand found a moderate correlation between POP severity and voiding difficulty. The study reported reported 63% of women presented with urinary leakage[15]. These findings are in line with ours that women with severe POP were more likely than those with mild or moderate POP to report frequent urination, urgent urination, and incontinence. This implies that urine symptoms may serve as a gauge of POP severity. A Qualitative study conducted in Canada found that POP-affected women were more prone to feel embarrassed or self-conscious about their urine symptoms. The severity of POP, the frequency of urine incontinence, and the effect of POP on everyday activities were all linked to this shame[16]. In current study Women with more severe POP were more likely to experience embarrassment or self-consciousness (52% vs. 14%).Women who had sought medical attention for urinary problems were more likely to feel embarrassed or self-conscious (67% vs. 25%). These results imply that embarrassment is a major problem for women with urinary symptoms and severe POP, and that seeking medical attention may be one of the contributing factors. According to the study's findings, it's critical for medical professionals to be aware of the possibility of embarrassment in POP-positive women. Providers need to be aware of this problem and provide women the chance to talk about their emotions of embarrassment.

Limitations: Because it was a single centered study, its conclusions might not apply to other populations. Since the research was cross-sectional and self-reported data, which is subject to bias, was employed, it is not possible to establish a causal link between POP and urinary symptoms. Despite these limitations, the findings of this study provide important information about the relationship between POP and urinary symptoms in women. Additional investigation is required to verify these results and examine the processes behind this connection.

CONCLUSION

POP is a serious issue for women in Dera Ghazi Khan, Pakistan, according to the study. A number of factors, including severity, ethnicity, education, and feelings of embarrassment or self-consciousness, were also discovered to be linked to POP, according to the study. The findings of this study suggest that urinary symptoms, feelings of embarrassment or self-consciousness, and a willingness to seek medical assistance are all related to the severity of POP. While ethnicity and POP severity did not significantly correlate, education level was revealed to be a significant predictor of POP severity. These results emphasize the significance of dealing with the psychological impact of urine symptoms, taking education levels into account while managing POP, and understanding the value of obtaining medical assistance when dealing with these symptoms. Furthermore, healthcare professionals must be aware of the resources available to Pakistani women with POP and endeavor to ensure that all women have access to high-quality care.

Author's Contribution:

Concept & Design of Study:	Aura Aleem
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Original Article

Association Between Arteriovenous Fistula (AVF) and Hemoglobin Levels in Hemodialysis-Dependent End-Stage Renal Disease (ESRD) Patients

AVF and Hemoglobin Levels in Hemodialysis-Dependent ESRD Patients

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ABSTRACT

Objective: To investigate the association between arteriovenous fistula (AVF) creation and hemoglobin levels in hemodialysis-dependent end-stage renal disease (ESRD) patients.

Study Design: A cross-sectional study

Place and Duration of Study: This study was conducted at the Central Park Medical College and Teaching Hospital in collaboration with Department of Nephrology, Choudhary Muhammad Akram Teaching Hospital, Lahore from December 2022 to June 2023.

Methods: Patients on hemodialysis were included, while those on peritoneal dialysis or not undergoing dialysis were excluded. Sociodemographic details, medical history, and dialysis access information were recorded. Hepatitis B and C screening was performed, and vascular access was categorized into AVF and lines. Hemoglobin levels were assessed, and statistical analysis was conducted using SPSS version 28.

Results: Out of 72 ESRD patients, 37.5% had AVF, and 62.5% had access via lines. Hemoglobin levels were significantly higher in patients with AVF (mean Hb ≥ 9.26 g/dL) compared to those without AVF (mean Hb ≤ 8.07 g/dL) with a p-value of 0.005. AVF presence was associated with a lower rate of infections (7.40%) compared to patients without AVF (60%) with a p-value of 0.0001.

Conclusion: Arteriovenous fistula (AVF) may be associated with higher hemoglobin levels and a reduced risk of infections in hemodialysis-dependent end-stage renal disease (ESRD) patients.

Key Words: End-stage renal disease, hemodialysis, arteriovenous fistula, hemoglobin levels, infection risk.

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INTRODUCTION

End-stage renal disease (ESRD) is a debilitating condition that affects millions of individuals worldwide, presenting a formidable challenge to the healthcare community. Patients with ESRD require renal replacement therapy, and one of the most common modalities is hemodialysis. Hemodialysis is a life-sustaining treatment that involves the removal of waste products and excess fluids from the bloodstream, thereby mimicking the essential functions of the kidney.

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Despite its critical role in maintaining the health of ESRD patients, hemodialysis is not without its complications and limitations.

One of the major complications often encountered in hemodialysis-dependent ESRD patients is anemia. Anemia is characterised by a decreased number of red blood cells or a reduced amount of hemoglobin in the blood, leading to diminished oxygen-carrying capacity and fatigue. In ESRD patients, anemia frequently arises due to the reduced production of erythropoietin, a hormone normally produced by the kidneys that stimulates red blood cell production. Consequently, anemia can significantly impair the quality of life for these patients and may contribute to increased morbidity and mortality. Recognizing the pivotal role of hemoglobin in oxygen transport and the body's overall physiological well-being, investigating factors that influence hemoglobin levels in hemodialysis-dependent ESRD patients is of paramount importance.

Arteriovenous fistulas (AVF) have emerged as a crucial aspect of the hemodialysis process. An AVF is a surgical connection between an artery and a vein, typically in the arm, that provides a suitable access point for hemodialysis.[10] It allows for high blood flow

rates, making the dialysis procedure more efficient and effective. The creation of an AVF is a standard practice in hemodialysis, and its benefits, such as improved patency and reduced risk of infection compared to other vascular access options, have been well-documented.[7] However, the association between AVF and hemoglobin levels in hemodialysis-dependent ESRD patients is a subject that has not been comprehensively explored.

Moreover, the association between AVF creation and hemoglobin levels may have broader implications beyond anemia management. Hemoglobin levels serve as a surrogate marker for various aspects of an ESRD patient's health. Therefore, this study is warranted for the assessment of AVF creation and hemoglobin levels in hemodialysis-dependent ESRD patient along the risk of infection development.

METHODS

As per guidelines of Helsinki, a cross-sectional study was conducted at Central Park Medical College and Teaching Hospital in collaboration with Department of Nephrology, Chaudhary Muhammad Akram Teaching Hospital, Lahore for the assessment of causes of anemia in patients of renal replacement therapy in lieu of arteriovenous fistula over December 2022 to June 2023. In which 72 patients with age range of 40 to 60 years were recruited after obtaining prior written informed consent; ethical approval was also obtained from institutional review board of Central Park Medical College and Teaching Hospital Lahore (CPMC/IRB-No/2234). All the patients who were on hemodialysis were included while patients who were not on hemodialysis or were on peritoneal dialysis were excluded from this study.

Sociodemographic details including age gender were recorded, details of medical history and access for dialysis. All patients were screened for hepatitis B and hepatitis C. Vascular access for hemodialysis was categorized into two groups: arteriovenous fistula (AVF) and lines (including both temporary and permanent lines). Serum hemoglobin level was assessed using hemoglobinometer in g/dL by obtaining 1 cc venous blood under aseptic conditions. Patients in the study receiving subcutaneous troponin & iron therapy were also recorded.

Statistical Analysis: Anonymized data was entered in Microsoft Excel 2016 and was compared for errors and omissions and after cross-checking data was exported into Statistical Packages Software for Social Sciences (SPSS) version 26 and statistical analysis were made. Qualitative data were presented in terms of frequencies and percentages. Normality for serum hemoglobin level was assessed and independent sample t test was employed. Stratification based on presence of AVF was made and chi-square test and correlation was employed based on stratification parameters and a p value less than 0.05 was regarded as significant.

RESULTS

A total of 72 patients of End Stage Renal Disease (ESRD) on maintenance with mean age of 46.05 ± 8.49 were recruited for the study. Out of these 72, male population was 48 (66.7%) while 24 (33.3%) were female patients. Screening for hepatitis B and C were done for these patients, 16 (22.2%) were positive for hepatitis C antibodies while no patients was positive for hepatitis B surface antigen.

Table No. 1: Gender and Viral Hepatitis Distribution Among Study Population.

Variables	N	Percentages (%)
Gender		
Male	48	66.7%
Female	24	33.3%
Hepatitis C	16	22.2%
Hepatitis B	0	0%

Method for access for hemodialysis were defined as, arteriovenous fistula (AVF) and line (including both temporary and permanent lines). 27 patients (37.5%) had AVF while rest 45 patients (62.5%) had access via lines. Moreover, all the patients were receiving troponin injections subcutaneously twice to thrice weekly. Only 2 patients (2.8%) were receiving iron injections intravenously. Out of these 72 patients, 29 patients (40.3%) had clinical infections.

Hemoglobin levels were assessed, and mean hemoglobin level for whole study cohort was noted as 8.46 ± 1.22 g/dl showing overall decreased hemoglobin and persistent anemia in study population. Then hemoglobin levels were compared in study population based on presence and absence of AVF (dialysis access) by as explained in table 2. The results suggest a significant difference in Hemoglobin levels between the two groups. Patients with AVF (mean Hb = 9.34 g/dL) have significantly higher Hemoglobin levels compared to those without AVF (mean Hb = 8.07 g/dL) with p-value of 0.003. This suggests that AVF might be associated with higher Hemoglobin levels.

Table No. 2: Comparing of Serum Hemoglobin Levels in dialysis dependent Patients with and without AVF.

Variables	Mean ± St. Dev	Mean Difference	T-value	p-value
Hemoglobin (No AVF)	8.07 ± 1.22	-1.183	-3.355	0.003
Hemoglobin (AVF)	9.26 ± 1.67			

On appliance of chi-square test to assess the role of AVF in development of infection, it was noted that rate of AVF was negatively associated with infections.

those who had AVF only 7.40 percent developed infections while on the other hand those who don't have AVF 60 percent developed infections with p vale of 0.0001 suggestive of lower rate of infections in patients with AVF. No significant differences for the other variables were noted in study groups as explained in table 3.

Table No. 3: Comparison of Study Variables in Lieu of AVF by employing Chi-Square Test

Factors	Categories	AVF Presence		p-value
		AVF Present (n=27(%))	AVF Not Present n=45(%)	
Infection	Yes	2 (7.4)	27(60)	0.0001*
	No	25(92.6)	18(40)	
Hepatitis C	Yes	6(22.22)	10(22.22)	0.620
	No	21(77.78)	35(77.78)	
Troponin Injection	Yes	27(100)	45(100)	0.999
	No	0(0)	0(0)	
Iron Levels	Yes	27(100)	45(100)	0.137
	No	0(0)	0(0)	
Ferritin Levels	Yes	27(100)	45(100)	0.743
	No	0(0)	0(0)	
Iron Injection	Yes	3(11.11)	1(2.22)	0.332*
	No	25(88.89)	44(97.78)	
Fistula Acted	Yes	7(25.92)	18(40)	0.308
	No	20(74.08)	27(60)	

DISCUSSION

The current study sought to investigate the association between arteriovenous fistula (AVF) creation and hemoglobin levels in hemodialysis-dependent end-stage renal disease (ESRD) patients, shedding light on a crucial aspect of renal replacement therapy and its implications for patients' anemia status and infection risk. Anemia is a prevalent and well-documented complication in hemodialysis-dependent ESRD patients.[10] It is primarily attributed to the decreased production of erythropoietin, a hormone responsible for stimulating red blood cell production. As our results demonstrated, the mean hemoglobin level in the study cohort was 8.49 g/dL, indicating the persistence of anemia in this patient population. Anemia is a significant concern in ESRD patients, as it leads to diminished oxygen-carrying capacity, fatigue, and a reduced quality of life. Additionally, it has been associated with increased morbidity and mortality, underlining the importance of addressing anemia in this population.[11]

One of the central findings of this study was the association between AVF creation and hemoglobin levels. Patients with AVF had significantly higher hemoglobin levels compared to those without AVF, with a mean hemoglobin level of approximately 9.26 g/dL in the AVF group versus 8.07 g/dL in the non-AVF group. The observed difference was statistically significant (p-value = 0.009), suggesting that AVF might be associated with higher hemoglobin levels. This finding is of particular significance as it points to a potential relationship between vascular access choice and the management of anemia in hemodialysis-dependent ESRD patients.[12] While the exact mechanisms underlying this association warrant further investigation, several hypotheses can be considered. One possibility is that AVF, with its higher blood flow rates and more efficient dialysis, may lead to improved removal of uremic toxins and excess fluids, resulting in a better balance of erythropoietin production and potentially higher hemoglobin levels. It is also important to consider that patients with AVF may experience fewer complications, including infections, which could indirectly contribute to improved overall health and hemoglobin levels.[13,14]

The study also explored the relationship between AVF and the risk of infections. The results demonstrated a notable inverse association between the presence of AVF and infection development. Among patients with AVF, only 7.40% developed infections, whereas 60% of patients without AVF experienced infections. This significant difference, with a p-value of 0.0001, suggests a lower rate of infections in patients with AVF. The lower infection rate associated with AVF is consistent with existing literature, as AVF is well-established as a superior vascular access choice in terms of infection risk. This study reinforces the importance of selecting AVF as the primary vascular access method in hemodialysis-dependent ESRD patients, not only for its well-documented infection-related benefits but also for the potential improvement it may offer in managing anemia.[15]

The findings of this study have several important implications for clinical practice. Healthcare providers who care for hemodialysis-dependent ESRD patients

should consider the potential impact of AVF selection on patients' hemoglobin levels and overall well-being. While this study does not establish causality, it suggests that AVF may be a valuable component in addressing anemia in these patients.

The study findings are limited and cannot be generalized due to cross-sectional design, the relatively small sample size, and the absence of a causative relationship between AVF and hemoglobin levels. Future research should explore the mechanisms by which AVF may impact erythropoietin production and hemoglobin levels in a larger and more diverse patient population.

CONCLUSION

AVF may be associated with higher hemoglobin levels and a reduced risk of infections. This knowledge should guide healthcare providers in making informed decisions about vascular access selection and anemia management in this vulnerable patient population, ultimately improving their quality of life and overall health.

Author's Contribution:

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Original Article

Risk Factors of Dental Caries

Prevalence and Risk Factors of Dental Caries among Patients Seeking Care at Tertiary Hospitals

Khansa Khan[1], Salman Zahir[4], Sarwat Jahan[1], Sarah Saleem[2], Sunan Kakakhel[3] and Sultan Zeb[5]

ABSTRACT

Objective: To study the prevalence and risk factors of dental caries among patients seeking care at tertiary hospitals.

Study Design: A observational cross-sectional study

Place and Duration of Study: This study was conducted at the Tertiary Care Hospitals, Peshawar January to May 2023.

Methods: A sample of 2000 patients was enrolled who visited the dental OPD of tertiary care hospitals using a non-random convenient sampling technique.

Results: Dental caries was prevalent in 43.60% of the population. Dental caries classified in the study based on their causes, showed that among the male population the most prevalent cause was malnutrition (34.66%), and followed by increased sweet consumption (29.78%). These also occurred to be the prevalent causes among female population i.e., 58.08% due to malnutrition, followed by 27.62% of the female population having dental caries due to increased sweet consumption.

Conclusion: The study reveals the substantial burden of dental caries among patients seeking treatment at tertiary institutions. The high prevalence rates emphasize the urgent need for effective interventions.

Key Words: Dental Caries, prevalence, risk factors, dental hygiene

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INTRODUCTION

For people all around the world, dental caries remains a serious global health problem.[1] It is acknowledged as an ailment of ancient times.[2,3] In spite of the general drop in caries prevalence in industrialized nations,[4] the majority of developing nations continues to deem caries as a serious problem. It is still a significant issue for young and the adult population in both emerging and industrialized nations.[5] According to studies, age, sex, ethnic group, dietary patterns, and oral care practices are few of the factors that can affect the prevalence of dental caries in a community.[6]

Adults have not been the primary focus of the most of epidemiological research projects on dental caries; instead, children have; studies on adults tend to be even rarer and confined solely to certain age groups.[7] Also, per reports, 38–80% of Indians are reported to have dental caries.[8] Since dental caries is a lifestyle illness that can be avoided via the development of effective policies and long-term planning, the WHO advises conducting frequent national oral health surveys at least once every ten years.[9] From the literature, we deduced that the majority of research has taken children's dental conditions into consideration. Additionally, little has been done to address dental caries in the adults. The results of this study will aid physicians in creating plans to prevent and treat dental caries in the surrounding communities.

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METHODS

This observational cross-sectional research was undertaken in tertiary care facilities from January to May 2023. Based on these assumptions: The sample size was obtained using a single population proportion calculation with 3% error margin, 99.999% confidence level, and 50% prevalence. The sample size was 1954. To limit error, we used non-random convenient sampling to collect data from 2000 dental OPD patients at a tertiary care facility. After hearing the study's goals, all participants provided oral informed permission before collecting data. Participant willingness determined inclusion. The research excluded systemic illness and trauma patients.

Consistent dentists took patient histories and examined their teeth to obtain data. The International Caries Detection and Assessment System (ICDAS), DMFT index, and Significant Caries Index were used to diagnose dental caries. When necessary, the oral exam included the following investigations:

1. Examine teeth with a dental mirror and probe for cavities, discolorations, and deterioration.
2. Screening and periapical radiography to identify lesions not detectable visually.
3. Dental transillumination to identify lesions not apparent to the naked eye.
4. Sensitivity testing for dentinal hypersensitivity, a dental caries sign.

A systematic questionnaire modified from the WHO dental health survey collected socio-demographic, nutritional, and dental health parameters. Age, sex, education, domicile, and marital status are socio-demographic factors. Diet includes sugar intake, oral hygiene, and tooth brushing may impair dental health. The Northwest School of Medicine Peshawar committee approved the research. Data was imported into MS Excel and analyzed using SPSS (Version 26). The variables were evaluated using descriptive statistics including means, standard deviation, frequencies, and percentages.

RESULTS

This study included 2000 participants as the project sample. Out of which 639 (31.95%) were males and 1361 (68.05%) were females.

Table No. 1: Marital Status of the Participants:

Marital Status	Males (%)	Females (%)	Total (%)
Married	158 (24.70%)	632 (46.43%)	790 (39.50%)
Unmarried	410 (64.10%)	551 (40.48%)	961 (48.05%)
Other (Divorced, Widowed)	71 (11.11%)	178 (13.09%)	249 (12.45%)
Total	639 (100.00%)	1361 (100.00%)	2000 (100.00%)

Table No. 2: Working Status of the Participants:

Occupation	Males (%)	Females (%)	Total (%)
Working Class	260 (40.69%)	292 (21.45%)	552 (27.60%)
Un-employed (Children, Retired)	379 (59.31%)	1069 (78.55%)	1448 (72.40%)
Total	639 (100.00%)	1361 (100.00%)	2000 (100.00%)

The mean participant's age involved in this study was 35.47 ± 31.34 years, with majority belonging to the age group 11-20 years (34.60%), followed by the age group 21- 30 years (20.10%), 1- 10 years (19.00%) and 41–50 years (18.70%) respectively (Table 6). Among the male participants 158 (24.70%) were married, 410 (64.10%) were unmarried whereas 632 (46.43%) of females participants out of the total 1361 were married (Table 1).

Table No. 3: Education of the Participants:

Education	Males (%)	Females (%)	Total (%)
No Education	155 (24.25%)	819 (60.18%)	974 (48.70%)
Primary Education	300 (47.89%)	279 (20.50%)	585 (29.25%)
Secondary Education	143 (22.69%)	232 (16.31%)	367 (18.35%)
Higher Education	33 (5.16%)	41 (3.01%)	74 (3.70%)
Total	639 (100.00%)	1361 (100.00%)	2000 (100.00%)

Table No. 4: Residence of the Participants:

Residence	Males (%)	Females (%)	Total (%)
Urban	211 (33.02%)	382 (28.06%)	593 (29.65%)
Rural	428 (66.98%)	979 (71.94%)	1407 (70.35%)
Total	639 (100.00%)	1361 (100.00%)	2000 (100.00%)

Table No. 5: Prevalence of Dental Caries:

Participants	Males (%)	Females (%)	Total (%)
With Caries	349 (54.62%)	822 (60.40%)	1171 (63.60%)
No Caries	290 (45.38%)	439 (32.20%)	729 (36.40%)
Total	639 (100.00%)	1361 (100.00%)	2000 (100.00%)

Table No. 6: Age and Gender based Prevalence of Dental Caries among patients visiting tertiary care hospital

Age (years)	Male Patients (%)	Female Patients (%)	Total Number of Patients (%)
1–10	41 (11.75%)	201 (21.88%)	242 (19.00%)
11–20	144 (41.26%)	297 (32.21%)	441 (34.60%)
21 –30	95 (18.68%)	199 (21.59%)	164 (20.70%)

31 – 40	28 (8.02%)	96 (10.41%)	124 (9.73%)
41 – 50	31 (8.89%)	103 (11.39%)	134 (10.70%)
51 – 60	24 (6.74%)	29 (2.98%)	53 (4.16%)
61 – 70	06 (1.71%)	05 (0.54%)	11 (0.80%)
Total	349 (100.00%)	922 (100%)	1271 (100.00%)

Table No. 1: Risk Factors of Dental Caries among study participants

Dental Caries Risk Factors	Male Patients (%)	Female Patients (%)	Total Number of Patients (%)
Poor Oral Hygiene (Inadequate Brushing)	87 (24.93%)	111 (12.04%)	189 (14.85%)
Diet (Increased Sweet Consumption)	104 (29.78%)	255 (27.65%)	359 (25.15%)
Malnutrition (Poor Diet)	121 (34.68%)	517 (56.08%)	638 (53.18%)
Smoking	23 (6.60%)	4 (0.43%)	27 (2.70%)
Teeth Arrangement	14 (4.01%)	35 (3.80%)	49 (4.20%)
Total	349 (100.00%)	922 (100.00%)	1271 (100.00%)

DISCUSSION

The purpose of this extensive research was to look into the incidence of dental caries and the risks related to it among patients seeking treatment at tertiary institutions. Dental caries, often known as tooth decay or cavities, is a serious health issue that has an effect on the entire world. Dental health is a vital element of general health and is viewed as an attribute of high quality of life. According to the WHO, dental caries is the 4th most expensive chronic medical condition to manage. The prevalence of dental caries has fallen in most developed nations over the previous 20 years. Conversely, the rate of dental caries has been growing in numerous developing countries in recent years.[1] For the purpose of creating efficient preventative measures and enhancing oral healthcare services, it is essential to comprehend the risk factors and prevalence of dental caries in individuals utilizing tertiary care facilities. A sizable sample of patients who sought treatment at tertiary hospitals was included in the study, guaranteeing a representative sample for analysis. Using standardized diagnostic criteria such as the DMFT (Decayed, Missing, and Filled Teeth) index, the prevalence of dental caries was evaluated.[10] Comprehensive interviews, dental examinations, and analysis of data helped identify risk variables.

