



Anesthesiology

ANALGESIC EFFICACY OF TRANSVERSUS ABDOMINIS PLANE BLOCK BY LAND MARK TECHNIQUE USING 30 ML OF INJ. BUPIVACAINE 0.25% IN PROVIDING EFFECTIVE PERIOPERATIVE ANALGESIA IN PATIENTS UNDERGOING OPEN INGUINAL HERNIA REPAIR SURGERY UNDER GENERAL ANAESTHESIA: A RANDOMIZED CONTROLLED TRIAL

Uma Shankar Gupta*

Assistant Professor, Department Of Anaesthesiology, Late Shri Lakhiram Agrawal Government Medical College, Raigarh 496001, Chhattisgarh, India. *Corresponding Author

Mayur Gupta

Senior Resident, Department of Critical Care, Sir Ganga Ram Hospital, New Delhi, India.

ABSTRACT

Introduction: We evaluated the efficacy of TAP block in providing effective perioperative analgesia in open Inguinal Hernia Repair Surgery under general anaesthesia.

Materials and Methods: A total of 70 adult male patients were randomized to Group T receiving TAP block with 0.25% bupivacaine and Group N with no TAP block followed by general anaesthesia. Mean cumulative requirement of analgesic intraoperatively and over the first 48 postoperative hours in patients receiving TAP block and in those not receiving TAP block were compared.

Results: Total analgesics consumption, no. of doses and total dose of analgesic required in the postoperative period was significantly higher in Group N as compared to Group T.

VAS score was significantly lower in Group T as compared to the Group N with fewer complications.

Conclusion: Preincisional TAP block decreases intraoperative fentanyl requirements and provides effective postoperative analgesia.

KEYWORDS : inguinal hernia repair, perioperative analgesia, TAP blocks, bupivacaine.

INTRODUCTION

Transversus abdominis plane (TAP) block is a peripheral nerve block, utilized to anaesthetize the somatic nerves, originating from T6 to L1 spinal roots supplying the anterolateral abdominal wall by depositing local anaesthetic in the neuro-vascular plane between internal oblique and transversus abdominis muscle layers. It was introduced in anaesthesia practice in 2001 by Rafi utilizing the traditional anatomical landmarks¹.

TAP block has subsequently been used as a component of multimodal analgesia for postoperative pain relief following various surgical procedures such as large bowel resection², open appendectomy³, retro pubic prostatectomy⁴, nephrectomy⁵, hernia repair⁶, laparoscopic cholecystectomy^{7,8} and caesarean section⁹.

Though TAP block provides definitive perioperative analgesia, there are very less studies which Evaluated Efficacy of Transversus Abdominis Plane (TAP) Block for perioperative analgesia in open Inguinal Hernia Repair Surgery under general anaesthesia. Based on these observations, this study was conceptualized to elucidate the efficacy of preincisional TAP block as a component of multimodal analgesia for providing perioperative pain relief in patients undergoing inguinal hernia repair surgery.

MATERIALS AND METHODS

After obtaining approval by the institute ethics committee and written informed consent, 70 adult male patients of ASA physical status (PS) I or II, Age: 18-60 years, Weight: 50-70kg, Mallampatti grade I / II, Undergoing elective inguinal hernia repair of duration of ≤ 2 hours under GA were recruited in this randomized controlled clinical trial. Unwilling patients and patients with body mass index >30 kg/m, ASA Grade III / IV, Mallampatti Grade III / IV, Hypersensitivity to local anaesthetic drug, Bleeding disorders / patients on anticoagulant drugs, Patients having any comorbid conditions, Infection, trauma, scar or sinuses at the site of block, Patients unable to speak or understand the verbal command and VAS and Opioid/alcohol use in last 24 hours were excluded from the study.

Standard ASA monitoring was used. Baseline parameters such as heart rate, continuous electrocardiogram, non-invasive blood pressure, SpO₂ were noted down. Patients were randomly allocated into two groups:

Group T: To be given TAP block with 30 ml of Inj. Bupivacaine 0.25%
Group N: No TAP block

Premedication:

Inj. Glycopyrrolate 0.2 mg i.v.

Inj. Ondansetron 4 mg i.v.

The triangle of Petit is formed by the iliac crest as the base, the external oblique muscle as the anterior border, and the latissimus dorsi muscle as the posterior border. The floor of the triangle is made up of the fascia from both the external and internal oblique muscles. A needle is inserted perpendicular to the skin just cephalad to the iliac crest near the midaxillary line. The TAP is identified using a 2-pop sensation (loss of resistance). The first pop indicates penetration of the fascia of the external oblique muscle, and the second indicates penetration of the fascia of the internal oblique muscle. After this 30 ml of Inj. Bupivacaine 0.25% was injected following careful aspiration to exclude vascular puncture. Ten min after TAP block, all patients received a standardized general anaesthesia.

