



Original Research Article

TO COMPARE THE EFFICACY OF ULTRASOUND GUIDED SUBCOSTAL TRANSVERSE ABDOMINIS PLANE (STAP) BLOCK WITH INTRAPERITONEAL INSTILLATION OF LEVOBUPIVACAINE

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ABSTRACT

Background: Laparoscopic cholecystectomy is referred to as a day care minimally invasive procedure. However, when the postoperative pain is poorly managed, many patients have to stay for a longer period of time after the surgery. Due to postoperative pain, there is an increase in morbidity, perioperative stress, and financial burden overall. If postoperative pain is not treated properly, it could lead to chronic pain development. There has been a multimodal approach to manage postoperative pain after laparoscopic cholecystectomy which is getting famous in clinical practice. This includes intra-peritoneal instillation of local anaesthetic agents and ultrasound guided regional blocks. The objective is to compare the efficacy of ultrasound guided subcostal transverse abdominis plane (sTAP) block with intraperitoneal instillation of levobupivacaine. Study design is a randomised double-blind study. This study was conducted in Aga Khan Maternal and Child Care Center Hyderabad from July 2024 to July 2025.

Materials and Methods: This is a randomised double-blind study which was performed in the Department of Anaesthesiology of the hospital. All of the participants were those who were given general anaesthesia and were undergoing elective laparoscopic cholecystectomy. All of the participants were divided into 2 groups, having equal numbers in both. All the participants that included in this research were aged from 20 years to 60 years. The inclusion criteria included patients with BMI of 18.5 kg/m² to 24.9 kg/m² as well as those with ASA status I and II. Modified Post Anesthesia Discharge Scoring System (PADSS) was used to check discharge readiness at the 4th, 5th, and 6th hour after the treatment.

Results: There were a total of 80 patients involved in this research. The majority of the participants were females. There were a total of 50 females and 30 males in this study. All the participants that included in this research were aged from 20 years to 60 years. All the participants were divided into 2 groups. Both the groups had an equal number of participants, 40 people in each group.

Conclusion: The USG Guided sTAP block group required fewer analgesics and showed lower pain scores.

Keywords: Laparoscopic cholecystectomy, morbidity, perioperative stress, financial burden, intraperitoneal instillation of levobupivacaine.

INTRODUCTION

Laparoscopic cholecystectomy is referred to as a day care minimally invasive procedure.^[1] However, when the postoperative pain is poorly managed, many patients have to stay for a longer period of time after the surgery.^[2] Due to postoperative pain, there is an increase in morbidity, perioperative stress, and financial burden overall.^[3] If postoperative pain is not treated properly, it could lead to chronic pain development. Therefore, one of the major factors of early recovery after surgery (ERAS) includes proper management of postoperative pain.^[4] After laparoscopic cholecystectomy, several methods can be used to treat and prevent postoperative pain. There are certain limitations and systemic side effects of conventional use of non-steroidal anti-inflammatory drugs, paracetamol, and opioids.^[5] There has been a multimodal approach to manage postoperative pain after laparoscopic cholecystectomy which is getting famous in clinical practice.^[6] This includes intraperitoneal instillation of local anaesthetic agents and ultrasound guided regional blocks.

At the end of the procedure, intraperitoneal instillation of levobupivacaine is simple and does not need any special skill.^[7] However, after laparoscopic cholecystectomy, its effect on somatic pain relief is still unclear. There has been a new method described for TAP blockade which is ultrasonography guided oblique subcostal approach. According to research, this approach provides pain relief in a greater capacity and even covers both, below and above the umbilicus.^[8,9] Although the initial results are promising, there have been limited studies on proving the efficacy of oblique subcostal TAP block for managing postoperative pain. There are also no studies on comparing TAP block with standard systemic opioids or intraoperative epidural anaesthesia.^[10,11] Therefore, this study was conducted to compare the efficacy of ultrasound guided subcostal transverse abdominis plane (sTAP) block with intraperitoneal instillation of levobupivacaine.

MATERIALS AND METHODS

This is a randomised double-blind study which was performed in the Department of Anaesthesiology of the hospital. There were a total of 80 patients included in this study. All of the participants were those who were given general anaesthesia and were

undergoing elective laparoscopic cholecystectomy. All of the participants were divided into 2 groups, having equal numbers in both. All the participants that included in this research were aged from 20 years to 60 years. The inclusion criteria included patients with BMI of 18.5 kg/m² to 24.9 kg/m² as well as those with ASA status I and II. Participants were informed about this study including the procedure, use of VAS score, and possible complications such as bruising, pain, tenderness at injection site, and hematoma. Later, their written consent was obtained. The Ethical Review Committee approved this research.

Exclusion criteria

Patients having known hypersensitivity to local anaesthetics was not a part of this study. Moreover, those with bleeding diathesis were also excluded. Lastly, individuals who had psychiatric illness and were taking antidepressant or antipsychotic medicines for it were also not a part of this study.

