

# Postoperative Analgesic Efficacy of Transverse Abdominis Plane Block versus Port Site Local Infiltration in Laparoscopic Gynaecological Surgeries- A Randomised Clinical Trial

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## ABSTRACT

**Introduction:** Pain relief postoperatively has advantages related to better patient satisfaction in terms of early ambulation and discharge and also better cardiovascular stability, decreased infections, neurological complications, prevention of thromboembolic phenomenon, and chronic pain syndrome. Non Steroidal Anti-Inflammatory Drugs (NSAIDs) and opioids are the most commonly used drugs in pain management. Transverse Abdominis Plane (TAP) block is a regional analgesic technique, which provides analgesia of the anterolateral abdominal wall and hence can be used to provide analgesia for caesarean section, hernia repairs, hysterectomies, cholecystectomy.

**Aim:** To compare the effectiveness of bilateral TAP block versus port sites local anaesthetic infiltration to relieve postoperative pain in laparoscopic gynaecological surgeries.

**Materials and Methods:** This single-blinded randomised clinical study conducted at PES Institute of Medical Sciences and Research, Kuppam, Andhra Pradesh, India, from January 2020 to June 2021. The clinical trial was conducted on 80 patients belonging to American Society of Anaesthesiologist (ASA) I and II posted for elective laparoscopic gynaecological surgeries. Patients were randomly allocated into two groups with 40 patients in each group. Group T (TAP block) received 0.6 mL/kg of 0.25% bupivacaine for bilateral ultrasound guided TAP block and group O (port sites local infiltration) received 0.6 mL/kg of 0.25% bupivacaine for port sites infiltration. At the end of surgery, patients received either TAP block or port site infiltration as per

the group allocated and then extubated. Postoperative pain intensity using Visual Analogue Scale (VAS) score were recorded at the time of shifting as 0 hr and then every 2 hrs, 4 hrs, 6 hrs, 8 hrs, 12 hrs and 24 hrs. The mean time for first rescue analgesia and total number of rescue analgesic given in first 24 hrs were noted. Haemodynamic parameters and side-effects with study drug were noted. For inferential statistics, numerical data was analysed by Chi-square test and for categorical data student's t-test was used. A p-value <0.05 was considered as statistically significant.

**Results:** Demographic parameters in both groups were comparable. There was no significant difference in VAS score upto 4 hours in between two groups. But mean VAS score was significantly low in group T when compared to group O at 6 hours (2.2±0.4 vs 2.7±0.5), 8 hours (2.7±0.4 vs 3.2±0.7) and 12 hours (3.3±0.5 vs 3.6±0.5). The time to receive rescue analgesic was longer in TAP block group (13.7±1.5 vs 10.6±1.64 hrs) when compared to port sites local infiltration group. And total number of rescue analgesia received was low in TAP block group (70% received single dose) when compared to port sites local infiltration group (80% received two doses).

**Conclusion:** The TAP block and port sites infiltration in patients undergoing laparoscopic gynaecological surgeries are used for effective postoperative analgesia as part of multimodal analgesia, which reduces the use of other analgesics like NSAIDs and opioids. However, TAP block provides superior and prolonged pain relief when compared to port sites local infiltration.

**Keywords:** Analgesia, Bupivacaine, Opioids, Visual analogue scale

## INTRODUCTION

Laparoscopic gynaecological surgeries are most commonly performed surgeries in tertiary care hospitals. Postoperative pain is the most common symptom following any surgery. Perioperative pain relief is associated with advantages like cardiovascular stability, decreased sympathetic activity, decreased rate of infections, decreased neurological complications, prevent chronic pain syndromes, and also better patient satisfaction in terms of faster recovery and early mobilisation, and shorter duration of hospitalisation [1,2]. Hence, postoperative pain management plays a key role in perioperative anaesthesia care.

Laparoscopic surgeries are associated with less bleeding, early mobilisation, early normal daily activity recovery, good cosmetic outcome, less postoperative pain, low morbidity and mortality, hence attained a major role in gynaecological surgeries [3,4].

