Postoperative analgesic efficacy of Ultrasound-Guided Transversus Abdominis Plane (TAP) Block in Lower Abdominal Surgery

ABSTRACT

Aim: To determine the postoperative analgesic efficacy of ultrasound guided tranversus abdominis plane blocks in different types of lower abdominal surgery.
Methodology: This study was conducted during July 2018 to December 2018 at the Department of Anesthesiology, Peoples Medical University & Hospital Nawabshah after the approval of ethical review committee PUMHSW Nawabshah, Pakistan. Patients undergoing elective lower abdominal surgeries between the age of 18-65 years and American Society of Anesthesiology (ASA) I to IV were included in this study while those patients with infection at the proposed site of injection, allergy to local anesthetics, bleeding or coagulation disorders were excluded from this study. Informed written consent for the study was taken from all the patients. The sample size was sixty. Patients' oxygen saturation (SpO2),base line heart rate (HR), blood pressure (BP) and respiratory rate (R/R)was monitored and recorded. Ultrasound guided TAP block was performed after induction of general anesthesia (GA included Post-Operative pain was determined by visual analog scale (VAS).
Results: A total of 60 patients were included in this study. Distribution of age 28.33% (n=17) for 26-35 years, gender 30% (n=18) male and 70% (n=42) females, height 5.1-5.6 feet in 51.67% (n=31) were observed while weight ≥50kg was observed in 66.67% (n=40) patients. ASA status 58.33% (n=35) stands in ASA status II-IV. Regarding surgical procedures 28.2% (n=17) underwent LS C-Section, 13.3% (n=8) appendectomy, 8.3% (n=5) Prostectomywere observed.

Keywords: Efficacy, Postoperative Nausea and Vomiting, PONV, granisteron, Ondansetron

1. INTRODUCTION

Lower abdominal surgery is one of most common procedure area particularly, for genitourinary, Obstetric/ gynecology procedures in females and prostatectomy in males appendectomy and inguinal hernia repairs in both genders resulting in moderate to severe post-surgical lower abdominal pain[1,2]. Acute postoperative pain is a common problem encountered in clinical practice[3]. A general consensus exists that acute postoperative pain is the major cause of prolonged hospital stay and patient dissatisfaction[4,5]. Transverse abdominis plane (TAP) block is aninnovative approach described by Kuppuvelumaniet al. in 1993[6]. Ultrasound guidance is now believed the gold standard for peripheral nerve block. Generally, a linear probe is sufficient for Transverse abdominis plane blocks[7]. Though, a convex probe is preferable for Transverse abdominis plane blocks in markedly overweight patients. It

is convenient to get ultrasound images; it can be employed in a lot of surgeries involving the anterolateral abdominal wall.The musculature of the lateral abdomen has 3 layers[8,9]. From superficial to deep, they are the external and internal oblique, andtransversus abdominis muscles. On its course from medial to lateral, the internal oblique muscle slopes upward and creates a small gap above the iliac crest. It is this sloping edge, above the iliac crest, that defines the medial aspect of the lumbar triangle of Petit. The inferior lumbar triangle, also identified as the Petit triangle[10]. The superior lumbar triangle, also known as the triangle of Grynfeltt-Lesshaft[11]. The aim of this study was to estimate thepostoperative analgesic efficacy of ultrasound guided TAP blocks invarious types of lower abdominal surgery.

2. MATERIAL AND METHODS

The current study was conducted at AnesthesiologyDepartment, Peoples Medical University Hospital Nawabshah during July 2018 to December 2018 after the approval of ethical review committee PUMHSW Nawabshah, Pakistan. Patients undergoing elective lower abdominal surgeries between the age of 18-65 years and american Society of Anesthesiology (ASA) I to IV were included in this study while those patients with infection at the proposed site of injection, allergy to local anesthetics, bleeding or coagulation disorders were excluded from this study. Informed written consent for the study was taken from all the patients.

The sample size was sixty. Patients'oxygen saturation (SpO2), base line heart rate (HR), blood pressure (BP) and respiratory rate (R/R) was recorded. Intravenous line was maintained with 18G intravenous cannula and was preloaded with 500ml of hetastartch 6% solution. Patients'ultrasound guided transverses abdominis planeblock was performed after induction of GA, with ultrasound system using linear ultrasound transducer (8-12 Hz), 15 minutes before the surgical incision on ipsilateral side.With intermittent aspirationlocal anaesthetic (20ml of 25% of bupivacaine) was deposited to see a hypoechoic shadow pushing the two layers apart. Similarly, TAP was performed bilaterally for the procedures with mid line incision.

Pain was assessed by VAS. Tramadol 50 mg IV Stat was given if VAS is 6 or above. The outcome variable was recorded in all patients on proforma by the principal investigator. The data was analyzed by using SPSS software, Version 20.

