"SPINAL ANAESTHESIA VERSUS INGUINAL FIELD BLOCK IN ASSESSING INTRAOPERATIVE EFFECTIVENESS AND POST OPERATIVE PAIN USING VISUAL ANALOGUE SCALE FOR INGUINAL HERNIA REPAIRAT DR PRABHAKAR KORE HOSPITAL & MRC, BELAGAVI"

By

Reg No. BH0117009

Dissertation

Submitted to the
KLE academy of Higher Education & Research,
Belagavi, Karnataka
In partial fulfillment
of the requirements for the degree of

MASTER OF SURGERY(M.S)
IN
GENERAL SURGERY

DEPARTMENT OF GENERAL SURGERY,
J. N. MEDICAL COLLEGE
BELAGAVI- 590010. KARNATAKA

April – 2020

KLE Academy of Higher Education & Research,

Belagavi, Karnataka

Endorsement by the HOD/ Principal/ Head of the Institution

This is to certify that the dissertation entitled **"SPINAL ANAESTHESIA VERSUS INGUINAL FIELD BLOCK IN ASSESSING INTRAOPERATIVE EFFECTIVENESS AND POST OPERATIVE PAIN USING VISUAL ANALOGUE SCALE FOR INGUINAL HERNIA REPAIR** AT PRABHAKAR KORE HOSPITAL & MRC, BELAGAVI**"**is a bonafide research work done by **Reg No. BH0117009**

Dr. A.S.GOGATE M.S.
Professor and Head,
Department of General Surgery,
J. N. Medical College,
Nehru Nagar, Belagavi – 10
Date:
Place:Belagavi

Dr. N.S. Mahantashetti, MD
Principal,
J. N. Medical College,
Nehru Nagar, Belagavi – 10

Date:
Place:Belagavi

JAWAHARLAL NEHRU MEDICAL COLLEGE

(A constituent unit of KLE Academy of Higher Education & Research Deemed-to-be University)
Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category "A" by MHRD (GoI)
Nehru Nagar, Belagavi-590 010, Karnataka-India

Website : http/www.jnmc.edu
E-Mail : Principal@jnmc.edu

☎ Office :+91-(0)831 2471350
FAX :+91 (0)831-2470759

Ref. No. : JNMC/PG/2312 Date : 24-9-2019

To,

Postgraduate Student,
Department of General Surgery,
2017-18 Batch,
J. N. Medical College,
Belagavi.

Sub: Acceptance Letter

Sir/Madam,

The softcopy of thesis entitled " SPINAL ANESTHESIA VERSUS INGUINAL FIELD BLOCK IN ASSESSING INTRAOPERATIVE EFFECTIVENESS AND POST-OPERATIVE PAIN USING VISUAL ANALOGUE SCALE FOR INGUINAL HERNIA REPAIR – A ONE YEAR COMPARATIVE STUDY " has been submitted for Anti-Plagiarism check through Turnitin software. The scan has been carried out and the scanned output reveals a match percentage of 7% (Seven percentage) which is within the acceptable limits of 10% as per the guidelines given by UGC.

Thanking you,

Yours sincerely,

Coordinator
Department of General Surgery
J. N. M. C. Belagavi.

Chairman,
Antiplagiarism Committee

ABSTRACT

Introduction: Inguinal hernial repair are commonly corrected by surgical treatment. The anesthetic methods in performing surgical inguinal repair include general, spinal or local anesthesia. However, these methods have recorded certain percentage of adverse effects and patient dissatisfaction especially with general anesthesia. Field blocks have also shown to be effective in promoting good anesthetic results along with less post -operative complication. However, till date spinal anesthesia and General anesthesia in IHR have been studied extensively, but the efficiency of inguinal field block is least studied. Hence our study aimed to evaluate the effectiveness of inguinal field block versus spinal anesthesia.

