

ORIGINAL RESEARCH

Ultrasound Guided Transversus abdominis plane (TAP) block versus Ilioinguinal and Iliohypogastric nerve block versus Local Infiltration for postoperative analgesia in inguinal hernia surgery

Neha Kumari¹, MD Shahbaz Alam², Macha Niranjan Reddy³, Mukesh Kumar Prasad⁴, Pallavi Ahluwalia⁵

¹PG Resident 3rd Year, Department of Anaesthesiology, Teerthankar Mahaveer Medical College and Research Centre, Moradabad, Uttar Pradesh, India.

^{*2}Associate Professor, Department of Anaesthesiology, Teerthankar Mahaveer Medical College & Research Centre, Moradabad, Uttar Pradesh, India.

³Assistant Professor, Department of Anaesthesiology, Teerthankar Mahaveer Medical College & Research Centre, Moradabad, Uttar Pradesh, India.

⁴Professor & HOD, Department of Anaesthesiology, Teerthankar Mahaveer Medical College & Research Centre, Bagadpur, Mordabad, Uttar Pradesh, India.

⁵Professor, Department of Anaesthesiology, Teerthankar Mahaveer Medical College & Research Centre, Moradabad, Uttar Pradesh, India.

Corresponding Author: Dr. MD Shahbaz Alam, Associate Professor, Department of Anaesthesiology, Teerthankar Mahaveer Medical College & Research Centre, Moradabad, Uttar Pradesh, India.

ABSTRACT

Background: Nerve blocks in inguinal hernia repair will provide analgesia and lessen the requirement of iv. analgesics thereby minimizing side effects and improve VAS score.

Materials and Method: The SA block were administered using standard technique. Patient were divided into three groups. Group T: Tap block using ultrasound. Group I: Ilioinguinal/iliohypogastric nerve block using ultrasound. Group L: Infiltration of incision site. VAS scores and hemodynamics were assessed at different time interval.

Results: The comparison of Mean among Three group-I, L and T of hemodynamic parameters were found not Significant and VAS score were found Significant.

Conclusion: Ultrasound-guided ilioinguinal and iliohypogastric nerve blocks provided better post-operative pain relief than ultrasound-guided TAP block and wound infiltration at the proposed site of incision.

Keywords: Inguinal hernia repair, TAP block, Ilioinguinal/iliohypogastric nerve block, Wound infiltration

INTRODUCTION

The correction of an inguinal hernia is surgical operation that is carried out the most commonly in general surgical departments all over the globe.^[1] Suffering after hernia treatment may range from mild to severe and is often related with a lengthened hospital stay, an unplanned admission to the icu, and a delay in returning to activities of daily life.^[2] Interventions may be carried out in this area while the patient is under general or local anesthesia, and postoperatively analgesia can be provided using a variety of different analgesic methods.^[3] Multimodal treatment usually

consists of the administration of nonsteroidal anti-inflammatory medicines,^[4] a flow of paracetamol, and anesthetic procedures such as localized infiltrating blocks. When blocks or infusions are performed using a local anesthetic, the duration of the patient's hospital stay, as well as the related complications and total expenditures, are reduced.^[5] Incorporation of local anesthetic enhances postsurgical pain treatment in a number of other ways as well, including a reduction in pain intensity and the need for opioids, which in turn reduces the risk of consequences including sickness, nausea, and respiratory distress. After having an incision made in the abdomen, patients can anticipate significant levels of pain and suffering.^[6] It has been suggested in the published research that nerve blocks, such as T.A.P. block, abdominal area blocks, and I.I.I.H. nerve blocks, may help decrease the discomfort that is caused by an incision made in the abdomen region.^[7] Research have also shown that, when contrasted with traditional parenteral and oral analgesics, TA.P block and II.IH nerve blockade are effective in circumstances when inguinal hernia treatment patients need appropriate pain control.^[8] Because there have been no studies that conclusively support neither of the two procedures described above, the latest research will be carried out to compare the efficacy of TA.P block to that of ilioinguinal and iliohypogastric nerve blocks USG guided to that of local infiltration.

MATERIALS AND METHOD

Following the acceptance of clearance from the Institutional Ethical Committee, the research was carried out inside the institution. Patient having ASA physical status I and II, age – eighteen to sixty-five years, surgeries lasting for <2 hr, patients with BMI 18.5-22.9 kg/m² were included in the study. Patient who refused to consent to the study, skin infection at the puncture site, hypersensitivity to the LA agents, pregnancy, preoperative opioid or non-steroidal anti-inflammatory drugs treatment for chronic pain, contraindication to subarachnoid block(SAB), patient requiring supplementary analgesics or conversion to G.A were excluded from the study. All patient undergoing inguinal hernia repair under spinal anaesthesia who were declared fit in the inclusion criteria till June 2022. A total of 63 cases were taken which was further divided into 3 groups representing 21 cases for each group.