3. RESULTS

In this study sixty subject were included. Distribution of age 10% (n=6) for 18-25 years, 36.66% (n=23) for 26-35 years, 28.33% (n=17) for 36-50 years and 23.33 (n=14) for 51-60 years of age (Figure 1), gender 30% (n=18) male and 70% (n=42) females(Figure2), height 5feet and less in 16.67% (n=10), 5.1-5.6 feet in 51.67% (n=31) and 6 feet and above in 31.67% (n=19) were observed while weight ≥50kgwas observed in 66.67% (n=40) patients.

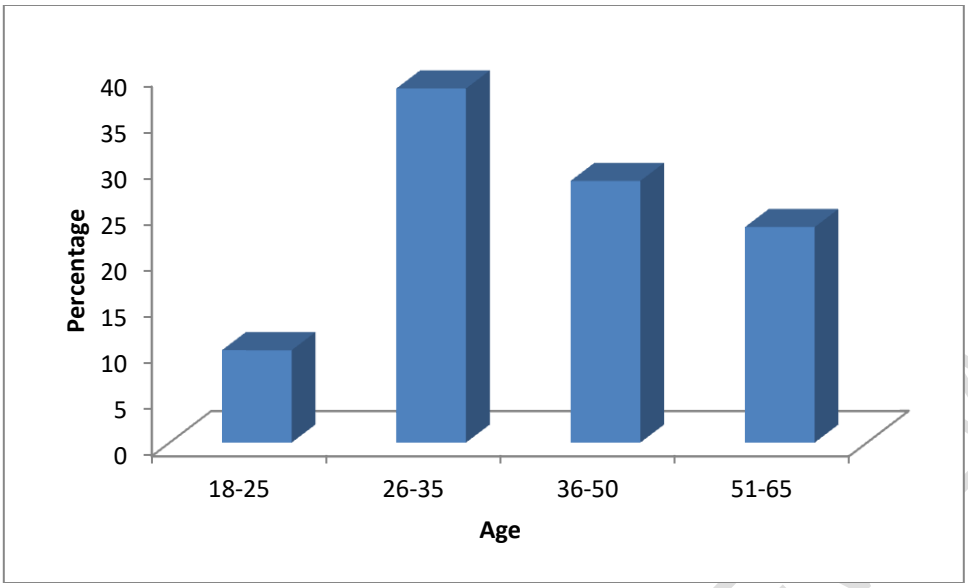
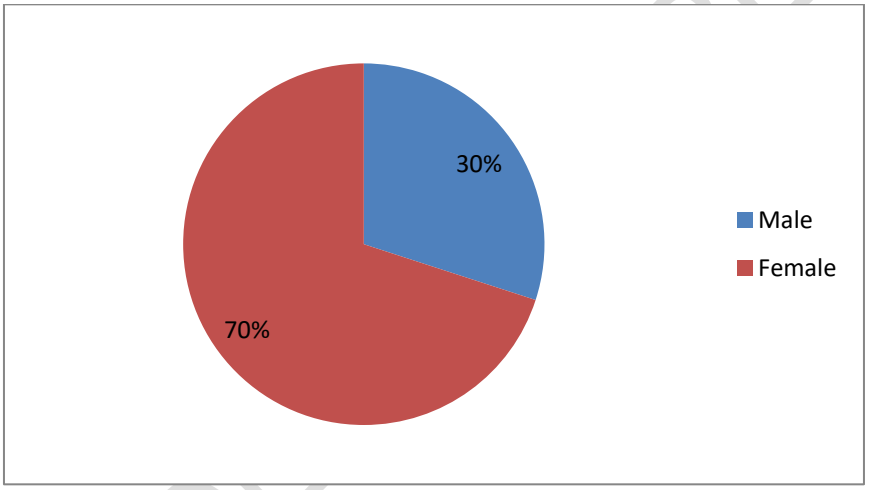


