ISSN: 2474-9206

Research Article

Journal of Anesthesia & Pain Medicine

A Comparative Study between Postoperative Pain Relief with Transversus Abdominis Plane Block and Local Field Block at Port Site in Lower Abdominal Laparoscopic Surgeries

Vijay Kumar*, Girishkumar Modi and Nagaraju Munagala

*Specialist Anesthesiologist, Tawam Hospital, UAE.

Corresponding Author
Vijay Kumar, Specialist Anesthesiologist, Tawam Hospital, UAE.

Submitted: 2023, Jun 28 ; **Accepted:** 2023, July 19; **Published:** 2023, July 24

Citation: Kumar, V., Modi, G. Munagala, N. (2023). A Comparative Study of Sevoflurane Versus Isoflurane as an Anaesthetic Agents. *J Anesth Pain Med, 8*(4), 182-190.

Abstract

Background: *In order to provide post-operative analgesia following abdominal incision, blocking the sensory nerve supply to the anterior abdominal wall is a potential strategy. Current methods for blocking these afferent nerves, including abdominal field blocks, have limited therapeutic usefulness, and the level of block that is accomplished is variable.*

Aim: *To compare the postoperative pain relief between ultrasound guided TAP block and local field block at port site in lower abdominal laparoscopic surgeries, the pain being assessed by visual analogue scale scoring.*

Method and materials: *Sixty patients were considered in the study, 30 patients were randomized to undergo TAP blockade and 30 were randomized to undergo local field blockade.*

Results: *Fentanyl consumption as total requirement of fentanyl, number of patients requiring fentanyl and incidence of nausea and vomiting. P value of ≤ 0.05 was considered to be significant. ANOVA test for age reveals the P value of 0.643 indicating that there is no significant effect of the variance in the age of patients between the groups. ANOVA for height shows a P value of 0.076, P value for weight of 0.176 and P value for ASA grading of 0.798 shows that there is no significance of the differences in the patient characteristics. Mann Whitney test, t-test, modified t-test were the statistical hypothesis tests used to assess significance of difference in patient characteristics.*

Conclusion: *The TAP block holds considerable promise as part of a multimodal analgesic regimen for post-operative pain management in lower abdominal surgeries.*

Keywords: Transversus Abdominis Plane Block, Peripheral Nerve Block, Laprascopic Surgery TAP Block, Local Infilration

1. Introduction

Although laparoscopic surgery is seen as a minimally invasive surgical treatment with lower perioperative pain scores when compared to open surgeries, it is linked to considerable levels of postoperative pain. In most cases, patients undergoing laparoscopic lower abdomen procedures received normal general anaesthesia [1,2].

The blocking of peripheral nerves is still a common practice in general anaesthesia. Its function has expanded beyond the operating room to include postoperative and long-term pain treatment. In all age groups, these procedures can be employed accurately with the right sedation and selection. Peripheral neural blockade, when used expertly, increases the anesthesiologist's possibilities for giving outstanding and ideal anaesthetic care [3,4].

The blocking of the neural afferents to the anterior abdominal wall (TAP block) is a reliable substitute for transversus abdominis plane block. These neural afferents pass through the transversus abdominis and internal oblique muscles in the neurofascial plane. A possible entry point to this neuro fascial plane is the petit triangle of the lower back. This triangle, which has the iliac crest forming

its base and is a fixed and immediately recognisable landmark, is bordered posteriorly by the latissimus dorsi muscle and anteriorly by the external oblique.(5,6) It is feasible to block the sensory nerves of the anterior abdominal wall before they pierce the muscular to innervate the abdomen by injecting local anaesthetics into the transversus abdominis plane via the triangle of petit. The lower six thoracic and upper lumbar abdominal afferents of the TAP block may result in a dermatomal sensory block, according to preliminary cadaveric investigations and volunteer trials [7,8]. The present study is an attempt to compare the efficacy of TAP block Versus local field block for postoperative analgesia in lower abdominal laparoscopic surgeries.