Material and methods: A hospital based comparative study included a total of 60 subjects with unilateral inguinal hernia repair. Two groups with equal distribution of subjects were selected for spinal and inguinal field block. Outcome variable studied was the visual analogue pain scores measured on an ordinal scale with 6 categories. The inguinal field block was achieved by local anesthetic of 40ml mixture of equal volumes of 2 % of Lignocaine with adrenaline and 0.5% Bupivacaine and respective anatomical position with 20gauge short bevel needle inserted at a point 1 cm medial and inferior to ASIS. Pain scores, intra operative effectiveness etc., were considered as primary outcome variables. Clinical presentation was considered as Secondary outcome variable. P value < 0.05 was considered statistically significant. IBM SPSS version 22 was used for statistical analysis.

Results: Total study subjects included in the study was 60. The two groups SA (spinal anesthesia) and the IFB (inguinal field block) group had 30 subjects each. The mean age of the subjects in the SA group was 46.93 ± 17.3 years and in the IFB was 39.27 ± 15.66 years. The post-operative pain scores for two groups at 6hrs and 12 hrs

for SA was 3 and IF (inguinal field) group was 2. Pain scores at 18 and 24 hrs the for SA group was 2 and IF group1 respectively. The pain scores at all time intervals showed statistical significance with $p<0.001$.

Conclusion: The post -operative pain in IFB was significantly less compared to SA. Hence field block can be effective in pain management among IHR.

LIST OF ABBREVIATIONS

GLOSSARY	ABBREVIATIONS
ASIS	Anterior superior iliac spine
COMI	Core outcome measures index
DBP	Diastolic blood pressure
GA	General anaesthesia
HR	Heart rate
IFB	Inguinal field block
IHR	Inguinal hernia repair
IOM	Internal oblique muscle
IQR	Interquartile range
LA	Local anaesthesia
MAP	Mean arterial pressure
NABA	Neuraxial block anaesthesia
PACU	Postanesthetic care unit
PNB	Peripheral nerve block
PVB	Paravertebral block
RA	Regional anaesthesia
RCT	Randomised controlled trials
SA	Spinal anesthesia
SAB	Subarachnoid block
SBP	Systolic blood pressure
TAM	Transversus abdominis muscle
TAP	Transversus abdominis plane
UGIB	Ultrasound-guided inguinal field block
VAS	Visual analogue scale

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

A hernia is one of the most commonly encountered conditions in surgical practice. The term “Hernia” described by the Greek words “Herons” meaning an offshoot or a bulge. The medical definition of hernia was given by Sir Astley Cooper in the year 1804as “protrusion of any viscus or part of the viscus through an abnormal opening in the walls of its containing cavity”.[1]An average of 20 million surgical repairs ofinguinal hernia is performed every year by the general surgeons.[2]The choice of anaesthesia to perform open inguinal hernia repair from the past literature is eitherregional (RA), general (GA) or local anaesthesia (LA).[3,4]

Over the years, local anesthesia had evolved as the most preferred anesthesia for all adult hernia repair procedures. Local anesthesia in adult hernial repair is most preferred because it is simple to perform, safe, effective and economical with no adverse effects.[5]The mechanism of pain control postoperatively by local anesthesia is mainly due to the effect of long duration of analgesia when given preoperatively. This happens because of obstruction in the piling up of local pain particles leading to better pain control postoperatively.[6]

The other anesthetic methods performed for hernia repair are under general, spinal, inguinal field block or epidural. Spinal anesthesia (SA) in recent days is used widely in performing inguinal hernia repair (IHR).The evidence of randomised control studies, reports SA technique to be effective in pain control, with minimal or no adverse events.[7,8]However, this technique does not suit for a walk in patients due to unpredicted hemodynamic responses, side effects and long hospital stay.[9]

The other popular method to achieve anesthesia is the Field block for inguinal hernia repair. This method had been reported as the most economical anesthetic technique in patients undergoing unilateral inguinal herniorrhaphy. Lower recovery time, increased patient comfort and minimal cost are the key advantages of this method.[10] Paravertebral block (PVB) in latest years also has a popular for a method for IHR. This technique uses local anesthetic drugs administrated unilaterally to the nerve roots and the related dermatomes without intervening central nervous system, thus avoiding the adverse effects of SA.[11]