The pain after abdominal surgeries is multifactorial, includes pain from surgical site incision, visceral pain from peritoneum and from manipulation of abdominal structures but major contribution is from the anterior abdominal wall [5]. Hence, for postoperative pain management abdominal wall local anaesthetic infiltration is an effective pain relief technique. This technique, along with Non Steroidal Anti-Inflammatory Drugs (NSAIDs) and opioids form part of multimodal analgesic techniques. Hence, this study was undertaken to compare postoperative analgesic efficacy of transverse abdominis plane block versus port sites local infiltration in laparoscopic gynaecological surgeries.

Various studies comparing the efficacy of Transverse Abdominis Plane (TAP) block versus local anaesthetic infiltration done in open surgeries using opioids as rescue analgesic have shown that TAP block provides better pain relief compared to local anaesthetic infiltration and decreased the consumption of rescue analgesic [6-11]. This study was

conducted to compare the efficacy of bilateral TAP block versus port sites infiltration for pain relief in laparoscopic gynaecological surgeries (minimally invasive surgery) and NSAIDs used as rescue analgesics.

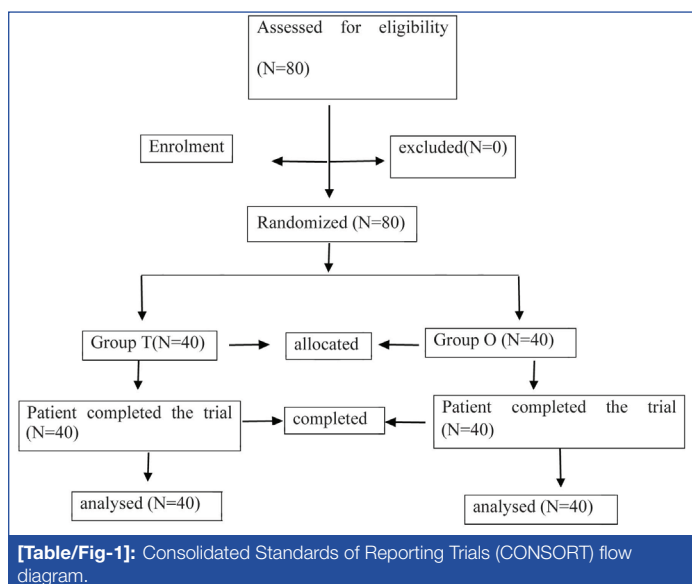
## MATERIALS AND METHODS

This single-blinded randomised clinical study conducted at PES Institute of Medical Sciences and Research, Kuppam, Andhra Pradesh, India, from January 2020 to June 2021. The ethical clearance from Institutional Hospital Ethical Committee approval (PESIMSR/IHEC/91/2019) and a written informed consent from patients were obtained. Patients were allocated either to TAP block group (group T) or port-sites infiltration group (group O), as per computer-based random allocation.

**Sample size calculation:** Considering the time for first analgesia request for TAP block versus local infiltration with a mean±SD of 6.11±6.2 and 2.63±1.83, and using the formula

$$n=2\{Z_{1-\alpha/2}+Z_{1-\beta/2}\}^2 \times \sigma^2 / \sigma^2$$

The sample size was calculated to be 27 per group, with an effective size of 1.0, power of the study as 90, and alpha error of 0.05 [7]. For convenience and to increase the power of the study the sample size for each group was increased to 40. Total of 80 patients were enrolled in the study with 40 in each group; there were no dropouts from the study [Table/Fig-1].



Patients were randomly allocated as per computer based random allocation:

- **Group T** (TAP block) (n=40): Patients received 0.6 mL/kg of 0.25 % bupivacaine for bilateral ultrasound guided TAP block.
- **Group O** (port sites local infiltration) (n=40): Patients received 0.6 mL/kg of 0.25% bupivacaine for port sites infiltration.

**Inclusion criteria:** American Society of Anaesthesiologist (ASA) physical status I and II, aged between 20-60 years posted for elective gynaecological surgeries were included in the study.

**Exclusion criteria:** Patients allergic to local anaesthetic drugs, those using medications for chronic pain, and patients with renal and hepatic diseases, conversion to open surgery intraoperatively were excluded from the study.

