

Post-Operative Wound Infection and its Management in Pediatric Surgical Patients: A Study of 560 Infants and Children

Post-Operative
Wound Infection and
its Management in
Pediatric

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ABSTRACT

Objective: Aim was to determine the prevalence of post-operative wound infection and its management in pediatric surgical patients.

Study Design: Descriptive/ observational study

Place and Duration of Study: This study was conducted at the Murshid Hospital & Health Care/ NICH, Karachi. Jun, 2020 to Feb, 2021.

Materials and Methods: Total 560 infants and children were presented. After getting informed written consent detailed demographics of enrolled cases included age, sex, weight and gestational age were recorded. All the patients were underwent for surgery and admitted for proper follow up. Post-operative frequency of wound infection and its risk factors were assessed. SPSS 22.0 was used to analyze all data.

Results: Among 560 patients, 160 were infants and 400 were older children. Mean age of the infants were 18.6 ± 5.25 days and mean age of children was 3.4 ± 7.16 years. Mean gestational age of the patients was 37.11 ± 9.31 weeks. Frequency of wound infection was found in 42 (7.5%) cases. Among 42 cases of WI, frequency of surgical site infection was 24 (57.1%), burst abdomen was in 14 (33.3%) and wound dehiscence in 4 (9.5%). Frequency of infection as per wound classification, dirty wounds were higher in 17 (40.5%) followed by contaminated, clean contaminated and clean wounds. We noticed that the infection rate increased with the time of the operation ($P = 0.002$), the presence of contamination throughout the procedure ($P = 0.003$), and the insertion of a new element into the procedure (such as a resident or intern) ($P = 0.001$).

Conclusion: We concluded in this study that rate of post-operative wound infection was higher among 7.5% cases, in which surgical site infection was common. Except this increase in surgery time, presence of contamination throughout the procedure and the insertion of a new element into the procedure were the most common risk factors for increase in infection rate among infants and children.

Key Words: Pediatric Surgery, Infants, Children, Wound Infection, Risk Factors

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INTRODUCTION

Paediatric surgery has developed into its own subspecialty over the course of time, largely as a result of the efforts of pioneering pediatric surgeons who polished their skills while treating young patients. Because of this, further efforts to build organized training and academic forums for the dissemination of scientific knowledge and support of evidence-based practice were made possible^[1].

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An infection may be conceived of as the invasion of organisms via the tissues of the host when the local and systemic defences of the host have been impaired. Pus discharge is an indicator of a serious wound infection, which may necessitate a further treatment to guarantee appropriate drainage, create systemic symptoms, and delay the patient's return home. Pus discharge is an indication of a major wound infection. A tiny wound infection can be recognized by the discharge of pus or a clear fluid, but it is not accompanied by other broad symptoms such as fever or chills.^[2] The most common and troublesome complication that might arise during the healing process of a wound is infection^[3]. Since the beginning of surgery's application as a technique of treatment, there has always been the possibility of infection following the procedure. Because of advances in medical science, it is now possible to treat and even avoid getting this infection. The discovery of antiseptics was one of the most important developments on the path toward making surgery completely risk-free. Infants (less than one years old) who have had surgery owing to abdominal birth defects have a clinical

condition that is understudied but prevalent and serious: surgical site infection (SSI). Surgical site infections can manifest themselves in a variety of ways, including wound infection, wound dehiscence, anastomotic leakage, postoperative peritonitis, and the creation of a fistula. These problems can increase a patient's length of stay in the hospital, as well as their medical costs, their quality of life, and even their chance of passing away [2-5].

Surgical procedures performed on children have been associated to an increase in the risk of SSI [6]. On the other hand, the prevalence of the vast majority of SSIs is completely unknown since they are so infrequent. The frequency of SSI has to be better understood in order to provide a context for clinical decision making and to open the path for more research into this illness. By knowing which birth defects had the highest prevalence of specific SSIs, for example, it may be able to make the use of customized preventative antibiotics possible.