The most commonly used technique to achieve analgesia in IHR are General anesthesia (60-70%), followed by regional anesthesia(10-20%) and local anesthesia (10%).[2] The database from a Danish hernia study, suggest that SA must be uninhibited,[12] but it is still used in minor(10-20%) percentages of surgeries.[2, 13]But the present studies to have restricted the use of RA without guidelines or proof to the uninhibition. In this view, a systematic analysis, an evidence-based study determined the probablebenefits of neuraxial block anaesthesia (NABA) in inguinal hernia repair among the adults. This study found NABA to be more effective in pain control and with minimal side effects when compared with GA.[2, 14, 15]

Regional blocks have been an integral modulefor achievingmulti-modal analgesia, thereby, successfully increasing post-operative recovery. One of the latest popularizing regional anesthetic methods is the Transversus abdominis plane (TAP) block. TAP block technique is achieved through the fascial plane between the internal oblique and transversus abdominis muscles targeting the somatic nerves T6–L1,

which runs in this plane. Thus, providing an effective analgesia to the parietal peritoneum as well as to the skin and muscles of the anterior abdominal wall.[16-18]

There are different methods available to achieve to TAP blocks. These include laparoscopic-assisted approaches[19], blinded double POP technique and[16]ultrasound-guided.[17] The laparoscopic assisted approach was first introduced by Chetwoodet al in 2011.[20] TAP blocks have an advantage of an effortless performance, less need for LA infiltration, and does not require sophisticated instruments.[19]

The use of spinal anesthesia and regional anesthesia in performing IHR have been studied separately and have been compared with general anesthesia in most studies. Review of the literature in this regard isscanty, although studied, these few reports have showed contrary results. To test the same, the current study aimed to evaluate the effectiveness of inguinal field block versus spinal anesthesia.

Need of the study: The frequency of spinal anesthesia and inguinal field block in operating IH is less studied. Few literatures which have studied its efficiency have shown to be contrasting. Hence this hypothesis should be studied further to enhance the use of these techniques.

AIMS AND OBJECTIVES

- To compare the effectiveness of inguinal field block versus spinal anaesthesia in intraoperative effectiveness and post-operative pain measured by the visual analogue scale, in inguinal hernia repair.

REVIEW OF LITERATURE

SPINAL ANESTHESIA FOR INGUINAL HERNIA:

Inguinal hernial repair is the most common surgeries among the adult population.[21]Inguinal hernias occur due to abdominal wall defect caused by loss of strength in the inguinal area.[22]

The patients who encounter this pathology are greatly of older age groups and hence selecting an appropriate method of anesthesia is crucial. Choosing an appropriate anesthetic method depends on various factors such as age, underlying diseases, medications etc.[21] The idea of selecting the correct anesthetic method is to ensure prolonged achievement of anesthesia without adverse complications and post-operative recovery with pain management.[23]

Spinal anesthesia has proven to be an excellent method of anesthetic procedure for surgery but has reported with certain hemodynamic instability, nausea and postoperative urinary retention.[23, 24] Although, GA and SA are the best anesthetic method for surgeries, they have side effects of decreasing blood pressure, vomiting and post-operative urinary retention.[24] The reason behind to opt less of spinal anesthesia in inguinal hernia repair is because of urinary retention.[14, 25]The most preferred anesthetic agent used for SA in IHR is Bupivacaine. Overdoses of this anesthetic agent cause prolonged voluntary action block thereby leading to urinary bladder dysfunction.[26]

These complications can be well managed by using short acting anesthetic drugs, lose dose of spinal anesthesia, IV fluids,vasoconstrictors, evading the practice of atropine and with local infiltration ofthe surgical wound with long acting anesthetic agent.[27]

A double blind clinical trial[23], had shown the incidence of urinary retention among general and spinal anesthesia in patients undergoing IHR. The UR was much seen in GA patient's comparative to SA patients. Other similar study assessed the pain control postoperatively among local anesthesia and SA patients for inguinal hernia repair. The results seem to be more in favor ofboth methods.