Induction: After pre oxygenation for 3 minutes, induction of GA performed with Inj. Fentanyl 1mcg/kg + Inj. Propofol 2-2.5 mg/kg + Inj Succinylcholine 1.5-2 mg/kg. Then Proseal LMA no. 3 or 4 was inserted and attached to closed circuit, after position confirmation LMA was fixed. Inj. Vecuronium bromide 0.1mg/kg i.v. given as loading dose.

Maintenance: Patient maintained on Controlled ventilation and O₂ + N₂O (50:50) + Sevoflurane 1.5% to 2.5% + Inj. Vecuronium bromide 0.025 mg/kg IV. Fluid given as per requirement. Supplemental doses of Inj. Fentanyl 0.5µg/kg if any signs of inadequate analgesia are noted in the intraoperative period such as tachycardia (>100 /min) and hypertension ($> 20\%$ elevation of baseline mean arterial pressure) in both the groups. Total dose of Fentanyl should not be more than 2 mcg/kg.

Reversal: At the end of surgery - anaesthetic gases discontinued and patient reversed with Inj. Neostigmine 50 µg/kg IV and Inj. Glycopyrrolate 10 µg/kg IV.

Extubation: LMA along with nasogastric tube is to be removed with suctioning after all criteria for extubation are achieved

STATISTICAL ANALYSIS: MedCalc statistical software was used in our study. Data were presented in mean \pm SD form. Parametric data was analyzed by student't' test & Non parametric data by Chi square test for two groups.

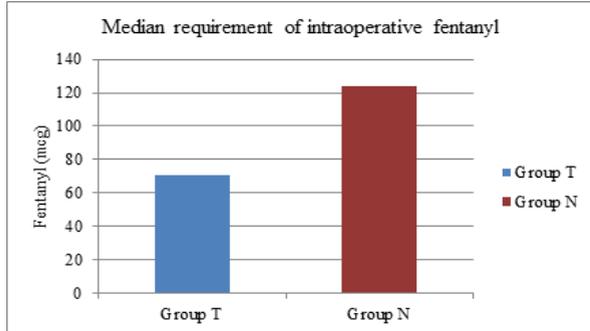
Significance of student't' test was judged as follows-

- > 0.05 not significant
- < 0.05 significant
- < 0.01 highly significant

RESULTS**TABLE 1: DEMOGRAPHIC DATA**

PARAMETERS	GROUP T	GROUP N	p - value
AGE (years)	44.4143 ± 12.7956	49.4714 ± 11.4565	> 0.05
WEIGHT (kg)	57.9239 ± 10.2290	60.6000 ± 5.9616	> 0.05
HEIGHT (cm)	162.3857 ± 4.6118	160.7857 ± 4.2062	> 0.05
DURATION OF SURGERY	15.0000 ± 7.0711	115.7143 ± 6.4332	> 0.05
ASA I	25	26	> 0.05
ASA II	10	9	> 0.05

Both the groups were comparable with respect to age, weight, height and ASA physical status (p value > 0.05; statistically not significant)

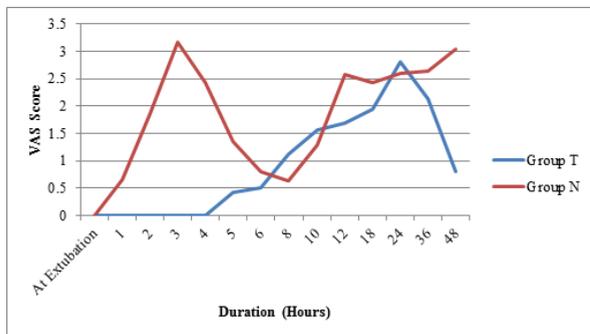
GRAPH 1: INTRAOPERATIVE FENTANYL REQUIREMENT**INTRAOPERATIVE PULSE RATE AND MAP**

Intraoperative pulse rate and mean arterial pressure were comparable in both the groups; p value > 0.05

ANALGESIC REQUIRED IN THE POSTOPERATIVE PERIOD

The no. of doses of analgesic required in the postoperative period was significantly higher in Group N (2.77 ± 0.43) as compared to Group T (0.88 ± 0.53); p value < 0.0001.

The total dose of analgesic required in the postoperative period was also significantly higher in Group N (277.14 ± 42.6) in comparison to Group T (88.57 ± 52.98); p value < 0.0001.

GRAPH 2: POSTOPERATIVE VAS SCORE

In the postoperative period, VAS score was significantly lower in Group T (0.93 ± 0.95) as compared to the Group N (1.82 ± 1.01); p value 0.0245; < 0.05.

POSTOPERATIVE PULSE RATE AND MAP

Postoperative pulse rate and blood pressure were comparable in both the groups; p value > 0.05

SEDATION SCORES

There was no significant difference observed in the sedation scores in both the groups; (p value > 0.05).

COMPLICATION

Nausea was seen in 2 patients in Group N whereas it was seen in 1 patient in Group T which was clinically as well as statistically significant. (p value > 0.05)

No other complications were observed.

