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Research Article

Ultrasound guided TAP and Genitofemoral Nerve block versus spinal anaesthesia for inguinal hernia repair – a comparative study

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ABSTRACT

Introduction: General anaesthesia (GA) and Spinal anaesthesia (SA) are the most common anaesthetic procedure used for inguinal hernia. Most of the time patients presents with other co- morbidities like cardiovascular and respiratory diseases, which makes GA and SA relatively risky. Local Nerve blocks with Local Anaesthesia is a less popular technique, which can be used to anesthesize patients with high risk.

Objectives: In our study, we tried to compare the Transverse Abdominis Plane (TAP) Block plus Genitofemoral Nerve (GFN) block with spinal anaesthesia for direct inguinal hernia repair.

Materials and methods: 80 patients scheduled to undergo direct inguinal hernia were taken and randomly divided into two groups: Group T received TAP plus GFN block and Group S received spinal anaesthesia. We compared the Onset of analgesia, quality of anaesthesia, hemodynamic changes and complications (if any), in both the groups.

Results: The demographic profile of both Group T and S were comparable in respect to age, height and weight. The onset of analgesia in Group T was 707.65 ± 34.5 seconds and in Group S was 215.82 ± 8.26 seconds. 92.5 % of times Surgeons were comfortable with the operating field in Group T and 100% in Group S. 7.5% of the blocks in Group T was not successful, and had to be converted to general anaesthesia. Incidence of hypotension and bradycardia was observed in Group S, whereas in Group T, there was no such findings. Shivering was seen in 20% of patients in Group S. Both the groups showed no incidence of nausea or vomiting.

Keywords: *TAP block, illioinguinal/ illiohypogastric nerve block, hernia surgery.*

INTRODUCTION

Hernia is defined as the protrusion of abdominal tissue through any defect in the abdominal wall. Inguinal hernia are common among abdominal hernia with 75% prevalence.[1] Inguinal hernia is the protrusion of intra abdominal tissue through the openings of the inguinal canal – internal (deep), external (superficial).[2] The diagnosis is mainly clinical, CT scan or Ultrasonography is useful only in the case of possible bowel obstruction. However they are not mandatory for surgical intervention.[3,4] There are two surgical approaches for hernia repair – open and laparoscopic. Open inguinal hernia repair can be performed under general, central neuraxial (spinal), regional nerve bocks with local anaesthetics.[5] The choice of anaesthesia technique totally depends upon the patients general condition and associated co morbidities. In patients with cardiovascular, cerebrovascular, severe respiratory diseases, liver impairment and coagulopathies, the associated risk of general and spinal anaesthesia is increased. Regional nerve blocks with local anaesthetics may be more convenient in such group of high risk patients.[6] Illioinguinal (IIN), Illiohypogastric (IHN) innervate the inguinal area and genital branch of the Genitofemoral nerve (GFN) supplies the spermatic cord, scortum and the adjacent skin above the thigh.[7] This nerve blocks is used for inguinal hernia repairs.[8] The GF nerve is separately blocked just above the pubic tubercle.[10,11]

Transversus Abdominis Plane (TAP) is the plane in between transversus abdominis and the internal oblique muscle which contains the intercostals, subcostal, illiohypogastric and the illioinguinal nerves. Eichenberger et al[9] studies shows that it is possible to block IIN and IHN before their division, in a single compartment (TAP) of the abdomen with almost 90% probability.[9] Direct visualisation under USG guidance improves the quality of block.
Intravenous Fentanyl increases the acceptability of LA techniques and decreases the visceral pain during traction and dissection of the hernia sac.

The aim of our study is to evaluate the effectiveness and safety of ultrasound guided TAP plus GFN block in comparison to spinal anaesthesia for direct inguinal hernia repair.

Objectives:
1. To compare the hemodynamic changes (HR, MAP) in both the groups
2. To compare the onset of analgesia in both the groups
3. to compare the quality of anaesthesia in both the groups
4. to compare any complications (if any) in both the groups.