Disadvantages:

- The technique poses a greater challenge to anesthetist in cases of the deformed spine due to scoliosis, kypho-scoliosis, or arthritis (osteoarthritis, rheumatoid arthritis, and ankylosing spondylitis).
- Optimal puncture sites obtained accurately is quite difficult in the majority of patients.
- Abnormal anatomy can be present in patients for reasons other than obesity and scoliosis. The paramedian technique may be selected in patients who cannot be positioned easily due to skeletal deformity and modification of paramedian technique by Taylor's approach has provided a reliable and less traumatic alternative in the deformed spine for establishing the subarachnoid block.[28, 29]

FIELD BLOCKS FOR INGUINAL HERNIA REPAIR: HISTORY, EVOLUTION AND METHODS IN CURRENT PRACTICE:

The inguinal field block involves "ilioinguinal-iliohypogastric nerve block". This field block offers both intraoperative and postoperative analgesia for inguinal surgery. It is the most convenient field block in surgeries for Inguinal hernia repair, Orchidopexy, Hydrocoele repair and Varicocele surgery.[30]

Inguinal field block (IFB) in amalgamation with T11 and T12 intercostal nerve blocks, has shown to offer post-operative pain relief after kidney transplant.[30]However, IFB in adult patients who were undergoing laparotomy through a Pfannenstiel incision had not resulted in pain reduction. Further leading toa long hospital stay withthe intake of morphine postoperatively.[31] The main advantage of this block is its use in managing chronic pain, especially in patients with inguinal hernial repair post operatively. However, a study showed contrasting results.[32]

Technique:

The technique follows an ultra-sounded guided procedure. The patient is positioned supine and uses a high frequency linear probe (10Mhz or greater). The probe is placed to the frontalgut wall along the line joining the anterior superior iliac spine (ASIS) and the umbilicus. The site of the probe should be such that the bony tracker from the ASIS is seen on one side of the image on the screen.

Next the performer should detect the 3 layers which as follows the peritoneum, transversus abdominis muscle (TAM), and internal oblique muscle(IOM). The muscle external oblique may not be seen as very obvious at this point. Hence by

gently positioning the probe to iliac crest in cephalad direction, with correct position of the probe with in line to the umbilicus, can get all 3 muscles visible as discrete layers. This method of positioning is helpful in case of confusion in the anatomy. Hence, it is better to get a clue of the peritoneum (deepest structures) and then move forward with superficial structures. The sonographic image of ilioinguinal and iliohypogastric nerves which lies closely appear astwo minor round hypoechoic structures with a hyperechoic border. The two nerves are found amid the IOM and the TAM approximating the ASIS.[33]

Landmark technique:

This method allows the needle to be inserted closely about 2.5 mm medial to ASIS with in line with the umbilicus.[34] Then a short-beveled needle should advance via the skin, subcutaneous and later gradually to a point were confrontation lost is sensed. At the point, the needle is at external aponeurosis, and at this point, the anesthetic agent is injected that is amid external and internal oblique muscle. This technique is not very successful in most of the cases and has greaterchances of femoral nerve block and peritoneal puncture.[33]

Complications:

- 30 % Block failure using the landmark technique.[33]
- This technique has an increased chances of bowel hematoma, small bowel puncture, Colon puncture and pelvic retroperitoneal hematoma.
- Less frequency of Temporary femoral nerve palsy with brief quadriceps paresis.

- The percentage of incident cases recorded of femoral nerve palsy with the landmark technique was 6%.But in cases of quadriceps paresis it showed to be reversible within hours.

List of different field block techniques (advantages and disadvantages):

Paravertebral block (PVB):

The prevertebral block was introduced in 1905[35], and later was popularized in the 20th century.[36] The use of PVB in between had diminished for years until literature work by Eason, and Wyatt [37], in 1979 commenced a new era. In subsequent years there has been good research and literature on PVB[38, 39], and recently has been established as regional anesthetic technique.

The reported incidence of complications with PVB is between 2.6% and 5%[40], and associated risk of chronic morbidity is far low.[35] The rate of failure in the technique from a well experienced clinician varied between 6.8% and 10%,[40]which is generally equivalent with spinal analgesia. Other complications of this block include low BP 4.6%, vascular puncture 3.8%, pleural puncture 1.1%, and pneumothorax 0.5%.[40]

Advantages of PVB:

- This technique is easy to learn and accomplish compared to thoracic epidural anaesthesia.
- The analgesia achieved is more efficient and successful than thoracic epidural anaesthesia
- PVB can safely be used in fully anaesthetised patients.