DISCUSSION

The principal finding of our study is that bupivacaine in TAP block provides effective intraoperative and immediate postoperative analgesia in patients undergoing open Inguinal Hernia Repair Surgery under general anaesthesia. The prolonged analgesic effect after TAP block may be due to the fact that the transversus abdominis plane is relatively poorly vascularized, and thus, drug clearance may be slowed. Our finding of preincisional TAP block reducing intraoperative fentanyl requirement was consistent with those of Bhattacharjee, *et al.*¹⁰ who reported a significant reduction in intraoperative fentanyl consumption in patients receiving TAP block with 0.5% bupivacaine in total abdominal hysterectomy. El-Dawlatly *et al.*⁷ reported a similar significant reduction in intraoperative sufentanil consumption in patients undergoing laparoscopic cholecystectomy. Our finding is also consistent with those of McDonnell *et al.*² in abdominal surgery and Carney *et al.*³ in open appendectomy. In 2008, Carney *et al.*¹¹ found that anatomical TAP block in total abdominal hysterectomy patients significantly reduces postoperative pain scores up to 48 h period. Postoperative morphine consumption also decreased at 12 h, 36 h and 48 h time period. However, the authors did not address intraoperative opioid requirement. Recently, Sharma *et al.*¹² also found that TAP block by landmark technique improves VAS score in first 24 h in patients undergoing major abdominal surgery. In contrast to our study Petersen *et al.*¹³ in 2013 found that TAP block does not provide superior analgesia in comparison to placebo after inguinal hernia repair.

There was no significant difference in the sedation scores between the two groups (Tammam *et al.*)¹⁴

There was no significant difference in perioperative complications in both the groups

CONCLUSION

The use of a pre-incisional, single dose TAP block reduces the intraoperative fentanyl requirement.

Reduces the postoperative systemic analgesic requirement.

Provides effective postoperative analgesia.

REFERENCES

- Rafi AN. Abdominal field block: A new approach via the lumbar triangle. *Anaesthesia*. 2001;56:1024-6.
- McDonnell JG *et al.* The analgesic efficacy of transversus abdominis plane block after abdominal surgery: A prospective randomized controlled trial. *Anesth Analg*. 2007;104:193-7.
- Carney J, Finnerty O, Rauf J, Curley G, McDonnell JG, Laffey JG. Ipsilateral transversus abdominis plane block provides effective analgesia after appendectomy in children: A randomized controlled trial. *Anesth Analg*. 2010;111:998-1003.
- O'Donnell BD, McDonnell JG, McShane AJ. The transversus abdominis plane (TAP) block in open retropubic prostatectomy. *Reg Anesth Pain Med*. 2006;31:91. [PubMed]
- Hosgood SA, Thiagarajan UM, Nicholson HF, Jeyapalan I, Nicholson ML. Randomized clinical trial of transversus abdominis plane block versus placebo control in live-donor nephrectomy.
- Aveline C *et al.* Comparison between ultrasound-guided transversus abdominis plane and conventional ilioinguinal/iliohypogastric nerve blocks for day-case open inguinal hernia repair. *Br J Anaesth*. 2011;106:380-6.
- El-Dawlatly AA *et al.* Ultrasound-guided transversus abdominis plane block: Description of a new technique and comparison with conventional systemic analgesia during laparoscopic cholecystectomy. *Br J Anaesth*. 2009;102:763-7.
- Petersen PL *et al.* The beneficial effect of transversus abdominis plane block after laparoscopic cholecystectomy in day-case surgery: A randomized clinical trial. *Anesth Analg*. 2012;115:527-33.
- McDonnell JG *et al.* The analgesic efficacy of transversus abdominis plane block after cesarean delivery: A randomized controlled trial. *Anesth Analg*. 2008;106:186-91.
- Sulagna Bhattacharjee, Manjushree Ray, Tapas Ghose, Souvik Maitra, and Amitava Layek. Analgesic efficacy of transversus abdominis plane block in providing effective perioperative analgesia in patients undergoing total abdominal hysterectomy: A randomized controlled trial. *J Anaesthesiol Clin Pharmacol*. 2014 Jul-Sep; 30(3): 391-396.
- Carney J, McDonnell JG, Ochana A, Bhinder R, Laffey JG. The transversus abdominis plane block provides effective postoperative analgesia in patients undergoing total abdominal hysterectomy. *Anesth Analg*. 2008;107:2056-60.
- Sharma P, Chand T, Saxena A, Bansal R, Mittal A, Shrivastava U. Evaluation of postoperative analgesic efficacy of transversus abdominis plane block after abdominal surgery: A comparative study. *J Nat Sci Biol Med*. 2013;4:177-80.
- Petersen PL *et al.* The effect of transversus abdominis plane block or local anaesthetic infiltration in inguinal hernia repair: A randomised clinical trial. *Eur J Anaesthesiol*. 2013;30:415-21
- Tarek F. Tammam. Transversus abdominis plane block: The analgesic efficacy of a new block catheter insertion method. *Egyptian Journal of Anaesthesia* Volume 30, Issue 1, January 2014, Pages 39-45