

Transverses Abdominis-Plane Block for Postoperative Analgesia in Inguinal Hernia Repair under Spinal Anesthesia

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ABSTRACT

Aim: To compare outcome of transverses abdominis plane block versus placebo for postoperative analgesia in inguinal hernia repair under general anaesthesia

Study design: Randomized controlled trial

Place and duration: Department of Anesthesia Jinnah Postgraduate Medical Centre, Karachi from 6th September 2017 to 6th February 2018

Methodology: One hundred patients with inguinal hernia repair under spinal anaesthesia were enrolled. They were divided into two groups; group A (receiving Bupivacaine) and group B (receiving normal saline). Outcome was checked by comparing both the groups for pain score and analgesic consumption.

Results: There were 64(64%) males where as 36(36%) females with mean age of 40.32±6.710 years. In group A, the mean pain score was 4.64±1.54 and mean analgesic consumption was 139.38±46.98 while in group B it was 5.62±1.29 and 238.30±44.49.

Conclusion: The ultrasound directed transversus-abdominis plane block delivers an efficient and virtuous post-operative analgesia method. It also decreases the requirement of analgesic with provision of reliable visual analogue scale scores having reduced complications after the surgery of inguinal hernia.

Keywords: Pain score, Analgesic consumption, Spinal anesthesia, Inguinal hernia

INTRODUCTION

Inguinal hernia (IH) surgery is a worldwide common procedure. Ilio-inguinal nerve block is an efficient analgesic used in postoperative care process after IH surgery. There has been through various researches mentioning the process to be blind with increased failure rate. Transversus abdominis plane block (TAPB) is an alternative, and highly effective abdominal filed block used for peripheral region of ilio-inguinal as well as hypogastric, and lower intercostal (T7–T11) nerves.¹

TAPB is a new technique applied in blocking of the abdominal-wall-neuronal afferents through the triangle of lumbar Petit. The TAPB has the main focus to distribute local analgesia at the internal oblique region. as well as transversus abdominis (TA) muscles. The spinal nerves are targeted in this plane². The TAPB has been formulated through the well-established ultrasonography. The proper distribution of the local anesthesia within IO and TA in the underlying nerves of fascia TA muscles is ensured through local anesthetic applied³.

TAPB has been used a multimodal regime for the post-operative analgesia under different surgical procedures including⁴ open appendectomy,⁵ retro pubic-prostatectomy⁶, nephrectomies⁷, hernia repair⁸, laparoscopic cholecystectomies^{9,10} as well as cesarean section¹¹.

MATERIALS AND METHODS

This randomized controlled trial study was conducted at Department of Anesthesiology, Jinnah Postgraduate Medical Center Karachi from 6th September 2017 to 6th February 2018 after IRB permission. One hundred patients with inguinal hernia repair under spinal anesthesia were enrolled. They were divided into two groups; group A (receiving Bupivacaine) and group B (receiving normal saline). All patients age range 18 to 50 years, either gender or undergoing unilateral inguinal hernia repair were included. Those patients having scrotal or recurrent hernia as well as other condition as strangulated, obstructed hernia, irreducible in addition to hepatic, renal failure and allergic conditions were placed in the

exclusion criteria. A premedication of alprazolam in 0.5mg oral dose was delivered in all the patients 2 hours prior to surgery. Major vitals including cardiac activity rate, BP monitoring and the oxygen peripheral saturation was uninterruptedly monitored during operation and also in the post-operative time. The spinal anesthesia was delivered through 15 mg of heavy bupivacaine dosage in the subarachnoid spinal L3 and L4 region. The surgery was initiated post analysis of the blockage level. All surgical process was completed by well experience surgeons where initiation of the surgery was performed through checking of the blockage level.

Lichtenstein tension-free meshplasty was performed through randomization where patients were grouped as A receiving 20 mL dosage of Bupivacaine in 0.2% while group B cases receiving dosage of 20 mL in normal saline. TAPB was then conducted by an experienced anesthesiologist who was blinded about the drug.

Pain evaluations were recorded within first 24 hours post-surgery by an anesthesiologist who was blinded about the information of the assigned group. to the group assignment. Pain assessment was also conducted through Visual Analog scoring procedure where the score was assigned within 10 to 0 values. Those patients having a score level > 4 were administered injection tramadol 1.5mg/kg. A complete record of consumed analgesic by each patient within 24 hour was documented. The demographic details as well as clinical history of each patient were also documented through a well-structured questionnaire. Data was analyzed using SPSS version 26.0 where mean and standard deviation were used for quantitative analysis and percentages and frequencies were used for assessing the qualitative variables.

