

## USG GUIDED TAP BLOCK FOR LAPAROSCOPIC CHOLECYSTECTOMY

Dr Namrata Jain<sup>1</sup>, DR Saba Ahmed<sup>2\*</sup>

1. MBBS, MD (FMT), Associate Professor, Department of Forensic Medicine & Toxicology, 2. MBBS, MD (Biochemistry), Professor & Head, Department of Biochemistry, NKP Salve Institute of Medical Sciences & Research Centre & LMH, Nagpur.

\*Corresponding author - DR Saba Ahmed

Email id – [drsachinjainortho@gmail.com](mailto:drsachinjainortho@gmail.com)

Received:16/11/2018

Revised:29/11/2018

Accepted:28/12/2018

### ABSTRACT

**Background:** Many patients experience moderate to severe pain after laparoscopic cholecystectomy. We aimed to evaluate the influence of ultrasound –guided transversus abdominis plane (TAP) block on postoperative pain scores and opioid consumption for patients undergoing laproscopic cholecystectomy. **Material and method:** Patients undergoing elective laproscopic cholecystectomy under general anaesthesia were divided randomly into two groups of 20 each to receive either ultrasound –guided bilateral transversus abdominis plane (TAP) block with 0.25% bupivacaine 20 ml each side (group TAP) or standard postoperative analgesia of inj. tramadol 1mg/kg IV 6h (group control).Both groups received acetaminophen 1g and inj. Diclofenac sodium (1.5 mg/kg IM) before extubation. The analgesic efficacy was judged by VAS both at rest and on movement, sedation score, and nausea score, which were also noted at 30 min, 2, 4, 6, 12, 18, and 24 h postoperatively .Inj. Tramadol (1 mg/kg) was given as rescue analgesic at visual analog scale (VAS) more than 3 in any group at rest or on movement.. Total tramadol consumption at 24 h was also assessed. **Results:** TAP block significantly reduced postoperative pain scores compared to standard analgesia in all periods after surgery. Tramadol consumption was significantly lower in the TAP group( 110.83) mg than in control group( 235.83 mg ). **Conclusion:** The USG-guided TAP block is easy and effective supplement to general anaesthesia, as a postoperative analgesic regimen in laproscopic cholecystectomy, with opioids-sparing effects and without any complications.

**Key words:** Drugs – bupivacaine and tramadol, laproscopic cholecystectomy, transversus abdominis plane block, ultrasound

### INTRODUCTION:

In outpatient surgery, laparoscopic cholecystectomy is a very common procedure which may be associated with reduced surgical trauma response and shortened convalescence when compared with open procedures. However, early post-operative pain is a frequent complaint among patients. The most common approach to postoperative pain relief for laproscopic cholecystectomy is multimodal using nonsteroidal anti-inflammatory drugs (NSAIDs), opioids, and local infiltration of anesthetic. Opioids are effective for treatment of postoperative pain, but can cause adverse effects such as nausea, vomiting, decreased

gastrointestinal motility, respiratory depression, and sedation, which further increase the morbidity of the patient (1). Accordingly, peripheral loco-regional techniques for post-operative pain relief are an attractive approach which may improve early pain control and minimize the need for opioids.(2)

Abdominal transverse plane (TAP) blockade plays a substantial role in analgesia after abdominal surgery because the deposition of local anesthetics in the transverse abdominal fascial plane can produce sensory block in the anterior abdominal wall from T7

to L1. 3 Many clinical studies have reported the beneficial effects of TAP in lower abdominal surgery. (3, 4, 5) As a large part of the pain after laparoscopic cholecystectomy comes from abdominal wall incisions, some trials have investigated TAP blockade as a possible analgesic option. Hebbard et al. in 2007 have described the ultrasound(USG)-guided approach to the TAP block.(6,7) Real-time ultrasound provides reliable imaging of three muscular layers of anterolateral abdominal wall and assessment of correct needle placement and local anesthetic injection, thus potentially increasing the success rate and safety of the TAP block compared to the landmark technique. So, we hypothesized that the USG guided TAP block, as a part of supplement to general anaesthesia along with other analgesic regimen, would result in decreased opioid (tramadol) consumption and improved analgesia in the first 24 h after laparoscopic cholecystectomy.

