Section: Anesthesia

Original Research Article

COMPARISON OF POSTOPERATIVE ANALGESIA BETWEEN PREOPERATIVE AND POSTOPERATIVE TRANSVERSUS ABDOMINIS PLANE (TAP) BLOCKS FOR DIFFERENT DURATIONS OF LOWER ABDOMINAL SURGERY

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ABSTRACT

Background: Lower Abdominal Surgeries are known for reduced postoperative pain and faster recovery. Effective analgesia is essential, and the Transversus Abdominis Plane (TAP) block is an effective regional anesthesia technique. This study compares the postoperative analgesic effects of preoperative versus postoperative TAP blocks.

Material and Methods: A prospective, Blinded, randomized controlled study was conducted at a tertiary care center in Gujarat from January to December 2023, involving 80 patients. They were randomly assigned to either a preoperative or postoperative TAP block group. Pain was assessed using Visual Analog Scale (VAS) scores and opioid consumption within 24 hours.

Results: Group 1 (preoperative TAP block) had significantly lower VAS scores and consumed fewer opioids than Group 2 (postoperative TAP block) at 6, 12, and 24 hours ($p < 0.05$). Preoperative TAP blocks resulted in better pain management and quicker analgesic requests.

Conclusion: Preoperative TAP blocks offer superior postoperative analgesia compared to postoperative blocks in Lower Abdominal surgeries, leading to improved pain control and reduced opioid consumption.

Keywords: Transversus Abdominis Plane (TAP) block, Postoperative analgesia, Visual Analog Scale

INTRODUCTION

Lower Abdominal Surgery is widely considered a minimally invasive approach with significant advantages, such as reduced postoperative pain, faster recovery, and shorter hospital stays. However, effective postoperative analgesia remains a critical factor in enhancing patient recovery and ensuring optimal outcomes. Various regional anesthesia techniques have been developed to address postoperative pain management, with the Transversus Abdominis Plane (TAP) block emerging as a particularly effective option.[1,2]

The TAP block, which involves the injection of local anesthetics between the transversus abdominis and internal oblique muscles, provides analgesia for the abdominal wall.[1] Traditionally, this block is performed preoperatively; however, recent studies have explored the potential benefits of postoperative TAP blocks, which may offer prolonged pain relief when administered after surgery.[3,4] The comparative efficacy of preoperative versus postoperative TAP blocks, especially in the context of Lower Abdominal Surgery, remains a topic of considerable interest.[5]

This study aims to compare the analgesic effects of preoperative and postoperative ultrasound-guided TAP blocks for Lower Abdominal surgeries of varying durations. By focusing on both the timing of the block administration and the surgical procedure's duration, we seek to determine which approach offers superior postoperative pain relief and patient comfort. This is of particular relevance as it could

potentially guide anesthesiologists in selecting the optimal timing for TAP block administration to maximize analgesic benefits.[6]

MATERIALS AND METHODS

This prospective, Blinded, randomized controlled study was conducted at a tertiary care center in Gujarat. The study aimed to evaluate the effectiveness of preoperative versus postoperative TAP blocks in providing postoperative analgesia for patients undergoing Lower Abdominal Surgery. The study was conducted over the period from January 2023 to December 2023.

Study Population

The study included 80 patients who were scheduled for Lower Abdominal Surgery. These patients were randomly assigned into two groups:

1. **Group 1 (Preoperative TAP block)**: Patients who received the TAP block before the commencement of the surgery.
2. **Group 2 (Postoperative TAP block)**: Patients who received the TAP block after the surgery had been completed.

