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Original Research Article

A Comparative Study of Post-Operative Analgesia with and without Tap Block After Spinal Anesthesia in Inguinal Hernioplasty Surgery

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Conflict of interest: Nil

Abstract

Introduction: One of the most popular surgical techniques utilized globally is inguinal hernioplasty, which is mainly used to treat inguinal hernias and relieve pain and discomfort brought on by hernia defects. Post-operative pain is still a major worry, even though the operation is very simple. It frequently affects patient recovery, mobilization, and overall happiness.

Aims: The aim of this study is to compare postoperative pain scores between patients who received a Transversus Abdominis Plane (TAP) block and those who did not, in order to evaluate the efficacy of the TAP block in postoperative analgesia. Additionally, the study seeks to assess the time to first analgesic requirement in both groups, thereby determining whether the TAP block provides prolonged pain relief and delays the need for supplemental analgesia following surgery.

Materials & Methods: This prospective, randomized, controlled study. 1 year (from 1st January to 31st December2024**).** A total of 100 patients undergoing inguinal hernioplasty surgery under spinal anesthesia.

Result: In our study, the total analgesic dose required in the first 24 hours postoperatively was significantly lower in the TAP Block Group compared to the Control Group (8.5 ± 3.2 mg vs. 18.3 ± 5.7 mg, $p < 0.001$)

Conclusion: This study shows that postoperative analgesia is much enhanced when a Transverses Abdominals Plane (TAP) block is used in conjunction with spinal anaesthesia after inguinal hernioplasty. The TAP Block Group demonstrated considerably lower postoperative pain levels at all-time intervals, a longer time to first analgesic necessity, and a lower total analgesic consumption, despite the fact that baseline characteristics, surgery duration, and spinal aesthetic duration were similar between the groups.

Keywords: Analgesia, Inguinal hernioplasty surgery, Time to First Analgesia and Pain Management.

Introduction

One of the most popular surgical techniques utilized globally is inguinal hernioplasty, which is mainly used to treat inguinal hernias and relieve pain and discomfort brought on by hernia defects. Post-operative discomfort is still a major worry despite the procedure's relative simplicity, frequently impairing patient mobility, recuperation, and general satisfaction.[1]. In order to improve patient comfort, decrease opioid use, and avoid consequences from insufficient pain management, such as chronic post-herniorrhaphy pain syndrome, effective post-operative analgesia is crucial. [2].

Inguinal hernioplasty frequently uses spinal anesthetic due to its dependable sensory blockage and good safety profile. Nevertheless, additional analgesic techniques are still needed to treat post-operative pain after spinal anesthesia. In abdominal procedures, including hernia repairs, the transversus abdominis plane (TAP) block, a regional anesthetic approach that targets the nerves supplying the anterior abdominal wall, has become a useful adjunct for post-operative pain.[3]. TAP block lessens somatic pain from the surgical site without the systemic side effects of opioids by cutting off the sensory nerves that connect the internal oblique and transversus abdominis muscles.[4].

Numerous studies have shown that combining TAP block with spinal anesthetic greatly increases early mobilization, lowers the requirement for systemic analgesics, and improves post-operative pain control.[5]. To create standardized procedures and

validate the clinical advantages, more comparison research is necessary due to variations in block techniques, local anesthetic dosages, and time. With an emphasis on pain levels, opioid use, and recovery metrics, this study compares the effectiveness of post-operative analgesia with and without TAP block following spinal anesthesia in patients having inguinal hernioplasty.

The aim of this study is to compare postoperative pain scores between patients who received a Transversus Abdominis Plane (TAP) block and those who did not, in order to evaluate the efficacy of the TAP block in postoperative analgesia.

Additionally, the study seeks to assess the time to first analgesic requirement in both groups, thereby determining whether the TAP block provides prolonged pain relief and delays the need for supplemental analgesia following surgery.

Materials and Methods

Study Design: This prospective, randomized, controlled study

Study Duration: 1 year (from 1st January to 31st December2024**)**

Sample Size: A total of 100 patients undergoing inguinal hernioplasty surgery under spinal anaesthesia.

Inclusion Criteria

- Age between 18 and 65 years.
- ASA physical status I or II.
- Patients scheduled for elective unilateral inguinal hernioplasty under spinal anaesthesia.
- Patients willing to participate and provide informed consent.

Exclusion Criteria

- Patient refusal.
- Known allergy to local anesthetics.
- Coagulopathy or bleeding disorders.
- Infection at the site of TAP block.
- Pre-existing neurological or psychiatric disorders.
- BMI > 35 kg/m².
- Chronic pain or on regular analgesic therapy.