Figure 1 AGE DISTRIBUTION OF THE PATIENTS



[

Figure 2 Gender distribution of the patients

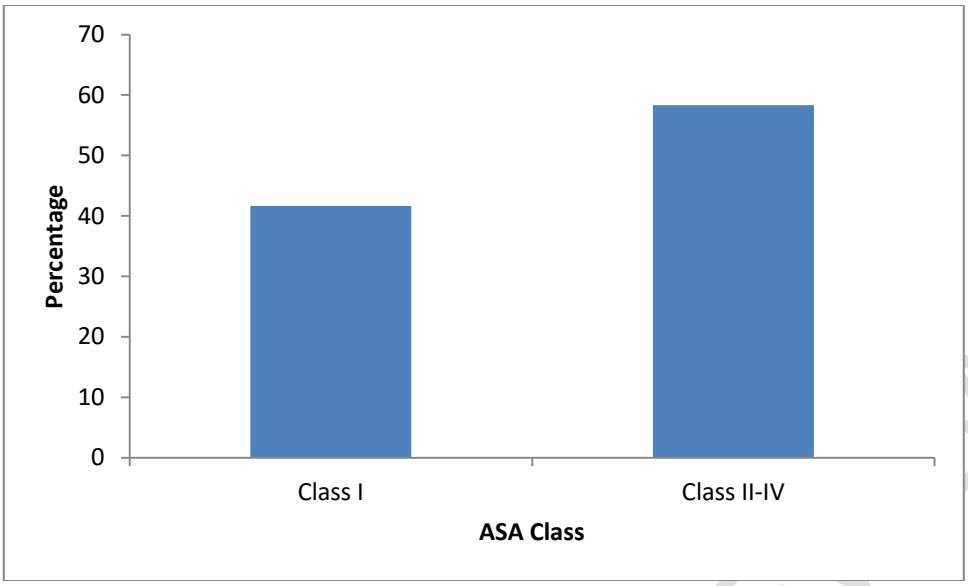


Figure 3: ASA STATUS DISTRIBUTION OF THE PATIENTS

ASA status 41.67%(n=25) of patients stands in ASA status I while 58.33% (n=35)stands in ASA status II-IV (Figure3). Regarding surgical procedures 28.2% (n=17) underwent LS C-Section, 13.3% (n=8) appendectomy, 8.3% (n=5) Prostectomy, 10% (n=6) Hysterectomy, 13.3% (n=8) cholecystectomy, 5% (n=3) vesicle calculus, 8.3% (n=5) Laparotomy, 3.3% (n=2) Ovarian cyst (Laparotomy), 3.3% (n=2) Left Inguinal Hernia, 1.7% (n=1) Right Inguinal Hernia and 5% (n=3) Myos Repair were observed (Figure 4).

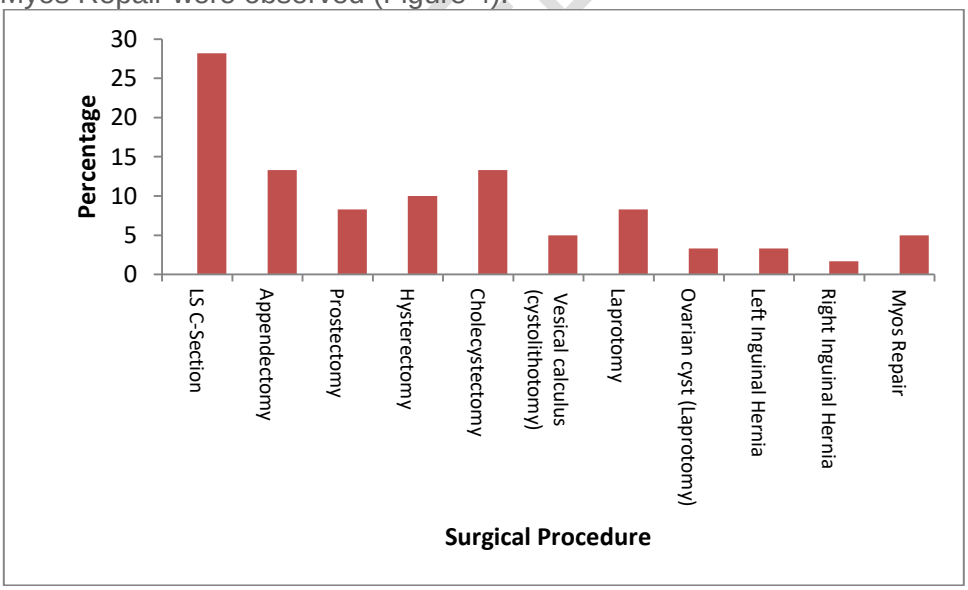


Figure 4 SURGICAL PROCEDURE DISTRIBUTION OF THE PATIENTS

No postoperative pain within 60 minutes was observed in any patient. Our results shows that Ultrasound-Guided TAP block is useful TAP block among lower abdominal surgery patients.

4. DISCUSSION

Total 60 patients were included in this study. Pain scores at six and 12 hr were investigated by various researchers[5, 8, 12] and this studies, respectively. The overall analyses showed that, in the TAP block group, the six-hour VAS pain score was reduced by 1.4 (95% CI, -1.9 to -0.8; P \ 0.001) , and the 12-hr pain score was reduced by 2 (95% CI, -2.7 to -1.4; P \ 0.001)[7]. Heterogeneity was high (I2=0.94, for both outcomes). A Study [11] investigated the pain score at 24 hr and found a reduction of 1.2 (95% CI, -1.6 to -0.8; P\ 0.001) in the TAP block group (I2 = 0.93). Consumption of opioids at 24 hr after surgery was investigated in previous studies, with a significant reduction in opioid intake of 14.7 mg (95% CI, -18.4 to -11.0; P\ 0.001) in the TAP block group[9, 11]. Only three studies[8, 9, 10]addressed the comparison between TAP block and epidural anesthesia, and none of them showed any significant differences between the two techniques.