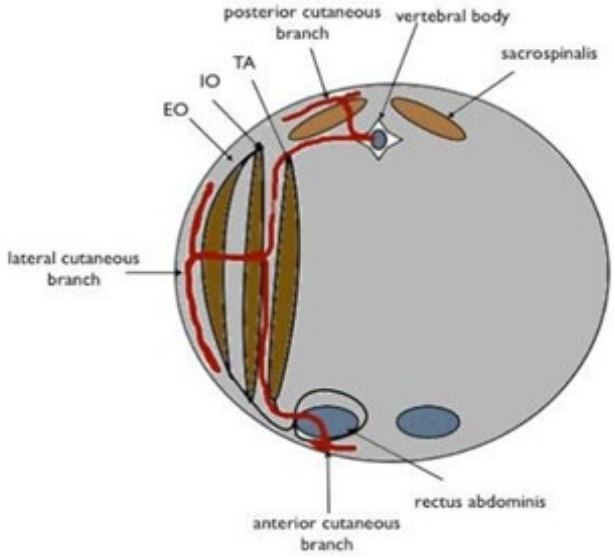


Figure 1: T7 to T12 spinal nerves pathway and branches in the abdominal wall

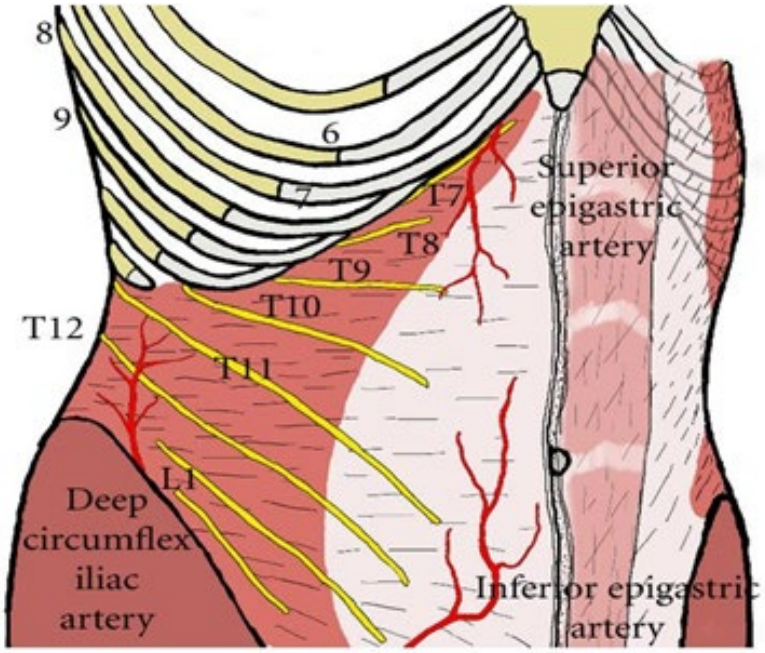


Figure 2: Cutaneous innervation of the abdominal wall.

2. Material and Methods

A total of 60 patients were included. Inclusion criteria was patients posted for elective laparoscopic lower abdominal surgeries Infra umbilical Hernioplasty (IUHP), Bilateral Inguinal Hernioplasty(BIHP), Appendectomy(LAE)), Non-obese patient, ASA-1 and ASA-2 and exclusion criteria was patients with known allergy to the local anaesthetic, infection at the site of TAP block, patients with drug therapy interfering with opioid drug action, Obese pa-

tient and ASA-3 and ASA-4 were excluded from the study Table 1 and 2.

After obtaining approval by Ethics Committee of hospital in India, where I did this study and obtained informed consent from the patient. we studied 60 ASA physical status I–II patients scheduled for Lower Abdominal Laparoscopic Surgeries. In this study those patients were selected who, were undergoing lower abdominal interventions and the port is inserted at the level of umbilicus or just above umbilicus having dermatome value of T8-L1 Fig. 3, 4. Patients were in a randomized double-blinded controlled. Randomization was done by sealed envelopes to undergo TAP block (n=30) or to receive standard care of local infiltration (n=30). The patients and the staff providing postoperative care were blinded to the group assignment. Data was collected and analyzed.