Most of the epidemiological data from Pakistan have focused on children more than adult population. This cross-sectional descriptive study was conducted in the community among individuals ranging in age from children to adults from various areas of Peshawar, Pakistan. In this study, the dental caries's prevalence was found to be 69.80% in both temporary and permanent dentition. Studies on school-aged children revealed that other nations, such as the United States (57%),[11] India (34.7%),[12] Ethiopia (40.8%),[13] and Kenya (43.3%),[14] had a lower frequency of dental caries than the present study. However, the prevalence of dental caries recorded by this study was less than a study carried in Nepal (83%).[15] The findings of the current study were in accordance with all the local literature reporting high prevalence.[16] However in comparison to global research, our community had a greater rate of dental caries. This could be attributed to socioeconomic differences and lifestyle variations.

The current study focuses on participants of different age groups; it was observed that female participants had more caries prevalence than males, this was in line with a study by Jinghao Hu et al.[17] One possible explanation is that females are more health concerned and visit the hospital more frequently than males. According to the literature, some of the causes of high prevalence, also identified by the study are poor dental hygiene, diet, smoking, sweet consumption, malnutrition, and teeth misalignment.[18,19]

The prevalence reported in the current study was lower than the prevalence of 72% discovered in a study conducted in Kosovo by Kamberi B et al.[20] In new Delhi a study focused to find the prevalence of dental caries among adult and old population[21] For the age range of 35 to 44 years, dental caries was found to be prevalent in 82.4% of cases. The findings, however, were greater than those of studies done in Nagpur by Dadode et al[22] in the same age group (48.6%) and Siliguri by Chakraborty et al.[23] in the 35–45-year age range (37.03%).

Among the male population the most prevalent cause was malnutrition (34.68%), followed by increased sweet consumption (29.78%) in this study. Similarly in a study by Lendrawati et al. showed that the consumption of sugary foods was found to be a significant factor in the development of caries.[24] A high consumption of sugar found in foods and beverages is the main risk factor for caries and the main factor to be taken into account for the prevention, control, and treatment of caries. Cariogenic bacteria feed on sugar, which serves as a substrate for their production of acid and the demineralization of dental enamel.[25] In a four-year prospective study a dose-response relationship

was found between frequency of consumption of sweet food and caries increment in adults.[17]

CONCLUSION

The study findings showed that dental caries were prevalent among 63.40% of cases in the population. Among males, the leading cause was malnutrition (34.65%) followed by increased sweet consumption (29.78%). Similarly, among females, malnutrition (36.08%) and increased sweet consumption (27.65%) were the most prevalent causes. The study also identified common complaints associated with dental caries, including toothache, bleeding gums, halitosis, sensitivity, discoloration, and decay.

The thorough investigation into the risk factors and prevalence for dental caries among participants seeking treatment at tertiary institutions highlights the considerable burden this oral health issue imposes on patients. The findings showed that the significant prevalence of dental caries in this population requires immediate attention and efficient methods. According to the report, dental caries continues to be a common issue among patients seeking treatment at tertiary hospitals. The high incidence rates show that dental caries remains a public health issue, necessitating quick action to stop its development. Dental caries places a significant financial burden on healthcare systems in addition to harming people's oral health and quality of life.

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Original Article

Estimate Number of Enteric Pathogens in Raw Chicken

Microbiological Profile and Susceptibility Pattern of Enteric Organisms in Raw Broiler Chicken Meat from Abattoirs of Lahore, Pakistan

Nida Javed[1], Saima Pervaiz[2], Fatima Tuz Zahra[3], Ghania Ali[4] and Ayesha Muazzam[4]

ABSTRACT

Objective: This study aimed to estimate number of enteric pathogens in raw chicken meat including surfaces of breast and cloacal region. Moreover, antibiotics susceptibility pattern of organisms isolated from thigh meat were also observed.

Study Design: A Descriptive, cross-sectional study.

Place and Duration of Study: This study was conducted at the Department of Microbiology, University of Health Sciences (UHS) Lahore, December 2021 to April 2022.

Methods: About 90 raw broiler chicken thigh meat samples from abattoirs of different areas of Lahore were collected. Swabs from chicken breast and cloacal region were also taken to estimate the microbes present on their surface.

Results: The mean Aerobic Plate Count was 4.75±1.18 log CFU/g. Out of 90 chicken samples, thigh meat had E. coli (n= 67), Proteus spp., (n=15), Enterobacter spp., (n=6), Citrobacter spp., (n=6) and S. aureus (n=3). From breast swab, E. coli (n= 69), Proteus spp., (n=14), Enterobacter spp., (n=9), Yersinia spp., (n=1), Citrobacter spp., (n=4), S. aureus (n=2) and Klebsiella spp., (n=6) were retrieved. Cloacal swabs revealed E. coli (n= 59), Proteus spp., (n=8), Enterobacter spp., (n=5), Yersinia spp., (n=2) and Citrobacter spp., (n=2). All the isolates were resistant to ampicillin.

Conclusion: Various Enterobacteriaceae species especially E. coli are common in broiler chickens at abattoirs. The presence of multi drug resistant strains of these enteric organisms is an important finding of this study.

Key Words: Antibiotics, Cross contamination, E. coli, Enterobacteriaceae, Multidrug resistant bacteria, Poultry meat, Raw Chicken.

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INTRODUCTION

Chicken meat is preferred due to its low fat and cholesterol content. This quality makes it a healthy food choice, which is not only readily available but also a rich and cheaper source of protein[1]. The consumption of poultry meat is therefore increasing worldwide. An increase in demand of chicken meat should not compromise its hygiene because contaminated raw meat can possibly transmit food-borne pathogens[2]. Food borne diseases are one of the leading causes of mortality and infections, especially in developing countries. Poultry meat is mostly found to harbor various enteric pathogens such as Salmonella, Campylobacter, S. aureus, E. coli and Listeria. Some members of Enterobacteriaceae family e.g. Escherichia coli, Salmonella, Klebsiella and Proteus are known to cause putrefaction of chicken meat and other food products[3]. The improper use of antibiotics for disease prevention and rapid growth promotion in broiler chickens is the leading source of development of bacterial resistance in them[4]. The intestinal bacteria, thus plays a vital role as vehicle of drug resistance genes which may be transmitted to other clinically important bacteria[5]. An amount of 10g meat sample (thigh) was thoroughly minced. It was diluted in 90ml (w/v) of buffered peptone water to achieve 1:10 dilution. A volume of one ml from meat solution was serially diluted to 1:10 dilution[6]. An amount of 0.1ml or 100ul was taken from TT1, TT3 and TT5 respectively and added to nutrient agar plates. The

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solution was spread evenly with the help of glass L-shaped spreader. The plates were incubated at 35-37°C for 24-48 hours. After incubation, colonies were counted on a colony counter and colony forming unit/gram (CFU/g) was calculated.

METHODS

The study employed a descriptive, go-sectional layout carried out on the University of Health Sciences, Lahore, from December 2021 to April 2022. Convenient sampling become used to gather ninety five raw broiler bird thigh meat samples from various abattoirs in Lahore. Additionally, swabs from bird breast and cloacal location were taken for microbial estimation. The meat samples have been processed by way of dilution in buffered peptone water, observed through serial dilution and plating on nutrient agar. Identification of Salmonella and Campylobacter become accomplished the usage of selective media and biochemical exams. Antimicrobial susceptibility checking out became carried out the usage of the Kirby Bauer Disk Diffusion approach, following CLSI breakpoints. Statistical analysis employed One Way ANOVA.

Data collection: The records assess for this examine involved obtaining 95 raw broiler chicken thigh meat samples from numerous abattoirs in Lahore thru convenient sampling. Swabs from the chicken breast and cloacal region have been additionally collected to assess microbial presence. A meticulous procedure blanketed mincing 10g of thigh meat, diluting it in buffered peptone water, and serial dilution for next plating on nutrient agar. The identification and locality of the sampled areas have been duly stated. Furthermore, the take a look at incorporated the identity of Salmonella and Campylobacter via selective media and biochemical assessments. The antimicrobial susceptibility of isolated organisms turned into assessed using the Kirby Bauer Disk Diffusion approach.

Statistical analysis: Data was expressed as mean and standard deviation. Bacterial counts were compared by One Way ANOVA test using SPSS Software 24.0 to determine difference in group means at P value ≤ 0.05.

RESULTS

According to Table 1, out of 95 raw broiler chicken samples, 39.0% had APC <4 log CFU/g, 22.1 % had >4 to <5 log CFU/g, 26.3 % had >5 to <6 log CFU/g, and 12.6% had >6 log CFU/g. The average APC was 4.751±1.1811 log CFU/g. This demonstrates that most samples met meat hygiene standards. This research detected no Salmonella or Campylobacter. Figure 1 shows that E. coli was recovered from 67 (70.5%) thigh meat samples, whereas Proteus, Enterobacter, Citrobacter, and S. aureus were isolated from 15 (15.8%), 6 (6.3%), 6 (6.3%), and 3 (3.2%) samples.

Table 2 shows chicken flesh, breast, and cloacal swabs identified enteric microbes. E. coli was identified from 59 (62.1%) cloacal samples, whereas Proteus Spp., Enterobacter, Yersinia spp., and Citrobacter were isolated from 67 (70.5%), 3 (3.3%), 1 (1.0%), and 2 (2.1%) samples. E. coli was recovered from 69 (72.6%) of 95 breast swabs, whereas Proteus, Enterobacter, Yersinia, Citrobacter, S. aureus, and Klebsiella were isolated from 16 (16.8%), 9 (9.5%), 1 (1.0%), 4 (4.2%), 9 (9.5%), and 6 (6.3%).

Using ANOVA, significant findings (P < 0.05) were seen for E. coli, Proteus Spp., and Enterobacter spp., whereas Citrobacter and S.aureus exhibited negligible effects (P > 0.05).

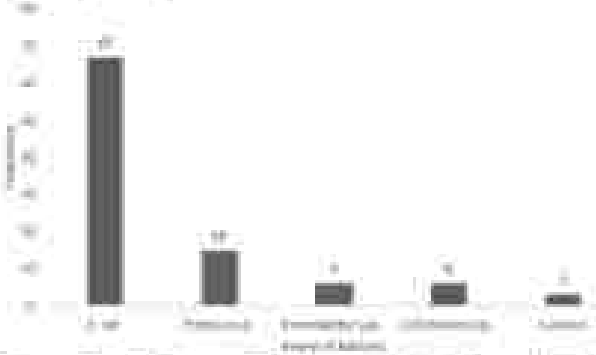

Figure No. 1: Spp., of bacteria isolated from thigh meat (n=95)

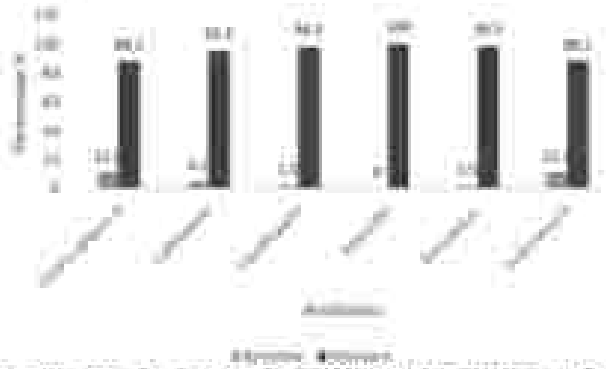

Figure No. 2: Antibiotic susceptibility pattern of E. coli (n= 67)

Table No. 1: Aerobic plate count from chicken thigh meat

Log CFU/g	Number	Percentage%
<4	37	39.0
>4 to <5	21	22.1
>5 to <6	25	26.3
>6*	12	12.6
Total	95	100.0
Mean ± SD	4.751 ± 1.1811	

*>6 log CFU/g depicts increased chance of spoilage of meat.

Table No. 2: Bacteria isolated from different types of samples

Sampling type	No of samples	E coli	Proteus spp.	Enterobacter spp.	Yersinia spp.	Citrobacter spp.	S. aureus	Klebsiella spp.
Thigh meat	95	67	15	6	0	6	3	0
Cloacal swab	65	59	47	5	1	2	6	0
Breast swab	93	69	16	9	1	4	9	6
Total	185	195	98	20	2	12	12	6

Table No.3: Frequency of antibiotic-resistant enteric strains isolated from chicken thigh meat

Bacterial strains	Antibiotics resistance %					
	Chloramphenicol C30µg	Cefriaxone CRO30µg	Ciprofloxacin CIP5µg	Ampicillin AMP10µg	Gentamicin CN10µg	Amikrowycin AZM15µg
E.coli (n=67)	59(88.1%)	64(95.5%)	66(98.5%)	67(100%)	66(98.5%)	59(88.1%)
Proteus spp. (n=15)	9(60.0%)	10(66.7%)	11(73.3%)	15(100%)	10(66.7%)	15(100%)
Enterobacter spp. (n= 6)	6(100%)	6(100%)	6(100%)	6(100%)	6(100%)	6(100%)
Citrobacter spp. (n=6)	5(83.3%)	5(83.3%)	6(100%)	6(100%)	6(100%)	6(100%)
S.aureus (n=3)	2(66.6%)	1(33.3%)	3(100%)	3(100%)	3(100%)	1(33.3%)

DISCUSSION

Aerobic plate count (APC) measures meat microbiology. European Union Standards and British meat processors association recommended a raw meat aerobic plate count below 106 CFU/g or cm2. Table 1 aerobic plate count results matched a local investigation that found 9 of 45 chicken samples with APC >6 log CFU. Other Karachi and Lahore investigations found higher APC values. All of these data emphasize the need to enhance slaughtering techniques and abattoir hygiene[7]. Human flora, slaughtering personnel's hand hygiene, slaughtering table and instrument flora, slaughterhouse temperature and humidity all affect bacterial burden during processing. E. coli was the most common microbe in this investigation. 70% of thigh meat samples had E. coli[7]. One local study found 87% E. coli in raw chicken samples from Lahore. Another research from Lahore revealed E. coli frequency up to 73%, while a Karachi investigation found 9 out of 10 samples positive for both coliforms and fecal coliforms[8,9]. Butchers inadequate hygiene during slaughtering and meat processing was also noted in these investigations. E. coli is common in raw chicken meat in Bangladesh and Nepal[7]. The aforementioned research show that E. coli is the best indication of food and water faeces. It may be spread by contaminated hands or water-intensive slaughter methods. Proteus spp. was 15.8% in this research and 13.4% in Nepal[10]. In Peshawar Pakistan found 11 Proteus spp. out of 21 isolates, whereas Saudi Arabia found 6 from 75 meat product samples demonstrating stronger hygienic practices[11]. This research detected 6.3% Enterobacter spp., comparable to another that found 6.9%. Present investigation found 6 (6.3%) Citrobacter spp., which matched 3.4%, but greater numbers were recorded in many studies from across the globe, making it a major meat rotting bacterium[12]. This investigation found lower counts of S. aureus than a nearby study that found 50% of retail chicken samples contaminated. 67% and 66.6% This investigation failed to isolate Salmonella and Campylobacter[13]. The explanation may be overuse of antibiotics for broiler chicken development and illness treatment. Rafiq and Sidrah found antibacterial activity in 73.3% of 90 chicken meat samples from various parts of Lahore at University of Health Sciences. This shows that substantial doses of chicken flesh antimicrobials inhibited meat microorganisms. Pakistan, Iran, and Egypt also found various antibiotics in chicken parts[14]. Table 3 shows that the prevalent pathogen, E. coli, was 100% ampicillin-resistant and 98.5% ciprofloxacin-resistant. Ciprofloxacin is a powerful antibiotic for gastrointestinal and urinary tract infections. Health officials worry that multi-drug-resistant urinary strains of E. coli identified from Lahore may originate from this antibiotic[15]. Results were similar shows tetracycline, sulfonamide, and quinolone resistance. A recent research in Turkey found 97% penicillin-resistant E. coli and 94.29 % multidrug-resistant[16]. The sensitivity pattern of Proteus spp. in our investigation matched. Compared to this investigation, identified several Citrobacter spp. The extensive use of common antimicrobials as prophylactics and growth promoters in veterinary medicine explains the high frequency of antimicrobial resistance seen in this research[17]. Increased animal exposure to antimicrobials

causes germs to become resistant, which is then passed on to people via a flawed food chain. The rise of resistant microorganisms increases the burden of human illnesses that do not respond to most medications[11].

CONCLUSION

Based on the results of this study, majority of chicken meat samples were microbiologically fit for human use. This was further assured by the absence of Salmonella and Campylobacter in these samples. The presence of various Enterobacteriaceae in raw meat can be the potential source of infection through consumption of undercooked meat. There is a chance of cross-contamination of other food products also. One of the critical findings is presence of multi drug resistant strains of these organisms. This poses an imminent threat to the health of the community making it even more difficult to treat the gastrointestinal infections produced by them. It is thus, the need of hour, to not only educate meat handlers at basic level but also emphasize the importance of implying stern laws for the safety of food.

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Original Article

Spontaneous Bacterial Peritonitis in with Cirrhotic Ascites

Frequency of Spontaneous Bacterial Peritonitis in Asymptomatic Outpatients with Cirrhotic Ascites

Bushra Fiaz[1], Ummarah Riaz[1], Hania Akbar[2], Anam Noor[2], Sayad Ahmad[1] and Hafizullah Khan[1]

ABSTRACT

Objective: The purpose of this Study is to ascertain the prevalence of spontaneous bacterial peritonitis (SBP) in asymptomatic cirrhosis patients who visit the Ayub Teaching Hospital's gastroenterology outpatient department.

Study Design: A Cross sectional/ Observational study

Place and Duration of Study: This study was conducted at the Department of Gastroenterology Unit, Ayub Teaching Hospital Abbottabad from 05 July 2022- 05 July 2023.

Methods: A total of 157 asymptomatic cirrhotic patients with ascites who presented to the gastroenterology outpatient department were recruited for the study, and ascitic fluid analysis was performed to determine the presence of spontaneous bacterial peritonitis. The study was carried out using a non-probability consecutive sampling study design.

Results: There were 157 patients in all, 96 of whom were female and 61 of them were male. On ascitic fluid analysis, spontaneous bacterial peritonitis is present in 33% (52/157) of asymptomatic cirrhotics with ascites, whereas 66% (105/157) do not.

Conclusion: The results of our prospective investigation demonstrate that among asymptomatic cirrhotic patients with ascites in our setting, spontaneous bacterial peritonitis has a low prevalence.

Key Words: Spontaneous Bacterial Peritoniti, Ascites, Cirrhosis

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INTRODUCTION

The most frequent and deadly infectious consequence of liver cirrhosis is spontaneous bacterial peritonitis, which causes portal decompensation due to fluid ascites infection without an abdominal site[1]. Ultrasonography-detected ascites have a similar fatality rate as open ascites, making early identification crucial for adequate therapy. Cirrhosis patients after initial decompensation had better transplant-free survival with aetiology and complication management than previously reported[2]. Prevention and early intervention should be the new approach to cirrhosis therapy to slow disease development and avoid clinical decompensation and liver transplantation[3,4].

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The 21st century challenge is to avert liver transplantation in as many cirrhosis patients as feasible. However, asymptomatic cirrhosis-secondary ascites patients do not know the incidence or course of spontaneous-bacterial peritonitis[5]. Spontaneous bacterial peritonitis is rare in cirrhotic outpatients with less severe liver disease, although it may be better in hospitalised patients. Three subgroups of spontaneous ascites infection exist. Ascites with spontaneous bacterial peritonitis and increased polymorph nuclear leukocytes (>250 cells/mm3) are considered positive for bacteria[6]. SBP-causing bacteria are isolated 60–70% of the time.

Culture negative neutrocytic ascites, bacteria-free, increases polymorph nuclear count without visible infection. leukocytes exceeding 250 cell/mm3. Remove TB, previous peritoneal carcinomatosis, hepatocellular carcinoma, pancreatitis, and ascitic fluid haemorrhage, which might raise leukocytes in ascites[7]. If the ascites sample contains blood, more than one neutrophilic granulocyte per 250 erythrocytes indicates SPB. One third of untreated patients will have positive bacteriological findings. CNNA symptoms and mortality are associated to SPB development; 30% to 55% of such patients have good blood cultures that show systemic bacterial infection. SBP is more common in CNNA patients and vice versa, proving the infection[7].

Non-neutrocytic monomicrobial bacteria ascites are not well-defined. Positive bacterial culture is described in this condition without leukocyte improvement. Child pugh class A patients usually show it. Bacteria bacteria may develop spontaneously (60%80) or as SBPs. Bactericides may be appropriate, thus antibiotics are only employed when symptoms appear and culture persists[7].

CNNA and SBP are similar medically and therapeutically, so the International Ascites Club Consensus Conference advised not to distinguish between the two entities. CNNA also refers to SBP, and neutrophils in ascites must be diagnosed and improved. Spontaneous infections may aggravate malignant ascites although they are more prevalent in cirrhotic ascites[8].

Early retrospective investigations found SBP in 8% of ascites patients, later prospective research found it in 10-30%. About 5% of non-selected outpatients have SBP. Lethality is high. Older studies reported 80–100% SBP-related lethality possibly due to worse therapeutic risks in cirrhosis patients and lack of antibiotics, but late studies found 20–40%, which may be due to early diagnosis and treatment. Lethality has not diminished in recent years[9]. Such patients had poor long-term diagnoses. In 40–70% of individuals, SBP worsens after a year. A more 30-40% 1 year survival after SBP, 20% two-year survival, and significantly poorer survival in children with a child pugh score > 10[10].

METHODS

Ascitic fluid analysis was used to detect the occurrence of spontaneous bacterial peritonitis in 157 asymptomatic cirrhotic patients with ascites who visited the gastroenterology outpatient department. Using a non-probability sequential sampling research design, the investigation was conducted. Sample Size: Patients with Cirrhotic Ascites presented in OPD during one year period i.e. 157 patients. Sampling Technique: Non probability, Consecutive sampling.