### Study Procedure

After thorough preanaesthetic evaluation all patients were given anxiolytic drug alprazolam 0.5 mg orally on previous day at bed time. In preoperative room technique of anaesthesia procedure and the study method were explained to patient own words and written informed consent taken as per institutional protocol. In the operation theatre intravenous (i.v.) accesses secured with 18G cannula, i.v. fluids were started according to body weight. Baseline Heart Rate

(HR), Non Invasive Blood Pressure (NIBP), Oxygen Saturation (SpO<sub>2</sub>), Electrocardiograph (ECG) were recorded. All patients received a standardised general anaesthesia protocol with propofol 2 mg/kg, fentanyl 2 mcg/kg, vecuronium 0.1 mg/kg (i.v.) and anaesthesia was maintained with isoflurane and 40% oxygen and nitrous oxide. Standard monitoring done throughout the operation. Intraoperative analgesia provided by i.v. paracetamol 15 mg/kg.

At the end of procedure, in group T anaesthesiologist administered the TAP block. The patient in supine or slightly lateral position, ultrasound probe was placed transversely in the horizontal plane along the lateral abdominal wall at the mid-axillary line, midway between the iliac crest and lower costal margin. At this level, the three abdominal muscles were easily distinguished and an optimal ultrasound view obtained. A 23 G Quinke's needle was inserted approximately 2-3 cm from the transducer in an anteroposterior direction and advanced in an in-plane approach into the plane between internal oblique muscle and transverse abdominis muscle [12,13]. Small amount of local anaesthetic or normal saline was injected to confirm correct needle placement and then the remaining volume of local anaesthetic was injected incrementally. A total volume of 0.6 mL/kg of 0.25% bupivacaine in two divided doses of 0.3 mL/kg was administered on either side. In group O at the end of procedure before port sites closure all the port sites were infiltrated with a total volume of 0.6 mL/kg of 0.25% bupivacaine. In the postoperative period, an observer blinded to the study assessed for postoperative analgesia using VAS scores, haemodynamic parameters, time for first rescue analgesia, total doses of rescue analgesia required and side effects at 0 hr as baseline (time at shifting patient to postoperative ward) then at 2 hrs, 4 hrs, 6 hrs, 8 hrs, 12 hrs and 24 hrs.

- The primary observation was to compare pain according to Visual Analogue Scale (VAS) Score.
- The secondary observations were, the time to reach VAS score ≥4, when rescue analgesia, Inj. diclofenac 75 mg i.v. was given, and total analgesic doses given in first 24 hr postoperatively.
- Adverse effects of local anaesthetic like hypotension, bradycardia, nausea and vomiting and pruritus were noted.

## STATISTICAL ANALYSIS

The observed data were entered into MS Excel 2007 version and analysed using Statistical Package for Social Sciences (SPSS) version 20.0. For descriptive analysis, categorical data were analysed using percentages and the continuous data were analysed using mean and standard deviation. For inferential statistics, numerical data was analysed by Chi-square test, and for categorical data student's t-test was used. A p-value <0.05 was considered as statistically significant.

## RESULTS

Demographic data of the two groups are shown in [Table/Fig-2], there was no statistically significant difference between the two groups.

Variables	Group O (n,%)	Group T (n,%)	p-value
<b>Age (years)</b>			
≤30	2 (5%)	5 (12.5%)	0.484*
31-45	23 (57.5%)	22 (55%)	
>45	15 (37.5%)	13 (32.5%)	
Age (mean±SD)	42.3±6.3	40.5±7.7	0.2311#
Body mass index (kg/m <sup>2</sup> ) (mean±SD)	22.5±1.1	22.6±1.1	0.8576#
<b>American Society of Anaesthesiologist (ASA) grade</b>			
I	21 (52.5%)	18 (45%)	0.502*
II	19 (47.5)	22 (55%)	

**[Table/Fig-2]:** Association of Demographic details (N=40). p-value <0.05 was considered as statistically significant; \*Chi-square test; #Student's t-test

There was no statistical significant difference between associations of type of surgery between the two groups as both groups underwent similar type of surgeries [Table/Fig-3].