### Material and methods

After obtaining approval from the hospital ethical committee and written informed consent, 60 ASA risk I and II patients scheduled for laparoscopic cholecystectomy, between 18 and 60 years of age of either sex, were enrolled in a prospective, randomized, double-blind, controlled study. Patients allergic to local anesthetics drugs, opioid addicts, and with psychiatric disorders were excluded from our study. The nature of the procedure was explained and the patients were taught to assess the intensity of pain using visual analog scale (VAS). Patients were randomized to receive subcostal TAP blockade bilaterally with 20 mL of 0.25% bupivacaine (TAP group) or the standard protocol of hospital analgesia ie;inj.tramadol 1mg/kg 6 hourly (control group). All patients received balanced general anesthesia. They were premedicated with inj. Glycopyrrolate (0.004 mg/kg), inj. Fentanyl (2  $\mu$ g/kg), Ranitidine 50 mg, and inj. Ondansetron 0.15 mg/kg. Induction of anesthesia was achieved with inj. Propofol (2 mg/kg). The trachea was intubated 90 seconds after giving inj.atracurium 0.5-0.6 mg/kg bolus. Anesthesia was maintained with O<sub>2</sub>/N<sub>2</sub>O, isoflurane, and maintenance dose of atracurium. Pulse, electrocardiogram (ECG), non-invasive blood pressure (NIBP), peripheral oxygen saturation (SpO<sub>2</sub>), end-tidal CO<sub>2</sub> (ETCO<sub>2</sub>) were monitored

throughout the procedure Ultrasound-guided TAP blockade was done by an anesthesiologist with sufficient experience in ultrasound-guided procedures prior to surgery. A transducer was positioned in the midline of the abdomen, below the xiphoid, and moved laterally in the subcostal direction to the beginning of the transverse abdominal muscle below the rectus abdominis muscle. After visualization of the neurofascial plane between the oblique internal muscle and the transverse abdominal at the level of the axillary line anterior to 100 mm, a 20-gauge Stimuplex needle was guided in the plane and, after aspiration, 20 mL of 0.25% bupivacaine were deposited bilaterally in the plan.

Ten minutes before the end of the operation, all patients received acetaminophen (1 g IV ) and inj. Diclofenac sodium (1.5 mg/kg IM).Patients in control group were given after operation inj tramadol 1mg/kg i/v 6 hourly as standard hospital analgesia protocol .After completion of the procedure, patients were shifted to the post-anesthetic care unit (PACU). Primary outcome measure in this study was 24-h tramadol consumption, VAS scores, and the associated side effects. When the VAS score was more than 3, inj. Tramadol 1 mg/kg IV was given as a rescue analgesic. Patients were given inj. Ondansetron 0.15 mg/kg IV before they were administered inj. Tramadol.

Assessment of pain was done using VAS both at rest and on movement at intervals of 30 min, 2, 4, 6, 12,18 and 24 h postoperatively .All postoperative assessments were double blinded.

### Statistical analysis

For statistical analysis, the SPSS 20.0 program was used. Differences between groups were analyzed using Student's t - test for the data with normal distribution and the Mann-Whitney U test for data without normal distribution. For non-parametric data, the chi-square test was used. The p value < 0.05 was considered statistically significant.

### RESULTS

This prospective study was carried out in 60 ASA I and II patients, who underwent laparoscopic cholecystectomy. They were randomly divided into two different groups. TAP Group patients received TAP block bilaterally with Bupivacaine (0.25%) 20

ml. Group C (control) patients received standard protocol of hospital analgesia. Both groups were comparable in terms of age, sex, weight, and surgical time [Table 1]. VAS score at rest and on movement was higher in the control group as compared to the TAP group at all the time intervals, and it was significantly higher at 30 min, 2, 4, 6, and 12 h. Total dose of tramadol consumption in group TAP was 110.83mg and in group C was 235.83mg, which showed that tramadol consumption was significantly decreased in group TAP.

**Table 1: Demographic data**

Group	Group TAP (study)	Group C (control)
<b>Age (years)</b>	45±9.6	42±7
<b>Sex (m/f)</b>	8/12	7/13
<b>Weight (kg)</b>	60±10	60±10
<b>Surgical time (min)</b>	70.70±15.20	69±7.20

**Table 2. Post-surgery Rest and movement pain with the use of VAS**

Time after surgery	TAP Group		CONTROL Group	
	Rest	Movement	Rest	Movement
<b>30 min</b>	0.75	2.1	3.25	5
<b>2 h</b>	1.0	2.1	2.4	4.1
<b>4 h</b>	1.2	2.5	2.5	4
<b>6 h</b>	1.8	3.2	3.2	4.7
<b>12 h</b>	1.95	3.5	3	4.8
<b>18 h</b>	2.4	4.2	2.8	4.6
<b>24 h</b>	1.9	3.4	2.3	3.8

VAS visual analogue score

Opioid-related side effects like sedation, nausea, and vomiting are related to the dose of opioids. In our study, incidence of nausea and vomiting score were low and comparable (15% and 18%) in group TAP and group C respectively. Sedation scores were also low in both the groups. This may be due to the use of tramadol, which is less sedative than morphine, and the prophylactic use of ondansetron. There were no complications related to blockade, such as bleeding, intravascular or intraperitoneal injection, infection or toxicity of the local anesthetic.