Inclusion Criteria: The inclusion criteria for this study will be all patients of either sex, age 10 to 70 years and above who has diagnosed with Cirrhotic Ascites, presented in OPD of gastroenterology units of ATH.

Abnormal during the one-year period from approval of the synopsis.Physical examination and initial complementary tests suggesting cirrhotic ascites.

Exclusion Criteria: The following patients will be excluded from the study:

- Symptomatic patients with Cirrhotic Ascites

RESULTS

The gender distribution of the 157 patients with cirrhotic ascites is found to be 38.9% male and 61.1% female. Spontaneous bacterial peritonitis (SBP) affected 18.1% of men and 23% of females. 56.7% of the population was 40–50 years old, 35.7% was 51–60 years old, and 7.6% was 61–70 years old.

Table No. 1: Gender Distribution

Gender	Frequency	Percent
Female	96	61.1
Male	61	38.9
Total	157	100.0

The study cohort consists of 61.1% females and 38.9% males, indicating a higher prevalence of cirrhotic ascites among females.

Table No. 2: SBP Development by Gender

Gender	Yes	No	Total	Percent
Male	29	32	61	38.9
Female	44	52	96	61.1
Total	73	84	157	100.0

No significant gender-based difference is observed in the development of spontaneous bacterial peritonitis (SBP), with percentages similar for males and females.

Table No. 3: Age Distribution

Age Group	Frequency	Percent
40-50	89	56.7
51-60	55	35.7
61-70	12	7.6
Total	157	100.0

The majority of patients fall within the age group of 40-50 years, comprising 56.7% of the study population.

Table No. 4: SBP Development by Age Group

Age Group	Yes	No	Total	Percent
40-50 years	52	37	89	56.7
51-60 years	18	43	55	35.7
61-70 years	3	7	12	7.6
Total	73	84	157	100.0

Age has a significant association with SBP development ($p=0.002$), with the highest percentage in the 40-50 age group.

Table No. 5: Underlying Causes of Cirrhosis

Causes	Frequency	Percent
Hepatitis B	54	34.4
Hepatitis C	91	58.0
Liver Cirrhosis	12	7.6
Total	157	100.0

Hepatitis C is the leading cause of cirrhotic ascites in the study, representing 58.0% of cases, followed by hepatitis B (34.4%).

Table No. 6: SBP Development by Gender and Asymptomatic Status

GP	Asympto-matic	SBP Develo-pment	Total	SBP Percen
Male	32	29	61	38.9
Female	52	44	96	61.1
Total	84	73	157	100.0

The development of SBP was observed to be significantly correlated with age ($p=0.001$), underlying causes ($p=0.000$), and length of cirrhosis ($p=0.000$). 39.5% of the patients had symptoms. Ninety-four percent had secondary SBP, and fifteen percent had gastrointestinal bleeding. The research offers insightful information on the complex features of cirrhotic ascites.

DISCUSSION

This study confirms clinical assumptions that outpatient cirrhosis patients had considerably lower SBP rates than hospitalised patients. One-third of outpatient paracentesis SBP patients died after a year, compared to 50–70% of inpatients. In asymptomatic outpatients with unique features from hospitalised patients, SBP stays distinct.[7] Unlike hospitalised patients, outpatient culture is dominated by gram-positive microbes.[8] Type I hepatorenal syndrome is rare in outpatients but may develop in 30% of SBP patients. Survival improves. Antibiotic-free outpatient SBP recurrence is uncommon. Hospitalised and ambulatory SBP patients had low ascitic fluid protein.[9] Outpatient SBP diagnosis criteria must be resolved. After 90 days, four patients without antibiotics had 250–500 neutrophils/mm³ and no hepatic, renal, or SBP symptoms. Good outcomes in eight bacterascites patients suggest antibiotics are unnecessary. Like neutrocytic ascites, these patients' bacterascites had a spectrum.[10] Resolution and bacteria clearance may occur spontaneously in neutrocytic ascites patients without renal issues. Previous study reveals that ascitic fluid neutrophils and bacteria change quickly. Without neutrocytic ascites, 42% of bacterascite episodes resolve.[11] This research found distinct microorganisms in hospitalised cirrhotic ascites patients. The rare species didn't include Escherichia coli and Klebsiella pneumoniae, which are prevalent in hospitalised cirrhosis patients, but they were linked to neutrocytic ascites, making them actual infections.[12] Most patients are sent to us after first assessment elsewhere, thus the uncommon species may symbolise our practice. A recent research shows SBP-grown organisms' shifting behaviours. Prophylactic or previous norfloxacin treatment explained Fernandez et al.'s[7] gram-positive organisms. However, regular, meticulous review of our patients' medical records indicated no antibiotics or treatments in the weeks preceding paracentesis.[13] Gram-positive bacteria predominate, thus further explanations are required. Due to liver disease complexity, this research may include many asymptomatic SBP patients due to its placement at a big referral hospital. SBP outpatients had a mean MELD score of 17.9, lower than Barcelona, Spain's 24.5 and the cohort of SBP patients, but similar to ascites patients without SBP (18.1) at the same centre.[14] The MELD score suggests that outpatient SBP patients may have less disease than hospitalised individuals. By studying numerous cirrhosis patients over several years, our research reduced sampling error. Paracentesis and ascitic fluid analysis were standardised, minimising sample handling variability. Patient treatment variety following ascitic fluid analysis represents 'real world' knowledge and offers this group a reasonable survival prognosis.[15] Debate is needed on some statistical errors. Only tertiary care referral centre patients may benefit. Retrospective analysis hampers research despite prospective data collection. For instance, paracentesis or antibiotic exposure should not be assessed within weeks after study entry. Classifying the range of pathogens in community outpatients with cirrhosis ascites requires prospective investigations, but the low rate of positive cultures makes this knowledge unlikely to impact patient management.[16] Second, ascites severity inside it difficult to calculate the child-Pugh score and encephalopathy from the medical record. Many non-SBP patients had no serum creatinine, making scoring unattainable. Third, SBP was identified and treated without protocol. Finally, our research included too few outpatients with SBP to recommend antibiotic treatment over inpatient care or determine which outpatients are more likely to develop SBP than low-protein ascites.[17] We conclude that cirrhotic ascites asymptomatic outpatients seldom have SBP. Most cultivated plants are gram-positive. Although lower than in hospitalised patients, one-year mortality may reach 33%. With less severe cirrhosis, spontaneous infection etiology in outpatients with cirrhotic ascites may be more difficult than in hospitalised patients.[18] The infection will cure naturally. Thus, neutrocytic ascites outpatients do not have the poor prognosis of SBP inpatients. Outpatient SBP diagnosis criteria may require reevaluation.

Authors appreciate Linda Sybrant's secretarial services.[19]

CONCLUSION

Asymptomatic liver cirrhosis and ascites patients had low SBP rates, according to our prospective study. Our patients' SBP bacteria were mostly Gram-positive, suggesting causal agent improvements. SBP is more prevalent in Cirrhosis patients under 12 months. SBP is also more prevalent in Hepatitis B patients than in Hepatitis C and other Cirrhosis. Our results should be interpreted cautiously and may only apply to a certain patient group. Further research is needed to assess the issue.

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Author's Contribution:

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Final Approval of version:	Bushra Riaz

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Original Article

Etiology and Management of Blunt Liver Trauma in a Tertiary Care Hospital

Management of Blunt Liver Trauma

Uzma[1], Shamsheer Ali[1], Mohammad Usman[2] and Saif Ur Rahman[3]

ABSTRACT

Objective: The increasing prevalence of bullet injuries and road traffic accidents poses significant challenges for the improvement in trauma management especially blunt liver trauma due to its location and being a high vascular organ. The present study aimed to determine the etiology and management of blunt liver trauma.

Study Design: A cross-sectional study

Place and Duration of Study: This study was conducted at the Department of General Surgery, Saidu Group of Teaching Hospitals Saidu Sharif Swat, (SGTH) from February 2022 to September 2022.

Methods: Patients presented with various injuries were examined and detail history was taken regarding the types of injuries and comorbid status. Head to toe examination was done. HBsAg and HCV and HIV status, Urea, creatinine and Random Blood Sugar Level (RBS), X-ray erect abdomen/ lateral decubitus position, Ultrasound abdomen, Peritoneal aspiration, and CT scan were performed on each patients. SPSS version 27 was used for data analysis.

Results: The overall mean age was 40.82±6.82 years. Age-wise distribution of patients were as follows: 136 (54.2%) in 10-25 years, 60 (25.4%) in 26-40 years, and 40 (16.9%) in 41-55 years. There were 144 (61%) males and 92 (39%) females. Road traffic accident (RTA) was the most prevalent mechanism of injury found in 98 (41.5%) cases, followed by fall from height 76 (32.2%), physical assault 38 (16.1%), and Sport's injury 24 (10.2%) cases. The incidence of successful conservation management was 77.1% (n=182). The mortality rate was 36.4% (n=86).

Conclusion: The present study observed that the severity of blunt liver trauma had significant association with probability of successful conservative management. Limited hospital resources and a lack of consensus on traditional treatment methods adversely affected success.

Key Words: Blunt liver trauma, etiology, management

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INTRODUCTION

The liver, which stands out in the abdominal cavity, is the largest and strongest organ and exhibits a strong posture. This highly vascularized organ comprises more than 25% of the body's lymphatic system and plays a dual role in hematological and immune functions. Liver injury in abdominal trauma is the secondary event occurs frequently, contributing significantly to 20% to 40% of deaths in affected patients, and the consequences of road traffic accidents (RTA)[1].

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Approximately 30% of liver injuries are associated with penetrating substances, while in Pakistan, the incidence varies. From 15% to 20% are associated with mild trauma to the gastrointestinal tract[2]. In developed countries, abdominal trauma accounts for 26% of traumatic liver injuries, while 30% are due to gunshot wounds and 40% are due to stab wounds[3]. Notably, in the liver injuries, 50% of internal injuries have no bleeding complications, necessitating laparotomy. The interventions are relatively easy to manage, including anticoagulants and sutures to prevent liver injury but the subset of higher liver injury presents significant management challenges, leading to an increased risk of death[4]. The incidence of different complications associated with liver trauma was 64% cases[5]. None of the liver trauma cases showed an association with other anatomic injuries, which accounted for 0%.

With modern imaging and comprehensive studies of the liver, important strategies have been developed to reshape the way, the liver injury is managed. Surgical management poses a significant challenge for consumptive surgeon's liver injury management[6]. Different surgical techniques come into play, such as simple liver resection, anatomical resection, direct suture closure, hemostatic measures combined with liver drainage. The surgical technique chosen depends

on the type of liver injury and severity, and by the knowledge of the experienced surgeons in the field.[7] Moderate injury usually results in two main types of ruptures of the liver, those with intact liver capsule and those with hemoperitoneum. Ruptures that do not injure the capsule, results in hematoma (sub capsular). In severe traumatic cases, as in an explosion, the liver may completely shatter. Shock rating systems have been developed to address this, and ongoing efforts are underway to standardize the use of liver shock management. Non-operative management (NOM) offers significant advantages, especially to reduce the need for major surgery. This approach helps to reduce the risks and complications associated with surgery, reducing the burden on healthcare resources and financial costs.[8,9] Additionally, elective surgery allows better return to work and longer recovery time, resulting in longer hospital stay in blunt liver injury.[10] There is paucity of data regarding the causes and management of blunt liver trauma in local setting. Therefore, the present study aimed to determine the etiology and management of blunt liver trauma.

METHODS

This cross-sectional study was carried out on 226 trauma patients in the Department of General Surgery, Saidu Group of Teaching Hospitals, Saidu Sharif Swat (SGTH, a tertiary Care Hospital) from February 2022 to September 2022. Patients presented with various injuries were examined and detail history was taken regarding the types of injuries and comorbid status. Head to toe examination was done. HBsAg, HCV and HIV status, Urea, creatinine, RBS, X-ray erect abdomen, lateral decubitus position, Ultrasound abdomen, Peritoneal aspiration, and CT scan in stable patients were different routinely investigation done on each patient. Demographic data such as age and gender, details history, and baseline details were recorded. A mid-section laparotomy was performed, and intraoperative observations were made to assess the severity of liver injury. Stable patients were monitored conservatively, including abdominal ultrasound and CT imaging. Patients with a collection volume of approximately 500 ml are also eligible for conservative management.

Descriptive statistics was done using SPSS version 27. Frequencies and simple percentages were calculated for qualitative variables and mean were calculated for quantitative variables, chi-square tests were used for analysis association with provisional mortality grade wounds. P-values were considered significant > 0.05.

RESULTS

The overall mean age was 40.02±8.82 years. Age-wise distribution of patients were as follows: 136 (54.2%) in 10-25 years, 60 (25.4%) in 26-40 years, and 40 (16.9%) in 41-55 years as shown in Table-I. There were 144 (61%) males and 92 (39%) females. Road traffic accident (RTA) was the most prevalent mechanism of injury, found in 98 (41.5%) cases followed by fall from height 76 (32.2%), physical assault 38 (16.1%), and Sport's injury 24 (10.2%) cases. The incidence of successful conservative management was 77.1% (n=182). The mortality rate was 36.4% (n=86). Different grades of liver injuries are demonstrated in Figure-1. Clinical details are presented in Table-II. Types of injuries are illustrated in Figure-2. Figure-3 depicts the different types of procedures performed in blunt liver trauma. Post-operative complications are demonstrated in Figure-4.

Table No. 1: Demographic details of patients

Variables	N (%)
Age (years)	40.02±8.82
Age Group (year)	
10-25	136 (54.2%)
26-40	60 (25.4%)
41-55	40 (16.9%)
Gender	
Male	144 (61%)
Female	92 (39%)

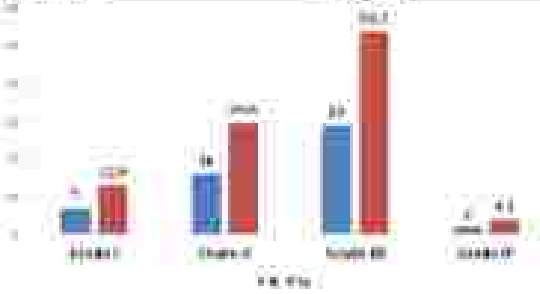

Figure No. 1: Different grades of blunt liver injuries (N=84)

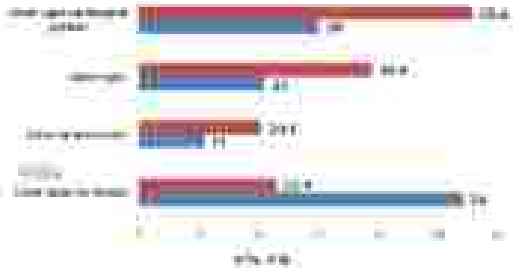

Figure No. 2: Types of injuries

Figure No. 3: types of procedures performed in blunt liver trauma

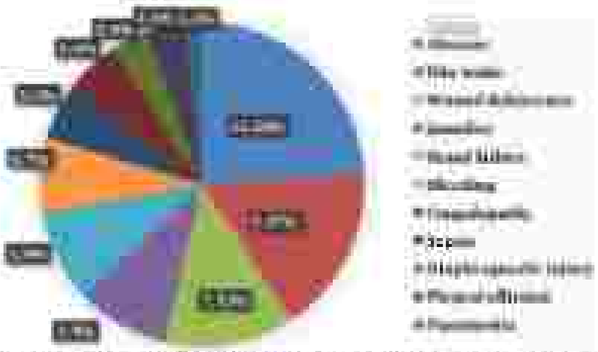

Figure No. 4: Post-operative complications of liver Trauma

Table No. 2: Clinical details

Clinical characteristics	N (%)
Sources	
Road traffic accident	98 (41.5%)
Fall from height	76 (32.2%)
Physical's assault	38 (16.1%)
Sport's injury	24 (10.2%)
Condition at arrival	
Stable	10 (18.5%)
Shock responding rapidly	17 (31.5%)
Shock responding slowly	29 (53.7%)
Treatment option	
Conservative	12 (22.2%)
Active	42 (77.8%)

DISCUSSION

The present study mainly focused on the etiology and management of blunt live trauma and reported that severity of blunt liver trauma had significant association with probability of successful conservative management. The liver, a vital and vascular organ, is located in the upper part of the abdominal cavity, protected by the ribs. Difficulties in protecting the liver and particular location pose challenges to laparotomies for liver injury, sometimes requiring a wide incision in the chest for adequate exposure. Complications in the management of bleeding livers and unstable patients has led to damage-control surgery. Patients with liver injury can be treated informally, and standards for such monitoring include contrast-enhanced CT scanning. Ultrasound-guided aspiration can be used to address any observed collections or bile leakage. Surgery is necessary when there is poor response to conservative means and extensive areas of necrosis are present in the liver. Definitive conservation by embolization is an appropriate option for those who demonstrate free-flow of contrast on CT but remain clinically stable.

According to Amiruddin Ali et al., males formed the majority in 364 cases, with a male-to-female ratio of 5:1, covering the age range from 20 to 60 years. Accordingly, our study found a 61% males and 39% females. Notably, a large proportion of young men were affected, possibly due to their involvement in outdoor activities, largely because compared to women of the same age. In our study, we found that mild abdominal trauma prevailed as the main cause of liver injury, often leading to liver damage. This is consistent with the findings of various other studies, where it is suggested that mild abdominal trauma as the most common cause related to liver injury. Supporting Tarchouli, et al highlighted the high mortality rate in patients who experienced uncomplicated abdominal trauma, reinforcing the importance of this type of trauma in terms of severity and potential outcome.

La Russa et al reported that twenty percent of individuals developing rounded abdomen had liver damage. In our study, we observed a male to female ratio of 1.57:1. Another study by Yadav et al found that the gender difference was more pronounced with 15:1 ratio, favoring males. All acute liver lesions were treated surgically, even when active bleeding was not evident, in 50-80% of cases. Among similar injuries, our study revealed examples of hepatic lesions that did not consistently bleed during laparotomy. In our study, the most important determinant of treatment option was the hemodynamic status of the patient.

The severity of liver damage correlates significantly with the likelihood of success in conservative treatment. A coefficient of 2.6 was recorded for injury rate, indicating that an injury rate increased the probability of obtaining effective conservative treatment. Typically, conservative treatment demonstrate an effect in the presence of deteriorating blood vessels, circulatory issues, and septic complications. Secondary bleeding is known to occur in less than 7% of conservatively managed patients, according to Ordóñez et al. and Lee et al. In our study, conservative treatment failed in 3% of cases due to late bleeding. Consistent with the findings of Brooks et al. and Alonso et al. Biliary proliferation was observed in 3-20% of conservatively treated patients.

Lin et al found that 79% of patients with liver injury had infiltrating blunt trauma, and several other authors reported that blunt trauma was the most common cause of liver injury. In a study conducted by Ibrahim et al a high mortality rate was recorded. Although several authors have reported that blunt trauma is the major cause of liver injury, our series deviates from this trend, suggesting that penetrating trauma (firearms) is the most common cause of liver injury.

CONCLUSION

The present study observed that the severity of blunt liver trauma had significant association with probability of successful conservative management. Limited hospital resources and a lack of consensus on traditional treatment methods adversely affected success. A short-term mortality rate of liver injury patients was associated with injuries classified as grades IV and V.

Author's Contribution:

Concept & Design of Study:	Uzma
Drafting:	Shamsheer Ali, Muhammad Usman
Data Analysis:	Saif Ur Rahman
Revisiting Critically:	Uzma, Shamsheer Ali
Final Approval of version:	Uzma

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Original Article

Frequency of Depression and Anxiety Among Melasma Patients Presented at Tertiary Care Hospital

Muhammad Erfan[1], Ammum Shahzadi[2], Afshan Sagheer[3], Ibra Khan[3], Areeba Jabbar[4] and Seemal Akram[5]

ABSTRACT

Objective: To determine the frequency of depression and anxiety in patients with melasma

Study Design: A cross-sectional study

Place and Duration of Study: This study was conducted at the Department of Dermatology, Faroog Hospital, Islamabad in the duration from October, 2022 to July, 2023

Methods: 180 patients presenting with clinically diagnosed melasma since two weeks of either gender having age between 13 to 60 years. We determined the frequencies for anxiety and depression in patients of melasma.

Results: The mean age of the patients presenting with acne vulgaris was 33.41±15.40 years. The frequency of anxiety in our study was 54 (33.3%). The frequency of depression in our study was 30 (18.5%).

Conclusion: From our study we conclude that the frequency of depression was 54 (33.3%) and anxiety 106 30 (18.5%) in patients with melasma.

Key Words: Anxiety, Depression, Acne vulgaris, Skin disease, Mental health

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INTRODUCTION

The connection between mental and physical well-being is a complicated phenomenon that continues to grab the interest of researchers and healthcare professionals alike in the intricate tapestry of human health.[1] Melasma is a dermatological illness that causes hyperpigmented patches on the skin. It has become a unique platform to illustrate the strong link between mental health and physical attractiveness. In addition to the outward signs of pigmentation, melasma patients frequently struggle with the equally serious but less obvious problems of worry and sadness.[2]

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The deep relationship between mental health and melasma demands an understanding of the physiological and psychological components that make up the condition's complex mosaic. The abnormality of melanin synthesis, the pigment that contributes to skin coloring, is the physiological basis of melasma.[3] Hormonal variations are known triggers, especially during pregnancy or as a result of using oral contraceptives, but genetic susceptibility and UV radiation exposure are also important factors. But the journey of melasma goes well beyond the boundaries of its physical roots, entwining itself with the fragile strands of mental health.[4]

Psychological anguish in those with melasma has been linked to the condition's apparent character. The focus placed by society on having perfect skin as a standard for beauty has brought skin-related issues to the forefront of issues with self-esteem and body image. Melasma patients frequently struggle to navigate a complex emotional web while experiencing feelings of humiliation, low self-worth, and self-consciousness.[5,6]

Melasma sufferers' life are long shadowed by depression, which is marked by enduring emotions of despair, hopelessness, and disinterest in once-enjoyed activities. The emotional upheaval is intensified by the expectation that society to live up to 'beauty' ideals, which breeds hopelessness and loneliness[7,8]. The periodic occurrence of melasma typically exacerbates its psychological toll, as flare-ups can occur at any time and add to the emotional strain experienced by those who are affected. Another powerful ally on the path to melasma is anxiety, which shows up as excessive

concern, restlessness, and hypervigilance[10,11]. Melasma is unpredictable, which makes people anxious since they can't stop worrying about when it will happen again or if their current coloring will get worse. The never-ending loop of worry and increased anxiety can have a negative effect on mental health in general.