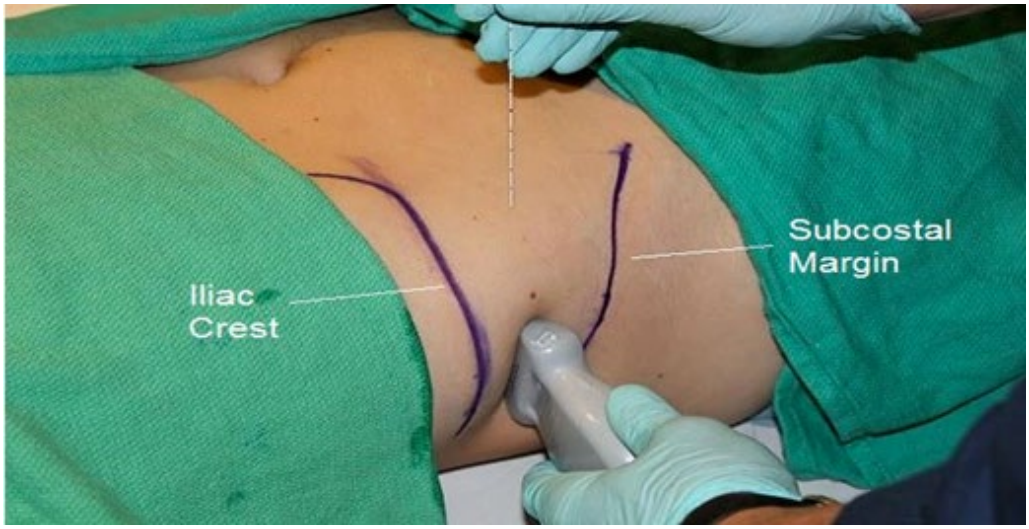


Figure 3: Position of Patient and aseptic technique

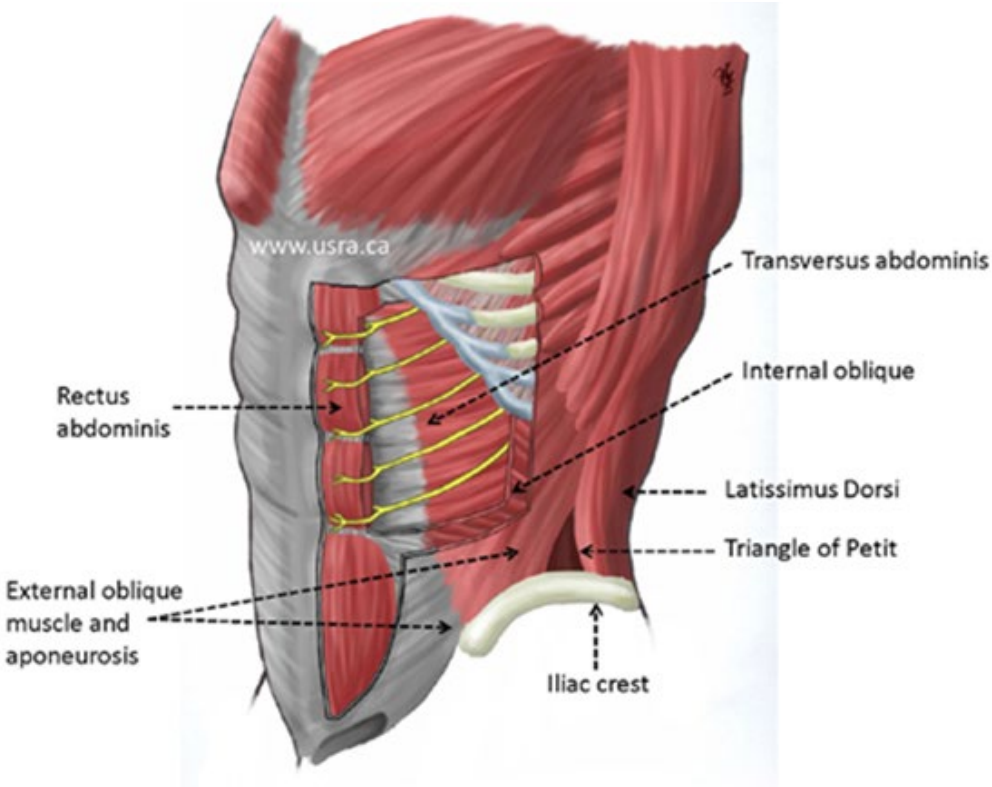


Figure 4: Anatomy of Transversus Abdominis Plane: Triangle of Petit

Figure 5: Ultrasound Image of Abdominal Wall

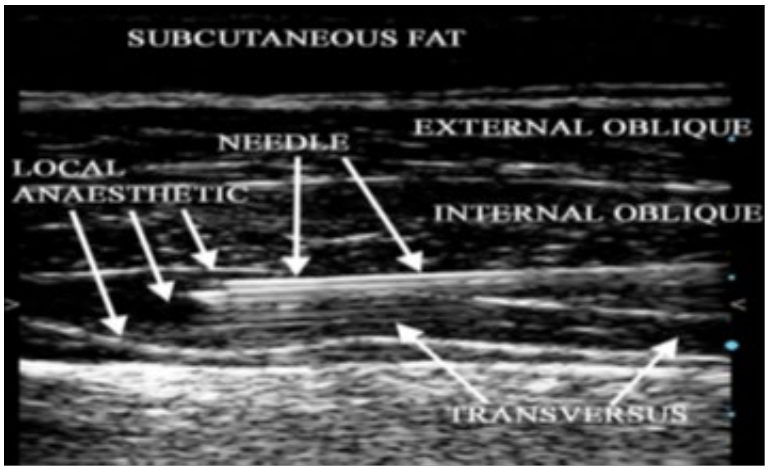


Figure 6: Ultrasound Image of Abdominal Wall with needle and local anaesthetic in transversus plane

3. Result