RESULTS

There were 35(70%) males and 15(30%) females with mean age of 40.32±6.705 years, while in group 'B' 29(58%) were males and 21(42%) female with mean age of 40.32±6.784 years. The mean height in group A was 1.63±0.22 meters while in group B it was 1.75±0.22 meters. The mean weight in group A was 60.92±14.87 kg while in group B it was 74.72±15.31 kg. The mean BMI in group A was 21.88±3.39 kg/m² while in group B it was 27.50±2.97 kg/m². The mean duration of hernia in group A was 10.72±6.29 months while in group B, it was 15.32±5.28 months. In group A, 23 patients

Received on 09-09-2022

Accepted on 19-01-2023

(23%) were smokers while in group B, 21(21%) were smokers. In group A, 15 patients (15%) had diabetes mellitus while in group B, 18 (18%) had diabetes mellitus. In group A, 26 patients (26%) had hypertension while in group B, 17(17%) had hypertension (Table 1). The mean pain score was 4.64 ± 1.54 and mean analgesic consumption was 139.38 ± 46.989 in group A while in group B, it was 5.62 ± 1.29 and 238.30 ± 44.49 respectively. Statistically the difference was significant ($P < 0.05$) [Table 2].

Table 1: Demographic information of the patients (n=100)

| Variable | Group A (n=50) | Group B (n=50) |
|------------------------------------|----------------|----------------|
| Age (years) | | |
| 18-34 | 8 (16%) | 8 (16%) |
| 35-50 | 42 (84%) | 42 (84%) |
| Gender | | |
| Male | 35 (70%) | 29 (58%) |
| Female | 15 (30%) | 21 (42%) |
| Height | | |
| 1.2-1.7 | 34(68%) | 18(18%) |
| 1.8-2.2 | 16(32%) | 32(32%) |
| Weight | | |
| 45-75 | 43 (86%) | 31 (62%) |
| 76-110 | 7 (14%) | 19 (38%) |
| BMI | | |
| 17-25 | 41(82%) | 12 (24%) |
| 26-35 | 9(18%) | 38 (76%) |
| Duration of hernia (months) | | |
| 3-10 | 28 (56%) | 14 (28%) |
| 11-24 | 22 (44%) | 36 (72%) |
| Smoking status | | |
| Smoker | 23 (46%) | 21 (42%) |
| Non smoker | 27 (54%) | 29 (58%) |
| Diabetes mellitus | | |
| Yes | 15 (30%) | 18 (36%) |
| No | 35 (70%) | 32 (64%) |
| Hypertension | | |
| Yes | 26 (52%) | 17 (34%) |
| No | 24 (48%) | 33 (66%) |

Table 2: Comparison of mean pain score and mean analgesic consumption in both groups (n=100)

| Variable | Group A | Group B | P value |
|-----------------------|--------------------|--------------------|---------|
| Pain score | 4.64 ± 1.54 | 5.62 ± 1.29 | 0.000 |
| Analgesic consumption | 139.38 ± 46.98 | 238.30 ± 44.49 | 0.000 |

DISCUSSION

With recent advancement in research and science the abdominis plane block has been applied effectively for management of postoperative pain specifically in lower abdominal surgical procedures. It has been reported to reduce the postoperative-opioid requirement.¹² Management of pain is the main concern after any surgical procedure in addition to other main factors as duration of hospitalization. Increase in hospital stay has been associated with comorbidities as well as delay in immobilization¹³.

Various types of analgesic techniques applied in surgery includes epidural analgesia¹⁴, intravenous patient controlled analgesia⁴ as well as peripheral nerve block¹⁵ and also TAPB block^{16,17}. An efficient analgesic requires reducing the postoperative stress as well as augmenting patient's satisfaction and health outcomes¹⁸.

TAPB has been commonly used in recent years by Rafi et al¹⁹ and reported that iliolumbar-triangle of Petit which is superiorly bound to lower coastal-margins, inferiorly to iliac crest, and anteriorly to EO as well as posteriorly to latissimus-dorsi muscles. The blunted technique uses double resistance loss post advancement of needle in the EO and IO fascia-layers²⁰.

Venkatraman et al²¹ elaborated in their study that TAPB prolonged the duration of postoperative analgesia by 440 minutes with a significant decrease in the requirement of other analgesics. Similar results have been reported in the present study results. The superiority of TAPB has been proven by reduction in VAS

scoring in the current research as well as other studies as of Bhattacharjee et al¹³ and Venkatraman et al²¹.

Mukhtar and Khattak²² described a substantial decrease in the intra-operative morphine utilization following pre-incisional TAPB. Tammam²³ conducted TAPB in inguinal hernia through placement of catheter ultrasonographically. Despite catheterization only a single dosage of as 20 mL 0.25% bupivacaine was required within 48 hours. Sharma et al²⁴ assessed the efficacy of TAPB analgesia post abdominal surgery and found that VAS scoring reduced in such patients with an additional decrease in the consumption of tramadol within 48 hours. These outcomes also correlate with current study results. Similarly, McDonnell et al¹⁸ conducted a study on efficacy of TAPB analgesia in patients undergoing bowel resection. TAPB application resulted in reduction in VAS scoring and need of Morphine within the initial 24 hours

CONCLUSION

There are effective and proficient results of TAPB in terms of postoperative analgesia. Its application reduced the further requirements of analgesia with a significant reduction in VAS score. There is also a substantial decrease in complications related to inguinal hernia surgery through TAPB administration.

Conflict of interest: Nothing to declare

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