It is crucial to use a holistic approach that takes into account both the visible and invisible features of melasma in order to unravel the intricate web of anxiety and despair in these patients. The goal of this study was to determine the frequency of depression and anxiety among melasma patients presented at tertiary care hospital. Through an awareness of the complex physiological and psychological factors involved, medical experts can customize interventions to meet the multiple character of melasma, providing comprehensive mental health assistance in addition to dermatological solutions. By taking a complete strategy that promotes skin health and emotional well-being, melasma's shadows can be lifted.

METHODS

A cross-sectional study was undertaken at Department of Dermatology, Farooq Hospital Islamabad in the duration from October, 2022 to July, 2023. The research commenced subsequent to obtaining authorization from the hospital's ethics council. Patients were recruited if they satisfied the inclusion criteria. Every patient was informed about the study's objective, as well as the potential hazards and advantages. The recruited patients were instructed to provide their signature on a written consent form. Demographic data, including age, gender, and address, along with pertinent medical records, were obtained, and a physical examination will be conducted.

Patients who received a diagnosis of melasma based on a physical examination underwent an assessment of depression and anxiety. The assessment of anxiety was conducted using the Hospital Anxiety and Depression Scale (HADS), and a diagnosis was made if the score on this scale exceeded 7. Depression is characterized as intense and usually long-lasting emotions of hopelessness and sadness. The assessment was conducted using the HADS scale and categorized as a score over 7.

An experienced consultant with a minimum of five years of specialized knowledge in the field supervised the entire process. A pre-designed proforma was utilized to gather comprehensive patient information.

The data analysis was conducted using the software SPSS v 23. The mean and standard deviation (SD) were used to quantify data, such as age. Qualitative variables such as gender, depression, anxiety, marital status, occupation status, and socio-economic status were represented in frequencies and percentages. The study stratified depression and anxiety with gender. Chi-square test was performed with a significance threshold of 5%. The presentation of all outcomes will be in the form of tables.

RESULTS

The mean age of the patients presenting with melasma was 33.41±13.40 years. The mean HADS-A score for anxiety was 8.62±5.60 while the mean HADS-D score for depression was 7.09±4.32. Regarding age distribution there were 99 (61.9%) patients in the age group of 18 to 35 years, there were 39 (24.4%) patients in the age group of 36 to 50 years and there were 22 (13.8%) patients in the age group of 51 to 70 years. According to the gender distribution there were 63 (39.4%) male while 97 (60.6%) female patients in our study. The frequency of anxiety in our study was 54 (33.8%). The frequency of depression in our study was 30 (18.8%). We found that anxiety and depression were significantly more prevalent in female patients presenting with melasma as compared to their male counterparts (P = 0.03; P = 0.04).

Figure No. 1: Gender distribution

Table No. 1: Basic demographics

Baseline characteristics		N	%
Marital status	Single	93	58.1%
	Married	67	41.9%
Socioeconomic status	Rich	27	16.9%
	Middle class	93	58.1%
	Poor	40	25.0%
Occupational status	Employed	73	45.6%
	Unemployed	87	53.1%
Age distribution	18 to 35 years	99	61.9%
	36 to 50 years	39	24.4%
	51 to 70 years	22	13.8%

Table No. 2: Frequency of anxiety and depression

Anxiety Depression		N	%
Anxiety	Yes	54	33.8%
	No	106	66.2%
Depression	Yes	30	18.8%
	No	130	81.3%

Table No. 3: Association of anxiety and depression with gender

Anxiety/Depression		Gender				P value
		Male		Female		
		N	%	N	%	
Anxiety	Yes	18	[illegible]	36	[illegible]	.03
	No	49	[illegible]	56	[illegible]	
Depression	Yes	7	[illegible]	23	[illegible]	.04
	No	56	[illegible]	74	[illegible]	

DISCUSSION

Anxiety and depression disorders are commonly occurring ailments that often appear together. Individuals who have both anxiety and depressive conditions simultaneously typically display greater degree of functional impairment, decreased quality of life, and inferior treatment outcomes in comparison to patients who have only one condition.

The investigation of these diseases primarily centers on the concurrent presence of depression and generalized anxiety disorder, with a particular emphasis on understanding their clinical presentation, progression, evaluation, and diagnosis. The diagnosis of these illnesses is complex due to the coexistence of mixed anxiety and mood states, as well as significant similarities in the physical and emotional symptoms of the disorders. The DSM-5 defined anxious distress as a specific category of serious depression. Several dermatologic illnesses significantly affect life quality. At least 30% of individuals with dermatologic diseases experience psychiatric disturbance and psychosocial impairment.

Within the field of dermatology, the psychological effects of melasma have been extensively researched. The impact on the life's quality, as measured by the "SF-36 Health Survey," is similar in patients with melasma and people with chronic illnesses such heart diseases, arthritis and diabetes. The frequency of depression was notably greater in patients with melasma compared to the general population. A study with a response rate of 61%, observed that 60% of the 2391 persons with melasma had depressed symptoms.

Not having enough education, being in young age, and the existence of itch were positively correlated with higher degrees of depressed symptoms. Accurate data regarding the frequency of depression among patients with melasma is lacking due to the utilization of multiple depression scoring techniques or self-reported data in the many research investigating this correlation.

The objective of the present study was to determine the prevalence of anxiety and depression among individuals diagnosed with melasma. Understanding this can enhance patient care and outcomes by identifying the need for timely supportive or psychological intervention. This intervention can ensure patients' adherence to therapy and improve their social and psychological well-being.

The study documented that 54 patients (33.3%) with melasma had anxiety, whereas 30 patients (18.5%) exhibited symptoms of depression. Our study's findings align with a previous study that reported the occurrence of anxiety at a rate of 16.27% and depression at a rate of 3.69% among patients with melasma. Several prior research have documented the attributes of melasma, with sun exposure identified as the primary contributing cause. A separate study involving 125 melasma patients revealed that 34.96% of them experienced depression, while 38.6% experienced anxiety. The study determined that there is a correlation between melasma and depression and anxiety in roughly 53% of the individuals.

CONCLUSION

From our study we conclude that the frequency of anxiety and depression in melasma patients was 33.3% and 18.5%. Anxiety and depression were significantly associated with gender. These patients must be provided proper counselling upon the onset of the disease to avoid the severity of the psychological factors.

Author's Contribution:

Concept & Design of Study:	Muhammad Erfan
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Revisiting Critically:	Muhammad Erfan, Amnum Shahzadi
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Original Article

Diagnostic Accuracy of RIPA-SA Score in Detecting Acute Appendicitis

Hunain[1], Uzma[2] and Saif Ur Rahman[2]

ABSTRACT

Objective: Determining the sensitivity and specificity of the RIPA-SA score is the main goal in evaluating its diagnostic accuracy in identifying acute appendicitis. Specificity evaluates the score's capacity to accurately identify real negatives, offering vital information about its clinical relevance, while sensitivity evaluates the score's capacity to properly detect true positives.

Study Design: A cross-sectional study

Place and Duration of Study: This study was conducted at the Department of General Surgery, Saidu Group of Teaching Hospital and Swat Medical Complex, Swat from January 2022 to December 2022.

Methods: Between January 2022 and December 2022, 224 acute appendicitis patients at the General Surgery Department of the Saidu Group of Teaching Hospital and the Swat Medical Complex in Swat participated in a cross-sectional research. Patients who had discomfort in the right iliac fossa (RIF) for less than seven days were recruited. Taking into account the surgical team's experience as well as imaging results, surgeons evaluated the surgical preparations of their patients. After the RIPA-SA score was assessed, scores based on fifteen distinct factors were produced. Based on the Receiver Operating Characteristic (ROC) study, the ideal cut-off threshold score was found to be 7.5.

Results: The overall mean age was 26.4 ± 8.98 years. Age-wise distribution of patients were as follows, 146 (65.2%) in 10-20 years, 36 (16.1%) in 21-30 years, 28 (12.5%) in 31-40 years and 14 (6.3%) in 41-50 years. Of the total 224 patients, there were 140 (62.5%) male and 84 (37.5%) female. Histopathology confirmed 128 positive cases of acute appendicitis, while the RIPA-SA score diagnosed 133 cases. There were 103 true negatives, 5 false negatives, 123 real positives, and 8 false positives among them. A 96.1% sensitivity, 92.7% specificity, 94.7% diagnostic accuracy, 94.0% positive-predictive-value, and 95.3% negative-predictive-value were all shown by the RIPA-SA score.

Conclusion: The present study indicated that the RIPA-SA score exhibited effective proficiency in identifying cases of acute appendicitis. Nevertheless, it achieves a balance by identifying cases early, thereby mitigating the risk of potential complications.

Key Words: Acute appendicitis, diagnostic accuracy, RIPA-SA score

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INTRODUCTION

Acute appendicitis is a common surgical emergency, occurring in a range of 13% to 77%, with an average incidence of approximately 50%[1]. Acute appendicitis are frequently encountered affecting approximately one in seven individuals during their lifetime causing unbearable pain in the right lower side of abdominal region[1,2].

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The preoperative diagnosis of this common condition is challenging, emphasizing the importance of accurate diagnosis, clinical details, and prompt response. While imaging modalities such as ultra-sonography and computed tomography enable a more accurate diagnosis of acute appendicitis, their widespread availability is limited, particularly in countries. Confirmation of the diagnosis is typically achieved through histopathology, as evidenced by the presence of leukocytosis. The identification of acute appendicitis involves the neutrophils presence in the submucosa, mucosa, and lamina propria[3]. The primarily parameters involved in the acute appendicitis diagnosis are medical history, elevated count of white cell, clinical details, and other laboratory investigations. This difficulty in diagnosis of acute appendicitis arises due to the resemblance of signs and symptoms to various genitourinary and gynaecological inflammatory conditions. Delaying an appendectomy results into increasing risk of sepsis and perforation in turns lead to higher mortality rate[4,5].

Having the ability to accurately identify acute appendicitis is crucial for emergency department

doctors, since it is a prevalent ailment that often presents in the ER. This has led to the development of a plethora of grading systems that take clinical indications, symptoms, and test findings into account. The three components of this system are the Alvarado score, the Modified Alvarado score, and the RIPA-SA system.[5,6,7] When compared to the Alvarado score, the new RIPA-SA scoring system for acute appendicitis shows much higher sensitivity, specificity, and diagnostic accuracy. When treating patients with right iliac fossa pain, a surgeon may decide early on to operate on those with a RIPA-SA score > 7.5, those with a score < 7.0 in the unit will either be monitored or released. A previous study focused on the RIPA-SA score, a revolutionary scoring system that demonstrated up to 89% and 97% of sensitivity and specificity, respectively[8]. Hence, the present study sought to explore the diagnostic precision of RIPA-SA in detecting acute appendicitis.

METHODS

From January to December 2022, 224 acute appendicitis patients at the Department of General Surgery, Zaldi Group of Teaching Hospital and Star Medical Complex, Sialt were studied in a cross-sectional research. Patients with right iliac fossa (RIF) discomfort for fewer than 7 days were included. Acute appendicitis has a 42% lifetime incidence [10]. Sample size was computed using confidence interval 95%, absolute precision 3%, and expected population proportion 40% (p=0.4). Consultant evaluated patients' surgical indications based on imaging and surgical team skills. The RIPA-SA score was calculated from 15 parameters with scores. The appropriate cut-off threshold score was 7.5, according to ROC analysis. SPSS 27 was used for descriptive statistics. For quantitative data like age, mean and standard deviation were used, for qualitative data like gender, frequency and percentage estimates were used. RIPASES score was provided as a 2 x 2 table with sensitivity, specificity, diagnostic accuracy, positive and negative predictive values.

RESULTS

The average age was 28.4 ± 8.98 years. 148 (65.7%) patients were 10-20 years old, 36 (16.1%) 21-30 years old, 28 (12.5%) 31-40 years old, and 14 (6.3%) 41-50 years old. Out of 224 patients, 140 (62.5%) were male and 84 (37.5%) female. The RIPA-SA score detected 133 acute appendicitis patients, whereas histopathology confirmed 128. These included 125 real positives, 8 false positives, 5 false negatives, and 102 true negatives. RIPA-SA had 96.1% sensitivity, 92.7% specificity, 94.7% diagnostic accuracy, 94.0% positive-predictive-value, and 95.5% negative predictive value. Age distribution of patients is shown in Figure-1. Figure-2 shows RIPASES score sensitivity, specificity, diagnostic accuracy, positive and negative predictive values. RIPA-SA score frequency is presented in Figure-3.

Figure No.1: Age-wise distribution of patients (N=224)

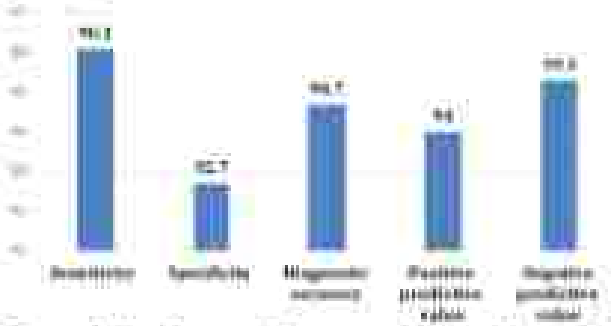

Figure No. 2: sensitivity, specificity, diagnostic accuracy, positive-predictive-value, and negative-predictive-value of the RIPASES score

Figure No. 3: Frequency of RIPA-SA score (N=145)

DISCUSSION

Acute appendicitis poses a significant challenge as often associated with the risk of appendiceal perforation and peritonitis, leading to elevated mortality and morbidity rates[11]. Relying solely on a patient's signs and symptoms for the decision to perform surgery results in the removal of normal appendices, known as negative appendectomy, occurring in 15% to 30% of cases[12,13]. A more rational approach seeks to reduce both negative appendectomy and appendiceal rupture rates. The goal is to minimize unnecessary appendicectomies without compromising the rate of appendiceal perforation[14,15]. Immediate surgical intervention is essential for acute appendicitis, a highly prevalent medical emergency[16]. Abdominal pain,

elevated temperature, guarding, anorexia, enuresis, and severe pain in right iliac fossa were common symptoms of acute appendicitis[illegible]. Numerous studies reported that higher sensitivity and specificity of CT scans could assist in primary revealing of AA[illegible].

RIPA-SA score is a new scoring system comprised of 14 factors determined through physical examination, clinical details, and laboratory investigations. A recent study reported that RIPA-SA score shown 98% and 67% sensitivity and specificity respectively that is more superior to 59% and 23% of Alvarado score[illegible]. Sharma et al[illegible]. In suspected instances of AA, the diagnostic accuracy of the Alvarado and RIPA-SA scores were compared. It was discovered that the latter is more superior to the former in terms of both sensitivity and diagnostic accuracy.

According to the current research, the RIPA-SA score showed 94.1% sensitivity, 92.7% specificity, 94.7% diagnostic accuracy, 94.9% positive-predictive-value, and 95.5% negative predictive value. Furthermore, Aslam et al[illegible] reported comparable findings, majority of cases were accurately diagnosed of AA based on (RIPA-SA score >7.5) and receiving appropriate treatment.

The RIPA-SA score proves to be a valuable diagnostic tool for the detection of acute appendicitis. A significant majority of patients could be accurately categorized as acute appendicitis high probability or low probability following the urinalysis, clerking completion, and clinical examination without considering of elevated white cells. In limited cases of acute appendicitis, patients wait for the elevated white cell.

CONCLUSION

The present study indicated that the RIPA-SA score exhibited effective proficiency in identifying cases of acute appendicitis. Nevertheless, it achieves a balance by identifying cases early, thereby mitigating the risk of potential complications. This advantage is counterbalanced by its lower specificity, leading to a slightly higher negative appendectomy rate and the associated morbidity and mortality linked to unnecessary surgical interventions.

Author's Contribution:

Concept & Design of Study:	Uzma
Drafting:	Hunain, Saif Ur Rahman
Data Analysis:	Saif Ur Rahman
Revisiting Critically:	Uzma, Hunain
Final Approval of version:	Uzma

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Original Article

Prevalence of Vitamin-D Deficiency among Individuals Diagnosed with Alopecia Areata

Vitamin-D Deficiency with Alopecia Areata

Sumyra Saleem[1], Muhammad Erfan[2], Muhammad Faisal Bacha[3], Ikra Khan[4], Areeba Jabbar[5] and Seemal Akram[6]

ABSTRACT

Objective: An immunological response causes hair follicle inflammation in alopecia areata (AA). Alopecia totalis, universalis, and patchy hair loss may occur. This Study examined vita min-d deficiency in alopecia areata patients.

Study Design: A case-control study

Place and Duration of Study: This study was conducted at the Department of Dermatology, Farooq Hospital Islamabad from October 2022 to July 2023.

Methods: This case-control Study was done on 45 alopecia areata (AA) patients and 45 controls. Serum 25-hydroxy vita min-d [25-(OH)-D3] levels were measured in all individuals. The SALT was used to assess alopecia's severity. Venous blood samples were taken in the lab for 25-(OH) vita min-d enzyme immunoassay on a chemical analyzer. The analytical data was recorded in SPSS 27.

Results: The mean age of study and control group was 22.94 ±7.82 years and 23.84 ±8.46 years respectively. The median (IQR) of vita min-d level of study and control group was 14.6±17.9) ng/dL and 23.2±15.32 ng/dL respectively. The incidence of Unifocal, Multifocal, Ophiasis, Alopecia universalis, and Alopecia totalis were different pattern of alopecia found in 20% (n=9), 51.1% (n=23), 11.1% (n=5), 6.7% (n=3), and 11.1% (n=5) respectively. Significant differences between study and control group were seen in terms of vita min-d levels based on SALT score that was 23.5 ng/dl in S1 compared to 7.9 ng/dl in S5.

Conclusion: It has been observed that a significant association between lower serum vita min-d levels and alopecia areata (AA) compared to the levels in healthy controls. This suggests that there may be a correlation between AA and vita min-d deficiency, as the mean vita min-d levels in patients were notably lower than healthy control group.

Key Words: Alopecia areata, vita min-d, autoimmune disease, hair loss

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INTRODUCTION

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An autoimmune condition known as alopecia areata (AA) that affects only certain organs is characterized by T-cell infiltration and cytokine release around anagen stage hair follicles[1,2]. This condition has long been recognized for its associations with HLA Class I and II, as well as its occurrence alongside various autoimmune disorders including rheumatoid arthritis (RA), type I diabetes mellitus (DM), vitiligo, systemic lupus erythematosus (SLE), thyroiditis, pemphigus vulgaris (PV), pernicious anemia, and celiac disease[3-5]. A kind of hair loss called alopecia areata (AA) does not leave scars behind. It may show up in a variety of ways, from isolated areas of hair loss to alopecia totalis (total baldness) and alopecia universalis (hair loss across the body)[6]. Individuals have a 1.7% lifetime chance of developing alopecia areata (AA), with a recorded prevalence estimated to be between 0.1% and 0.2%. References[7,8]. With alopecia areata (AA), the incidence of autoimmune disorders rose by 16%[9]. Numerous studies on vita min-d have shown how important it is for immune system regulation[10].

The maintenance of calcium homeostasis and bone health may be strongly influenced by the secosteroid hormone known as vita min-d. Although 1,

25-dihydroxyvita min-d (1, 25(OH)2D3) is the physiologically active form, its short half-life (less than 4 hours) may sometimes result in normal levels, even in cases of vita min-d insufficiency. Consequently, this marker is seen to be a more trustworthy indication as it captures vita min-d exposure from all sources and offers a consistent picture of vita min-d levels.[9, 10] Furthermore, calcium and vitamin D both have immunomodulatory properties. A lack of vitamin D has been connected to a variety of autoimmune conditions, such as vitiligo, psoriasis, and systemic lupus erythematosus.[11-13] The correlation between vita min-d deficiency and alopecia areata (AA) is still a subject of debate, and conflicting data on this association exist. Therefore, the objective of the current study was to determine the prevalence of vita min-d Deficiency among Individuals Diagnosed with Alopecia Areata.

METHODS

45 alopecia areata (AA) patients and 45 controls. All patients had vita min-d levels checked and SALT was used to assess disease severity. Venous blood samples were taken in the lab for twenty five-(OH) Enzyme immunoassay for vitamin D on a chemical analyzer. Following signed notification consent, demographic, illness, family, and atopy histories were gathered. Several hair loss patterns were recorded: totalis, unifocal, universalis, ophiasis, and multifocal. SALT reported illness severity as S1–S5. The hospital laboratory analyzed vita min-d levels in 5 ml blood samples from each patient. vita min-deficiency, insufficiency, and sufficiency were classified as <10, 21-29, and 30 ng/dl. The data obtained from the analysis was recorded using SPSS version 27. The mean ± standard deviation (SD) was calculated for continuous variables such as age and the number of patches. Qualitative parameters such as SALT score, family history of the disease, disease's duration, history of atopy, and alopecia pattern were presented as frequencies and percentages.

RESULTS

The overall mean age of study and control group was 22.94 ±7.92 years and 23.84 ±8.46 years respectively. The median (IQR) of vita min-d level of study and control group was [4.6±17.9 ng/dL and 23.2±33.32 ng/dL respectively. The incidence of Unifocal, Multifocal, Ophiasis, Alopecia universalis, and Alopecia totalis were different pattern of alopecia found in 20% (n=9), 51.1% (n=23), 11.1% (n=5), 6.7% (n=3), and 11.1% (n=5) respectively. Significant differences between study and control group were seen in terms of vita min-d levels based on SALT score that was 23.5 ng/dl in S1 compared to 7.9 ng/dl in S5. Each group comprised 18 individuals (40%) who were male and 27 individuals (60%) who were female. Nail pitting was observed in 16 (35.6%) of the patients, while none were observed in the control group. Demographic details of patients are shown in Table-I. Distribution of patients based on their disease duration are shown in Figure-1. Figure-2 illustrate the Pattern of alopecia. SALT score are shown in Table-II.