ANOVA for height shows a P value of 0.076, P value for weight of 0.176 (shown in table 1 and fig 7). P value for ASA grading of 0.798 shows that there is no significance of the differences in the patient characteristics. (Shown in 1 , 2 and Figure 7,8).

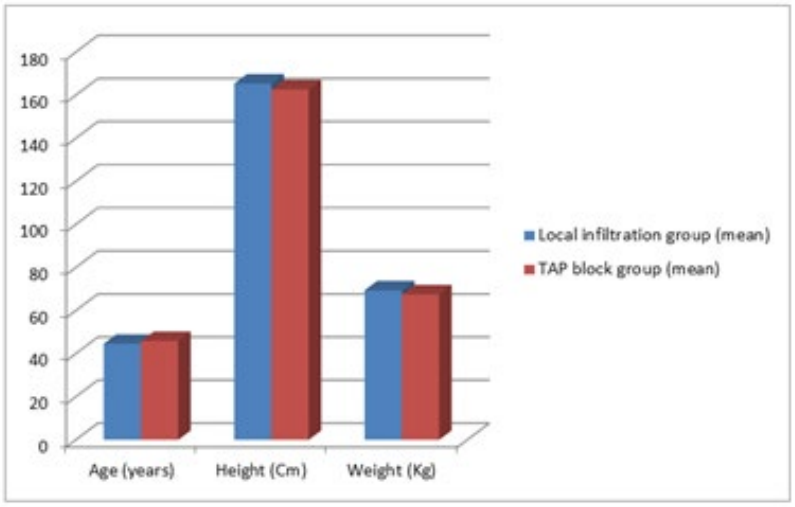
Age/Height /Weight (Table1)

	Local infiltration group (mean)	TAP block group (mean)	P Value
Age (years)	44.600	45.867	0.643
Height (Cm)	165.367	162.733	0.076
Weight (Kg)	69.467	67.533	0.176