Inclusion Criteria

- Female patients aged 18–60 years
- ASA (American Society of Anesthesiologists) physical status I and II
- Scheduled for elective Lower Abdominal Surgery
- Consent to participate in the study

Exclusion Criteria

- History of allergy to local anesthetics
- Severe hepatic or renal dysfunction
- Pregnancy or breastfeeding
- Contraindications to regional anesthesia

Procedure

For both groups, the TAP block was performed under ultrasound guidance. In Group 1, the block was administered prior to the surgical procedure, while in Group 2, it was administered after the completion of surgery. The local anesthetic used was a combination of 0.25% bupivacaine and 2% lignocaine, with a total volume of 20 mL injected bilaterally into the transversus abdominis plane. The efficacy of analgesia was assessed using the Visual Analog Scale (VAS) for pain at 0, 6, 12, and 24 hours post-surgery. The primary outcome was the total amount of opioid consumption within the first 24 hours after surgery, and secondary outcomes included the VAS score and time to first analgesic request.

RESULTS

A total of 80 patients participated in the study, with 40 patients in each group. Table 1 shows mean age of participants in both groups was comparable, and there were no significant differences in demographic characteristics ($p > 0.05$).

Table 2 exhibits VAS scores were significantly lower in Group 1 (preoperative TAP) compared to Group 2 (postoperative TAP) at 6, 12, and 24 hours after surgery ($p < 0.05$).

Table 3 shows Patients in Group 1 required significantly fewer opioids within the first 24 hours compared to Group 2 ($p < 0.05$).

Table 1: Demographic Characteristics of Study Participants

Characteristic	Group 1 (Preoperative TAP)	Group 2 (Postoperative TAP)
Age (mean ± SD)	36.2 ± 8.5	35.8 ± 9.2
ASA Classification (I/II)	30/10	29/11
BMI (mean ± SD)	23.4 ± 2.3	23.2 ± 2.5
Duration of Surgery (min)	85.3 ± 10.4	84.5 ± 11.2

Table 2: VAS Scores at Different Time Points

Time (hours)	Group 1 (Preoperative TAP)	Group 2 (Postoperative TAP)
0	0.2 ± 0.4	0.3 ± 0.5
6	2.1 ± 1.1	3.5 ± 1.3
12	1.8 ± 1.0	3.0 ± 1.0
24	1.5 ± 1.0	2.8 ± 1.2

Table 3: Total Opioid Consumption (mg) in the First 24 Hours

Group	Opioid Consumption (mean ± SD)
Group 1 (Preoperative TAP)	15.2 ± 5.6
Group 2 (Postoperative TAP)	25.8 ± 7.1

DISCUSSIONS

The results of this study provide valuable insights into the efficacy of preoperative versus postoperative ultrasound-guided TAP blocks in the management of postoperative pain following Lower Abdominal Surgery. Our findings suggest that preoperative TAP blocks offer superior analgesic benefits in terms of reduced pain scores and decreased opioid consumption compared to postoperative TAP blocks.

The lower VAS scores and reduced opioid consumption in Group 1 may be attributed to the initiative-taking approach of blocking pain pathways before the onset of surgery. This may result in a more effective blockade of nociceptive stimuli during the surgical procedure and contribute to prolonged pain relief after surgery. Additionally,

earlier blockade of pain pathways may lead to better overall pain management, reducing the need for postoperative analgesics.[2,5]

The results of this study are consistent with previous research that supports the efficacy of the TAP block in laparoscopic surgeries.[4,3] However, the comparison between preoperative and postoperative administration of the block is novel and provides important clinical insights. Similar studies have suggested that preoperative regional anesthesia techniques may provide more effective pain relief than those administered after surgery.[6,7]

It is noteworthy that while the preoperative TAP block showed significant advantages in terms of pain management, postoperative TAP blocks may still offer benefits, particularly in patients who cannot receive preoperative blocks or those with contraindications to general anesthesia.[7,1] The timing of the block, therefore, should be tailored to the individual patient's needs and the surgical context.

CONCLUSION

In conclusion, this study demonstrates that preoperative ultrasound-guided TAP blocks provide superior postoperative analgesia compared to postoperative blocks in patients undergoing Lower Abdominal Surgery. These findings suggest that preoperative administration of the TAP block should be considered a preferred method for improving pain management and reducing opioid consumption after surgery.

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