## DISCUSSION

The efficacy of postoperative analgesia is measured with less perioperative stress, better patient satisfaction and reduction of side effects. (8) The importance of good postoperative analgesia led to the introduction of TAP blockade in this field. The approach of ultrasound-guided TAP block in this surgery became more popular after the results of El-Dawlatly et al. (9) Studies have shown that subcostal TAP can decrease postoperative narcotics use, (2,10,11) which plays an important role in multimodal analgesia treatment. The meta-analysis conducted by Zhao showed in 905 patients that TAP blockade reduced the need for analgesics and pain scores compared to multimodal analgesia (NSAIDs and opioids) (12) The main problems with the TAP block for laparoscopic cholecystectomy were unstable supraumbilical effects of local anesthetics and insufficient data on the differences in postoperative analgesia between TAP block and infiltration of local anesthetic at the incision site. A study conducted by Tolchard et al. introduced the subcostal variation of the TAP block (STAP) for postoperative analgesia of laparoscopic cholecystectomy (13). The authors correlated STAP with infiltration at the incision site and found significantly better analgesia after STAP. Shin et al. compared STAP and TAP blocks and standard analgesia, and the results confirmed the advantage of STAP in opioid pain and consumption scores (14).

These data are very promising but still need to be proven with a larger number of patients. We performed the STAP block for our study. The results obtained showed significantly better analgesia in the STAP group at all-time points in the postoperative period. Analgesic effect of TAP decreased over time, but remained clearly present. The lower consumption of tramadol in the TAP group again confirmed its potential in the future. This result is similar to the results of previous studies, although they have used analgesia with different opioids. (14) The meta-analysis conducted by Zhao et al. (12) reminds us of how difficult it is to evaluate postoperative analgesia due to heterogeneity between multimodal analgesic protocols, but the combination of different types of NSAIDs (ketorolac, diclofenac or dipirione) and opioids (morphine, tramadol) is still a worldwide

standard. 17 Therefore, we consider that the combination of diclofenac and tramadol, which is the standard analgesic protocol in our hospital, can be compared with other data.

One important measure of analgesic efficacy in our study was the requirement of opioid analgesic during the first 24 h. The 24-h consumption of total tramadol was 53% less in group TAP as compared to that in group C [Table 2]. Our study results are comparable with those of Dawlatly et al. (9) who showed 55% decrease in opioid requirement after USG-guided TAP block in laparoscopic cholecystectomy. Niraj et al. (15) showed 45% decrease in opioid requirement with USG-guided TAP block in open appendectomy.

De Oliveira (16) included 633 patients in meta-analysis and found preoperative TAP block administration resulted in greater effects on early pain and opioid consumption compared with postoperative administration. Our group has reported on the overall effect of TAP block to improve the quality of postsurgical recovery after laparoscopic surgery, in contrast, Kane et al (17) did not detect a beneficial effect on recovery in subjects undergoing laparoscopic hysterectomy. Several methodological differences such as variations of the surgical procedure may contribute to this. The incidence of nausea and vomiting was very similar in both groups of our study. Results of Vladimir et al (18) study on Subcostal transversus abdominis plane block STAP in laparoscopic cholecystectomy was comparable to our study. Finally it is noteworthy that there were no complications of STAP block in the present study. Study suggest the opinion that ultrasonic guidance may be safer in the conduction of neural blockade. This study has some limitations. The first is the relatively small number of patients. Further studies comparing TAP block with other effective multimodal analgesic strategies are warranted.

In conclusion, TAP block can significantly improve postoperative analgesia of laparoscopic cholecystectomy. Of course, a double-blind and more randomized study is needed in the future.