After getting clearance from College Research and Ethical Committee this study was done till June 2022. Mean, frequency distribution, Chi Square test and Anova test were executed to find out the differences. To observe statistical difference .05 level was taken significant. All the analysis was done with the help of Statistical Package for Social Sciences version 26 and MS EXCEL 2019. Pre-anaesthetic evaluation was done for all the patients prior to surgery. Each patient was explained the entire procedure and purpose in his/her language. Written informed consent for the procedure and anaesthesia were taken from all the patients and participation information sheet were filled out. Routine investigation was done for all the patients according to hospital protocol. Patients were put to NPO prior to the midnight from surgery and they were premedicated with 0.05mg/kg midazolam IV to ease anxiety and make them contented during the surgery. In pre-operating room IV line was secured with an 18G needle as per patient/surgery requirement and preloading done with 15ml/kg of ringer lactate over 15-20min. In OT standard monitors were attached. Patients were monitored continuously. Subarachnoid block were administered in sitting position using the midline approach with 25G Quincke needle, 2.5ml of 0.5% hyperbaric bupivacaine was injected. Spinal block was performed at either L2-L3 or L3-L4 space and the level of sensory and motor block was assessed with pin prick method and modified bromage scale, respectively. Patient were arbitrarily divided into 3 groups by chit and box method. Block were be given under USG guidance as follow.

Group T Transverse abdominis plane block using 20ml of 0.25% bupivacaine with 5mcg/ml adrenaline. Group I Ilioinguinal/iliohypogastric nerve blocks using 10ml of 0.25% bupivacaine in ilioinguinal and 10ml of 0.25% bupivacaine in iliohypogastric with 5mcg/ml adrenaline. Total volume 20ml. Group L Infiltration of incision site with 20ml of 0.25% bupivacaine with 5mcg/ml adrenaline. All the procedures were performed under aseptic precaution and nerve blocks was performed by ultrasound guided (Sonosite turbomax). Postoperatively when patient complained of pain, patient was given Inj. PCM 1gm IV infusion as first rescue analgesia and it was be then continued for 8 hour. In spite of Inj. PCM if patient complained of break through pain, then given Inj. TRAMADOL 100mg IV. The primary outcome was pain measured by (VAS) scores. Secondary outcome of the study is hemodynamic changes, 1st rescue analgesia requirement and total analgesic requirement in 24 hrs.