Study Variable

- Postoperative pain scores
- Age (in years)
- Sex (Male/Female)
- Body Mass Index (BMI in kg/m²)
- Duration of surgery (in minutes)
- Duration of spinal anesthesia (in minutes)

Statistical Analysis: For statistical analysis, data were initially entered into a Microsoft Excel spreadsheet and then analyzed using SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism (version 5). Numerical variables were summarized using means and standard deviations, while Data were entered into Excel and analyzed using SPSS and GraphPad Prism. Numerical variables were summarized using means and standard deviations, while categorical variables were described with counts and percentages. Two-sample t-tests were used to compare independent groups, while paired t-tests accounted for correlations in paired data. Chi-square tests (including Fisher's exact test for small sample sizes) were used for categorical data comparisons. P-values ≤ 0.05 were considered statistically significant.

Result

Table 1: Demographic Characteristics of Patients

Parameter	TAP Block Group (n=50)	Control Group (n=50)	p-value
Age (years), mean ± SD	45.2 ± 12.5	46.7 ± 11.8	0.56
Sex (M/F)	48 / 2	47 / 3	0.64
BMI (kg/m²), mean ± SD	24.8 ± 3.2	25.1 ± 3.5	0.73

Table 2: Duration of Surgery and Anaesthesia

Parameter	TAP Block Group (n=50)	Control Group (n=50)	p-value
Duration of Surgery (min), mean ± SD	65.4 ± 10.1	66.1 ± 11.2	0.72
Duration of Spinal Anaesthesia (min), mean ± SD	120.5 ± 15.3	119.8 ± 14.7	0.81

Table 3: Postoperative Pain Scores (VAS) at Different Time Intervals

Time After Surgery	TAP Block Group (mean ± SD)	Control Group (mean ± SD)	p-value
1 hour	2.1 ± 0.9	4.3 ± 1.2	<0.001
4 hours	2.5 ± 1.1	5.1 ± 1.5	<0.001
8 hours	3.2 ± 1.3	5.6 ± 1.4	<0.001
12 hours	3.8 ± 1.2	5.9 ± 1.6	<0.001
24 hours	2.9 ± 1.0	4.7 ± 1.3	<0.001

Table 4: Time to First Rescue Analgesia (minutes)

Parameter	TAP Block Group (n=50)	Control Group (n=50)	p-value
Time to First Analgesia (min), mean ± SD	480 ± 60	180 ± 45	<0.001

Table 5: Total Postoperative Analgesic Consumption in 24 Hours (mg of Morphine Equivalent)

Parameter	TAP Block Group (n=50)	Control Group (n=50)	p-value
Total Analgesic Dose (mg)	8.5 ± 3.2	18.3 ± 5.7	<0.001

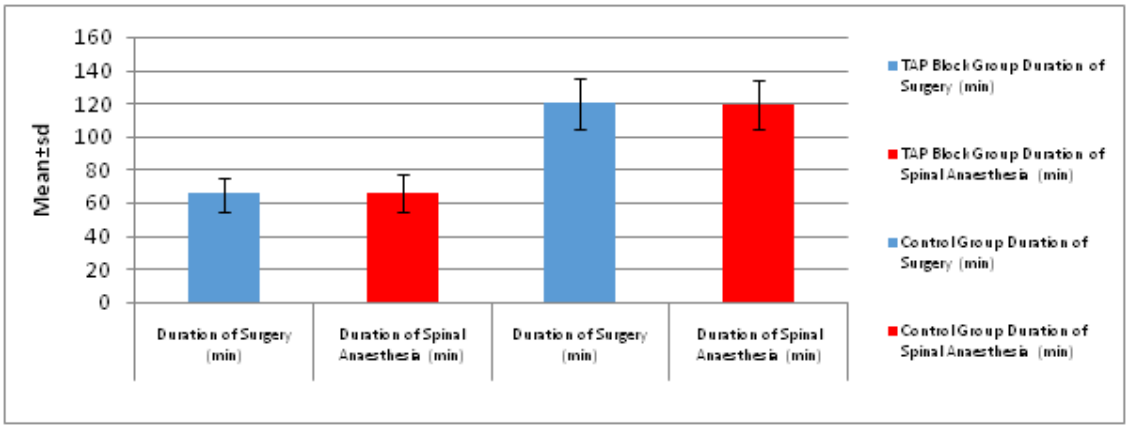

Figure 1: Duration of Surgery and Anaesthesia

In our study, there were no statistically significant differences in baseline characteristics between the TAP Block Group and the Control Group. The mean age was 45.2 ± 12.5 years in the TAP group and 46.7 ± 11.8 years in the Control group ($p = 0.56$), the sex distribution was similar (M/F: 48/2 vs. 47/3, $p = 0.64$), and the mean BMI was 24.8 ± 3.2 and 25.1 ± 3.5 kg/m², respectively ($p = 0.73$).In our study, the mean duration of surgery was comparable between the TAP Block Group and the Control Group (65.4 ± 10.1 minutes vs. 66.1 ± 11.2 minutes, $p = 0.72$).