MATERIAL AND METHODS
After obtaining approval of Lakhimpur Medical College and Hospital's ethical committee, informed was taken from 80 male patients posted for direct inguinal hernia repair. All patients were of ASA I and II, aged between 21-80 years. All patients were explained in their own language about the study procedure and the possibility of aborting the procedure if they were unwilling at any moment of the procedure. The patients were randomly divided into 2 groups in alternate manner into Group T and Group S (40 numbers in each group)

Exclusion criteria were
1. patient's unwillingness to participate
2. obesity class 1 and 2 (body mass index>= 30kg/m^2)
3. infection at the injection site
4. known allergic to local anaesthetic drugs
5. vulnerable subjects (eg mentally challenged, differently abled, seriously ill etc)
6. Large and irreducible, strangulated or incarcerated hernias

Drug preparation:
For Group T, 20 ml of 0.5% Bupivacaine
Fro Group S, 2.5 ml of Hyperbaric Bupivacaine + 30 mcg of Bupregesic
Ultrasound (Sonoscan X3) with linear probe L7141 (9.5-12.2) frequency,50 mm 22 G stimuplex needle for block. 25G Quincke needle for spinal anaesthesia.
All patients were cannulated with 18G iv cannula, preferably on the left hand. 500 ml RL infusion was started. All baseline parameter were connected like ECG, non invasive BP, HR, SpO2. The pre operative Heart Rate (HR) and Mean Arterial Pressure (MAP) was noted down.
In Group T, all patients received 50 mcg Fentanyl iv prior to any procedure. After proper antiseptic and aseptic dressing, an USG linear probe was placed 5cm above and lateral to the Anterior Superior Illiac Spine (ASIS) with the axis directed towards the umbilicus. Illioinguinal (IIN) and Illiohypogastric (IHN) can be seen as small hyperechoic structure in between the Transversus Abdominis (TA) and the Internal Oblique (IO) muscle. 10 ml of LA (Bupivacaine) is injected into this plane. For Genito femoral (GFN) block, the linear probe is placed transversely just above and lateral to the pubic tubercle and 5 ml of LA injected near the inferior epigastric artery. For any residual or visceral pain further 50mcg of intravenous Fentanyl was given intraoperatively.
In Group S, after proper antiseptic and aseptic dressing, patients received 2.5 ml hyperbaric 0.5% Bupivacaine + 30mcg Bupregesic intrathecally at L3-4 space.
The Onset of analgesia – defined as time taken from completion of block to being insensitive to pin prick. The time was noted down in both the groups.
The Quality of anaesthesia – defined as Patient's and Surgeon's satisfaction. Patient's satisfaction was assessed using Visual Analogue Scale (VAS 0-10). 0 being NO PAIN and 10 being WORST IMAGINABLE PAIN. Surgeons were asked about the ease of operating condition in Likert scale and was categorised as comfortable and mildly difficult/ uncomfortable and uncomfortable.

Heart Rate (HR) and Mean Arterial Pressure (MAP) were noted down in both the groups, in 1 minute interval, for first 10 minutes and then at 3 minutes interval for next 1 hour. If any incidence of Bradycardia (HR<50) and Hypotension (MAP<65) was observed, it was managed with inj Atropine 0.6mg iv and inj Epehedrine 6mg iv respectively.
Requirement of additional analgesics (iv Fentanyl), and complications like shivering, vomiting etc was also noted down, for both the groups. If patients complained with VAS 7-10, or Surgeons found it uncomfortable, they were converted to GA.

RESULTS

Both the groups are comparable in respect to age and weight. Group T mean age was 46.75 ± 2.5 and Group S mean age was 46.8 ± 2.33 years. And Group T mean weight was (62 ± 4) and Group S (60 ± 5) kgs.

Onset of sensory block in Group T was found to be 707.65 ± 34.6 seconds, whereas in Group S 215.82 ± 8.27 seconds. Significantly faster in Group S.

In patients satisfaction score, using Visual Analogue Scale (VAS), in Group T out of 40 patients, 27 (67.5%) gave a score of 0-3. 10 (25%) gave 4-6 and 3 (7.5%) scored 7-10. The patients scoring between 4-6 were given further dose of iv Fentanyl 50mcg. And 3 patients complaining with score 7-10 were converted to general anaesthesia. And in Group S, 40 out of 40 scored 0-3.