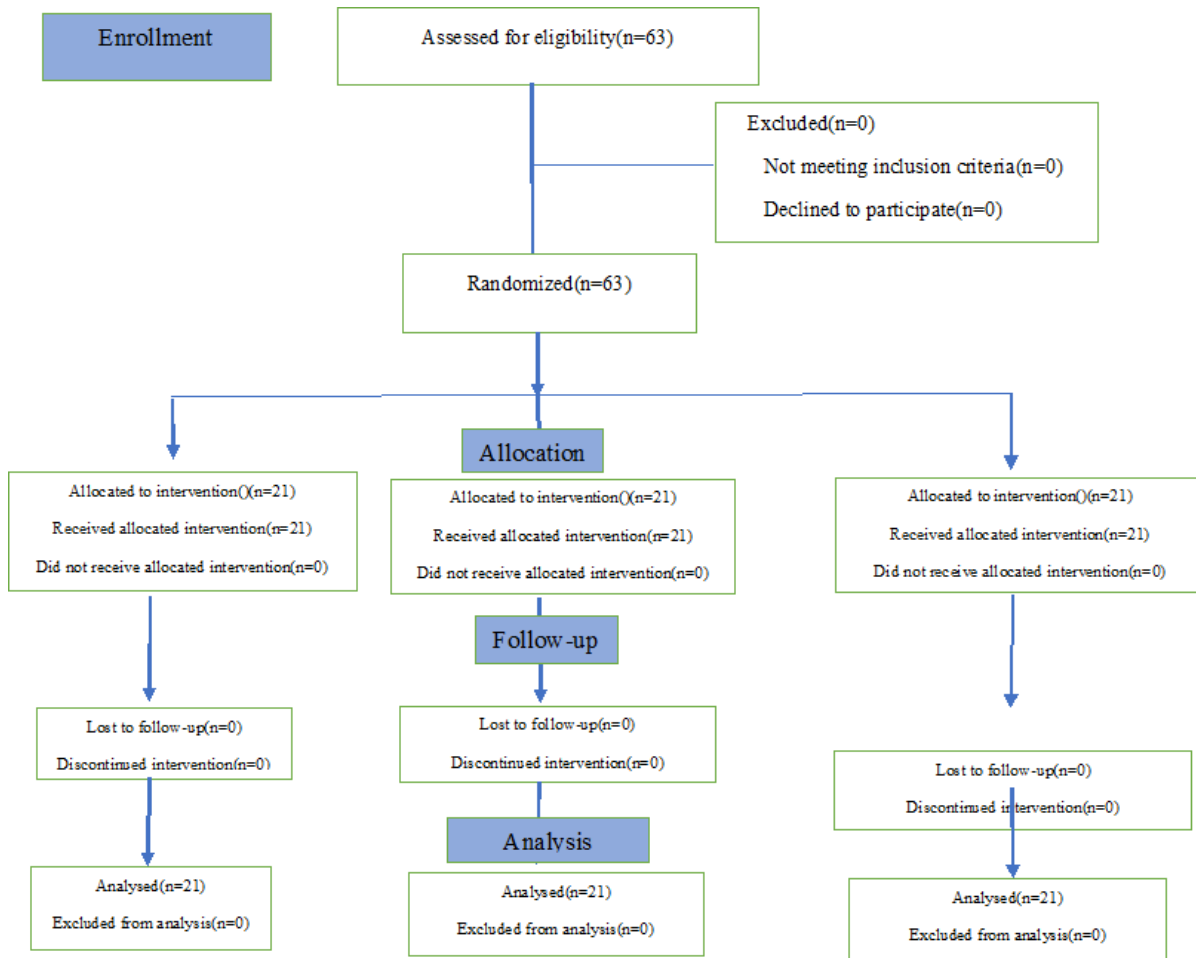


Figure 1: Consort flow diagram

RESULTS

Table1: Comparison of Group-I, L and T in age, weight, height, BMI

Variable	Group I		Group L		Group T		P Value
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	
AGE	44.71	12.34	45.38	14.749	47.9	14.815	0.74
Weight	56.05	6.734	56.29	6.357	56.9	6.049	0.904

Height	159.952	5.572	157.948	5.7278	160.524	5.5823	0.304
BMI	21.9409	2.662879	22.59521	2.568253	22.03428	2.68435	0.687

(To compare the Mean between Groups, we used ANOVA Test)

Table 1 shows the comparison of Mean among Three group-I, L and T in age, weight, height BMI, The difference in Mean age were found not Significant, The mean weight were found not Significant, The Mean height were found not Significant, The difference in Mean BMI were found not Significant.

Table 2: Comparison of Group-I, L and T in HR with respect to follow up

HR in min	Group-I		Group-L		Group-T		P Value
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	
T0	80.76	5.74	82.57	6.46	82.33	9.66	0.697
T1	80.29	7.62	84.33	6.67	80.43	9.90	0.199
T5	82.38	6.05	85.48	6.68	83.1	10.77	0.437
T10	82.71	5.10	83.33	7.91	86.57	5.67	0.115
T15	84.33	5.21	83.38	7.26	84.86	9.53	0.814
T20	85.95	7.41	83.05	7.37	80.48	8.32	0.079
T30	85.86	9.00	82.1	5.86	82.19	7.38	0.19
T40	83.33	5.83	79.29	4.26	82.38	7.10	0.072
T50	81.52	4.79	79.67	5.20	83.48	8.93	0.18
T60	79.86	3.62	80.86	5.97	87.14	8.73	0.001
T75	78.14	4.97	78.71	5.42	82.14	10.21	0.164
T90	77.29	6.03	79.29	5.30	86.57	9.53	0.001
T120	75.43	5.46	75.81	3.87	85.05	7.04	0.001

(To compare the Mean between Groups, we used ANOVA Test)

Table. 2 shows the comparison of Mean among Three group-I, L and T of HR at different time interval, The difference in Mean of T.0, T.1, T.5, T.10, T.15, T.20, T.30, T.40, T.50 and T.75 were found not Significant, The difference in Mean of T.60, T.90 and T.120 were found Significant.

Table 3: Comparison of Group-I, L and T in Mean Arterial Pressure with respect to follow up

MAP (in Mins)	Group-I		Group-L		Group-T		P Value
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	
T0	94.11	7.76	95.08	4.91	90.60	6.82	0.077
T1	92.70	6.73	92.54	3.83	92.13	5.21	0.939
T5	94.86	8.04	94.67	3.70	92.13	7.92	0.361
T10	107.17	8.33	106.92	5.52	104.63	6.31	0.419
T15	91.46	5.86	92.70	3.68	92.98	6.70	0.643
T20	92.22	6.53	89.71	2.95	91.79	5.45	0.255
T30	90.13	6.10	91.65	3.90	92.70	4.09	0.226
T40	91.27	6.52	93.11	3.19	90.16	5.12	0.178
T50	91.27	5.90	92.98	3.05	91.79	5.52	0.525
T60	90.22	5.09	93.14	3.87	92.40	6.33	0.176
T75	91.97	4.48	92.60	3.53	91.90	4.76	0.844

T90	92.13	4.38	91.30	2.65	90.65	5.02	0.515
T120	91.71	3.94	91.46	2.83	90.00	6.01	0.41

(To compare the Mean between Groups, we used ANOVA Test)

Table. 3 shows the comparison of Mean among Three group-I, L and T of MAP at different time interval, The difference in Mean of T.0, T.1, T.5, T.10, T.15, T.20, T.30, T.40, T.50, T.60, T.90 and T.120 were found not Significant.