Type of surgeries	Group O (n,%)	Group T (n,%)	(Chi-square test)
DHL with chromopertubation	0	1 (2.5%)	0.762
DHL with ovarian drilling	1 (2.5%)	1 (2.5%)	
DLH with septal resection with ovaria	0	1 (2.5%)	
Laparoscopic cystectomy	4 (10%)	5 (12.5%)	
Laparoscopic myomectomy	4 (10%)	1 (2.5%)	
Laparoscopic salpingectomy	2 (5%)	3 (7.5%)	
Laparoscopically assisted vaginal hysterectomy	13 (32.5%)	12 (30%)	
Total laparoscopic hysterectomy	16 (40%)	16 (40%)	

**[Table/Fig-3]:** Association of type of surgeries between the groups (n=40). p-value <0.05 was considered as statistically significant  
DHL: Diagnostic hysterolaparoscopy

The VAS scores were comparable between the two groups until 4 hours postoperatively, but between 6-12 hours, the TAP block group had significantly lower VAS score compared to port-sites infiltration group suggesting better pain relief with TAP block [Table/Fig-4]. A total of 80% cases group O received two doses of rescue analgesia compared to only 12% in group T, indicating a prolonged pain free interval with group T [Table/Fig-5].

VAS	Group O (Mean±SD)	Group T (Mean±SD)	p-value (Student's t-test)
At 0 hr	-	-	-
At 2 hrs	2±0	1.9±0.1	0.3204
At 4 hrs	2.1±0.3	2±0	0.0793
At 6 hrs	2.7±0.5	2.2±0.4	<0.001*
At 8 hrs	3.2±0.7	2.7±0.4	0.0001*
At 12 hrs	3.6±0.5	3.3±0.5	0.0032*
At 24 hrs	3.8±0.4	3.6±0.5	0.0858

**[Table/Fig-4]:** Comparison of VAS in groups. p-value <0.05 was considered as statistically significant

Total number of rescue analgesic	Group O (n,%)	Group T (n,%)	p-value (Student's t-test)
1 dose	8 (20%)	28 (70%)	<0.001*
2 doses	32 (80%)	12 (30%)	

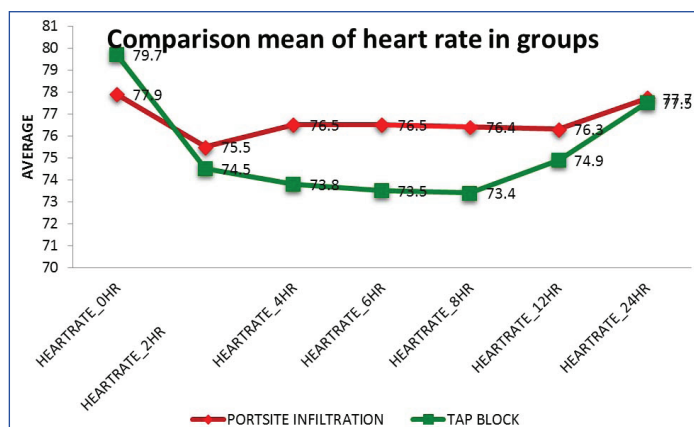
**[Table/Fig-5]:** Total number of rescue analgesic given. p-value <0.05 was considered as statistically significant

Mean time for first rescue analgesia was significantly longer in TAP block group and the mean number of rescue analgesic doses required was also significantly lesser in TAP block group [Table/Fig-6].

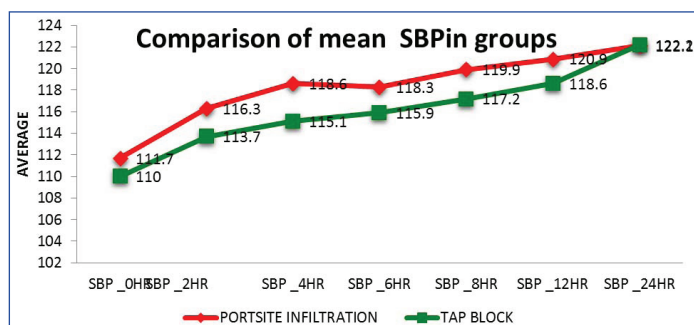
Rescue analgesic required	Group O (Mean±SD)	Group T (Mean±SD)	p-value (Student's t-test)
Mean time in hours	10.6±1.64	13.7±1.5	<0.001*
Mean number of doses	1.8±0.4	1.3±0.4	<0.001*

