

Comparison between Ultrasound-Guided Transversus Abdominis Plane Block with Ilioinguinal or Iliohypogastric Nerve Block for Post-Operative Analgesia in Patients of Inguinal Hernia Repair

Plane Block and Nerve Block for Post-Op. Analgesia in Hernia Repair

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ABSTRACT

Objective: To compare ultrasound guided transversus abdominis plane block with Ilioinguinal or iliohypogastric nerve block in terms of post-operative analgesia.

Study Design: Prospective, randomized single-blind study

Place and Duration of Study: This study was conducted at the department of anesthesia and intensive care of DG Khan & Nishtar Hospital, Multan from April 2017 to April 2018.

Materials and Methods: Hospital local research and ethical committee approved the study protocols consent was taken after complete information of study. Allocation of the patients into groups was done by using lottery method. Patients were divided into two groups I and II. Main variables of the study are postoperative analgesia requirement, dose of diclofenac sodium and VAS score. SPSS software was used for data analysis.

Results: Mean duration of rescue analgesic requirement and dose of tablet diclofenac required per minutes of Group I was 322.05±21.87 minutes and 207.05±9.77 mg, respectively. While, the mean duration of rescue analgesic requirement and dose of tablet diclofenac required per minutes of Group II was 413.04±12.13 minutes and 175.28±9.71 mg, respectively. The difference was statistically significant.

Conclusion: We concluded that Ilioinguinal (IIH) and Iliohypogastric (IHN) nerve block reduced the rescue analgesic requirement as compare to ultrasound guided TAP block. Duration of post-operative analgesia is longer in IIIH/IHN block.

Key Words: TAP Block, Ilioinguinal block, Iliohypogastric block, inguinal hernia repair, Analgesia

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INTRODUCTION

Inguinal hernia repair is a common surgical procedure that can cause moderate to severe pain in post operative time¹. Pain is an unpleasant feeling which may results poor outcome and late recovery to the daily activities and affecting about 43% of patients.

Main purpose of pain management in post operative period is to minimize the dose of medication to avoid the side effects². Many pharmacological and non pharmacological techniques are available to reduce pain after hernia repair. This technique includes peripheral local anaesthetic, topical analgesics, epidural injections and some non pharmacological pain therapies³.

Block of regional nerve provides a greater degree of post operative pain reduction and facilitates the ambulation and early discharge from hospital⁴. Among the regional blocks Ilioinguinal and iliohypogastric nerve blocks are commonly used regional blocks. For pain management after herniorrhaphy incidence of failure of regional blocks found to be 30% in experienced hands due to blind techniques⁵. Use of ultrasonography for administration of regional blocks reduces the adverse events and complications⁶. By reducing the pain outcomes can be improved to a significant level. Analgesia to the parietal peritoneum and deep muscles of the anterior abdominal wall can be provided with transversus abdominis plane block which

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is a rapidly expanding and novel technique following lower abdominal surgeries^{7,8}. Due to its efficacy and easiness transverse abdominal plane block becoming popular day by day. Accuracy and success rate of TAP block can be improved by using ultrasound during its administration⁹. Few previous studies demonstrate the effectiveness of TAP block for post operative pain relief following inguinal hernia repair but no study give the conclusive results that ultrasound guided TAP block are superior than blind procedures¹⁰. This study will fulfill local reference gap regarding this topic and available literature.

MATERIALS AND METHODS

Study was randomized controlled trial conducted in the department of anesthesia and intensive care of DG Khan & Nishtar Hospital, Multan, from April 2017 to April 2018. Hospital local research and ethical committee approved the study protocols consent was taken after complete information of study. Adult patients of more than 18 years of age both genders ASA status I and II and who were scheduled for inguinal hernia repair were included in the study. Patients with BMI more than 35 kg/m², pregnant woman, alcohol abuser, history of taking painkillers, infection at the injection site, poor coagulation profile and who were refused to give consent were excluded from the study. Patients were informed and trained about visual analogue score. Tab Alprazolam 0.25mg and ranitidine 150mg given before 2 hours of surgery orally. Standard monitoring was attached like ECG, pulse oximetry and non invasive blood pressure. Propofol 2mg per kg atracurium 0.5mg per kg was given intravenously. After three of oxygen ventilation a mixture of Isoflurane and oxygen was given through inhalation rout, mixture of nitrous oxide and Isoflurane was used for maintenance of anesthesia. TAP block or Ilioinguinal nerve block was given in respective group. Allocation of the patients into groups was done by using lottery method. Patients were divided into two groups I and II. Patients in group I were administered TAP block 0.75% ropivacainein dose of 3mg per kg, similarly patients in group II were administered IIN or IHN block with 0.75% ropivacaine. During administration of TAP block ultrasound probe was placed at the costal margin or on the lateral abdominal wall. Surgeon was allowed to perform surgery after completion of block. Neuromuscular blockade was nullified with glycopyrrolate and Neostigmine. Patients were extubated when they are fully conscious and breathing spontaneous. Immediately after surgery standard analgesic agents was given to all patients. If VAS score was more than 4 Tramadol 2 mg per kg was given intravenously. In case of persistent score was more than 4 diclofenac 75mg was given intravenous. Oral diclofenac 75mg was given after 4 hours. To prevent the post operative nausea and vomiting injection