## REFERENCES

1. T. Bisgaard Analgesic treatment after laparoscopic cholecystectomy: a critical assessment of the evidence *Anesthesiology* , 104 ( 2006 ) , pp. 835 – 846 Cross Ref View Record in Scopus Google Scholar
2. Moiniche S, Jorgensen H, Wetterslev J, et al. Local anesthetic infiltration for postoperative pain relief after laparoscopy: a qualitative and quantitative systematic review of intraperitoneal, port-site infiltration and mesosalpinx block. *Anesth Analg*. 2000;90:899---912.
3. AN Rafi Abdominal field block at a new approach via the lumbar triangle *Anaesthesia* , 56 ( 2001 ) , pp. 1024 – 1026 Cross Ref View Record in Scopus Google Scholar
4. MR Siddiqui , MS Sajid , DR Uncles , et al. The meta-analysis on the clinical effectiveness of transversus abdominis plane block *J Clin Anesth* , 23 ( 2011 ) , pp. 7 - 14 Article Download PDFView Record in Scopus Google Scholar
5. N. Bharti, P. Kumar, I. Bala, et al. The efficacy of a novel approach to transversus abdominis plane block for postoperative analgesia after colorectal surgery *Anesth Analg* , 112 ( 2011 ) , pp. 1504 - 1508
6. Hebbard P, Fujiwara Y, Shibata Y, Royse C. Ultrasound-guided transversus abdominis plane (TAP) block. *Anaesth Intensive Care* 2007;35:616-8.
7. Tran TM, Ivanusic JJ, Hebbard P, Barrington MJ. Determination of spread of injectate after ultrasound-guided transversus abdominis plane block: A cadaveric study. *Br J Anaesth* 2009; 102:123-7.
8. CL Wu , JM Richman Postoperative pain and quality of recovery *Curr Opin Anaesthesiol* , 17 ( 2004 ) , pp. 455 – 460 Cross Ref View Record in Scopus Google Scholar
9. AA El-Dawlatly, A. Turkistani, SC Kettner, et al. Ultrasound-guided transversus abdominis plane block: description of a new technique and comparison with conventional analgesia during laparoscopic cholecystectomy *Br J Anaesth*, 102 ( 2009 ) , pp. 763 – 767 Article Download PDF Cross Ref View Record in Scopus Google Scholar
10. N. Bhatia , S. Arora , W. Jyotsna Comparison of posterior and subcostal approaches to ultrasound-guided transverse abdominis plane

block for postoperative analgesia in laparoscopic cholecystectomy *J Clin Anesth* , 26 ( 2014 ) , pp. 294 – 299 Article Download PDFView Record in Scopus Google Scholar

11. CK Chen, PC Tan , VE Phi , et al. A comparison of analgesic efficacy between oblique subcostal transversus abdominis plane block and intravenous morphine for laparoscopic cholecystectomy. A prospective randomized controlled trial *Korean J Anesthesiol* , 64 ( 2013 ) , pp. 511 – 516 Cross Ref View Record in Scopus Google Scholar
12. X. Zhao , Y. Tong , H. Ren , et al. Transversus abdominis plane block for postoperative analgesia after laparoscopic surgery: a systematic review and meta-analysis *Int J Clin Exp Med* , 7 ( 2014 ) , pp. 2966 – 2975 View Record in Scopus Google Scholar
13. Tolchard S, Davies R, Martindale S. Efficacy of the subcostal transversus abdominis plane block in laparoscopic cholecystectomy: Comparison with conventional port-site infiltration. *J Anaesthesiol Clin Pharmacol*. 2012;28 (3):339-43.
14. HJ Shin , AY Oh , JS Baik , et al. Ultrasound-guided oblique subcostal transversus abdominis plane block for analgesia after laparoscopic cholecystectomy: a randomized, controlled, observer-blinded study *Minerva Anesthesiol* , 80 (2014) , pp. 185 - 193 View Record in Scopus Google Scholar
15. Niraj G, Searle A, Mathews M, Misra V, Baban M, Kiani S, et al. Analgesic efficacy of ultrasound-guided transverses abdominis plane block in patients undergoing open appendicectomy. *Br J Anaesth* 2009;103:601-5.
16. De Oliveira GS, Jr, Castro-Alves LJ, Nader A, et al.: Transversus abdominis plane block to ameliorate postoperative pain outcomes after laparoscopic surgery: a meta-analysis of randomized controlled trials. *Anesth Analg*. 2014;118(2):454–63.  
10.1213/ANE.0000000000000066 [PubMed]  
[Cross Ref] F1000 Recommendation
17. Kane SM, Garcia-Tomas V, Alejandro-Rodriguez M, Astley B, Pollard RR. Randomized trial of transversus abdominis

plane block at total laparoscopic hysterectomy: effect of regional analgesia on quality of recovery. *Am J Obstet Gynecol* 2012; 207: 419, e1-5

18. VRSAJKOV, Vladimir et al. Subcostal transversus abdominis plane block can improve analgesia after laparoscopic cholecystectomy. *Rev. Bras. Anesthesiol*. [online]. 2018, vol.68, n.2 [cited 2019-01-05], pp.149-153.

**How to cite this article:** Jain N., Ahmed S., Usg Guided Tap Block For Laparoscopic Cholecystectomy, *Int.J.Med.Sci.Educ* 2019;6(1):46-50