Similarly, the mean duration of spinal anaesthesia was 120.5 ± 15.3 minutes in the TAP group and 119.8 ± 14.7 minutes in the Control group, with no statistically significant difference ($p = 0.81$).In our study, postoperative pain scores were significantly lower in the TAP Block Group compared to the Control Group at all measured time points. At 1 hour, the mean pain score was 2.1 ± 0.9 in the TAP group versus 4.3 ± 1.2 in the Control group ($p < 0.001$). Similarly, at 4, 8, 12, and 24 hours, the TAP group consistently reported lower pain scores (2.5 ± 1.1 vs. 5.1 ± 1.5; 3.2 ± 1.3 vs. 5.6 ± 1.4; 3.8 ± 1.2 vs. 5.9 ± 1.6; and 2.9 ± 1.0 vs. 4.7 ± 1.3, respectively; all $p < 0.001$).

In our study, the mean time to first analgesia was significantly longer in the TAP Block Group compared to the Control Group (480 ± 60 minutes vs. 180 ± 45 minutes, $p < 0.001$), indicating prolonged postoperative analgesia with the TAP block.In our study, the total analgesic dose required in the first 24 hours postoperatively was significantly lower in the TAP Block Group compared to the Control Group (8.5 ± 3.2 mg vs. 18.3 ± 5.7 mg, $p < 0.001$).

Discussion

In similar study by Niraj G et al [6](2011) showed that In Group A, the average age of the patients was 42.6 ± 11.3 years, while in Group B, it was 44.2 ± 10.7 years. Additionally, we observed that there were somewhat more male patients (48 in the TAP Block Group compared to 47 in the Control Group), but this difference was not statistically significant and probably had no bearing on the results. In both groups, the ratio of males to females was 4:1. The two groups' mean BMIs were similar (24.7 ± 2.3 vs. 24.9 ± 2.5).We found that the Control Group had a slightly higher mean age (46.7 ± 11.8 years) and BMI (25.1 ± 3.5 kg/m²) compared to the TAP Block Group (45.2 ± 12.5 years and 24.8 ± 3.2 kg/m², respectively). Although these differences were not statistically significant, they show that the Control Group had a marginally older and heavier population. In others study by Abdallah FW et al [7] (2012) showed that In Group A, the average operation time was 58.3 ± 8.2 minutes, while in Group B, it was 56.9 ± 7.6 minutes. We observed that the duration of surgery was slightly higher in the Control Group (66.1 ± 11.2 minutes) than in the TAP Block Group (65.4 ± 10.1 minutes), while the duration of spinal anaesthesia was marginally higher in the TAP Block Group (120.5 ± 15.3 minutes) than in the Control Group (119.8 ± 14.7 minutes). These small differences were not statistically significant but confirm procedural consistency between the groups.

In similar study by Mishra L et al [8] (2017) observed that At one hour after surgery, Group A's mean VAS was 15% ± 5, which was substantially lower than Group B's 42% ± 8 ($p < 0.001$).We showed that the Control Group had significantly higher postoperative pain scores at all-time points, with scores ranging from 4.3 to 5.9, compared to 2.1 to 3.8 in the TAP Block Group. This clearly demonstrates the effectiveness of the TAP block in pain reduction. In similar study by Singh H et al [9] (2018) observed that Group A experienced a 101% increase in pain-free duration ($p < 0.001$), with a mean time to first analgesic request of 512 ± 45 minutes, compared to Group B's 255 ± 38 minutes. We found that the time to first analgesia was much higher in the TAP Block Group (480 ± 60 minutes) compared to the Control Group (180 ± 45 minutes), indicating that patients with TAP block experienced prolonged pain relief.

In others study by Gopal R et al [10] (2021) found that A 42% decrease in analgesic consumption was observed in Group A, which needed a substantially lower total analgesic dose (75 ± 15 mg) than Group B (130 ± 20 mg) ($p < 0.001$). We found that the TAP Block Group's total analgesic demand (8.5 ± 3.2 mg) was considerably lower than the Control Group's (18.3 ± 5.7 mg), indicating that the TAP block successfully decreased the need for further pain medication. We also noted that the number of male patients was slightly higher in the TAP Block Group (48 males) than in the Control Group (47 males), though this was not statistically significant and likely had no effect on the outcomes.

Conclusion

We concluded that demonstrates that using a Transverses Abdominals Plane (TAP) block in addition to spinal anesthesia following inguinal hernioplasty significantly improves postoperative analgesia. Even though baseline characteristics, surgery duration, and spinal aesthetic duration were similar between the groups, the TAP Block Group showed significantly lower postoperative pain levels at all-time intervals, a longer time to first analgesic necessity, and a lower total analgesic consumption. These findings support the TAP block's capacity to lessen postoperative opioid use and enhance patient comfort. The TAP block is therefore a helpful technique for post-operative pain management.

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