Table 4: Comparison of Group-I, L and T in Visual Analog Scale(VAS) with respect to follow up

VAS SCORE	Group I		Group L		Group T		P Value
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	
T0	--	--	--	--	--	--	--
T15 mnts	--	--	--	--	--	--	--
T30 mnts	--	--	--	--	--	--	--
T60 Mints	--	--	1.57	0.507	--	--	--
T2hr	0.52	0.512	4.43	0.507	2.52	0.512	0.001
T4hr	2.43	0.507	2.67	0.483	4.52	0.512	0.001
T6hr	4.86	1.014	3.43	0.507	1.62	0.498	0.001
T10hr	2.62	0.498	5.48	0.512	2.43	0.507	0.001
T14hr	3.33	0.483	2.52	0.512	3.48	0.512	0.001
T18hr	2.48	0.512	3.62	0.498	2.52	0.512	0.001
T24hr	3.48	0.512	4.52	0.512	3.52	0.512	0.001

(To compare the Mean between Groups, we used ANOVA Test)

Table 4. and Fig shows the comparison of Mean among Three group-I, L and T of VAS score at different time interval, The difference in Mean of T.2hrs, T.4hrs, T.6hrs, T.10hrs, T.14hrs, T.18hrs and T.24hrs were found Significant.

DISCUSSION

After an open inguinal hernia repair, the acute postoperative discomfort is at its peak within the first twenty-four hours after the procedure.^[9] To reduce this pain, various modalities have been adopted including central neuraxial analgesia, nonsteroidal anti-inflammatory drugs, parenteral opioids, IIIH nerve block, TAP block and wound infiltration with varying results. However, IIIH and TAP blocks are easy to perform and are effective with least complications.^[10-14] The purpose of the current study was to evaluate the length of time of analgesia in USG guided TAP block, USG guided Ilioinguinal and Iliohypogastric nerve block, and Local Infiltration for postoperative analgesia.

The mean age, weight, height, BMI of the cases in the present study for the patients administered with ilioinguinal and iliohypogastric nerve blocks was 44.71±12.34, 56.05±6.73, 159.95± 5.57, 21.94± 2.66 respectively. On the other hand, for the patients with Local infiltration at proposed site of incision, the mean age, weight, height, BMI of the cases was 45.38 ± 14.74, 56.29 ± 6.35, 157.95 ± 157.94, 22.59± 2.57 respectively whereas for the patients administered with TAP block, the mean age, weight, height, BMI of the cases was 47.9 ±14.82, 56.9 ±6.04, 160.52 ± 5.58, 22.03± 2.68 respectively. However, there was an insignificant association between the

anthropometric parameters with reference to each group. Our findings were relevant with Kamal et al.^[15] which reported an insignificant association between the anthropometric parameters and the procedures performed.

In 24 hours after surgery, the VAS Score was analogous in all the three groups. However, at 6 hour and upto 18 hour, the group which received ilioinguinal and iliohypogastric nerve block had a lesser VAS Score. However, at 24 hour the VAS score was increased significantly. A similar trend were observed for the other two groups with Local infiltration at proposed site of incision and TAP Block. Moreover, at 24 hour, the VAS Score was the highest among the cases in Group. L., as linked to the cases in Group. T. and I. The difference among the three groups with reference to the time was statistically significant. Henceforth, the cases who received I.I.H. and T.A.P. block were relaxed than those who received Local infiltration in the first 24 h. Such results are consistent with the ones discovered by Petersen et al., who discovered that the discomfort ratings for initial region under the curve for 6 hours were considerably lower in group IIIH. However, they discovered that there were no big differences in the VAS pain levels assessed during the first 24 hours as AUC24 hours both when cough and at rest across the three groups: group TAP, group infiltration (wound infiltration with ilioinguinal block), and group placebo.^[16] This may be due to the fact that they did a blind ilioinguinal block and did not use ultrasonography to check the location of the needle in their research.

CONCLUSION

In patients who had open inguinal hernia repair, ultrasound-guided ilioinguinal and iliohypogastric nerve blocks appeared to be superior to wound infiltration at the proposed site of incision and ultrasound-guided TAP blocks with respect to every parameter.

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