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ORIGINAL ARTICLE

Comparison of analgesic efficacy of transversus abdominis plane block with direct infiltration of local anesthetic into surgical incision in lower abdominal gynecological surgeries.

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ABSTRACT… Objective: To compare the mean time for analgesic requirement of transversus abdominis plane block with direct infiltration of local anesthetic into surgical incision in lower abdominal gynecological surgeries. **Study Design:** Randomized Controlled Trial. **Setting:** Department of Anesthesia, Combined Military Hospital, Kharian. **Period:** 1st July 2022 to 1st January 2023. **Methods:** A total of 60 patients with 30 patients in each group undergoing elective c section were included in the study. Patients were counselled about VAS scoring system before procedure. Time (in minutes) for first rescue analgesia and requirement in 24 hours was noted. **Results:** Mean time required for first analgesia was 143.966±8.15 minutes in group A as compare to 86.400±7.08 minutes in group B (p=0.000). **Conclusion:** Our study has concluded that TAP block is a promising technique in alleviating postoperative pain in patients undergoing lower abdominal gynecological surgeries.

Key words: Gynecological Surgeries, Local Anesthetic Infiltration, TAP Block, Time for Analgesic Requirement.

INTRODUCTION

The transversus abdominis plane block has gained significant popularity as a component of multimodal anesthesia in a range of abdominal and gynecological operations. This procedure involves administering a local an aesthetic solution between the transversus abdominis muscle and internal oblique muscle at the front part of the abdominal wall.[1] The TAP block is performed to anaesthetize the intercostal nerves that supply the abdominal wall and give effective pain relief after surgery. It specifically targets the plane between the muscle layers. Research has demonstrated that TAP blocks effectively alleviate postoperative pain, leading to a considerable reduction in the need of opioids.[2] This contributes to enhanced patient comfort during surgeries such as complete abdominal hysterectomy, laparoscopic cholecystectomy, and robotic sacrocolpopexy.[3,4] The TAP block is administered by injecting local anesthesia into the neurovascular plane located between the transversus abdominis muscle and the internal oblique muscle.[5] Additional research has demonstrated the effectiveness of TAP blocks in managing pain after laparoscopic colorectal cancer surgery. When used as part of a comprehensive pain management strategy, TAP blocks have been found to give effective analgesia.[6] Although TAP blocks are often highly beneficial for relieving postoperative pain, it is important to consider the selection of adjuvants that can improve the duration and effectiveness of the block. Research has been undertaken to explore the efficacy of using dexmedetomidine and dexamethasone as supplementary medications to bupivacaine in transversus abdominis plane (TAP) blocks. This combination has shown promising outcomes in enhancing post-operative pain management for patients undergoing lower abdominal procedures.[7,8]

In the study, Group-A had an average time for the beginning of analgesia using TAP at 296.3 ± 37.1 minutes, while Group-B had a faster

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onset at 202.0 ± 34.9 minutes, with a statistically significant difference (P= 0.0009).[9]

The aim of our study was to assess the pain-relieving effectiveness of a transversus abdominis plane block compared to directly injecting local an aesthetic into the surgical incision for gynecological operations involving the lower abdomen. This comparison aims to achieve the lowest possible complication rate in future interventions for reducing opioid usage and pain scores, in order to determine the most effective technique.