**[Table/Fig-6]:** Association of mean time and dose for rescue analgesic given. p-value <0.05 was considered as statistically significant

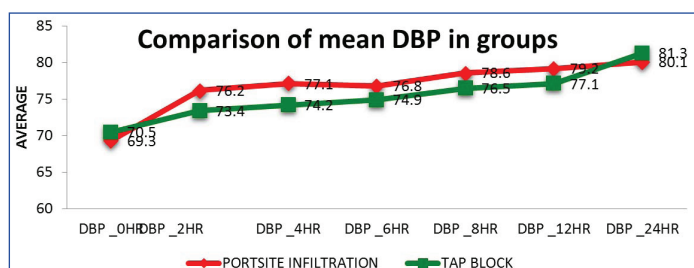
Mean values of the heart rate, systolic blood pressure, and diastolic blood pressure at different time intervals postoperatively are as shown in [Table/Fig-7-9], respectively. The values between the two groups were comparable without any statistical significant difference over a period of 24 hours. There were no side-effects like hypotension, bradycardia, pruritus, drowsiness in either of the groups.



**[Table/Fig-7]:** Comparison of mean heart rate between two groups.



**[Table/Fig-8]:** Comparison of mean systolic blood pressure between two groups.



**[Table/Fig-9]:** Comparison of mean diastolic blood pressure between two groups.

## DISCUSSION

The TAP block is a regional analgesic technique, which blocks thoracolumbar nerves originating from T6-L1 spinal roots and provide analgesia to anterolateral abdominal wall by local anaesthetic drug infiltration in the plane between the transverse abdominalis muscle and internal oblique muscle. It was first described by Rafi AN in 2001 as landmark based approach through the triangle of Petit [14]. It was further made safer and easier by using ultrasound guided technique [10,11]. There is increasing evidence to show that TAP block is effective pain relieving technique for surgeries like caesarean section, hysterectomy, cholecystectomy, colectomy, hernia repairs. Various approaches for TAP block include subcostal technique, lateral technique, posterior technique, oblique subcostal technique with each technique providing analgesia over different abdominal areas [15].

The present study compared the postoperative analgesic efficacy of TAP block and port sites local infiltration using 0.25% bupivacaine in patients undergoing laparoscopic gynaecological surgeries with inj. diclofenac 75 mg i.v. as rescue analgesic and found that TAP block was superior to port sites infiltration in terms VAS score, time for first rescue analgesic requirement and total dose of rescue analgesia required over 24 hours postoperatively.

In the present study, TAP block with 0.25% bupivacaine provided longer duration of analgesia with better VAS scores measured at different time intervals compared to port sites local infiltration

with 0.25% bupivacaine. This finding was comparable with study by Habtenariam M et al., who found that TAP block had significantly lesser pain scores compared to wound infiltration in caesarean section patients up to 18 hours post operatively [8]. Also, comparable with studies by Abd El-Hamid AM and Affi EE, who found that patients with TAP block better pain scores at rest for 12 hours and on cough for 6 hours postoperatively compared to wound infiltration [10]. Pratheeba N et al., also showed TAP group had better lower VAS scores compared to wound infiltration with ropivacaine [9]. Mishra M et al., showed that VAS scores were comparable at 1 hr, 3 hrs, and 6 hrs postoperatively whereas, at 12 hours and at 24 hours the TAP block group had statistically significant lower pain scores compared to wound infiltration group [11].

The secondary observation of the present study, time to reach VAS >4, that is the time at which rescue analgesia was given, was significantly longer in group T when compared to group O. Wayu B et al., showed that the need for first analgesic was significantly longer in TAP block group compared to LAI group (673 min vs 227 min) [16]. Bava EP et al., showed that there was no difference in 24 hour Inj Morphine requirement between TAP block group and local infiltration group [17]. Probable reason being the authors had performed the TAP block using land mark based approach, the transverse abdominal plane was identified using the pop off sign, but in the present study, transverse abdominis plane was identified using ultrasound guide approach, hence, a more precise deposition of the local anaesthetic drug and effective and prolonged analgesia.