Table No. 1: Demographic and baseline characteristics of patients

Parameters	Study group (N=45)	Control (N=45)
Age (years)	22.94 ±7.92	23.84 ±8.46
vita min-d level (ng/dL)	[4.6±17.9	23.2 ±33.32
Gender N (%) Male Female	27 (60%) 18 (40%)	27 (60%) 18 (40%)
Family history of Disease	13 (28.9%)	4 (8.9%)
Family history of atopy	10 (22.2%)	7 (15.6%)

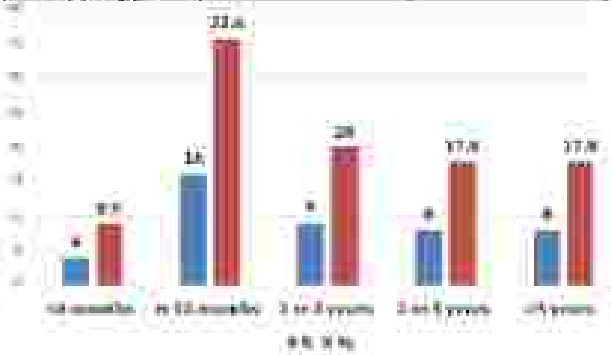

Figure No. 1: Distribution of patients based on their disease duration (N=45).

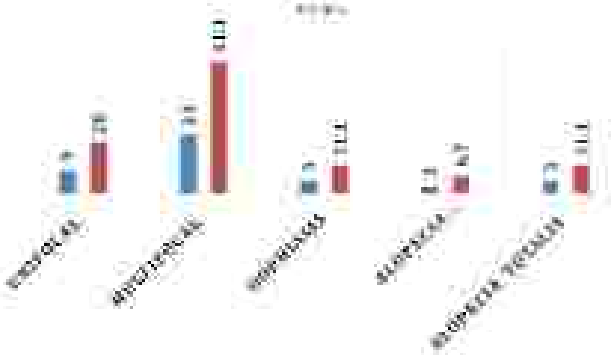

Figure No. 2: Pattern of alopecia (N=45)

Table No. 2: SALT score

SALT Score	N (%) [Mean SD]
S1	7 (15.6%) [23.5]
S2	10 (22.2%) [23.5]
S3	18 (40%) [18.6]
S4	3 (6.7%) [12.4]
S5	7 (15.6%) [7.9]

DISCUSSION

Alopecia areata predominantly affects individuals at a young age and is more prevalent in females. The most prominent alopecia areata pattern was multifocal alopecia, characterized by the presence of two or more patches. A majority of patients sought medical attention within one year of experiencing symptoms. Moreover, in the study, twelve patients (27%) had a positive family history of the disease, in contrast to only two individuals in the healthy control group. Additionally, a higher number of alopecia areata patients were found to have a family history of atopy compared to the healthy controls. The present study's findings show that those with "alopecia areata" (AA) had significantly lower average vits min-d levels than did healthy controls, with a p-value of less than 0.05 indicating statistical significance. Surprisingly, a more severe vits min-d deficiency was linked to more severe instances of AA[15,16]. Yilmaz et al [17] reported that AA patients had lower vits min-d serum levels than control cases. The study found that 93% of their cohort had 25(OH)D deficiency, a slightly lower prevalence than the observed value in the present study. Their study reported no significant correlation between AA severity and vits min-d levels. On contrary, vits min-d levels were inversely related to AA severity as observed in the present study. These variations underscore the complexity of the association of vits min-d levels with AA severity, suggesting that additional factors may contribute to these associations.

vits min-d, generated through the skin conversion process of pre to pre-vitamin, plays a role in enhancing tyrosinase activity and melanin synthesis. Consequently, it contributes to pigmentation and exhibits diverse immunoregulatory functions[18-20]. vits min-d analogues are recognized for their ability to promote repigmentation in individuals with vitiligo patches[21].

The perennial pathogenesis of "alopecia areata" (AA) is likely associated with autoimmunity and inflammation. An earlier report revealed that immunomodulatory effects of vits min-d exerts by pro-inflammatory cytokines inhibition[22]. The pro-inflammatory cytokines upregulation comes from vits min-d deficiency in AA. Consequently, this could lead to increased systemic inflammation in AA, which is recognized as an autoimmune disease affecting the hair follicles[23].

Another study reported the "alopecia areata" (AA) relapse as a seasonal variation, which indicated the lower vits min-d levels in winter season[24]. In the study groups of both patients and controls in this study, vits min-d levels were lower, suggesting a potential vits min-d deficiency in the general population[25].

CONCLUSION

A significant association between lower serum vits min-d levels and "alopecia areata" (AA) compared to the levels observed in healthy controls. This suggests that there may be a correlation between AA and vits min-d deficiency, as the mean vits min-d levels in patients were notably lower than healthy control group.

Author's Contribution:

Concept & Design of Study:	Sumyra Saleem
Drafting:	Muhammad Erfan, Muhammad Faisal Bashir
Data Analysis:	Ibra Khan, Areeba Jabbar, Seemal Akram
Revising Critically:	Sumyra Saleem, Muhammad Erfan
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Original Article

Improvement in LV Functions After 40 Days Following PCI of Asymptomatic Patients with Ischemia between 12 and 48 Hours

Samra Rehmat, Sherbhader Khan and Imran Khan

ABSTRACT

Objective: To assess the impact of percutaneous coronary intervention (PCI) on left ventricular (LV) function in asymptomatic individuals with ischemia lasting between 12 and 48 hours.

Study Design: A cross-sectional study.

Place and Duration of Study: This study was conducted at the Department of Cardiology MTI, LRH Peshawar between January 2021 and January 2023.

Methods: The study was done 100 patients enrolled at the Gujja Khan Medical College, Swabi, Department of Cardiology MTI,LRH Peshawar between January 2021 and January 2023 and included 100 individuals with ischemia lasting between 12 and 48 hours. They all had PCI at the time of the study. Echocardiographic evaluations were done before PCI and 40–42 days after that. The primary outcome indicators were ejection fraction (EF) and fractional Shortening (FS) measurements of LV function. A statistical study was done to determine how PCI will affect LV functions.

Results: The findings revealed that after 40 days, the mean EF increased from 50.72 at baseline to 56.58, and the mean FS increased from 32.57 to 37.98, indicating a substantial improvement in LV functioning ($p \leq 0.001$).

Conclusion: This Study found that asymptomatic individuals with ischemia lasting between 12 and 48 hours may improve their LV functioning with PCI.

Key Words: Percutaneous Coronary Intervention (PCI), Left Ventricular (LV) Functions, Ejection Fraction (EF), Fractional Shortening (FS)

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INTRODUCTION

This Study looked at asymptomatic individuals with ischemia lasting between 12 and 48 hours to see how percutaneous coronary intervention (PCI) affected their left ventricular (LV) functions. They got PCI throughout the investigation. Echocardiographic evaluations were performed at the beginning and 40 to 42 days following PCI. The primary outcome indicators were ejection fraction (EF) and fractional Shortening (FS) measurements of LV function. According to the findings, LV functions significantly improved after 40 days, with the mean EF increasing from 50.72 at baseline to 56.58 and the mean FS increasing from 32.57 to 37.98.

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In asymptomatic patients with ischemia lasting between 12 and 48 hours, PCI is beneficial in enhancing LV functioning.

According to the World Health Organization (WHO), coronary artery disease (CAD) is one of the leading causes of mortality and disability worldwide, killing around 18 million people annually. Ischemic heart disease and heart failure are mainly brought on by it[1]. Reducing the risk of myocardial infarction (MI) and mortality is the primary goal of CAD therapy (Hoe, 2018)[2]. Percutaneous coronary intervention (PCI), which entails implanting a steel mesh (stent) to unblock the clogged artery and increase blood flow, is the most widely used treatment option for CAD (Soares et al., 2020)[3]. According to Husain et al. (2018)[4], PCI is an efficient way to improve symptoms, increase blood flow, and decrease mortality due to CAD. According to a recent study, PCI may also assist asymptomatic CAD patients by enhancing left ventricular (LV) function (Yang et al., 2018)[5]. In patients with CAD, LV function is a crucial indicator of the long-term prognosis (Nichols, 2009)[6]. According to Tong et al. (2017)[7], the primary imaging method utilized to evaluate LV function in CAD is echocardiography[8]. This Study assessed how PCI affected LV functions in

asymptomatic individuals with 12 to 48 hours of ischemia. Between January 2021 and January 2022, 100 patients were enrolled at the Gujja Khan Medical College, Swabi, Department of Cardiology MTI LRH Peshawar. Echocardiographic evaluations were performed at the beginning and 40 to 42 days following PCI. Ejection fraction (EF) and fractional shortening (FS) measurements of LV functions were the primary outcome indicators. A statistical study was done to determine how PCI will affect LV functions. After 40 days, the findings revealed that the mean EF increased from 50.72 at baseline to 56.53, and the mean FS increased from 32.57 to 37.98, showing a substantial improvement in LV functioning ($p < 0.001$). These results imply that in asymptomatic patients with ischemia lasting between 12 and 48 hours, PCI is beneficial in enhancing LV functioning. Furthermore, these findings are consistent with earlier studies that showed PCI positively benefits LV function in CAD patients (Yang et al., 2018). For asymptomatic patients with ischemia lasting between 12 and 48 hours, this Study suggests that PCI should be the primary line of therapy.

METHODS

The Department of Cardiology MTI LRH Peshawar at the Gujja Khan Medical College in Swabi undertook this prospective observational Study from January 2021 to January 2022.

Study Population: The 100 patients referred for PCI throughout the Study period made up the All of the patients who had ischemia between 12 and 48 hours and were asymptomatic. Exclusion criteria included stress echocardiography findings of inducible ischemia, abnormal LV ejection fraction (50%), and any clinical disorders that would have impacted the Study's outcomes.

Data Collection: Age, gender, hypertension, diabetes, past MI or revascularization, and smoking status were among the demographic and clinical variables that were gathered at baseline. To evaluate LV function, echocardiography was also done.

Echocardiographic Assessment: Echocardiographic evaluations were performed at the beginning and 40 to 42 days following PCI. Measurements were made of the LV ejection fraction (EF) and fractional Shortening (FS).

Statistical Analysis: IBM Inc., Armonk, New York, USA, SPSS version 21.0 was used to analyze the data. The mean values of EF and FS were compared between baseline and 40–42 days later using the Student's t-test. Statistical significance was defined as a p-value of 0.05.

RESULTS

The Study included 100 asymptomatic individuals with ischemia lasting between 12 and 48 hours. Table 1 displays the demographic and clinical characteristics of the Study population. The patients' average age ranged from 46 to 68 years, and 85% were men. Diabetes and hypertension were found in 28% and 58% of the patients. At baseline, echocardiographic evaluations revealed that the mean EF was 50.72%, and the mean FS was 32.57%, indicating a considerable impairment in LV functioning. After 40–42 days, the mean EF increased to 56.53% ($p < 0.001$), and the mean FS increased to 37.98% ($p < 0.001$) (Table 2).

Table No.1: Demographic and Clinical Characteristics of the Study Population (n=100)

Demographic/Clinical Characteristic	Number (%)	%
Age	Mean (years)	58
Range (years)	46–68	
Gender	Male	85 (85%)
Female	12 (12%)	
Hypertension	Yes	58 (58%)
No	42 (42%)	
Diabetes	Yes	28 (28%)
No	72 (72%)	
Prior MI/Revascularization	Yes	26 (26%)
No	74 (74%)	
Smoking	Yes	27 (27%)
No	73 (73%)	

Table No.2: Echocardiographic Assessment Results before and after 40–42 days (n=100)

Echocardiographic assessment	Baseline	After 40–42 days
Ejection fraction (%)	50.72	56.53
Fractional Shortening (%)	32.57	37.98

Table No.3: Comparison of Ejection Fraction and Fractional Shortening before and after 40–42 days.

Echocardiographic assessment	Baseline	After 40–42 days	p-value
Ejection fraction (%)	50.72	56.53	<0.001
Fractional Shortening (%)	32.57	37.98	<0.001

DISCUSSION

The Study's findings add to the research showing that PCI improves CAD patients' LV functioning. According to earlier research (Pan et al., 2014; Yang et al., 2018), PCI may enhance LV remodelling, restore LV function, and lower mortality risk in CAD patients. Furthermore, recent research has shown that PCI may benefit even asymptomatic patients with ischemia lasting up to 48 hours, leading to significant improvements in LV function and decreases in mortality. In this investigation, asymptomatic individuals with ischemia lasting between 12 and 48

hours showed substantial improvements in LV function after 40 days[4]. The mean EF increased from 50.72 to 56.38 compared to the baseline, while the mean FS increased from 32.57 to 37.96. Similar improvements in LV function have been shown in other studies after PCI, with mean EFs ranging from 50 to 56 per cent and mean FSs from 32 to 39 per cent (Yang et al., 2018). Thus, our results are consistent with the body of research and show that PCI successfully enhances LV functioning in CAD patients. The research has several restrictions that must be addressed. First, owing to selection bias, there may have been variations in the baseline characteristics of the patients since the research was completed throughout the year[7]. Second, since the follow-up time frame was so brief (40–42 days), the improvement in LV function may have been understated. Thirdly, mortality in asymptomatic patients with ischemia lasting between 12 and 48 hours was not evaluated, nor were the long-term effects of PCI on LV function, risk of recurrent ischemia, or other outcomes. More research is required to assess the long-term consequences of PCI on these individuals. Our research showed that PCI successfully enhances LV functioning in asymptomatic individuals with ischemia lasting between 12 and 48 hours. According to the findings, LV functions significantly improved after 40 days, with the mean EF increasing from 50.72 at baseline to 56.58 and the mean FS increasing from 32.57 to 37.96. According to these results, PCI ought to be the first choice of therapy for asymptomatic individuals with ischemia lasting between 12 and 48 hours.

CONCLUSION

This Study found that asymptomatic individuals with ischemia lasting between 12 and 48 hours may improve their LV functioning with PCI. In addition, the findings showed that the mean EF increased from 50.72 at baseline to 56.38, and the mean FS increased from 32.57 to 37.96 after 40 days. Considering PCI as the first line of therapy for asymptomatic individuals with ischemia lasting between 12 and 48 hours is suggested by these results.

Author's Contribution:

Concept & Design of Study:	Samra Rahmat
Drafting:	Sharbhader Khan
Data Analysis:	Imran Khan
Revisiting Critically:	Saura Rahmat, Sharbhader Khan
Final Approval of version:	Samra Rahmat

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Original Article

Lithotripters for the Treatment of Ureteric Stones

Comparative Efficacy and Safety of Hand-Held and Conventional Intra-Corporeal Pneumatic Lithotripsy in the Treatment of Ureteric Stones

Akhtar Nawaz Orakzai[1], Bakhtawar Gul Wazir[1] and Noor Muhammad[2]

ABSTRACT

Objective: To evaluate hand-held vs conventional intra-corporeal pneumatic lithotripters for the treatment of ureteric stones in terms of effectiveness and safety.

Study Design: A comparative study.

Place and Duration of Study: This study was conducted at the Department of Urology, Institute of Kidney Disease (IKD) Peshawar, from 1st Oct 2010 to 1st Oct 2011.

Methods: This study was carried out from October 1, 2010, to October 1, 2011, at the Urology Department, IKD Peshawar. Examined were 100 adult patients with ureteric calculi measuring at least 0.7 cm. Using two distinct pneumatic lithotripters, ureteroscopy and lithotripsy were performed on each patient. There was follow-up. The following factors were evaluated: stone location, size, laterality, degree of fragmentation, rate of clearance, and complications.

Results: Mean stone size was 16.3±0.62mm in Group A and 15.0±0.69mm in Group B. In Group A stone clearance was 96% (48/50) while it was 92% (46/50) in Group B. Group A lithoclast was able to break 49/50 stones while Group B could break 44/50 stones. Group A lithoclast was able to break 46/50 stones into fragments ≤4mm while Group B could break 40/50 stones into such fragments. Proximal migration occurred in 1 case in Group A while in 6 cases in Group B. 4 and 1 stone in Group A and B, respectively, required ESWL and 2 stones in Group B required open ureterolithotomy as auxiliary procedure. There were 2 perforations in Group "B". Intra operative bleed, post operative pain and hematuria were more common in Group "B" while fever was more common in Group "A".

Conclusion: Hand-Held pneumatic lithoclast is more efficient and safe as compared to conventional pneumatic Lithoclast in the treatment of ureteric stones.

Key Words: Ureteric stones, Ureterorenoscopy, Pneumatic Lithoclast.

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INTRODUCTION

Ureteric stones are a major burden.[1] Extra-corporeal shockwave lithotripsy (ESWL), ureteroscopy (URS) with intracorporeal lithotripsy (ICL) and open or laparoscopic ureterolithotomy are the treatment options for failure of expectant approach.[1,2] URS with ICL gives success rates up to 100%.[3,4]

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The process may not work as intended if the stone cannot be reached, cannot be broken up, migrates upward, or cannot be passed through.[5] In ICL + URS includes risks, just like any other surgical surgery. The most dangerous consequence is ureteric avulsion, which is followed by ureteric perforation and vision-obscuring intraoperative haemorrhage.[6] Post-operative consequences include fever, haematuria, and loin discomfort. Pneumatic lithotripsy breaks stones by striking them directly with a metallic probe.[7] A conventional lithoclast consists of a sizable cylinder filled with compressed air that is connected to a mechanism that controls the release of air pressure by applying pressure to a foot paddle.[8] A pressure tube connects the pressure-releasing device to the hand piece. In the Lithoclast's hand piece, ballistic energy is produced by compressed air. A carefully timed burst of compressed air accelerates a projectile directed to within one micrometre of accuracy to a high speed. The bullet strikes the probe's base, propelling it forward and making a strong impact on the stone surface.[9] The Hand-held lithoclast is a pneumatic lithotripter working

by the same principal but the compressed CO2 is contained within a small cylinder which fits in a hand-held device having a trigger. Pressing the trigger releases powerful jet of compressed CO2 which moves the metallic probe forward producing the stone breaking impact (No foot pedals, power cords, consoles or external gas supplies, making the device completely portable)[11]

Many have compared various modalities like ESWL, laser lithotripsy and more invasive options with pneumatic lithotripsy.[12,13]

No doubt laser has proved to be superior in terms of efficacy and safety but the cost effectiveness is an issue in developing countries. Pneumatic lithotripsy is the most accepted disintegration technique having high stone clearance rates, low complication rates and significantly lower costs. Pneumatic lithotripsy is also going through evolution and different types of air compression devices are available.[14] The Institute of Kidney Diseases (IKD) Peshawar is a center of excellence in the region. It manages a huge burden of ureteric stones by URS with ICL using pneumatic lithotripsy. In this study we have compared two different pneumatic lithotripters for the treatment of ureteric stones. The comparison was made in terms of efficacy and safety.[15]

METHODS

The Institute of Kidney Diseases (IKD) Hayatabad Peshawar examined 100 adult patients with ureteric stones > 0.7 cm from October 1, 2014 to October 1, 2021 utilizing history, physical examination, supportive therapy, and diagnostic tests. KUB ultrasound and X-ray were needed. IVU assessed radiolucent stones. The patients were lottery-selected into two groups. URS with ICL using a hand-held lithoclast was Group "A." Participants in Group "B" underwent standard Lithoclast therapy. An experienced urologist performed lithotomy position under spinal or general anaesthesia. All induction patients got intravenous antibiotics. Karl-Storz, Germany, supplied the 8Fr semi-rigid ureteroscope with a 4Fr operational channel. The 500mm-long, 1.0mm-diameter hand-held pneumatic lithoclast probe LMA-Stone Breaker employs a compact disposable cylinder filled with pressurised CO2. A typical pneumatic lithotripter, the Swiss Lithoclast has a 605-mm probe and 1.0-mm diameter. The stone was detected via normal ureteroscopy, and the intention was to break it into 4 mm fragments that could pass alone. After surgery, a 6Fr Cook JJ stent was always utilized to stent the ureter. After a full day, a basic X-ray KUB assessed stone fragmentation and the JJ stent, which was remained in place for two weeks. Patients got weekly checkups until stones disappeared. The requirement for an extra or auxiliary procedure or the stone's proximal migration was considered failure, however the lithotripters in question did not fail if they could not reach the calculus using URS. A proforma lured everything. Data was analysed using SPSS 22. The two groups were compared using Student-t, Kendall's tau B, and Chi-Square, and a p-value of 0.05 was significant. Data was presented in tables and graphs.

RESULTS

We examined 100 patients. Profiles were similar for both groups. Mean patient ages in Group A and B were 38.52±14.72 and 35.46±13.93 years, respectively. Group A included 36 males and 14 females, while Group B had 34 males and 16 females. 29 right and 21 left calculi were found in both groups. Group A patients had 12 upper, 12 middle, and 26 lower ureter stones. Group B patients included 5 upper, 12 middle, and 33 lower ureter stones (Table 1). The mean stone size was 16.5±0.61mm in Group A and 18.5±0.69mm in Group B. Group A 20, 26, and 4 included 7-10mm, 11-15mm, and 16-20mm stones. In B, 18, 24, and 8 stones were 7-10mm, 11-15mm, and 16-20mm (Table 2). One patient in Group A had no hydronephrosis, whereas 19, 22, and 8 had mild, moderate, and severe. However, Group B contained 5, 23, 19, and 3 individuals with no, mild, moderate, and severe hydronephrosis (Table3). Group A has 96% stone removal (48/50) and Group B 92% (46/50).

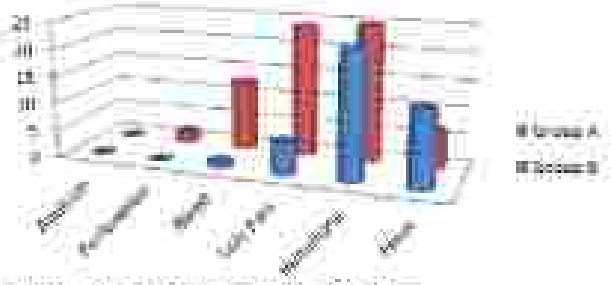

Figure No. 1: Comparison of Safety

Table No. 1: Stone Location Group A Vs Group B

		Device Used		
		LMA Stone Breaker	Swiss Lithoclast	Total
Location of Stone	Proximal Ureter	12	5	17
	Middle Ureter	12	12	24
	Distal Ureter	26	33	59
Total		50	50	100

Group A lithoclast broke 48/50 stones and Group B 44/50. Group A lithoclast managed to shatter 46/50 stones into ≤4mm pieces, but Group B only managed 40/50. Only one stone in Group A moved proximally, whereas six in Group B did. 4 stones in Group A and 1 in Group B needed ESWL, while 2 stones in Group B

needed open ureterolithotomy. All 6-Fr Double J stents were passed. Two Group "B" ureters pierced. Other problems in groups "A" and "B" were per-operative bleed 1 and 13, loin discomfort 6 and 24, fever 14 and [illegible], and hematuria 23 and 21.