ondansetron 4 mg was given intravenously. Data analysis was done by using SPSS version 24. Mean and standard deviation were calculated and presented for numerical data like VAS score, duration of first analgesic requirement, age of patient, weight, and height and hemodynamic parameters. Qualitative data was presented as numbers and percentages like gender incidence of nausea vomiting and patients satisfaction. Probability value ≤ 0.05 .

RESULTS

Eighty patients were included in this study. The patients were divided into two Groups as n=40 in Group I and n=40 in Group II. The mean age, height, weight and BMI of Group I was 29.47±2.54 years, 167.85±2.91 cm, 68.22±2.43 kg and 25.69±2.21 kg/m², respectively. While, the mean age, height, weight and BMI of Group II was 30.42±2.38 years, 168.81±2.69 cm, 67.55±2.24 kg and 26.24±2.72 kg/m², respectively. The difference was statistically insignificant (Table. I).

Table No.1: Showed mean of age, height, weight and BMI in both groups

| Variables | Group I n=40 | Group II n=40 | P-value |
|--------------------------|-----------------|------------------|---------|
| Age (years) | 29.47±2.54 | 30.42±2.38 | 0.089 |
| Height (cm) | 167.85±2.91 | 168.81±2.69 | 0.133 |
| Weight (kg) | 68.22±2.43 | 67.55±2.24 | 0.201 |
| BMI (kg/m ²) | 25.69±2.21 | 26.24±2.72 | 0.322 |

Table No.2: Showed the mean VAS at rest of both groups

| VAS at rest | Group I n=40 | Group II n=40 | P-value |
|-------------|-----------------|------------------|---------|
| 0 minute | 0.58±0.22 | 0.56±0.21 | 0.761 |
| 30 minutes | 0.68±0.32 | 0.63±0.28 | 0.507 |
| 60 minutes | 0.98±0.51 | 0.99±0.55 | 0.949 |
| 90 minutes | 0.93±0.43 | 1.05±0.32 | 0.185 |
| 2 hours | 1.74±0.35 | 0.79±0.29 | 0.000 |
| 4 hours | 1.89±0.22 | 0.83±0.33 | 0.000 |
| 6 hours | 2.20±0.64 | 1.31±0.36 | 0.000 |
| 8 hours | 3.62±0.78 | 1.97±0.22 | 0.000 |
| 10 hours | 3.69±0.74 | 2.67±0.34 | 0.000 |
| 19 hours | 3.79±0.46 | 3.64±0.21 | 0.041 |
| 24 hours | 3.81±0.31 | 3.17±0.33 | 0.000 |

Table No.3: Showed mean duration of rescue & dose of tablets

| Characteristics | Group I n=40 | Group II n=40 | P-value |
|--|-----------------|------------------|---------|
| Duration of rescue analgesic requirement (minutes) | 322.05±21.87 | 413.04±12.13 | 0.000 |
| Dose of tablets diclofenac required per patient (mg) | 207.05±9.77 | 175.28±9.71 | 0.000 |