In Surgeons satisfaction score, using Likert scale, in Group T, surgeons found it comfortable in 30 (75%) cases, mildly uncomfortable in 7 (14.5%) and uncomfortable in 3 (7.5%) cases. Whereas, in Group S, 37 (92.5%) were comfortable and 3 (7.5%) were found to be slightly uncomfortable.

Incidence of hypotension was more in Group S, and Group T was found to be maintaining a stable BP. The MABP in Group S was showed a fall till 5 minutes after giving spinal anaesthesia. Whereas, the Heart rate were found to be more or less stable.

Similarly, Bradycardia was noted till 7 minutes in group S and group T patients were found to maintaining a stable HR throughout.

Incidence of shivering was observed in 8 (20%) patients in Group S whereas no patients in Group T had any incidence of shievering.

No patient complained of nausea or vomiting in both the groups.

DISCUSSIONS

Patients with co morbidites undergoing hernia surgery, hemodynamic stability is of utmost importance. Hemodynamic response often aggravates during spinal anaesthesia[14]. Here, we have tried to compare the responses between TAP and GF nerve with spinal anaesthesia for direct hernia surgery.

In our study, we have found that in Group T, the onset was significantly delayed with 707.65 ± 34.6 seconds. In Group S, it was 215.82 ± 8.26 seconds. It is in accordance to the findings with Jakku Praneeth et al[12].

In Group S, we found a drop in Mean Arterial Pressure (MAP) and Heart Rate. It is a common finding and is basically due to reduction in both cardiac output and decrease in systemic vascular resistance.[6] Our findings co relate with results of Jakku Praneeth et al.[12] In Group T, patients were hemodynamically stable with no fluctuation in both MAP and HR. This findings correlate with Huang Z, et al.[13]

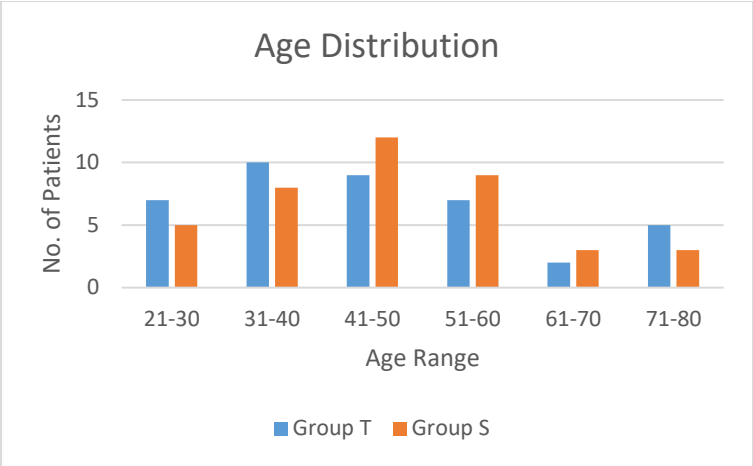
In our study, 10 patients (25%) in Group T as per VAS, required further dose of iv fentanyl. Our results matchd with Fekry et al[14], who found the amount of intraoperative use of sedative was more in II/IHN block than in spinal group. We also found that 92.5 % in Group T was successful, whereas, 3 patients (7.5%) had to be converted to General anaesthesia. Eichenberger et al[9] in their studies, concluded that the success rate of the TAP approach for II/IIH nerve block is 95% (95% confidence interval: 84-98%)

In Group T, 3 (7.5%) patients scored VAS >7 and was converted to GA. The failure rate was 7.5%, with a success rate of 92.5%. Eichenberger et al[9], also found the success rate to be 95% with ultrasound guided II/IH nerve block.

Our study has its own limitations, although we have mainly tried to compare the hemodynamic responses in both the groups, the use of iv analgesics in Group T limits the validation of VAS score. Moreover, we could not blind the operating surgeons, so it might be possible for one's preference for the spinal anaesthesia. And the operator skill variability can influence the block performance.

CONCLUSIONS

Hernia repair surgeries with co morbidities poses a real challenge to anaesthetist, especially to perform under general or spinal anaesthesia. To preserve the hemodynamic stability, in such type of patients, ultrasound guided Transverse abdominal plane approach for llioinguinal / Illiohypogastric nerve plus Genito femoral nerve block provides a safe anaesthetic procedure under monitored anaesthesia care. And systemic iv analgesics should be administered to prevent visceral pain during traction of hernia contents.