After extubation, all the patients were monitored for up to 6 hours and their complications such as bleeding, pain, hematoma, vomiting, nausea, and infection were noted. Modified Post Anesthesia Discharge Scoring System (PADSS) was used to check discharge readiness at the 4th, 5th, and 6th hour after the treatment. When the score was ≥ 9 , patients were considered fit for discharge and were sent home. After the patient went home and 48 hours were completed, follow-up was done through video call or phone and VAS scores as well as number of paracetamol tablets taken were recorded. Patients were admitted if they were not fit for discharge after 6 hours post-operation.

SPSS version 22 was used to analyse the data. Data was collected in tabular form in excel sheets. Chi-square and t-test were used to determine the difference between 2 groups.

RESULTS

There were a total of 80 patients involved in this research. The majority of the participants were females. There were a total of 50 females and 30 males in this study. All the participants that included in this research were aged from 20 years to 60 years. All the participants were divided into 2 groups. Both the groups had an equal number of participants, 40 people in each group. One was group sTAP (subcostal TAP block) and the other was group IP (intraperitoneal instillation). [Table 1] shows the patients' characteristics.

Table 1

Characteristics	Group sTAP (n=40)		Group IP (n=40)	
	N	%	N	%
Gender				
Female	26	65	24	60
Male	14	35	16	40
ASA Physical Status				
I	24	60	26	65
II	16	40	14	35

Mean $\pm$ SD		
Age (yrs)	40.7 $\pm$ 10.1	41.8 $\pm$ 9.6
BMI (kg/m ²)	22.8 $\pm$ 2.1	23.1 $\pm$ 1.9
Duration of surgery (min)	52.4 $\pm$ 9.1	51.5 $\pm$ 9.3

[Table 2] compares the postoperative pain scores (VAS) between both the groups. All the values are in the form of mean and standard deviation.

Table 2

Time after surgery (hrs)	Group sTAP	Group IP
1	3.6 $\pm$ 0.8	5.8 $\pm$ 1.0
2	3.2 $\pm$ 1.0	5.6 $\pm$ 1.1
3	2.7 $\pm$ 0.8	5.1 $\pm$ 1.2
4	2.4 $\pm$ 0.7	4.7 $\pm$ 1.1
5	2.2 $\pm$ 0.8	4.5 $\pm$ 1.0
6	2.1 $\pm$ 0.7	4.3 $\pm$ 1.1
12	1.8 $\pm$ 0.6	3.8 $\pm$ 1.0
18	1.6 $\pm$ 0.5	3.5 $\pm$ 0.8
24	1.4 $\pm$ 0.4	3.2 $\pm$ 0.7

[Table 3] shows the incidence of adverse effects.

Table 3

Effects	Group sTAP (n=40)		Group IP (n=40)		p-value
	N	%	N	%	
Vomiting	3	7.5	4	10	0.7
Nausea	5	12.5	6	15	0.5
Infection	0	0	0	0	-
Hematoma/Bleeding	1	2.5	0	0	0.3
Others (Pain at Injection Site)	1	2.5	2	5	0.5

DISCUSSION

The most common treatment for biliary tract is cholecystectomy which helps in reducing pain and shorter hospital stays. This ultimately leads to faster recovery.^[12] After laparoscopic cholecystectomy, there are three types of pain that arise and contribute to the discomfort that is experienced by the patients. These types of pain include abdominal pain, visceral pain, and shoulder-referred pain.^[13,14]

This study was carried out on 80 patients who were undergoing laparoscopic cholecystectomy under general anesthesia. All of the 80 participants were selected using the inclusion criteria. They all were divided into 2 groups, having 40 individuals in each group. One group received ultrasound guided subcostal TAP blocks. The other group of patients received intra-peritoneal instillation for the pain after surgery. There was no significant difference seen statistically between both the groups in terms of age, gender, BMI, and surgery duration. These findings are similar to other studies which were conducted on the same topic.^[15,16]

VAS score was used to observe postoperative pain which was recorded after every hour for the first 6 hours. After that, it was recorded at the 12th, 18th, and 24th hour. Group sTAP had significantly lower scores at all intervals as compared to the Group IP. The results of our study were similar to the findings of Khandelwal et al., where the pain scores were significantly lower in the group sTAP for the first 6 hours.^[17] However, their study found that there was

no significant difference seen in pain scores after 6 to 24 hours between both the groups.

Some studies were in contrast to our study where they stated that TAP block was ineffective for postoperative pain following laparoscopic cholecystectomy.^[18,19] The reason was that TAP block can only relieve the somatic component of pain and not the visceral pain. This is because in laparoscopic cholecystectomy, visceral pain occurs due to viscera dissection, peritoneal stretch, and residual gas under diaphragm. The severity and grade of visceral pain can be affected by anatomical variations, inflammation of tissues, tissue adhesions, and surgical expertise in tissue handling.^[20] This leads to the ineffectiveness of the TAP block.

CONCLUSION

The USG Guided sTAP block group required fewer analgesics and showed lower pain scores.

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