When a wound becomes infected, it is because the relationship between the host and the bacterium has shifted in such a way that the bacteria now have the upper hand. When bacteria start to develop in a wound, this not only causes a systemic septic reaction, but it also impedes the numerous processes that are involved in the wound healing process. To put it another way, each of these processes is disturbed when bacteria start to grow in a wound. It would appear that a complete elimination of surgical wound infections is a very remote prospect. It is the second most common nosocomial infection⁵, and it causes a lot of problems for patients, including making them feel sicker, forcing them to stay in the hospital longer, causing them to miss more work, and causing them to pay more for treatment (the cost of a procedure increases by 300 to 400 percent) [7-9].

By taking an epidemiological approach, we determined the rate of infection that occurred in children after they had surgery.

MATERIALS AND METHODS

This Descriptive study was conducted at Murshid Hospital & Health Care/ NICH, Karachi and comprised of 560 infants and children. Children had cardiac disease, any other severe medical illness, re-operated cases and those did not provide any written consent were excluded from this study.

Patients who had just had surgery were checked into the hospital for a full follow-up. Following the acquisition of informed written permission, complete demographic information of enrolled patients such as age, sex, weight, and gestational age was collected. The information on each patient, including the length of the operation, the specifics of any contamination, and the components utilized during surgery, was recorded. All of the information pertaining to the patients was

collected and entered into a proforma that had been created especially for the research project. This proforma included the patients' clinical characteristics, potential risk factors, diagnosis, complications (like wound infection), microbes identified, length of hospital stay, and final outcome. SPSS 22.0 was used to analyze all data. Frequencies and percentages were used for categorical variables and mean standard deviation was used for data presentation.

RESULTS

Among 560 patients, 160 were infants and 400 were older children. There were 330 (58.9%) males and 230 (41.1%) females among all cases. Mean age of the infants was 18.6 ± 5.25 days and mean age of children was 3.4 ± 7.16 years. Mean gestational age of the patients was 37.11 ± 9.31 weeks. (table-1).

Table No.1: Enrolled patients' baseline demographics and clinical features

| Variables | Frequency | %age |
|------------------------------|------------------|------|
| Gender | | |
| Male | 330 | 58.9 |
| Female | 230 | 41.1 |
| Mean age of children (years) | 3.4 ± 7.16 | |
| Mean age of infants (days) | 18.6 ± 5.25 | |
| Mean gestational age (weeks) | 37.11 ± 9.31 | |
| Type of Cases | | |
| Older Children | 400 | 71.4 |
| Infants | 160 | 28.6 |

Frequency of found infection was found in 42 (7.5%) cases (figure-1).

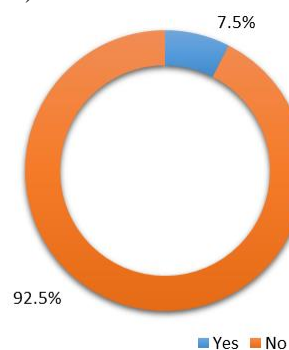


Figure No.1: Prevalence of wound infection among all cases

Among 42 cases of WI, frequency of surgical site infection was 24 (57.1%) (Picture-1), burst abdomen (Picture-2) was in 14 (33.3%) and wound dehiscence in 4 (9.5%). (table-2).

Table No.2: Type of wound infections among all cases

| Variables | Frequency (n=42) | %age |
|-------------------------|------------------|------|
| Type of WI's | | |
| surgical site infection | 24 | 57.1 |
| burst abdomen | 14 | 33.3 |
| wound dehiscence | 4 | 9.5 |



Figure No.2: Surgical Site Infection of wound



Figure No.3: Burst Abdomen due to infected wound

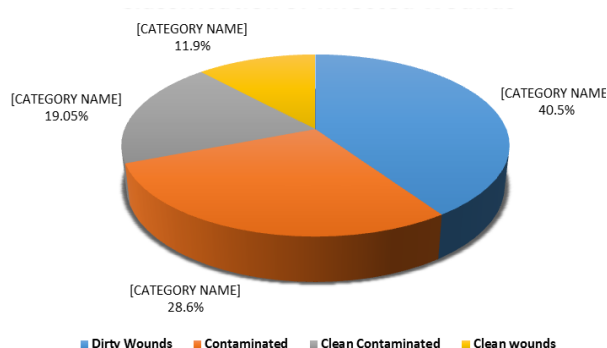


Figure No.4: Prevalence of infection with types of wound classification

Frequency of infection as per wound classification, dirty wounds were higher in 17 (40.5%) followed by contaminated, clean contaminated and clean wounds (figure-2).