METHODS

This research took place at the Anesthesia Department of Combined Military Hospital, Kharian, from July 1, 2022, to January 1, 2023. Following approval from the hospital's ethical committee (IERB approval certificate number 35) dated: 06-06-22. The study aimed to enroll a total of 60 participants, with 30 assigned to each group, using sample size software. The calculation was based on a significance level of 5%, a study power of 90%, and the mean time for the onset of the first analgesia in Group-A (TAP block) being 296.3 ± 37.1 minutes compared to Group-B (local anesthetic infiltration) at 202.0 ± 34.9 minutes.[9] The inclusion criteria comprised women aged between 20 to 40 years undergoing elective Cesarean section, with a BMI ranging from >18 to <30, and a normal coagulation profile, as indicated by the INR. Exclusion criteria included patients unable to comprehend the numerical rating score (NRS), those undergoing emergency Cesarean section, and individuals with contraindications for spinal anesthesia (such as site infection, coagulopathy, or uncooperative behavior). Prior to enrollment, each participant provided written informed consent after receiving detailed explanations regarding the study's purpose and the advantages and disadvantages of the techniques involved. Patients were randomly assigned to one of the two groups through a computer-generated random number table. In Group A, patients received a Transversus Abdominis Plane (TAP) block using a 22 G spinal needle with 0.6ml/kg of 0.25% bupivacaine, divided bilaterally (0.3 ml/kg each). In Group B, patients underwent direct infiltration of local anesthetic with 0.6 ml/kg of 0.25% bupivacaine into the surgical incision. Prior to surgery, patients were thoroughly briefed on the Visual Analog Scale (VAS) scoring technique. Standard anesthesia monitoring was initiated, and patients received Ringer's lactate solution at 10 mL/kg before the administration of general anesthesia. All patients underwent standard general anesthesia. Postoperatively, patients were monitored in the Post-Anesthesia Care Unit (PACU) with standard monitoring, and VAS scores were recorded at intervals of 1/2, 1, 2, 4, and 6 hours. If the VAS score was ≥4, patients were administered rescue analgesia with Inj. Tramadol at 1.5 ml/kg. The time (in minutes) to the first rescue analgesia and the total requirement within 24 hours were recorded. Tramadol at 1.5 mg/kg IV was administered incrementally upon request for additional analgesia.

The Statistical Package for the Social Sciences (SPSS) version 25 was utilized for data analysis. Quantitative variables such as age, BMI, length of operation, number of prior C-sections, and duration of initial analgesic requirement were presented as mean values with corresponding standard deviations (SD). A comparison between the two groups was conducted using independent sample T-tests, with statistical significance set at $p < 0.05$.

RESULTS

Age range in this study was between 20 to 40 years with mean age of 28.50±2.75 years, mean BMI 26.20±1.18 Kg/m^2, mean duration of procedure 45.23±4.19 mins, mean previous C-section 1.10±1.02 and mean time required for first analgesia was 143.96±8.15 minutes in Group A and mean age of 28.96±2.60 years, mean BMI 26.20±1.51 Kg/m^2, mean duration of procedure 45.96±5.10 minutes, mean previous C-section 1.23±1.07 and mean time required for first analgesia was 86.40±7.08 minutes in Group B as shown in Table-I. Frequency and percentage of ASA status in both groups are shown in Table-II.

Mean time required for first analgesia was

143.96±8.15 minutes in group A as compare to 86.40±7.08 minutes in group B (p=0.000) as shown in Table-III.

Demographics	Group A n=30 Mean±SD	Group B n=30 Mean±SD
Age (years)	28.50±2.75	28.96±2.60
BMI (Kg/m^2)	26.20±1.18	26.20±1.51
Duration of surgery (mins)	45.23±4.19	45.96±5.10
Previous number of C-section	1.10±1.02	1.23±1.07
Time required for first analgesia (mins)	143.96±8.15	86.40±7.08

Table-I. Mean±SD of patients according to age, BMI, duration of procedure, previous number of C-section and time required for first analgesia in both groups n=60

ASA Status		n=30 Group A	n=30 Group B
1	I	23 (76.7%)	24 (80%)
2	II	4 (13.3%)	4 (13.3%)
3	III	3 (10%)	2 (6.7%)
	Total	30 (100%)	30 (100%)

Table-II. Frequency and percentage of ASA status in both groups n=60

	Group A n=30	Group B n=30	t	P-Value
Time required for first analgesia (mins)	14.96 ± 8.15	86.40 ± 7.08	29.171	0.000

Table-III. Comparison of mean time required for first analgesia in both groups n=60