Table No. 1: Comparison of Size of stones Treated

		Device Used		
		LMA Stone Breaker	Swiss Lithoclast	Total
Size of stone	?-10mm	20	11	31
	11-15mm	26	24	50
	16-20mm	4	8	12
Total		50	50	100

Table No. 3: Degree of Hydronephroses associated with Stones treated

		Device Used		
		LMA Stone Breaker	Swiss Lithoclast	Total
Degree of Hydronephrosis	No Hydronephrosis	1	3	4
	Mild	19	23	42
	Moderate	22	19	41
	Severe	8	5	13
Total		50	50	100

Table No. 4a: Comparison of Ability to break the stones

		Device Used		
		LMA Stone Breaker	Swiss Lithoclast	Total
Able to Break the Stone	Yes	49	44	93
	No	1	6	7
Total		50	50	100

Table No. 4b: Comparison of Ability to make Effectively smaller fragments

		Device Used		
		LMA Stone Breaker	Swiss Lithoclast	Total
< 4 mm Fragments	Yes	46	40	86
	No	4	10	14
Total		50	50	100

DISCUSSION

Ureteric stones can be treated expectantly or some intervention, in the form of extra-corporeal shock-wave lithotripsy (ESWL), ureteroscopy and intra-corporeal lithotripsy (URS and ICL) and ureterolithotomy, is required[1]. URS and ICL is the most amazing form of therapy. ICL can be done using LASER, ultrasonic vibration, electro-hydraulic and pneumatic lithoclasts. Pneumatic lithoclast works by transmitting energy (Produced by sudden release of compressed CO2 or Air), through a projectile, to a probe which breaks the stone by directly hitting it like a hammer[2]. A variety of pneumatic lithoclasts are available. We have compared two different types of pneumatic lithoclasts in terms of efficacy and safety. The basic principle of the two types is almost the same[3]. The main difference is that the conventional lithoclast is a device with limited portability as it is plugged to electric supply, has a huge cylinder attached to it and a foot paddle as well. The LMA-Stone Breaker is totally portable as it is hand-held device with a built-in cylinder and a built-in trigger. Additionally, the CO2 gas-driven system provides higher probe tip velocity in respect to break even the hardest stones[4]. It requires fewer shocks to fragment stones, and minimal probe movement reduces stone retropulsion. It is shown in clinical studies to be atraumatic to surrounding tissue. Both the groups were comparable. A total of 100 patients were treated, 50 patients in each group[5]. Mean age of the patients in Group A and B was 38.82±14.73 and 35.48±13.93 years respectively and was comparable with the other research groups. There were 36 male and 14 female patients in Group A while 34 male and 16 female patients in Group B. Mean stone size was 16.8±6.62mm in Group A and 13.0±6.69mm in Group B. In Group A 20, 26 and 4 stones ranged from ?-10mm, 11-15mm and 16-20mm in size. While in B, 18, 24 and 8 stones were ?-10mm, 11-15mm and 16-20mm in size. Both the groups had 29 right sided calculi while 21 left sided calculi. In Group A patients, 11, 12 and 26 stones were located in upper, mid and lower ureter respectively[6]. While in Group B patients, 5 stones were in upper ureter, 12 in the mid ureter and 33 stones in lower ureter. These figures show comparison of our study population to international research. In Group A, 1 patients had no hydronephrosis while 19, 22 and 8 had mild, moderate and severe hydronephrosis respectively[7]. On the other hand in Group B, 3, 23, 19 and 5 patients had no, mild, moderate and severe hydronephrosis respectively. So the profile was quite comparable for both the groups. In Group A stone clearance was 98% (49/50) while it was 92% (46/50) in Group B. Group A lithoclast was able to break 49/50 stones while Group B could break 44/50 stones (p-Value = 0.050). Group A lithoclast was able to break 46/50 stones into fragments ≤4mm while Group B could break 40/50 stones into such fragments (p-Value = 0.08)[8]. The difference in the clearance rates may be related to the powerful nature of the lithoclast in Group A as it is able to break the hardest of stones. But the real difference seems to be in relation to the ability of

Group A lithoclast as it was successful in not even breaking the stones but breaking them into much smaller particles as compared to the conventional lithotlast (Table 4a and 4b)[11]. These smaller particles can pass with greater ease and hence better clearance rates in a shorter period of time. For its powerful nature, LMA-Stone Breaker is used by some surgeons in percutaneous nephrolithomy because it can break hard and large stones in a shorter period of time. Inspite of superiority in power, proximal migration occurred in only 1 case in Group A while 6 stones migrated proximally in Group B.[12] This may be attributed to the fact that stones were successfully broken into small fragments before they could migrate proximally as conventional lithoclast needed more number of strikes to break stone. Proximal migration of stone was less in Group A despite the fact that more stones were located in upper ureter in this group. 4 and 1 stone in Group A and B, respectively, required ESWL and 2 stones in Group B required open ureterolithotomy as auxiliary procedure. Again more invasive auxiliary procedure were less frequent in Group A. 6Fr Double J stent was passed in all cases. There were no cases of ureteric avulsion in any group (Figure 1). Two ureters were perforated in Group "B". The Group A stone breaker is a powerful lithoclast yet there were no ureteric perforations.[13] This complication can occur due to many factors but in the authors opinion it is mostly related to the ureterorenoscopy (URS) and or difficult access rather than lithoclasty.[14] Other complications noted in group "A" and "B", respectively were, peroperative bleed 1 and 13 (p-Value = 0.001), postoperative loin pain 6 and 14 (p-Value = 0.000) and post-operative hematuria 22 and 25 (p-Value = 0.46). This shows that Group A lithoclast is less traumatic as it can quickly convert a stone into smaller fragments requiring less number of shocks and minimizing the chances of collateral damage. Post-operative fever was noted in 14 patients in Group A as opposed to 7 patients in Group B(p-Value = 0.046). All the patients with fever were managed successfully with antibiotics (Oral/Intravenous) and no patient needed re-hospitalization.

CONCLUSION

Hand-Held pneumatic lithoclast is more efficient and safe as compared to conventional pneumatic Lithoclast in the treatment of ureteric stones. However, more structured research, such as Randomized Control Trials, should be conducted to clarify the picture.

Author's Contribution:

Concept & Design of Study/ Drafting:	Akhter Nawaz Orakzai, Bakhtawar Gul Wazir, Noor Muhammad
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Final Approval of version:	Akhter Nawaz Orakzai

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Original Article

Comparison of Post-Operative Pain Between Standard Versus Mini-Percutaneous Nephrolithotomy

PO Pain Between Standard VS Mini-Percutaneous Nephrolithotomy

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ABSTRACT

Objective: To compare postoperative pain between standard vs. mini percutaneous nephrolithotomy.

Study Design: A Comparative Cross-Sectional Study

Place and Duration of Study: This study was conducted at the Urology Department, Lady Reading Hospital, Peshawar from June 9th, 2022 to June 9th, 2023.

Methods: A total of 140 patients with kidney stones (more than 10mm) were randomly allocated in two groups. Patients of Group A were subjected to mini PCNL while group B were subjected to standard PCNL. Follow-up was done to determine the intensity of pain on Visual Analogue Score (VAS).

Results: In group A mean age was 36.3±8.5 years and in group B it was 38.9±10.1 years (p=0.096). Males in group A were 57.1% compared to 70% in group B (p=0.114). 14.3±3.7mm was mean size of stone in group A compared to 15.5±3.3mm in group B (p=0.071). The mean BMI of group A was 26.3±3.5kg/m² compared to 26.2±3.3kg/m² in group B (p=0.893). 14.3% in group A were diabetic compared to 17.1% in group B (p=0.642). 8.6% in group A were hypertensive compared to 11.4% in group B (p=0.573). 12.9% in group A were smokers compared to 24.3% in group B (p=0.082). On follow-up, the mean postoperative pain on the visual analogue scale in the group mPCNL group was 2.5±0.9 compared to 3.1±1.1 in the sPCNL group (p < 0.001).

Conclusion: Mini PCNL is associated with less postoperative pain than standard PCNL. We recommend, taking into account the side effects of both procedures, more randomized control trials with larger samples.

Key Words: Urolithiasis, Pain, visual analogue scale, Percutaneous nephrolithotomy (PCNL)

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INTRODUCTION

In our country, estimated prevalence of urolithiasis is 10 to 15% but only 1-3% of symptomatic patients come to the hospitals[1]. Currently, different treatment modalities for renal stone are in practice. Minimally invasive endoscopic procedures are replacing open surgries[2]. Treatment of urolithiasis is much safe and effective with advancement in endoscopic procedures[3], with more than 90% stone clearance PCNL has revolutionized treatment of urolithiasis[4].

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To prevent ureteral obstruction and promote healing, pigtail ureteric stents had been used in endoscopic surgeries[5].

In large (>20) and smaller stones (10–20 mm), PCNL is the preferred therapy, according to European Association of Urology (EAU) guidelines[6]. Excellent stone-free rates following PCNL have been reported, which ranges from 76% to 98%[7]. However, attributed to its complications, PCNL is a challenging technique[8,9].

Mini-PCNL, a modification of the traditional PCNL technique (24 to 30Fr working channel) to micro endoscope short percutaneous tract (18 to 22Fr) has been created to reduce morbidity associated with instrumentation, blood loss, postoperative pain, and probable kidney damage[11]. The method involved tract dilation upto 16Fr followed by the use of a 15Fr vascular peel-away sheath and a 12Fr nephroscope is used to remove the stones[12].

The mean pain score at 24 hours was significantly lower in mPCNL vs. sPCNL at 0.3 (0.46) vs 0.75 (0.53) (P < 0.001)[13]. In another study, in mPCNL group mean pain on VPS was 5.44±1.5 compared to 6.19±1.65 in the sPCNL group (p > 0.06)[14].

This study is designed to compare the mean pain score after sPCNL vs. mPCNL. Studying literature, we found controversial statistics of postoperative pain following

these, steered our mind to this idea. Some studies are in favor of sPCNL and others favor mPCNL regarding postop pain, yet many fail to generalize these modalities. This study will integrate these in light of postop pain in adult population. This study will help lay a foundation for urologists for future research recommendations and for randomized control trails to distinguish these modalities.

METHODS

The Urology Department of Lady Reading Hospital in Peshawar conducted a Comparative Cross-Sectional Study from June 9 to June 10, 2023. Routine baseline investigations i.e. complete blood counts, biochemical analysis (serum electrolytes, urea, and creatinine) urinalysis and urine culture (if pus cells in urine), X-ray KUB (kidney, ureter, and bladder), and ultrasound KUB (kidney, ureter, and bladder) were performed in all patients. By block randomization, patients were allocated in two groups. Group A patients underwent mini PCNL while group B patients underwent standard PCNL. The sample size was 70 in each group keeping a 5.44±1.5 mean pain score in mPCNL and 6.19±1.65 mean pain score in sPCNL.

Inclusion criteria were newly diagnosed patient from 20 to 60 years of age having renal stones of size 10mm on ultrasound. Patients who had procedures for renal stones, BPH on DRE, UTI and any functional or anatomical abnormalities of urinary tract were excluded. PCNL was performed in prone position. 26Fr sheath and 26Fr nephroscope was used in sPCNL while 16Fr sheath and 12Fr nephroscope was used in mPCNL. On first postop day, pain assessment done. All the procedures were performed by a single experienced urologist having a minimum of five years of experience.

Data Collection Procedure: The ethical committee was consulted, the patients were told of the goal and potential advantages of the trial, and written, informed consent was acquired. Name, address, sex, and age were noted on a pre-made proforma. To prevent bias, the exclusion criteria were closely adhered to.

Data analysis was conducted using SPSS version 21. The mean and standard deviation of age, stone size, height, weight, BMI, and postoperative discomfort were determined using descriptive statistics. Frequency and percentage were calculated for gender, DM, HTN, and smoking status. Pain in both the groups was compared using a T-test keeping a p-value ≤ 0.05 as significant. The P-value of Pain in both groups was stratified among gender, stone size, BMI, DM, HTN, and smoking status to see the effect modification using a T-test.

RESULTS

140 patients in total, split into two groups. Patients in group B received standard PCNL (sPCNL), whereas patients in group A received micro PCNL (mPCNL).

37.6±9.6 years was the average age. There is a minimum age of 23 and a maximum age of 55. Group B's mean age was 38.3±10.1 years, while group A's was 34.5±8.5 years ($p=0.026$). Table 1 compares the ages of the various groupings.

There were 81.1% males in group A compared to 70% in group B (p 0.114). (Table -2), for comparison of gender. The mean size of the stone in group A was 14.5±2.7mm compared to 15.3±2.3mm in group B ($p=0.071$). (See table-3), for comparison of categories of stone size between both groups. The mean BMI of group A was 26.3±2.3kg/m² compared to 26.2±2.3kg/m² in group B ($p=0.893$).

14.3% in group A were diabetic compared to 17.1% in group B ($p=0.642$). 8.6% in group A were hypertensive compared to 11.4% in group B ($p=0.573$). 12.9% in group A were smokers compared to 24.3% in group B (p 0.082).

On follow-up, mean postoperative pain on the visual analogue scale in group mPCNL group was 2.5 ± 0.9 compared to 3.1 ± 1.1 in sPCNL group ($p < 0.001$). (table-4)

The statistical significance of pain of different variables was calculated using the student T-test and ANOVA Test. (table-5).

Table No.1: Age comparison between the two groups (n = 70 each)

		Treatment Groups	
		mPCNL	sPCNL
Age groups	23-30 years	23 32.9%	18 25.7%
	31-40 years	21 30.0%	19 27.1%
	41-55 years	26 37.1%	33 47.1%
Total		70 100.0%	70 100.0%

Table No.2: Gender Comparison for Both Groups (n=70 each)

		Treatment Groups	
		mPCNL	sPCNL
Gender	Male :	40 (57.1%)	49 (70.0%)
	Female	30 (42.9%)	21 (30.0%)
Total		70 (100.0%)	70 (100.0%)

Table No.3: Size Comparison of the Stones in the Two Groups (n = 70 each)

		Treatment Groups		P value
		mPCNL	sPCNL	
Size of stone	10-15mm	44 (62.9%)	33(47.1%)	0.062
	15-25mm	26 (37.1%)	37(52.9%)	
Total		70(100.0%)	70(100.0%)	

Table No.4: Comparison of each group's mean level of pain (n=70 each)

Treatment Groups	Mean	SD	P value
mPCNL	2.4	0.9	< 0.001
sPCNL	3.1	1.1	

Table No.5: P-value of postoperative pain in both age groups using T-test and ANOVA test

Age groups	Mean pain in Group A	Mean pain in Group B	P value
25-30 years	2.8 (0.9)	3.2 (1.4)	0.299
>30-40 years	2.7 (1.0)	3 (0.8)	
>40-55 years	2.2 (0.7)	3.2 (1.0)	
Gender			
Male	2.5 (0.8)	3.2 (1.0)	
Female	2.4 (1.0)	3 (1.2)	
Size of stone			
10-15mm	2.4 (0.8)	3.3 (1.0)	<0.001
>15-20mm	2.5 (1.1)	3 (1.0)	
BMI (kg m2)			
20.4-25.1	2.4 (0.9)	3.3 (1.1)	<0.001
>25.1-29.9	2.3 (0.9)	2.8 (1.0)	
>29.9-32	2.6 (0.8)	3.4 (0.9)	
DM			
Yes	2.6 (0.9)	3.1 (1.0)	0.014
No	2.6 (0.8)	3.2 (1.0)	
HTN			
Yes	2.6 (0.9)	2.9 (0.9)	0.014
No	2.6 (0.8)	3.2 (1.1)	
SMOKING			
Yes	2.7 (1.0)	3.4 (0.8)	0.049
No	2.4 (0.9)	3.1 (1.1)	

DISCUSSION

Modern urologists treat urolithiasis with safer and more efficient lithotripsy thanks to technological advancements. As of right now, PCNL is regarded by AUA and EAU recommendations as the recommended treatment for renal stones larger than 2.0 cm. Furthermore, because of their relative safety, "mini-PCNL" development is gaining popularity. Furthermore, reports indicate that compared to conventional PCNL, small PCNL is a safer method in terms of complications and Hb decline.

Certain surgeons have a tendency to forego placing the nephrostomy tube due to the swift progress made in PCNL techniques. Zilberman and colleagues examined the micro PCNL publications. In comparison to normal PCNL, they reported comparable results with mPCNL[17]. Less hospital days, pain ratings, analgesic usage, a quicker return to regular activities, and cheaper expenditures are all associated with mPCNL.

Furthermore, certain instances with single tracts, no distal obstruction, no intraoperative difficulties, and no planning for the second look are criteria for mPCNL[18,19].

Of the patients in the Karimi et al[20] study, 210 had undergone mPCNL. Every patient had kidney stones larger than 2 cm (average 3 cm), and 21 of them had staghorn stones. 91.04% of the cases had no stones, and 8.95% (18 patients) still had residual shards of stone that were about 7 mm, all of these patients received SWL treatment. A blood transfusion was required for 22 patients (10.9%), 16 patients (7.9%) experienced a UTI, and 40 patients experienced mild bleeding. Diclofenac or indomethacin were administered to treat pain, 10 individuals received 50 mg of pethidine. The average stay in the hospital was three days. The researchers emphasized that mPCNL is a cost-effective, safe method that offers excellent patient comfort.

In a related trial, Shah et al[21] examined the pain, analgesic requirement, and number of hospital days of patients who were randomly assigned to receive mPCNL or a small diameter (8F) nephrostomy tube. A 6F Double J tube was used to contain the mPCNL group. There were fewer hospital days, analgesic needs, and discomfort in that group. However, 39.4% of the same sample experienced Double J discomfort.

Bellman and Jung successfully used the method to patients who were obese[22]. Done on bilateral kidney stones by Shah et al. Jou et al. emphasized that staghorn stones larger than 3 cm were potentially potential candidates for mPCNL[23].

PCNL is a difficult procedure, even in the hands of the most skilled practitioners, problems might arise in 11–83% of cases. The most significant side effect is bleeding, which can be treated with the intervention (0.6–17%)[24,25]. Nephrostomy tube placement can prevent bleeding during nephroscopy, puncture, and dilatation of the tract. This could imply that hemostasis cannot be achieved in mPCNL. Although they are experimental, it is claimed that diathermy or fibrin injections are used for internal and parenchymal bleeding[26,27]. Cormio et al. found reduced hospital stays for mPCNL patients after using Tachosil® for bleeding[28]. Data from 5503 patients and 96 centers were reported by de la Rosette et al. They documented 1.6% hydrothorax, 3.4% renal pelvis perforation, and 1.5% serious bleeding. 326 patients (5.7%) had blood transfusions. In our study, it is reflected.[29]

Different analgesics have been employed in earlier trials. Morphine, diclofenac, and Pethidine were utilised by Aghamir et al[30], Shah et al[21], Shen et al. and Gonullar et al[31,32] reportedly prefers mPCNL to sPCNL as it carries worst pain and more postop narcotic analgesics.

CONCLUSION

Comparing mini PCNL to regular PCNL, less postoperative pain is reported. More randomized controlled studies are advised, especially with bigger sample sizes.

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Review Article

Emerging Methodologies Used in Assessing Childhood Vaccination Coverage: A Comparative Scoping Review

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ABSTRACT

Objective: This review critically compares existing and emerging methods used to assess childhood vaccination coverage in developing countries to determine their strengths, weaknesses, accuracy, efficiency, inherent biases, and suitability based on their unique challenges.

Results: The methodologies reviewed included administrative data, household surveys (Demographic Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS) and Lot Quality Assurance Sampling (LQAS), school-based assessments, and serosurveys. Administrative data often suffers from inaccuracies and data manipulation tendencies. Household surveys, especially DHS and MICS, offer detailed insights but are resource-intensive and require specialized expertise. School-based assessments, while easy to implement, face generalizability constraints. Serosurveys are resource-intensive but uniquely gauge effective vaccination coverage through immunity profiling. A novel approach such as LQAS emerges as a rapid and suitable method for resource-limited settings. MICS Plus is also a recent innovative extension that effectively assesses seasonality effects.

Conclusion: This review serves as an updated guide with novel developments for policymakers, health professionals, and program implementers to make informed decisions on vaccination coverage assessment. Combining methods like LQAS with household surveys and following them with the MICS Plus model can yield optimal results for developing countries.

Key Words: Vaccination; Surveys; Methodologies

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INTRODUCTION

Vaccination stands as a monumental achievement in the history of medicine, safeguarding millions of children from infectious diseases annually since the innovative work of Edward Jenner in late 18th century[1]. Its benefits extend beyond just individual protection and encompass social and economic developments[2]. Generally, the global childhood vaccination coverage masks significant disparities at the micro-level. High-income countries often report coverage rates exceeding 90%, while nations in regions like sub-Saharan Africa and Asia struggle with barriers ranging from infrastructural deficits to civil unrest, putting populations at risk from diseases such as measles[3].

Therefore, cost-effective, reliable, accurate and periodic assessment of childhood vaccination coverage becomes imperative, particularly in developing countries, where the trends exhibit pronounced fluctuations. To this end, several methodologies have been developed i.e., administrative data, household-based surveys, school-based screenings, and others[4]. Yet, as methodologies proliferate, so do challenges in their application, i.e., lack of accuracy and reliability, overestimations, and underestimations. Overall, these challenges have created an ambiguity around methodologies.

This review addresses this gap and compares the various methodologies available for evaluating vaccination coverage, weighing their strengths and weaknesses, and considering their suitability in different contexts. We aim to provide policymakers and stakeholders, especially those in developing countries, with insights to aid in selecting suitable assessment methods based on the available resources and aims, thereby ensuring that all children gain the benefits of immunization.

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RESULTS

Administrative Data: Administrative data reports are widely cost-effective implemented methods of data presentation about the records of vaccine doses, both received and administered[8,11]. These data are predominantly managed using electronic health information systems or, in some instances, manually through booklets and registers[10,11]. They undergo collection, compilation, and conversion into a structured format across various tiers, from private health facilities to broader provincial levels, to ascertain an overall vaccination coverage estimate[8]. However, it comes at the cost of coverage bias due to the misrepresentation of selective populations[11]. The introduction of digital data recording systems augments its efficiency, enabling near real-time monitoring, which is indispensable for quick decision-making[8].