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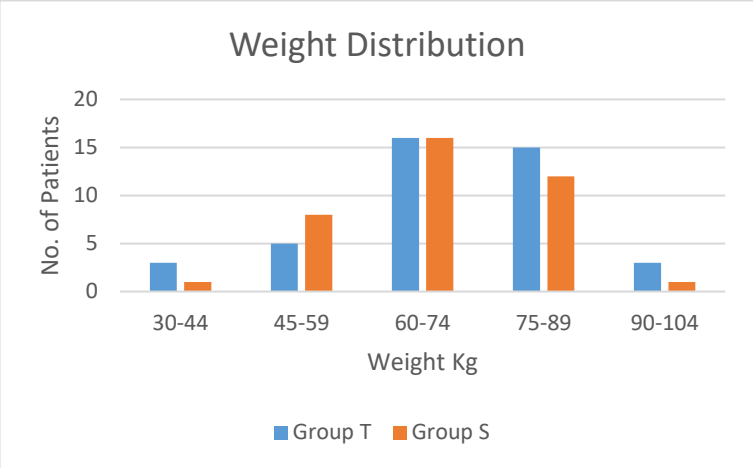

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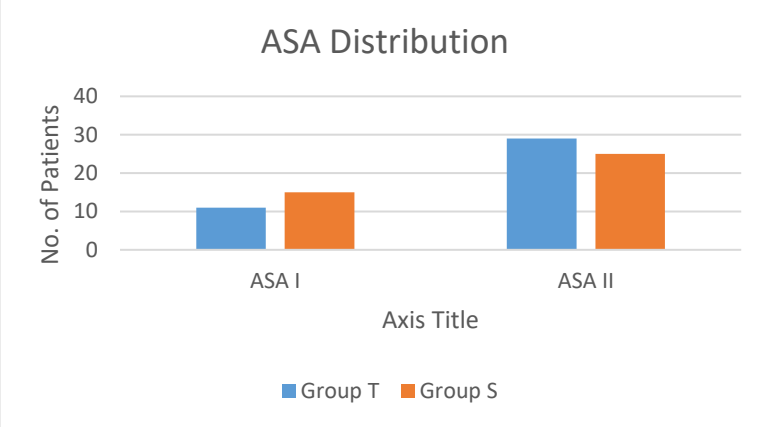

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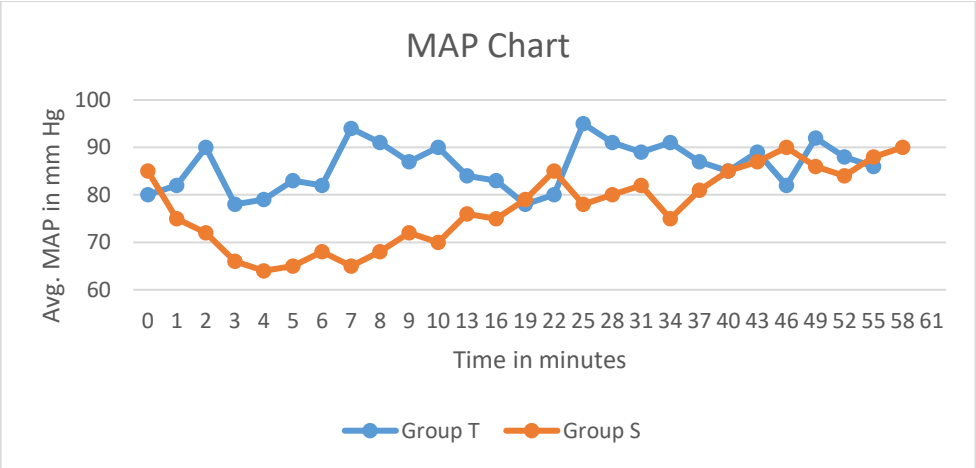