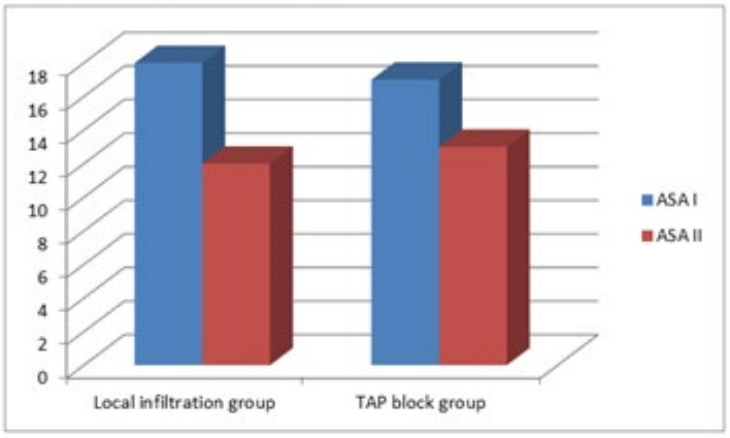
ASA Grading table: 2

	Local infiltration group	TAP block group
ASA I	18	17
ASA II	12	13

Age/ Height/Weight bar chart (Fig 7)



ASA grading bar chart (Fig. 8)



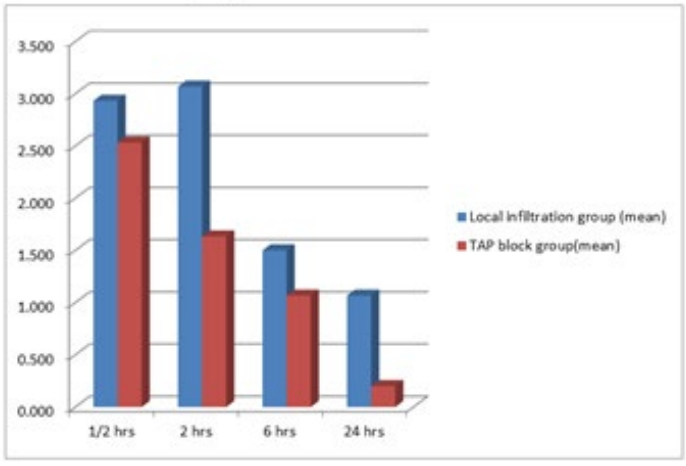
Patients undergoing TAP block with bupivacaine had lesser fentanyl requirements in different time interval than those undergoing local infiltration. Overall, fentanyl consumption was also lower in 24 hrs in the patients who underwent TAP blockade 10 mcg (mean) when compared to local infiltration group 35.833 mcg(mean), the P value being 0.0001 is quite significant.

Postoperative VAS pain scores were reduced after TAP block at some, but not at all the time points assessed. Categorical pain scores were lower in patients who received the TAP block; during postoperative time points as seen by the mean values of VAS scores of 2.933,3.067,1.500,1.067 at 30 min, 2, 6, 24 hrs respectively in local infiltration group as compared to 2.533,1.633,1.067,0.200 at 30 min, 2, 6, 24 hrs respectively in TAP block group. Analysis of VAS scores at 30 min shows P value of 0.162 which is not significant indicating that there was no considerable difference in pain between the groups. VAS scores at 2 hrs show P value of 0.000 indicating significant difference in pain at 2 hrs. VAS scores at 6 hrs shows P value of 0.002, showing significance of difference in VAS scores at 6 hrs also. VAS scores at 24 hrs show P value of 0.000 which is less than 0.05 and is also significant. Total number of patients requiring fentanyl in local infiltration group were 21 and in the TAP block group were 9. (Shown in Table 3 and Figure 9).

VAS score (Table 3)

Time	Local infiltration group (mean)	TAP block group(mean)	P Value
1/2 hrs	2.933	2.533	0.162
2 hrs	3.067	1.633	0.000
6 hrs	1.500	1.067	0.002
24 hrs	1.067	0.200	0.000

VAS Score bar chart (Fig 9)