Household Surveys

Demographic Health Surveys (DHSs): DHS is a cornerstone variant of household survey established in the 1980s, which offers extensive data on population, health and nutrition through nationally representative data[12,13]. These surveys are carried out primarily for impact evaluation of health interventions. Customizable questionnaires are used to capture a wide range of indicators, from fertility to health themes. Due to its robust methodology, DHS is structured to ensure comparability across countries and over time, making it a valuable resource for trend analyses[15,17].

Table No.1: Strengths, weaknesses and minimum required sample size of each methodology

No.	Methodology	Sample size (minimum required)	Strengths	Weaknesses
1	**Administrative data** (Routine reports/electronic registry databases)	At least 10,000 population per district	a) Cost-effective b) Large sample size c) Easy to monitor and track coverage, missed opportunities, and dropout rates d) Routinely e) Real-time data	a) Inaccurate denominators b) Excluded private sector c) Data manipulation d) Transcription errors **Electronic registry:** f) Highly trained human resources g) Duplicate records h) Difficult to track migrants
2	**Demographic Health Surveys** (DHS)	15,000 households (Rural: 30-40 women; Urban: 20-25 women per cluster)	a) [illegible] b) Other indicators are also assessed c) Two-stage sampling with high response rates (90%) d) Quality trainings (4 weeks) e) National coverage estimates f) [illegible]	a) Exclusion of populations i.e. nomads b) [illegible]
3	**Multiple Indicator Cluster Surveys** (MICS)	10,000 households (15-35 HHs per cluster)	a) High-quality and comparable [illegible] b) Other indicators taken into consideration c) Both men and women are interviewed d) High response rate e) Two-stage sampling f) [illegible] g) High quality training (3 weeks) h) MICS Plus [illegible]	a) MICS data may require 2 years for [illegible] on average, [illegible] months for the first draft of the report
4	**Lot Quality Assurance Sampling** (LQAS)	[illegible]	a) Requires small sample size b) Works adaptably to stratified sampling c) Highly cost- and time-effective d) Rapid testing methodology e) Does not require advanced statistical trainings f) Classifies results into well-performing and poorly performing units	a) Confidence intervals for individual districts are not especially informative b) Requires additional statistical [illegible] to convert the results to be generalizable
5	**School-based** assessment	Not specific	a) Can capture a large proportion of children who are usually missed in households b) Easy access c) Identify areas of missed or poor coverage d) [illegible]	a) [illegible] b) Limited information on age-appropriate vaccination data may be missed c) Only children within specific age groups can be assessed d) Robust school infrastructure is required
6	**Serological surveys**	[illegible]	a) Direct measure of immunity b) Assess effective coverage	a) Costly and logistically challenging b) Vaccination could be from natural infection c) Underestimation due to waning immunity d) Non-participation and ethical issues e) Poor sensitivity assays f) Requires highly skilled human resources

Table No.2: Biases, Accuracy and Classification strengths

		Characteristics				Precision and classification strength		
No.	Methodology	Bias	Accuracy and validity	Feasibility	Representativeness	National	Provincial	District
1	**Administrative Data**	Coverage bias	Weak	Easy	Yes	Yes	No	No
2	**DHS**	a) Indicator bias	Strong	Difficult	Yes	Yes	Yes	Yes
3	**MICS**	b) Sampling bias, c) Recall bias	Strong	Difficult	Yes	Yes	Yes	Yes
4	**LQAS**	Interpretation bias	Weak	Easy	Yes	No	Conditional	Yes
5	**School-based Assessments**	Cognitive bias	Weak	Easy	No	No	No	Yes
6	**Serological Surveys**	Information bias	Strong	Difficult	Yes	No	Yes	Yes

Table No.3: Waning immunity profile

Vaccine type	Duration
BCG[a] (single dose)	10–20 years
Hepatitis B (single dose)	10–15 years
OPV (after 0, 1, 2, 3 doses)	5–10 years (within ≥ 80% of the vaccinated cohort)
Pentavalent (after 1, 2, 3 doses)	18 months (based on only 1 study)
PCV[b] (after 1, 2, 3 doses)	3–5 years
Rota (after 2 doses)	[illegible]
IPV (after 2 doses)	≥ 14 years
MMR[c] (after 2 doses)	Lifelong protection against measles and rubella, protection against mumps starts to decline in later life
TCV[d] (single dose)	2–7 years (under study)
Td[e] (after 5 doses)	None at 1st dose, 1 years at 2nd dose, 5 years at 3rd dose, 10 years at 4th dose, lifelong at 5th dose
Influenza vaccine	90 days

[a] BCG: Bacille Calmette-Guérin [b] PCV: Pneumococcal conjugate vaccine
[c] MR: Measles-Rubella [d] TCV: Typhoid conjugate vaccine
[e] Td: Tetanus diphtheria

The core of the DHS methodology involves conducting face-to-face interviews with women (typically aged 15–49 years) and, in some surveys, men (often aged 15–59 years) in sampled households. The sampling process employs a two-stage stratified sampling design: the first stage involves selecting clusters (usually enumeration areas) from a master sampling frame, and the second stage involves the systematic sampling of households within these clusters[16,17]. Additionally, DHS often incorporates biomarker data, such as anthropometric measurements, Human Immunodeficiency Virus (HIV) testing and anaemia testing, providing a more holistic health profile. The strengths and weaknesses of the DHS methodology are summarized in table 1. This popular methodology has been adopted in more than 90 low- to middle-income countries[17].

Multiple Indicators Cluster Surveys (MICS): Another popular survey method is MICS, which provides high-quality comparable microdata on a wide range of areas such as nutrition, fertility, mortality, contraceptive use, unmet need, maternal and newborn health, female genital mutilation, menstrual hygiene management, child illness and treatment, and child development[18]. Men aged 15–49 years are interviewed individually, while women are data sources for themselves and children under the age of 18 residing within the same house[18]. This type of survey is conducted to monitor the trends of progress on the SDGs and has been implemented in around 118 countries[19].

MICS Plus: MICS Plus is an innovative sub-variant of MICS that capitalizes on the use of mobile phones for data collection on specific indicators from a subset of households surveyed in the primary MICS[20]. In this sub-variant, data collection via telephonic interviews continues for 12 months, with intervals of 1–2 months. Information is gathered from one well-informed adult in each sampled household. The primary emphasis of MICS Plus is on indicators like education, nutrition, health and child protection that might be influenced by seasonality[20].

Lot Quality Assurance Sampling: Originally developed in 1920s for the industrial quality checks, Lot Quality Assurance Sampling (LQAS), is a distinct approach with the potential to accommodate random and clustered sampling techniques with smaller sample sizes[20,21]. Instead, it categorizes administrative and geographical areas into priority zones based on predetermined targets for specific indicators. LQAS is preferred over many other sampling techniques due to its efficiency and reduced logistical needs[22]. Supervision Areas (SAs) are first identified and then sampled, with a minimum requirement of 19 per SA. The SAs are then assessed based on the predefined decision rule, and thresholds (upper and lower) are decided. Interestingly, the introduction of the direct

adjustment method has overcome the limitation of generalizability in LQAS but still lacks the identification of missed opportunities for simultaneous vaccination (MOSV)[7].

School-based Assessment: Schools are also considered potential sites for the assessment of childhood vaccination coverage through school-based nurses or nominated staff[7,8]. This methodology not only helps in identifying pockets of under-vaccinated students, enabling schools and health departments to proactively address potential outbreaks, but also leverages the high enrolment rates in schools to ensure widespread vaccine delivery[7,8]. The scope of these assessments is though geographically limited as they capture data mainly from children attending schools above the recommended age of vaccinations and potentially miss out on home-schooled or unenrolled children[7].

Serosurveys: Seroprevalence studies are one of the most technical approaches in providing estimates of population-level immunity using cross-sectional designs for antibody detection[9]. These studies may involve serum collection through blood samples, dotted blood spot sampling or oral fluids[10]. Many developing countries have been using this methodology for measuring effective vaccination coverages rather than crude coverages[11,12]. Crude vaccination coverage measures the number of children vaccinated, while effective vaccination coverage refers to the level of immunity that is generated in response to vaccination. Serology can also be used to assess the impact of vaccination on disease burden and progress towards the elimination of a set vaccine-preventable disease. Besides the tendency of misclassification error, the issues of low sensitivity associated with oral fluid sampling may further underestimate coverage rates too[10,13].

Overall Comparison and Novelty of Methodologies: Our review compared the strengths, weaknesses, and some recent modifications of several popular methodologies which have been implemented over the years for the evaluation of childhood vaccination coverage. Our literature search suggested that administrative data offer a macro-level perspective[7], whereas household surveys, like DHS and MICS, provide micro-level insights by directly interacting with households[14]. Remarkably, innovative sub-variants like MICS Plus have emerged, capitalizing on mobile technology to enable continuous and adaptive data collection over extended periods, especially for indicators which are prone to change due to seasonality[15]. Our detailed search revealed that LQAS, with its unique sampling approach, is a modified approach which offers a rapid means to assess and categorize geographical areas based on vaccination targets[16]. This detailed review also highlighted that school-based assessments are limited in scope but utilize educational infrastructure for vaccination monitoring[7], while serosurveys capitalise on their ability to assess the actual immunity levels in populations following vaccination[10]. Table 1 provides an overview of the comparison. Table 2 illustrates biases and feasibility, with representation at different levels.

Comparison of Accuracy and Reliability: While administrative data offer a vast coverage scale, their accuracy and reliability can be compromised due to an easy approach to data manipulation, incomplete records, over-reporting, and under-registration of the target population[17]. On the other hand, household surveys like DHS and MICS are comprehensive but can also be influenced by biases such as parental recall, respondent desirability bias, and vaccine card availability which lower the overall accuracy of the surveys. MICS has though strived to improve its methodology especially to address the response rate for increasing accuracy. The missing of certain population groups also undermines the reliability of both survey designs[18,19]. Whereas LQAS is effective at classifying areas, it does not estimate population sizes, which may limit its use for large-scale insights[16]. Interestingly, its reproducibility also depends on the robust use of Bayesian or Hypergeometric distribution for assertive sample size calculations Operating and Risk Curves[16]. The subvariant MICS Plus might face skewed data challenges related to non-response bias and its reliability alters with the magnitude of potential recall bias. Similarly, school-based assessments are also prone to selection bias as they may not be representative of all children, especially those not attending school[7]. Finally, accuracy in sero-surveys is affected due to biases from false positive/negative test results along with waning immunity (table 3)[10] and its reliability thus sticks to the area of misclassification range[13].

Comparison of Sampling Techniques and Ease of Data Collection: Traditional sampling is not typically employed in administrative data assessment, which aim to capture entire populations from healthcare facilities[20] and hence data is always readily available. However, household surveys like DHS and MICS work on sampling approaches, such as stratified multistage cluster sampling, making them universally comparable within the sample size of 10,000 – 15,000[21]. MICS differs from DHS in that its foundation rests on census data as the first sampling frame while DHS operates based on enumerating areas. MICS Plus usually relies on the subset random sampling of the primary MICS dataset. Remarkably, LQAS operates via a distinct random sampling methodology predetermined by upper and lower thresholds[16]. It also tends to introduce interpretation bias if the null hypothesis is not properly framed according to Bayesian or Hypergeometric distribution by keeping α and β errors within limits[16]. This interpretation bias can be addressed through the

implementation of objective decision rules[11]. In contrast, school-based assessments inherently bias their sampling towards school-attending children only and are mostly easy to conduct. Of all the approaches, serosurveys are though highly resource-draining but often utilize the simplest method of cross-sectional sampling to provide a snapshot of immunity levels within a given population at a particular time.

CONCLUSION

Assessing childhood vaccination coverage is complex as each methodology presents unique advantages and limitations. Administrative data offer broad, cost-effective insights but can face data integrity issues. Household surveys, such as DHS and MICS, provide detailed insights, with innovations like MICS Plus harnessing digital technology for real-time data collection. An industrial quality control methodology, LQAS, enables rapid regional assessments, while school-based methods leverage educational infrastructure but may have limited scope. Serosurveys stand out in terms of technical rigor, emphasizing effective vaccination coverage, although these are not spared from challenges linked to biological sampling. Thus, the integration of LQAS with household surveys, particularly when extended with the MICS Plus model, can furnish comprehensive and timely data, proving especially beneficial for developing countries. Furthermore, school-based assessments can effectively bridge data disparities in regions with robust educational infrastructure if harmonized with other methodologies such as serosurveys. Thus, this review offers a contemporary guide for policymakers, health professionals, and program implementers to adopt flexible approaches in the future.

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Review Article

Nishamalaki Drug- An Ayurvedic Antioxidant Regimen for Periodontal Diseases and Diabetes Mellitus?

Nubesh Khan Syed Mohammed

ABSTRACT

Numerous epidemiological studies have suggested a link between diabetes and periodontitis, both of which are widespread chronic disorders in the world. It seems that diabetes increases the risk of periodontal disease, although treating periodontitis can also help improve glycemic control. Recently, research has focused on the significance of oxidative stress-inflammatory pathways in the etiology of diabetes and periodontitis. The use of antioxidants in the treatment of periodontal disease has gained importance. Research has indicated that addressing oxidative stress and hyperglycemia concurrently may yield better results than treating hyperglycemia exclusively with intensive care. Nishamalaki, an ayurvedic drug, has both antiglycemic and antioxidant property. This review investigated Nishamalaki's potential benefits as an antioxidant for treating both periodontal diseases and diabetes.

Key Words: Antioxidants, Chronic periodontitis, Diabetes, Reactive oxidative species

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INTRODUCTION

Reactive oxygen species (ROS) have received increased attention in recent years for their potential role in the growth of a number of chronic inflammatory diseases, including type 2 diabetes, atherosclerosis, rheumatoid arthritis, and periodontitis.[1]

The majority of tissues continuously create reactive oxygen species as part of normal cellular metabolism. When free radicals or other reactive nonradical species behave negatively, the antioxidant defense system can prevent or lessen the harm they cause. Antioxidants effectively combat ROS under physiological circumstances, preventing ROS-related tissue damage. When inflammation takes place, innate immune system cells, like neutrophils and macrophages, play a significant part in the substantial increase in ROS production, when phagocytosis occurs through the respiratory burst's metabolic route.[2] Tissue damage and oxidative stress come from the antioxidant defense system's incapacity to combat high ROS levels or activities.

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Dental plaque is the main cause of the inflammatory and contagious disease known as periodontitis. The majority of periodontal tissue deterioration is assumed to be caused by the homeostatic balance between reactive oxygen species and antioxidant defense mechanisms, which shield and repair vital tissue cells and molecular components. This response of the host to microorganisms and their products is what causes the most loss of periodontal tissue loss.[3]

There is a lot of evidence linking periodontitis to noncommunicable illnesses like diabetes, heart disease, and chronic kidney disease.[4] It is recognized that type 2 diabetes and periodontal disease have a symbiotic relationship. Periodontal disease affects a substantial percentage of diabetic patients, and it is widely acknowledged that periodontal care significantly reduces HbA1c levels. Periodontal treatment relieves the bacterial infection that causes periodontal disease, which in turn reduces local inflammation in the periodontal tissue and insulin resistance.

Oxidative stress is increased by diabetes, which can disrupt insulin action and secretion and speed the disease's progression to an overt state.[5,6] According to Karunamanas et al plasma levels of 8-8-iso prostaglandin F2a were discovered in diabetic patients and Nox1, Nox2, Nox4, and p47 levels were greater in diabetes model rats.[7] One of the key elements in the beginning and development of periodontitis may be elevated reactive oxygen species.[8] By activating transcription factors for the forkhead box and reducing Wnt signaling, an increase in ROS results in a decrease in bone production and an increase in bone resorption.[9]

As shown by Vo et al in their clinical trial, using antioxidants topically or systemically during periodontal treatment causes reduction in local

inflammation.[9] Arora et al and Singh et al have conducted those analyses on the administration of lycopene and vitamin E for the treatment of periodontitis in people without underlying medical conditions.[10,11]

Periodontal surgery or non-surgical therapy, such as SRP, are two commonly used methods to treat PD. Systematic reviews by Malina et al and Smiley et al concluded that the main result of periodontal therapy is not improved by the use of several therapies in combination with SRP.[12,13] Individuals with type 2 diabetes, which is associated with poor recovery after surgery and the development of periodontal disease, however, may benefit from combined therapy. As a result, combining SRP with antioxidant supplements may have positive therapeutic effects. But there aren't many literature-based meta-analyses that look at how antioxidants and periodontal therapy are used together in diabetes individuals.

Despite providing numerous effective treatment choices for diabetes mellitus, modern medications can have a number of side effects, including hypoglycemia. Due to these drawbacks, Due to the limitations of intensive hyperglycemia treatment in preventing diabetic complications, which are linked to oxidative stress, it has been suggested that simultaneous targeting of hyperglycemia and oxidative stress could be more effective than intensive hyperglycaemia treatment alone in the management of diabetes mellitus. Antioxidant therapy has therefore drawn more interest. Plant products having hypoglycaemic and antioxidant qualities would be highly helpful in the treatment of diabetes mellitus.

Herbal medicines cannot be considered scientifically authentic if the medicine being examined has not been confirmed and described to ensure consistency in the manufacturing process. Additionally, numerous deadly side effects, including direct toxic effects, allergic reactions, impacts from pollutants, and interactions with herbal medications, have lately been identified. As a result, research into herbal medicines is becoming more and more important in order to develop potent formulations using quick, accurate, and contemporary quality control methods.

Nishamalaki, a variety of combinations of Haridra and Amalaki that have been proven to be helpful and are often used in the management of diabetes mellitus, is recommended in Ayurvedic texts. Amalaki, also known as Indian gooseberry or Amla, is regarded as the most important medicinal plant by the ancient Indian medical system known as Ayurveda.

The current review discussed Nishamalaki's potential benefits as an antioxidant for treating both periodontal diseases and diabetes.

ROLE OF ANTIOXIDANTS ON PERIODONTAL HEALTH

Periodontal disease, which affects 10-15% of the world's population, is one of the leading causes of tooth loss. Periodontal disease has been related to the overabundance of free radicals that result from oxidative stress or an antioxidant deficit. An obvious oxidative process with elevated quantities of reactive oxygen and nitrogen species occurs early in the development of periodontal disease, particularly in periodontitis.

For the first time ever, the University at Buffalo School of Dental Medicine shown how the risk of periodontal disease may be increased by a diet deficient in antioxidant vitamins. The serum levels of antioxidant substances, including vitamins A, C, and E, selenium, a-carotene, beryptoxanthin, lycopene, and lutein, were examined to see if they were related to periodontal disease. According to the findings, selenium has a strong link with periodontal disease. When antioxidant levels are low, gum tissue's capacity to combat oxidative stress, preserve healthy tissue, and limit bacterial damage appears to be reduced.[14]

The results of Kroll's study suggest that peripheral and gingival serum total antioxidant status was considerably lower in each subgroup compared to controls, which was connected with periodontal clinical status. He concluded that periodontal tissues may acquire lesions more quickly due to oxidative stress, as evidenced by a rise in ROS concentration and a fall in antioxidant activity in gingival blood. In a contradicting study, it was revealed that gingival tissues, erythrocyte membranes, and plasma of patients with periodontitis had significantly increased enzymatic antioxidant activity than healthy controls.

Two oxidative damage markers, malondialdehyde and 8-hydroxy-deoxyguanine, were shown to be more common in the saliva of those with periodontitis.[15,16] According to research by Canakci et al, periodontal inflammation is accompanied by an increase in oxygen radical formation or activity as well as a decrease in saliva's antioxidant capacity.[17] The degree of periodontal disease, however, was not associated with the elevated oxidative stress.

Root planing and scaling are shown to alter the activity of antioxidant enzymes, supporting the idea that oxidative stress plays a part in periodontal degeneration.[18] Salivary antioxidants like SOD and GPx, according to Novakovic et al, accurately represented both the tissue response to therapy and the periodontal response. Previous research found a highly substantial inverse relationship between salivary antioxidant levels and the periodontal parameters examined.[19]

Waddington et al discussion of inflammatory periodontitis provided additional evidence that ROS

contributes to tissue degradation.[11] Only after the antioxidant defense mechanism has failed to counteract the increased ROS generation does oxidative stress occur. Human gingival tissue's SOD and CAT activities were assessed, and it was discovered that these activities decreased as the depth of the periodontal pocket increased. Patients with periodontitis had lower levels of SOD and GPx in their saliva.

Another study found a substantial inverse relationship between periodontal characteristics and the antioxidant enzyme activity SOD, CAT, and glutathione reductase in patients with periodontitis. In saliva, individuals with periodontitis exhibited lower quantities of non-enzymatic antioxidants and greater concentrations of enzymatic antioxidants such as SOD and GPx, according to research by Novakovic et al.[12]

Numerous research has attempted to focus on the role that antioxidants can be used in the management of periodontitis, because of its protective effect against ROS. The results of supplemental periodontal therapies with antioxidants such vitamin E, taurine, and lycopene have been found to be superior to standard periodontal therapy in terms of clinical periodontal parameters, systemic and local antioxidant activity, and levels of local and systemic ROS.

Vitamin C helps older people maintain their periodontal health, according to recent studies.[13] Another recent study looked at the impact of dietary treatments in addition to periodontal therapy, including lycopene, vitamin C, vitamin E, capsules with fruits, vegetables, and berries.[14] It has been established that lycopene and vitamin E are the only dietary supplements linked to better clinical markers. These results suggest that antioxidants may be used to treat periodontitis, which may be beneficial for both periodontal health and general oxidative state.

REVIEW OF THE LITERATURE ON NISHAMALAKI'S PHARMACODYNAMIC EFFECTS

One of the components of Nishamalaki, Amalaki (Indian Gooseberry), is regarded as the best ayurvedic rejuvenation herb. In addition to stimulating the brain to replenish the body's three fundamental elements—water, fire, and air—which are necessary for all physiological activities, it is distinctive in that it includes a natural balance of flavors in a single fruit. It was proposed that the more potent and consistent antioxidant action of tannins, rather than the mistaken "vitamin C" component, offers the better benefit. It contains calcium, phosphorus, iron, carotene, thiamine, riboflavin, and niacin among other minerals and vitamins.