We noticed that the infection rate increased with the time of the operation ($P = 0.002$), the presence of contamination throughout the procedure ($P = 0.003$), and the insertion of a new element into the procedure (such as a resident or intern) ($P = 0.001$) (table 3).

Table No.3: Frequency of risk factors to increase wound infection

| Variables | Frequency(n=42) | %age |
|----------------------------|-----------------|------|
| Risk Factors | | |
| Surgery time (>2hours) | 20 | 47.6 |
| Contamination in procedure | 16 | 38.1 |
| Insertion of new element | 6 | 14.3 |

DISCUSSION

In spite of advancements in surgical methods and a better knowledge of the etiology of wound infection, postoperative wound infection continues to be a major source of morbidity and death for patients who are having operative procedures. There is a wide range of variation in the occurrence of this condition among countries, regions, and even healthcare institutions. Damani reported a 30% rate of hospital-acquired infections^[10], while our total incidence was 7.5%. Another study found that this tendency is responsible for forty percent of all clean and clean contaminated treatments, which results in increased healthcare expenses and patient morbidity.^[11]

When considering the length of the treatment, it is important to keep in mind that the longer the patient is under anesthesia, the greater the risk of a postoperative wound infection^[12]. According to the findings of this research, a longer duration of surgery (more than 120 minutes) was associated with a higher risk of postoperative wound infection.

Infections at the surgical site and ruptures of the abdominal wall were the types of complications that occurred most often in our patients. Despite the fact that infection is the most common cause of this complication, we had four patients who developed dehiscence as a result of it. In the course of our investigation, we did not come across any cases of necrotizing fasciitis, septicemia, or cellulitis that had spread. It is not necessary to have a positive culture in order to make a diagnosis of wound infection^[13]. On the other hand, we found that every single one of our patients had a culture that was positive. According to Arora et al.^[14], the percentage of flourishing civilizations is 87 percent.

Because infections can result in significant morbidity and death, antibiotics are frequently used over the course of surgical therapy for many of the birth defects that have been identified. This should not come as a surprise. However, there is still considerable debate as to whether or not antibiotics are both safe and effective for the population under consideration here. It would indicate that the use of antibiotics during the perioperative period in pediatric patients can bring about a reduction in the incidence of surgical site infections. However, in recent years, long-term antibiotic usage in infants has been related to significant unfavorable outcomes^[15,16]. More specifically, antibiotics can modify the gut microbiota and elevate the risk of problems such as necrotizing enter colitis and late-onset sepsis. According to the findings of a more recent comprehensive investigation^[17], pre-operative antibiotic treatment did not have any impact on the rate of surgical site infections that occurred in infants. However, this ineffectiveness in non-newborns may be owing to an erroneous timing of administration, which may be addressed by rigorous adherence to protocols.^[18]

According to the findings of our research, the typical length of postoperative hospital stays ranged from 7 days in cases without complications to 14 days in instances including wound infections (range 5-20days). The patient's recovery is set back by approximately one week due to an infection at the surgical site, and in certain instances, the length of time spent in the hospital is greatly increased.^[19] Even with today's advanced surgical and sterilization procedures, as well as the preventative use of effective antibiotics, postoperative wound infection continues to be a major contributory factor in patients' morbidity.

CONCLUSION

We concluded in this study that rate of post-operative wound infection was higher among 7.5% cases, in which surgical site infection was common. Except this increase in surgery time, presence of contamination throughout the procedure and the insertion of a new element into the procedure were the most common risk factors for increase in infection rate among infants and children.

Author's Contribution:

| | |
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| Drafting: | Khair Jan Habib, Amnah Azim |
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| Revisiting Critically: | Mohseena Siddiq Mansoori, Khair Jan Habib |
| Final Approval of version: | Mohseena Siddiq |

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

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