Only one RCT[10] investigated eight-hour pain score and 24-hr morphine consumption. Six studies[5]investigated the efficacy of TAP block vs local anesthetic infiltration at the wound site. Compared with local infiltration, TAP block significantly reduced thesix-hour VAS pain score[9,10]by 1.4 (95% CI, -2.2 to -0.6; P \ 0.001); however, this difference was not significant at 12 hr[2,5] and 24 hr[1-3,5] . The TAP block significantly reduced 24-hr tramadol consumption by 5.0 mg (95% CI, -9.5 to -0.5; P = 0.004)[8].

4. CONCLUSION

Our study results showed that Postoperative analgesic efficacy of Ultrasound-Guided Transversus Abdominis Plane (TAP) Block in Lower Abdominal Surgery showed significant results as no value is found to be ≥0.05.

CONSENT

All authors declare that 'written informed consent was obtained from the patient.

REFERENCES

1. Tsai HC, Yoshida T, Chuang TY, Yang SF, Chang CC, Yao HY, Tai YT, Lin JA, Chen KY. Transversus abdominis plane block: an updated review of anatomy and techniques. BioMed research international. 2017 Oct 31;2017.
2. Xue Y, Yuan H, Chen Y. Effects of dexmedetomidine as an adjunct in transversus abdominis plane block during gynecological laparoscopy. Experimental and Therapeutic Medicine. 2018 Aug 1;16(2):1131-6.
3. Brogi E, Kazan R, Cyr S, Giunta F, Hemmerling TM. Transversus abdominal plane block for postoperative analgesia: a systematic review and meta-analysis of randomized-controlled trials. Canadian Journal of Anesthesia. 2016;63(10):1184-96.
4. Stav, L. Reytman, M. Stav et al., "Transversus Abdominis Plane Versus Ilioinguinal and Iliohypogastric Nerve Blocks for Analgesia Following Open Inguinal Herniorrhaphy," RambamMaimonides Medical Journal, vol. 7, no. 3, p. e0021, 2016. Bi o Me d R es e arch Inter nationa l 11
5. AykutUrfalıoğlu[a]MuratBakacak[b]ÖmerFarukBoran[a]FatihMehmetYazar[c]Mahmutarslan[a]HafizeÖksüz[a], Ultrasound-guided versus surgical transversus abdominis plane block in obese patients following cesarean section: a prospective randomised study https://doi.org/10.1016/j.bjane.2016.07.009
6. Kuppuvelumani P, Jaradi H, Delilkan A. Abdominal nerve blockade for postoperative analgesia after caesarean section. Journal of Obstetrics and Gynaecology Research. 1993;19(2):165-9.
7. Baeriswyl M, Kirkham KR, Kern C, Albrecht E. The analgesic efficacy of ultrasound-guided transversus abdominis plane block in adult patients: a meta-analysis. Anesthesia & Analgesia. 2015 Dec 1;121(6):1640-54.

8. Wang P, Chen X, Chang Y, Wang Y, Cui H. Analgesic efficacy of ultrasound-guided transversus abdominis plane block after cesarean delivery: A systematic review and meta-analysis. Journal of Obstetrics and Gynaecology Research. 2021 Sep;47(9):2954-68.
9. Wang P, Chen X, Chang Y, Wang Y, Cui H. Analgesic efficacy of ultrasound-guided transversus abdominis plane block after cesarean delivery: A systematic review and meta-analysis. Journal of Obstetrics and Gynaecology Research. 2021 Sep;47(9):2954-68.
10. Sethi D, Garg G. Analgesic efficacy of ultrasound-guided transversus abdominis plane block for laparoscopic gynecological surgery: a randomized controlled trial. Anesthesia and Pain Medicine. 2022 Jan 7.
11. Bava EP, Ramachandran R, Rewari V. Analgesic efficacy of ultrasound guided transversus abdominis plane block versus local anesthetic infiltration in adult patients undergoing single incision laparoscopic cholecystectomy: a randomized controlled trial. Anesthesia, Essays and Researches. 2016 Sep;10(3):561.
12. Wang P, Chen X, Chang Y, Wang Y, Cui H. Analgesic efficacy of ultrasound-guided transversus abdominis plane block after cesarean delivery: A systematic review and meta-analysis. Journal of Obstetrics and Gynaecology Research. 2021 Sep;47(9):2954-68.