An in vitro study conducted by Nampoothiri et al. on the antioxidant and inhibitory potential of Terminalia bellerica and Emblica officinalis fruits against LDL oxidation and key enzymes linked to type 2 diabetes revealed that the methanolic extract of Emblica officinalis exhibited scavenging activity against hydroxyl, superoxide, and nitric oxide radicals.[15] This in vitro investigation demonstrated the antioxidant efficacy of Emblica officinalis' active ayurvedic principles.

Turmeric, another essential component of Nishamalaki, is one of the greatest ayurvedic treatments for all metabolic diseases, including diabetes. It is well renowned for its abilities to improve skin tone, fight bacteria, and promote healing. In addition to these advantages, it provides a scrubbing action that helps with eliminating extra body fat. It also corrects metabolism and is helpful for anemia, diabetes, and liver issues.

Numerous studies in the scientific community proved the antioxidant, anti-inflammatory, antidiabetic, and lipid-lowering properties of turmeric.[16] Turmeric's hypoglycemic impact has been attributed to increased peripheral glucose consumption, increased insulin secretion, and decreased hepatic glucose synthesis. The consumption of 4 grams of turmeric enhanced postprandial serum insulin levels in healthy subjects, according to Wickenberg J, et al investigation on the turmeric's effects on post-meal plasma glucose and insulin in healthy individuals.[17] Curcumin's effects on human protein glycosylation, lipid peroxidation, and oxygen radical production were studied by Jain et al.[18]

RESEARCH REVIEW ON THE ANTIOXIDANT PROPERTY OF NISHAMALAKI

Since Nishamalaki is more effective, it is likely that it uses additional or combined processes, maybe working through several systems, and exerting protective benefits. In a rat model of diabetes brought on by streptozotocin, Suryanarayana P et al. investigated the effects of turmeric and curcumin on antioxidant enzymes and oxidative stress.[19] Their research revealed that Amla and Curcuma each have antioxidant activity and reduced lipid peroxidation on their own.

Jayshree et al found that Nishamalaki had decreased MDA activity, thereby preventing the development of oxidative stress and lipid peroxidation.[20] There has also been a reported rise in the levels of SOD and catalase, which has had the combined effect of reducing superoxide radical generation.

CONCLUSION

This investigation explored the potential periodontitis relationship to oxidative stress and related systemic variables. The main cause of periodontal tissue damage brought on by host-microbe interactions is oxidative stress. Reactive oxidative species would seem to have a crucial part in the pathology of periodontal disease, despite the fact that there are a variety of potential

mechanisms that could result in the destruction of periodontal tissue. Reactive oxygen species are dangerous oxidants that should be eliminated as soon as they form or repaired in vivo. The standard periodontal therapy has been supplemented with a range of antioxidants, and positive results have been observed. This opens up new opportunities for periodontal therapy. According to studies, the anti-diabetic medication Nishamalaki has antioxidant properties and also lessens oxidative stress. We can improve clinical outcomes by combining novel antioxidant and anti-inflammatory therapies with conventional periodontal care. Nishamalaki, an antioxidant supplement, may relieve the burden of periodontal disease without any additional effort.

Author's Contribution:

Concept & Design of Study:	Nubesh Khan Syed Mohammed
Drafting:	Nubesh Khan Syed Mohammed
Data Analysis:	Nubesh Khan Syed Mohammed
Revisiting Critically:	Nubesh Khan Syed Mohammed
Final Approval of version:	Nubesh Khan Syed Mohammed

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Case Report

Treatment of Discoloured Nonvital Tooth Using the Walking Bleach Technique: A Case Report

Muhammad Qasim Javed and Swati Srivastava

ABSTRACT

A discoloured non vital tooth (NVT) especially in the anterior region is a common aesthetic concern for many patients, significantly impacting their self-esteem, confidence, social interactions, and employability. Effectively managing NVT, often involves the use of bleaching agents such as sodium perborate and hydrogen peroxide. The careful selection of the bleach and the application of an appropriate bleaching technique are crucial for conservative and successful case management. Improper technique can lead to complications such as cervical resorption, ultimately resulting in tooth loss. This case report aims to elucidate the proper management of a discoloured anterior tooth following endodontic treatment for a patient who reported at the Endodontic department at college of dentistry, Riphah International University, Islamabad, Pakistan in May, 2023.

Key Words: Bleaching, sodium perborate, discolouration, hydrogen peroxide, non-vital bleaching, walking bleach

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INTRODUCTION

Contemporary dentistry is based on the concept of minimal intervention, emphasizing the preservation of dental tissue. This philosophy is particularly relevant in the treatment of tooth discolouration of NVT. Bleaching teeth to restore their natural colour not only aids in saving dental tissue but also offers a substitute for crowns.[1]

Dental dyschromia presents variations in its causes, location and intensity, stemming from external factors, internal factors or both. A thorough case study is imperative to achieve a correct diagnosis, as a successful treatment and the precision of outcomes are contingent upon it.[2] Teeth experiencing a traumatic event accompanied by intra-pulpal haemorrhage often undergo discolouration as the components of blood permeate into the tubules of dentin. Alternatively, the breakdown of red blood cells releases iron, causing brownish-red and black discolorations, especially after a traumatic event resulting in pulp necrosis.[3] Various irrigants used during endodontic therapy, intra canal medications and root canal sealers can induce internal colour changes.

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Historically, invasive prosthetic restoration was the predominant approach to address this type of discolouration.[4] Internal NVT bleaching stands out as an efficient, simple and minimal invasive technique.[5] The outcome of the bleaching procedure hinges on the accurate identification of the etiology, proper diagnosis, and flawless execution of the bleaching technique. For the procedure to be successful, the tooth must have healthy surrounding periodontal tissues, a properly obturated canal, and, most importantly, a correctly positioned barrier to avert the bleaching agent from leaking into the periapical tissues.[6]

Oxidising agents are used in the coronal part of a NVT for the intra-coronal bleaching. Bleaching a NVT relies on permeability of dentin, enabling the oxidising agent to directly infiltrate the pigment in dentinal tubules, effectively addressing or mitigating discolouration issues.[7] The oxidising agent functions by removing intrinsic stains by degradation of larger components of pigment to smaller components thereby assisting in lightening of shade in a NVT.[8] Carbamide peroxide and hydrogen peroxide are presently the most widely used bleaching agents for NVT. These agents are employed in high concentrations for NVT, although the mechanism of action is consistent.[9]

CASE REPORT

A 20-year-old male patient presented at the Endodontic department at college of dentistry, Riphah International University, Islamabad, Pakistan. The chief complaint of patient was greyish discolouration of right upper central incisor. He expressed a desire for a treatment that would result in an aesthetically pleasing smile. No systemic illness was found and the patient was not on any kind of medication which can cause discolouration.

Upon clinical examination of tooth #11, a defective post endodontic restoration with recurrent caries was identified. The percussion test was negative. The diagnosis of previously treated tooth with asymptomatic apical periodontitis was made for #11. There was no history of dental trauma.

The patient was explained about the need for endodontic retreatment (ER) and additional management options including bleaching, composite veneer, ceramic veneer and all ceramic crown, with their advantages and disadvantages. He was advised that the procedure of bleaching may or may not produce the anticipated outcome. However, he opted for bleaching considering the conservative nature of the treatment. A treatment plan of non-surgical retreatment followed by bleaching was made. Patient's signature on the informed consent was taken before treatment was initiated.

Figure No.1: (A) Preoperative radiograph of tooth #11 (B) Successful re-treatment of tooth #11 (C) Preoperative photograph of #11 with black discoloration in the cervical third area (D) Post walking bleaching treatment photograph of #11 depicting a harmonious colour shade.

At the first clinical session, the photograph of the tooth #11 was taken. Subsequently, after rubber dam isolation, ER was performed on #11. During the second clinical session, a shade guide was used to evaluate the shade of #11 using a vita porcelain shade guide under normal daylight conditions. It showed severe discolouration in the cervical third area of #11. Thereafter, after rubber dam isolation 2 mm of gutta-percha was removed from the coronal portion of the root below the CEJ using a round bur. The prepared coronal portion of the root was sealed with a glass ionomer cement (GIC) base having a thickness of 2 mm. It was packed over the gutta-percha. Thus, a barrier between the sealed canal and the bleaching material was made. Next, the pulp chamber was etched using 37% phosphoric acid, followed by thorough washing and drying. This etching process was performed to open the dentinal tubules, which, in turn, enhanced the penetration and effectiveness of the bleaching agent.

For the bleaching protocol, walking bleach technique was employed. The bleaching agent used was a combination of sodium perborate and 30% hydrogen peroxide (FGM Dental Products). The paste was packed in the pulp chamber using a plastic instrument and compacted with a wet cotton pellet. This was succeeded by cotton pellet placement in pulp chamber and access cavity sealing with GIC (Ultramer, 3M).

The patient was scheduled for a follow-up after 1 week. In the second clinical session, a desired lightening of tooth #11 was observed. The temporary filling was removed and the bleaching agent was washed from the pulp chamber. This was followed by the placement of calcium hydroxide dressing for 1 week within the pulp chamber and replacement of temporary filling (Cavit). Later, at third visit after 7 days the tooth was restored with composite resin restoration.

DISCUSSION

Tooth discolourations can vary in terms of causes, location and intensity.[6] Accurately determining the cause of discolouration in NVT is crucial for a exact diagnosis and the implementation of an appropriate bleaching protocol. This case report was linked to the intrinsic discolouration of tooth #11 caused by pulpal remnants and possibly use of various materials during endodontic therapy. An unfavourable prognosis for the tooth bleaching treatment was anticipated in this case due to severity of discolouration and long time elapsed since endodontic treatment was done. This was informed to the patient before beginning the case and informed consent was taken as managing the expectations of the patient at the outset of the treatment is a crucial step.

In situations where discolouration originates intrinsically, the recommended treatment is often bleaching of NVT through intra-canal techniques.[7,8] In the present case report, walking bleach technique was employed. Our findings are in corroboration with the findings from various other studies.[9,10,11] To address the significant severity of tooth discolouration and the requirement for potent products to achieve optimal results, a blend of 30 % hydrogen peroxide and sodium perborate was selected. When sodium perborate is mixed with water, satisfactory results might not be

achieved. Moreover, the use of water with sodium perborate might extend the time required to achieve desired results.

Dental bleaching is generally considered a safe procedure, with certain protective measures in place. Firstly, it is imperative to achieve complete isolation of the soft tissues, including the gingiva, tongue, cheeks and lips to shield them from potential burns caused by the hydrogen peroxide. Secondly, there is a consideration for the risk of cervical resorption. Therefore, it is recommended to apply a 1-2mm base of glass ionomer cement over the root filling material. A mechanical barrier is thus created between the sealed canal of NVT and the bleaching material used, aligning with findings from other studies.

In order to achieve the desired shade, the pulp chamber is packed with calcium hydroxide for seven days before doing the post endodontic restoration. This is a critical step as it facilitates the elimination of residual oxygen, which can interfere with the polymerisation of the post endodontic restoration. Additionally, it helps minimise the risk of cervical root resorption by shifting the pH to an alkaline zone.

This case was followed up for two years and the colour stability was observed. In contemporary dentistry, the effective and satisfactory seal offered by adhesive systems combined with composites plays a crucial role in preventing the migration of pigments and bacteria into the pulp chamber. This factor may contribute to justifying the colour stability observed. This aligns with Abbott's findings in 2009, who noted that all teeth exhibiting colour regression in their study also had unsatisfactory restorations. Despite this, the precise mechanism causing lightening of shade in NVT is not completely comprehended, and if a recurrence takes place, a new treatment plan of bleaching can be discussed with the patient.

The outcomes of tooth bleaching frequently lack predictability, and attaining a completely natural tooth colour is not assured. Certain authors propose that teeth discoloured for an extended period may not respond as effectively to internal bleaching as those with a shorter discolouration duration. This discrepancy could potentially be attributed to the limited number of reported cases, variations in bleaching techniques, and/or disparities in the quality of final restorations for long-term discoloured teeth.

The success of the technique applied in this clinical case highlights aspects that warrant additional investigation. Future studies should document the clinical cases that detail the successful outcome of long standing NVT.

CONCLUSION

The current case report illustrates the efficacy of NVT bleaching utilizing carbamide peroxide and hydrogen peroxide to achieve a predictable esthetic outcome. Over a two-year follow-up period, there was no evidence of discoloration relapse or cervical root resorption. Consequently, it can be inferred that the walking bleach technique is a viable and effective treatment option for non-vital, discoloured teeth.

Author's Contribution:

Concept & Design of Study:	Muhammad Qasim Javed, Swati Srivastava
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Case Report

Immotile Cilia Syndrome

Immotile Cilia Syndrome: A case Report

Ghulam Mustafa

ABSTRACT

Immotile cilia syndrome is a genetic disorder characterized by defects in the structure and function of cilia, which are hair-like structures that protrude from the surface of cells and play a role in various physiological processes, including the movement of mucus in the respiratory tract. PCD is often autosomal recessive to manifest the disease. The impaired movement of cilia in the respiratory tract can result in the ineffective clearance of mucus and debris. This makes individuals with PCD more susceptible to respiratory infections such as sinusitis, bronchitis, and pneumonia.

Key Words: Bronchiectasis, Immotile cilia syndrome, Kartagener's syndrome, Primary ciliary dyskinesia, Sinusitis, Situs inversus.

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INTRODUCTION

Kartagener's syndrome, also known as primary ciliary dyskinesia (PCD) or immotile cilia syndrome, which is a rare genetic disorder that is characterized by a triad of symptoms: situs inversus, bronchiectasis and chronic sinusitis[1]. The primary cause of Kartagener's syndrome is a defect in the structure or function of cilia. In individuals with Kartagener's syndrome, the cilia do not function properly, leading to the accumulation of mucus and recurrent respiratory infections[2]. Regarding the bronchiectasis in Kartagener's syndrome, there has been debate over whether it is truly congenital (present from birth) or acquired after damaging infections in early life[3]. Some studies suggest that the bronchiectasis may develop over time due to recurrent respiratory infections, while others propose that there may be congenital factors contributing to its development[4].

Eliasson et al[5] have established a solid pathophysiological foundation for this disorder. Electron microscopic examination demonstrates disarray of ciliary microtubules and the absence or partial absence of dynein arms, essential for both ciliary and sperm tail movements.

Situs inversus is indeed caused by defective embryonic organ movement around 10 to 13 days after implantation, it suggests that an error in the normal developmental process leads to the mirror-image arrangement of organs. Bronchiectasis and sinusitis can indeed result from mucus retention and infection.

We describe a case of female child with repeated respiratory distress and chest infection. The development of respiratory distress and chest crepitations in this child may suggest pulmonary complications. The accumulation of pulmonary secretions requiring physiotherapy for removal indicates potential issues with mucus clearance or respiratory function.

METHODS

A female child with history dates back to the age of 30 days of life, when she developed respiratory distress. After that, she often had same complaints for which she took treatment from local doctors till the age of 9 yrs.

1st Admission: During her initial admission to hospital, she presented with symptoms including productive cough, respiratory distress, cyanosis from 1 day, and exhibited signs of tachypnea, clubbing, pectus carinatum, and chest crepitations. Diagnostic workup was done on next day, including a chest X-ray, revealed bronchiectatic changes, and HRCT Chest showed mild interstitial thickening. On the sixth day of admission, a sweat chloride test was conducted, revealing elevated levels of 76 mmol/L, this result prompted a follow-up test performed after more than three months to mitigate the possibility of false-positive outcomes, yet the repeated test still indicated elevated levels, measuring 78 mmol/L. Echocardiography was performed 12th day of admission that revealed levocardia, structurally and functionally normal heart.

2nd Admission: At the time of the admission echocardiography was repeated showing moderate pulmonary hypertension. Subsequent HRCT Chest demonstrated hyperinflated lungs with peripher bronchiectasis. She was treated with IV antibiotics

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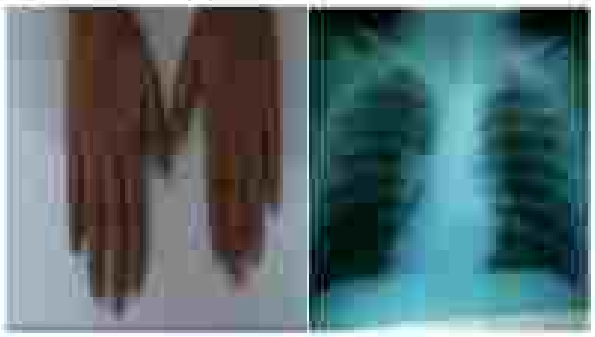
(Ceftriaxone, Cefuroxime), I.V hydrocortisone, nebulization, iron and multivitamin supplementation with chest physiotherapy. She was discharged on oral Cefuroxime, Multivitamin and was advised Chest physiotherapy. For next 18 months, she remained at home with Nebulization and Oxygen inhalation without significant work-up.

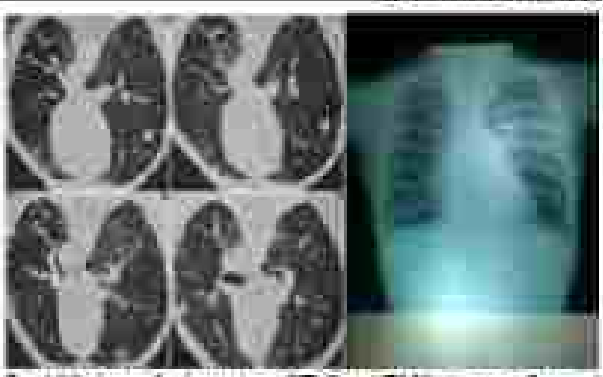


3rd Admission: 3rd time admitted at Hospital, with same complaints of productive cough and respiratory distress. Chest x ray showed hyperinflated lungs with perihilar opacities. HRCT Chest revealed bilateral hyperinflated lungs having bronchiectasis with peribronchial cuffing, areas of air-trapping, patch of fibrosis. On 20th day of admission 99m MAA Lung Perfusion Scan was performed showed multiple large segmental and sub-segmental perfusion defects in both lung field more on right lower lobe. Repeat echocardiography showed mild pulmonary hypertension. Immunoglobulin (IgG) levels were 13.3 g/L (5.4-16.2 g/L). Echocardiography showed borderline RV function, severe pulmonary hypertension, pulmonary artery systolic pressure 70 mmHg. During this admission she was given intravenous (IV) Ceftazidime and Amoxi-clav. Oral Co-Trimoxazole, Nebulization with Tobramycin, Normal saline, Hypertonic saline, Ipratropium and Beclomethasone, chest physiotherapy and on 27th day she was Oxygen free and afebrile.

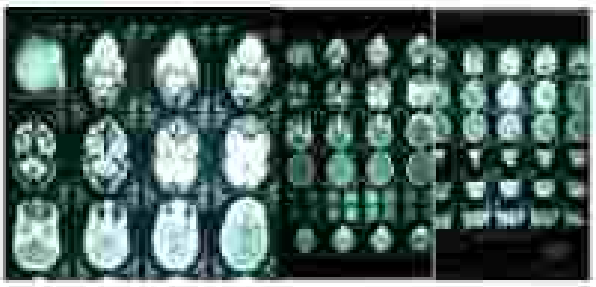
After nose-mouth Saccharine test (A bedside test to diagnose ciliary dyskinesia) was performed. A drop of saccharine was put in pone nare in front of inferior meatus and the patient was asked to tell when she felt the taste of saccharine. The time for patient was 5 hours, not felt the taste for 1st test and on repeat test respectively while for control it was 5 min in each case.

She was discharged on Tab Co- Trimoxazole, Tab Prednisolone, Nebulization with Ipratropium and Beclomethasone along with chest physiotherapy.

4th Admission: She was admitted at Hospital again. Rhino scintigraphy Scan was performed that didn't show prompt transit of tracer into nasopharynx with nasal mucociliary transport rate (NMTR) of 1.9 mm/min in left nostril and 2.18 mm/min in right nostrils (Normal Range of ~5mm/min). There is scintigraphic evidence of delayed mucociliary transport in both nostrils. This finding confirmed our diagnosis of Immotile Cilia Syndrome.



On 10th day of admission CT Scan PNS was performed that showed bilateral maxillary and ethmoidal sinusitis with non-pneumatization of bilateral frontal sinuses. After two days of CT PNS Delta F508 mutations showed both the alleles negative for CFTR gene mutations and patient was discharged on oral Amoxi-clav, Prednisolone, and Salbutamol.



DISCUSSION

Cilia line the epithelium in various anatomical structures, including the trachea, bronchi, nasopharynx, Eustachian tubes, fallopian tubes, and cerebral ventricles; the immotile cilia syndrome, characterized by immotile sperm due to dynein arm defects, is associated with impaired sperm tail movement, while defective embryonic cilia are believed to contribute to the random lateralization of viscera, resulting in a distribution of individuals with either levocardia or dextrocardia[3]. Our ultrastructural findings closely resemble those described by an author in the context of immotile cilia syndrome. A study reported a case with the cases of cyanosis and respiratory distress early within few days of life. Another described a case with symptoms appearing at 2 days of life[4,5].

These cases highlight the variability in the presentation of Kartagener's syndrome in the neonatal period, with symptoms ranging from respiratory distress to nasal discharge and otitis media. The common thread in these cases is the presence of situs inversus and respiratory difficulties, which are key features of the syndrome. In this case we used saccharin test for final diagnosis of ciliary dyskinesia and mucus clearance. Riechelmann et al[6] also described this test and concluded that the saccharin test, a cost-effective and straightforward procedure, is a clinically valuable method for assessing mucociliary clearance in older children and adults. A

normal test, when properly conducted, effectively rules out the diagnosis and eliminates the necessity for more intricate testing.

Early diagnosis is important to implement aggressive airway clearance and antibiotic measures, preventing the onset of bronchiectasis, and ensuring avoidance of inappropriate ear, nose, and throat procedures. The diagnostic process typically commences with functional studies, commonly involving the direct measurement of ciliary beat frequency on nasal epithelial cells. Subsequently, ciliary ultrastructure is examined through electron microscopy to further corroborate the diagnosis.

CONCLUSION

This case highlights a challenging diagnostic journey with recurrent respiratory distress ultimately diagnosed as Immotile Cilia Syndrome, emphasizing the importance of a comprehensive diagnostic workup in complex respiratory cases.

Author's Contribution:

Concept & Design of Study:	Ghulam Mustafa
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Data Analysis:	Ghulam Mustafa
Revisiting Critically:	Ghulam Mustafa
Final Approval of version:	Ghulam Mustafa

Conflict of Interest: The study has no conflict of interest to declare by any author.

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