The mean VAS at rest of Group I at 0 minute, 30 minutes, 60 minutes, 90 minutes, 2 hours, 4 hours, 6 hours, 8 hours, 10 hours, 19 hours and 24 hours was 0.58 ± 0.22 , 0.68 ± 0.32 , 0.98 ± 0.51 , 0.93 ± 0.43 , 1.74 ± 0.35 , 1.89 ± 0.22 , 2.20 ± 0.64 , 3.62 ± 0.78 , 3.69 ± 0.74 , 3.79 ± 0.46 and 3.81 ± 0.31 , respectively. While, the mean VAS at rest of Group II at 0 minute, 30 minutes, 60 minutes, 90 minutes, 2 hours, 4 hours, 6 hours, 8 hours, 10 hours, 19 hours and 24 hours was 0.56 ± 0.21 , 0.63 ± 0.28 , 0.99 ± 0.55 , 1.05 ± 0.32 , 0.79 ± 0.29 , 0.83 ± 0.33 , 1.31 ± 0.36 , 1.97 ± 0.22 , 2.67 ± 0.34 , 3.64 ± 0.21 and 3.17 ± 0.33 , respectively. The difference reached to statistically significant for 2 hours to 24 hours, as $p\leq 0.05$ (Table. 2). The mean duration of rescue analgesic requirement and dose of tablet diclofenac required per minutes of Group I was 322.05 ± 21.87 minutes and 207.05 ± 9.77 mg, respectively. While, the mean duration of rescue analgesic requirement and dose of tablet diclofenac required per minutes of Group II was 413.04 ± 12.13 minutes and 175.28 ± 9.71 mg, respectively. The difference was statistically significant (Table. 3).

DISCUSSION

A study was conducted by Peterson et al¹¹ on comparison of TAP block and Ilioinguinal block in terms of duration of analgesia after hernia repair and reported that there was not markable difference in morphine consumption within 24 hours of post operative period. Both Ilioinguinal block and TAP block have almost similar duration of analgesia and complication rate. Results of this study are comparable with our study conclusion.

Another study was conducted by Avelineet al¹² he included 273 patients in a study that were undergoing for inguinal hernia repair. He compared ultrasound guided TAP block and blind IHN block. He reported that morphine consumption after surgery was lower in TAP block group within 24 hours immediately after surgery TAP block was ultrasound guided in both studies and IHN block was blind in both groups.

Another study was conducted Kamal Ket al¹³ and reported that ultrasound guided IHN block reduce the rescue analgesia requirement as compared to ultrasound guided TAP block. Duration of rescue analgesia was 319.8 ± 115.2 minutes in TAP block and 408 ± 116.4 minutes in IHN group p value was 0.005 which is a significant value. In TAP block 23.33% patients require tramadol in first 4 hours and in IHN group 6.67 % patients require Tramadol in first 4 hours. No patients require diclofenac intravenously in both groups.

Another study was conducted by Sujatha C et al¹⁴ in 2017 on comparison of TAP block and Ilioinguinal block and iliohypogastric block and stated that ultrasound guided TAP block provides longer duration of analgesic effect as compare to Ilioinguinal and iliohypogastric block. But in complications view both techniques are safe (no complications observed in both groups). Results of this study are comparable with our

results. Mean duration of analgesia was 5.900 ± 1.881 hours in TAP block and 3.766 ± 1.754 hours in IIIH group.

In a study Yu et al¹⁵ compared TAP block with infiltration of local anesthetic into the incision site and reported that infiltration technique is effective equally in short term analgesic effects but it is stated that TAP block provides longer duration of postoperative analgesia. Its long lasting effect prolongs to 24 hours after surgical management of any major problem. In our study we used local anesthetic in IIIH block and superiority of IIIH block was remained constant for long term analgesia. Results of this study were also comparable with our results.

Another study on this topic was conducted by Frassanito et al¹⁶ and reported that patients in TAP block group have significantly lower VAS score after surgery immediately and in long term outcomes as compare to IIIH block. Not only in normal position but also at coughing and at the time of discharge from hospital VAS score was lower in TAP group and patients were satisfied in better terms. He concluded in his study and demonstrated that analgesia requirement is two times in IIIH group as compared TAP block group.

A similar study was conducted by Mohamed MH et al¹⁷ in 2015 on this topic but he compared both groups' n pediatric patients and reported conclusion opposite to our conclusion. He observed that IIIH group is superior as compared to ultrasound guided TAP block group. Minimum incision no requirement of mesh in pediatric population but in adults' extensive dissection required. This conclusion is controversial. Another study by Willschke H et al¹⁸ also reported similar results as reported by previous study. Both of these studies conducted on pediatric patients which concluded that ultrasound guided TAP block does not give better outcomes when compared in children.

Reid MF et al¹⁹ and Anatol TI et al²⁰ also conducted studies on comparison of ultrasound guided TAP block and IIIH nerve block to compare in terms of analgesic effect and complications rate. Anatol TI et al²⁰ reported that both groups are equally effective no one have superiority over other but Reid MF et al¹⁹ give contrast conclusion that IIIH group is superior in terms of analgesia duration.

CONCLUSION

Results of our study reveals that IIIH and IHN nerve block reduced the rescue analgesic requirement as compare to ultrasound guided TAP block. Duration of post-operative analgesia is longer in IIIH/IHN block.

Author's Contribution:

| | |
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