DISCUSSION

The study aimed to determine the duration of analgesia obtained through a TAP block technique and assess the quality of analgesia provided by this technique. The findings demonstrated that the TAP block resulted in prolonged pain relief and superior analgesic efficacy in comparison to the local infiltration of anesthesia directly into the surgical incision site. Moreover, the TAP block was linked to a reduced prevalence of post-operative vomiting and nausea, as well as decreased need for sedation. Chole et al[10] reported the fact that the Transversus Abdominis Plane block is becoming more commonly employed in whole abdominal hysterectomy for both benign and malignant diseases, as a component of multimodal anesthesia.

In a study, Bisch et al.[11] examined the impact of transversus abdominis plane blocks compared to non-steroidal anti-inflammatory medicines on the number of opioids used after ovarian cancer surgery. It was discovered with the use of NSAIDs, rather than TAP blocks, after surgery for ovarian cancer was associated with decreased opioid usage in terms of the duration of hospitalization. A study conducted by Richard et al.[12] highlighted the efficacy of the double pop blind transversus abdominis plane block in providing pain relief for abdominal procedures. The duration until the first request for pain relief in the TAP block group was 143.966±8.15 minutes, while it was 86.400±7.08 minutes in the local infiltration group, with a p-value of 0.000.

Anatomically, these nerves originate from the T9 to L1 segments and come together to form the TAP plexus. The anatomical area is located at the anterior axillary line, bounded by the ligament of the inguinal region and the costal boundary. Abdel-Ghaffar et al.[13] assessed the pain-relieving effectiveness of morphine as an addition to bupivacaine for ultrasound-guided transversus abdominis plane block in upper abdominal surgeries. According to a study conducted by Zhao et al.,[14] it was observed that there was a significant decrease in pain scores and a lower need for rescue tramadol within the initial 24 hours after laparoscopic colorectal cancer surgery when patients received a bilaterally, ultrasound-guided, posterior transversus abdominis plane block with ropivacaine. Abdelfatah and Amin[15] conducted a review which concluded that the Transversus Abdominis Plane (TAP) block is highly significant in providing pain relief after abdominal procedures. This is because the TAP block is able to create a region of reduced sensation throughout the entire front part of the abdominal wall. A study conducted by Cai et al.[16] found that the TAP block effectively decreased postoperative pain in adult patients having surgery. In this line, Birat et al.[17] confirmed that the efficacy of subcostal transversus abdominis plane block was compared

to the local infiltration of bupivacaine in patients undergoing laparoscopic cholecystectomy. As part of a comprehensive approach to managing postoperative pain, a study indicated that a transversus abdominis plane block significantly reduced postoperative pain and decreased the number of opioids needed after laparoscopic surgery.[18] In a study conducted by Hang et al.[19] TAP blocks were identified as a growing method for providing pain relief during abdominal surgery. The TAP block, as described by Vaddi[20], is a kind of regional anaesthesia that provides pain relief following abdominal surgery, particularly for pain in the parietal wall.

The current study assessed the effectiveness of TAP block using Ropivacaine and Bupivacaine for pain relief after abdominal surgery. The results indicated that 0.5% Ropivacaine provided a longer period of pain relief compared to 0.25% Bupivacaine. The current study, as described by Ismail et.al.[21], examines the effectiveness of ultrasound-guided transversus abdominis plane block versus local anesthetic infiltration in major gynecologic procedures.

LIMITATION

The sample size of patients in our study was limited. Consequently, the findings may not be broadly applicable as the study was conducted exclusively within a single hospital setting. Given that our primary objective was to assess the onset duration of the two approaches, we did not evaluate pain experienced during movement. Incorporating such assessments would have likely influenced the duration of analgesia since pain during movement encompasses both visceral and parietal pain components.

CONCLUSION

Our study has concluded that TAP block is a promising technique in alleviating postoperative pain in patients undergoing lower abdominal gynecological surgeries.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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