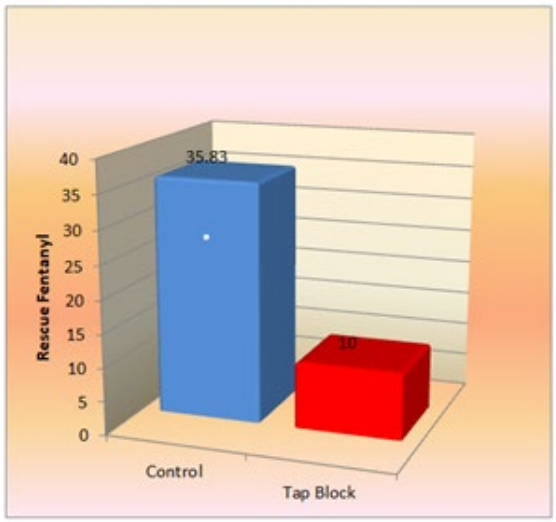


Fentanyl consumption as total requirement of fentanyl, number of patients requiring fentanyl ,nausea and vomiting. P value of ≤ 0.05 was considered to be significant. ANOVA test for age reveals the P value of 0.643 indicating that there is no significant effect of the variance in the age of patients between the groups. (Shown in Table 4 and Figure 10).

Fentanyl requirement (Table 4)

Time total 24hrs	Local infiltration grp(Mean)	TAP block grp (Mean)	P value
0-24hrs	35.855	10.000	0.001

Bar chart for rescue fentanyl (Fig 10)

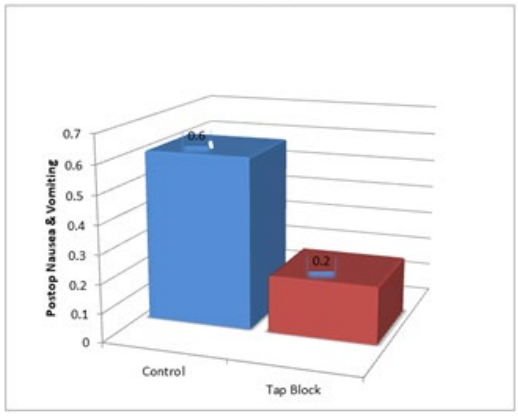


12 patients developed postoperative nausea in the local infiltration group, compared with 6 patients that received TAP blockade. Coming to nausea and vomiting ANOVA shows a P value of 0.024 indicating a highly significant difference in the occurrence of nausea and vomiting, local infiltration group having more nausea and vomiting. (Shown in Table 5 and Figure11).

Nausea and vomiting (Table 5)

Nausea and vomiting	Local infiltration grp(mean)	TAP block (mean)	P value
0-24hrs	0.600	0.200	0.024

Nausea & Vomiting Bar chart (Fig 11)



4. Discussion

Laparoscopic surgery is one of the most frequently done surgical techniques today in the entire world. The analgesic regimen should give safe, efficient analgesia with minimal side effects to patients. The best chance of achieving these goals is through a multimodal analgesic regimen. Alternatively, patient-controlled epidural opioid administration can produce adequate analgesia but is frequently accompanied by side effects, most notably nausea, vomiting, and itching, which lowers patient satisfaction. Additionally, the use of opioids carries the risk of delayed respiratory depression.(9) Furthermore, due to logistical challenges and/or the existence of medical contraindications, it is not always practicable to administer opioid analgesia.(10,11) A localized method like TAP blocking has a lot of potential to be an efficient part of a multimodal analgesic regimen for postoperative analgesia in light of these problems.

The abdominal wall incision is a significant source of the discomfort that individuals feel following abdominal surgery. This study showed that adding a TAP block to a standard multi-modal analgesic regimen reduced pain and requirement of fentanyl for 24 hours, and also reduced the incidence of nausea and vomiting when compared to the same regimen with a local field block. Groups were comparable in terms of age, weight and height with insignificant P value for all three parameters mentioned above. Both the groups had equal number of patients. In all the patients, the transversus abdominis neuro-fascial plane was easily localized by ultrasound guidance in one to two attempts, and the block performed without complication.

The discovery that the TAP block decreased the need for fentanyl for up to 24 hours by 10mcg (mean) as opposed to 35mcg (mean) in the local infiltration group is significant since it shows that a single shot TAP block approach can deliver potent analgesia for a long time. The TAP is generally sparsely vascularized, which may cause drug clearance to be hindered, and this may be one of the causes of the prolonged persistence of the analgesic action following TAP blocking. Currently, researchers are examining how drugs injected into the TAP behave. The likelihood of further blocking the nerves supplying the front abdominal wall was increased, thanks to the direct vision of the block needle, local anaesthetic distribution in the plane, and the transversus abdominis and internal oblique muscles under ultrasound guidance.