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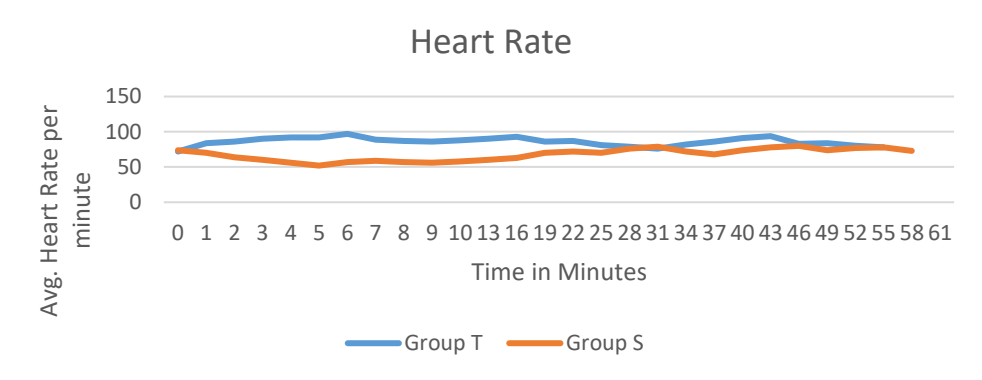

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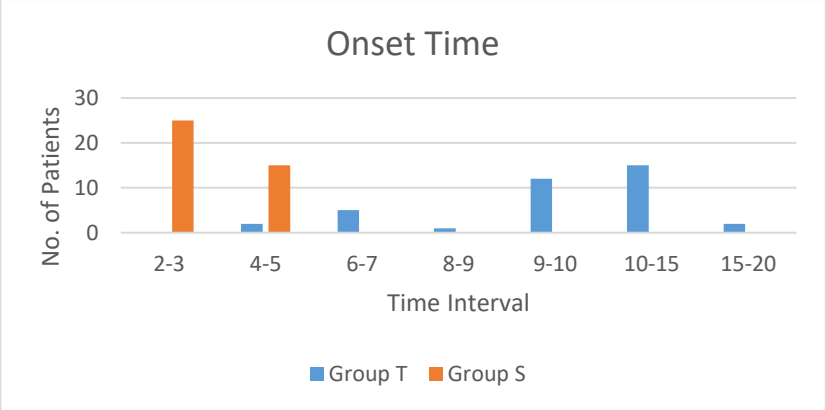

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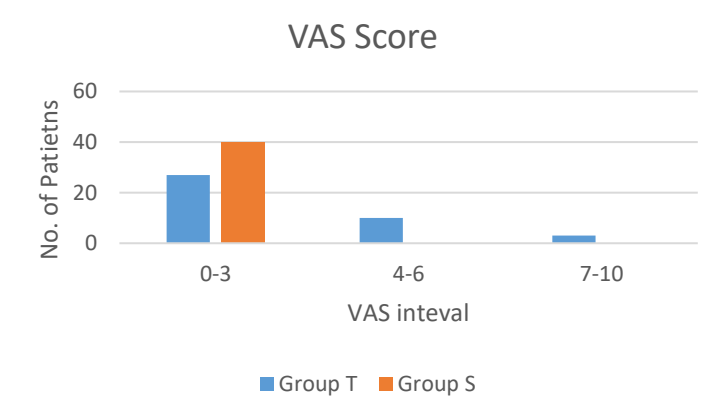

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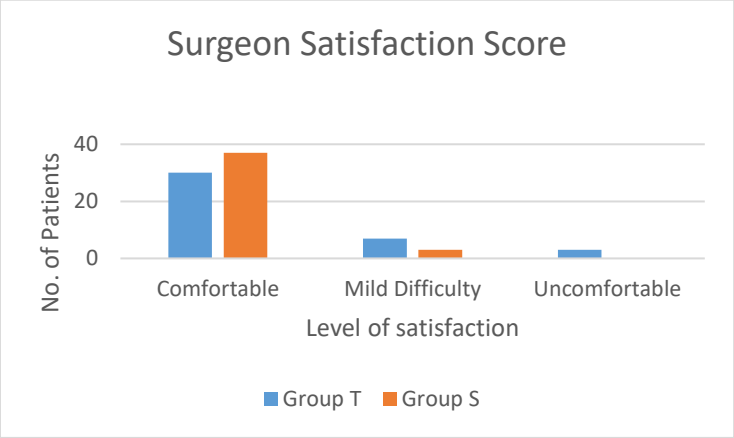

Table 8.

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