**Comparison of rescue analgesic administered over 24 hr:** The present study showed demand for rescue analgesic consumption was significantly less with transverse abdominal plane block when compared to local portsite infiltration over 24 hr period. This was comparable to study by Wayu B et al., who showed that the amount of Inj Tramadol required was significantly lower in TAP block group compared to LAI group [16]. Study done by Abd El-Hamid AM and Affi EE, also showed significantly lower number of subjects in TAP block group required supplemental analgesia [10]. Study done by Habtemariam M et al., found significantly less tramadol less consumption in TAP block group compared to local infiltration group with median (IQR) of 100 mg (100-150) VS 150 mg (150-200) [8]. Pratheeba N et al., found that the total analgesic doses required was lower in TAP block group compared to wound infiltration group [9]. Also studies done by Scharine JD, Belavy D et al., and El Sharkwy et al., showed that TAP block proved effective prolonged postoperative analgesia compared to other methods [18-20].

**Comparison of haemodynamics and side-effects:** There was no significant changes in haemodynamic parameters over 24 hours and the mean haemodynamic parameters (heart rate, systolic blood pressure, diastolic blood pressure, SpO<sub>2</sub>, respiratory rate) at 0, 2, 4 hrs, 6 hrs, 8 hrs, 12 hrs, 24 hrs in both groups were comparable. These findings were comparable with study by Abd El-Hamid AM and Affi EE, and Wayu B et al., [10,16]. Habtemariam M et al., in their study also found no significant differences between the two groups [8]. There were no side effects like hypotension, bradycardia, pruritus, drowsiness in both groups. This was comparable to studies by Wayu B et al., [16].

To summarise, VAS scores compared between two groups, there was no significant difference upto 4 hours, but there was significantly low VAS score at 6, 8, 12 hours in TAP block group when compared to port sites local infiltration group, the time to first rescue analgesic was longer in TAP block when compared to port sites local infiltration group. And total dose rescue analgesic consumption was less in TAP block when compared to port sites local infiltration group.

## Limitation(s)

All the patients belonged to physical status ASA grade I and II with no severe underlying disease; therefore, the results of the present study should not be generalised. All the VAS measurements were not carried out by a single observer to eliminate any interobserver variability. The surgeries were conducted by different surgeons, thus causing differences in tissue handling and port sites local anaesthetic infiltration and thus interference with intensity of pain.

## CONCLUSION(S)

The quality of analgesia in this present study was evidenced by a reduction in pain scores and decreased rescue analgesic demand. TAP block and local infiltration are easy to perform, provide effective analgesia, with stable haemodynamic without any significant adverse effects. However, this study showed TAP block provided superior and prolonged pain relief when compared port sites infiltration.