The effective block maintained patients free from opioid-related adverse effects and decreased the need for opioid analgesics. The TAP block group experienced less nausea and vomiting, which is consistent with a fentanyl-sparing effect of the TAP block. In this patient population, performing the TAP block was simple. The use of ultrasound guidance significantly enhanced TAP placement and block effectiveness while lowering the risk of side effects from blind TAP block, such as peritoneal and visceral injuries, and thereby lowering morbidity. Additionally, there have been no reported negative effects of ultrasound-guided TAP block in the literature to yet [9,10].

Our goal is to give sustained analgesia with a single shot TAP block, thus our justification for utilising a greater dose of local anaesthetic arises from that. This dose, despite being quite high, falls within the manufacturer's recommendations for infiltration anaesthesia, such as a field block or brachial plexus block. However, the dose is higher than that recommended by the manufacturer for infiltration or minor nerve block analgesia for the purpose of postoperative analgesia. Of importance, this dose is within the recommended safe dose range for bupivacaine.

5. Conclusions

The TAP block has a lot of potential as a component of a post-operative multimodal analgesic regimen. Lower abdominal laparoscopies for analgesia allow precise placement of the local anaesthetic between the internal and transverse abdominal muscles thanks to the ultrasound-guided TAP block.

Conflict of Interest

None

Funding

None

References

1. El-Dawlatly, A. A., Turkistani, A., Kettner, S. C., Machata, A. M., Delvi, M. B., Thallaj, A., ... & Marhofer, P. (2009). Ultrasound-guided transversus abdominis plane block: description of a new technique and comparison with conventional systemic analgesia during laparoscopic cholecystectomy. British journal of anaesthesia, 102(6), 763-767.
2. Niraj, G., Searle, A., Mathews, M., Misra, V., Baban, M., Kiani, S., & Wong, M. (2009). Analgesic efficacy of ultrasound-guided transversus abdominis plane block in patients undergoing open appendicectomy. British journal of anaesthesia, 103(4), 601-605.
3. McDonnell, J. G., Curley, G., Carney, J., Benton, A., Costello, J., Maharaj, C. H., & Laffey, J. G. (2008). The analgesic efficacy of transversus abdominis plane block after cesarean delivery: a randomized controlled trial. Anesthesia & Analgesia, 106(1), 186-191.
4. Gray, H. (2000). Anatomy of the human body. Bartleby. com. Inc Lea & Febige, Philadelphia, 1125.
5. Netter, F. H. (1989). Abdomen posterolateral abdominal wall. Atlas of human anatomy summit. New Jersey, USA: The Ciba-Geigy Corporation, 4, 230-40.
6. Carney, J., McDonnell, J. G., Ochana, A., Bhinder, R., & Laffey, J. G. (2008). The transversus abdominis plane block provides effective postoperative analgesia in patients undergoing total abdominal hysterectomy. Anesthesia & Analgesia, 107(6), 2056-2060.
7. Mukhtar, K., & Singh, S. (2009). Transversus abdominis plane block for laparoscopic surgery. British journal of anaesthesia, 102(1), 143-144.
8. Gaiser, R. R. (2003). Changes in the provision of anesthesia

for the parturient undergoing cesarean section. Clinical obstetrics and gynecology, 46(3), 646-656.
9. Dahl, J. B., Jeppesen, I. S., Jørgensen, H., Wetterslev, J., & Møiniche, S. (1999). Intraoperative and postoperative analgesic efficacy and adverse effects of intrathecal opioids in patients undergoing cesarean section with spinal anesthesia: a qualitative and quantitative systematic review of randomized controlled trials. The Journal of the American Society of Anesthesiologists, 91(6), 1919-1919.
10. Werawatganon, T., & Charuluxananan, S. (2005). Patient controlled intravenous opioid analgesia versus continuous epidural analgesia for pain after intra-abdominal surgery. Cochrane Database of Systematic Reviews, (1).