## REFERENCES

- [1] Yu N, Long X, Lujan-Hernandez JR, Succar J, Xin X, Wang X. Transversus abdominis-plane block versus local anesthetic wound infiltration in lower abdominal surgery: A systematic review and meta-analysis of randomized controlled trials. *BMC Anesthesiology*. 2014;14(1):121.
- [2] Ramsay MA. Acute postoperative pain management. *Proc (Bayl Univ Med Cent)*. 2000;13(3):244-47.
- [3] Wesley JH. Complications of hysterectomy. *Clinical Obstetrics and Gynecology*. 1997;40(4):928-38.
- [4] Nieboer TE, Johnson N, Lethaby A, Tavender E, Curr E, Garry R, et al. Surgical approach to hysterectomy for benign gynaecological disease. *Cochrane Database of Systematic Reviews*. 2009;(3):CD003677.
- [5] Choi JB, Kang K, Song MK, Seok S, Kim YH, Kim JE. Pain characteristics after total laparoscopic hysterectomy. *International Journal of Medical Sciences*. 2016;13(8):562-68.
- [6] Verma N, Krishnendu S, Chandak AV, Singam A, Chandak VC, Chakole V. Effectiveness of transverse abdominis plane block as a method of regional anaesthesia in unilateral inguinal hernia repair. *J Evol Med Dent Sci*. 2020;9(42):3097-102.
- [7] Aydogmus M, Sinikoglu S, Naki M, Ocak N, Sanli N, Alagol A. Comparison of analgesic efficiency between wound site infiltration and ultra-sound-guided transversus abdominis plane block after cesarean delivery under spinal anaesthesia. *Hippokratia*. 2014;18(1):28-31.
- [8] Habtemariam M, Muluget H, Solomon F, Hailu S, Ayalew N, Aweke Z. Effect of transversus abdominis block and subcutaneous wound infiltration on post-operative pain analgesia after cesarean section at Hawassa University, southern Ethiopia: A prospective cohort study. *Int J Surg Open*. 2020;26:108-113.
- [9] Pratheeba N, Remadevi R, Raajesh IJ, Bhavani V, Tripathy DK, Bhat RR. Comparison of postoperative analgesic efficacy of wound site infiltration and ultrasound-guided transversus abdominis plane block with 0.5% ropivacaine in lower abdominal surgeries under spinal anesthesia. *Anesth Essays Res*. 2018;12(1):80-84.
- [10] Abd El-Hamid AM, Affi EE. Transversus abdominis plane block versus local anesthetic wound infiltration in patients undergoing open inguinal hernia repair surgery. *Ain-Shams Journal of Anaesthesiology*. 2016;9(2):280.
- [11] Mishra M, Mishra SP, Singh SP. Transversus abdominis plane block versus wound infiltration of local anesthesia for Post Operative Analgesia. *J Med Sci Clin Res*. 2016;04(03):9916-22.
- [12] Walter EJ, Smith P, Albertyn R, Uncles D.R. Ultrasound imaging for transversus abdominis blocks. *Anaesthesia*. 2008;63(2):211.
- [13] Hebbard P. Subcostal transversus abdominis plane block under ultrasound guidance. *Anesthesia and Analgesia*. 2008;106(2):674-75.
- [14] Rafi AN. Abdominal Field Block: A new approach via the lumbar triangle. *Anaesthesia*. 2001;56(10):1024-26.
- [15] Tsai HC, Yoshida T, Chuang TY, Yang SF, Chang CC, Yao HY, et al. Transversus abdominis plane block: An updated review of anatomy and techniques. *Biomed Res Int*. 2017;2017:8284363.
- [16] Wayu B, Germa B, Shitemaw T, Dendir G. A comparative study between transversus Abdominis Plane Block and wound site local anesthesia infiltration for effective post-operative pain control for lower abdominal surgery: A prospective cohort study, Ethiopia. *J Anesthesia Clin Res*. 2018;09(09).
- [17] Bava EP, Ramachandran R, Rewari V, Chandralekha, Bansal VK, Trikha A. 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;10(3):561.
- [18] Scharine JD. Bilateral transversus abdominis plane nerve blocks for analgesia following cesarean delivery: Report of 2 cases. *AANA J*. 2009;77:98-102.

- [19] Belavy D, Cowlishaw PJ, Howes M, Phillips F. Ultrasound-guided transversus abdominis plane block for analgesia after caesarean delivery. *British Journal of Anaesthesia*. 2009;103(5):726-30.
- [20] El sharkwy I.A, Nouredin EH, Mohamed EA, Mohamed AA. Laparoscopic-guided transversus abdominis plane block versus trocar site local anesthetic infiltration in gynecologic laparoscopy. *Gynecological Surgery*. 2018;15(1):1047-53.

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**PLAGIARISM CHECKING METHODS:** [Jain H et al.]

- Plagiarism X-checker: Aug 06, 2022
- Manual Googling: Sep 19, 2022
- iThenticate Software: Sep 21, 2022 (20%)

**ETYMOLOGY:** Author Origin**AUTHOR DECLARATION:**

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. No

Date of Submission: **Jul 30, 2022**  
Date of Peer Review: **Aug 22, 2022**  
Date of Acceptance: **Sep 23, 2022**  
Date of Publishing: **Oct 01, 2022**