- Least risk of neurological complications than with most other regional anaesthetic techniques.
- Marked hypotension is uncommon because of rare sympathetic block bilaterally.
- Urinary retention is very unlikely to occur.
- There is less nausea, vomiting, constipation and sedation than compared with opioid-based analgesic techniques. Oral intake of food and early ambulation is expected.
- This block has greater analgesia effect along with more time of analgesia.
- The dose levels of local anaesthetic are lower.[36]

Disadvantage:

The blocks which extend to T1, T2 can lead to Ipsilateral Horner's syndrome.[36]

Hadzic A et al[39], prospectively studied the efficacy of PVB primarily in patients undergoing IHR. The study randomly allocated 50 patients to either PVB or GA, using standardizedprotocols. The outcome variables measured were suitability to avoid postanesthetic care unit (PACU), ambulation, home readiness, records of data on time-to-postoperative pain, and incidence of adverse events. This study showed that the PVB group of patients around 71% of them had achieved the criteria to avoid the postanesthetic care unit compared to patients in the GA group. Least number of patients (n=3, 13%) in the PVB group demanded treatment for pain compared to patients in GA group (n=12, 50%). The PVB group of patients were able to walk around early within 102 +/- 55 minutes than those in the GA group (213 +/- 108 minutes; $P < 0.001$). Further, the discharge times in PVB group was 156 +/- 60 and 253 +/- 37 minutes compared with those in the GA group with 203 +/- 91 and 218 +/-

93 minutes ($P < 0.001$). The adverse events recorded such as nausea vomiting sore throat and pain within 24 hrs of surgery was much lesser or least among the PVB group comparatively to the GA group. Hence, this technique is one of the best anesthetic technique which allows outpatients to undergo IHR.

Peripheral nerve block (PNB):

PNB is useful in pain management of post laparoscopic surgery and controls the pain perception of the abdomen is completely blocked by the nerves of the abdominal wall.[41] This method is not employed for laparoscopic surgery due to the difficulty encountered in managing visceral pain. This technique was used in two patients undergoing laparoscopic TEP inguinal hernia repair. This block is more preferred in cases of complication of GA and is performed in the cases where their minimum space of pre-peritoneum and abdominal wall.This block was a success as single port TEP in patients who had severe chronic obstructive pulmonary disease COPDand severe heart failure.[42]

Transversus Abdominis Plane Block(TAP):

Transversus abdominal plane (TAP) block, a regional block is used widely in postoperative pain management. The technique involves deposition of local anesthetic (LA) into the fascial plane superficial to the transversus abdominis muscle, where nerves supplying the anterolateral abdominal wall traverse (T7 –T12 intercostal nerves, ilioinguinal and iliohypogastric nerves, and the lateral cutaneous branches of the dorsal rami of L1 –L3).[43]

Advantage:

- Provides good postoperative analgesia
- Reduces the need for opioids
- The respiratory mechanism is well maintained
- Early ambulation and hospital discharge.[44]

Disadvantage:

The blind insertion with guidance may lead to injury to the kidney, spleen, liver, and intestines have been reported if the fascial plane is localised by the blind insertion technique.[45] This can be best avoided by use of ultrasonography for regional blocks. As it offers direct visualisation of the anatomical plane, needle placement, and the pattern of local anesthetic spread resulting in increased safety margin and optimal block quality. The successful use of US-guided TAP block has been reported in several other surgical procedures: donor hepatectomy, colorectal surgery, inguinal hernia repair, laparoscopic bariatric surgery, retropubic prostatectomy, iliac crest bone graft, and also in patients experiencing somatosensory chronic abdominal pain where other forms of pain management had failed.[46-48]

A meta-analysis by BaeriswylM et al[41] (2015), evaluated the anesthetic effect of ultrasound guided TAP blocks for all abdominal surgeries. The results of this analysis suggested that the Ultrasound-guided TAP block provided marginal postoperative analgesic effect after abdominal laparotomy or laparoscopy and cesarean delivery. In addition, there was no benefit of added analgesic effect noticed in patients who had SA with long acting opioid.TAP is a modern technique which has allowed its advantage in the repair of IH with least complications.[7, 49]

MOST RELEVANT STUDIES:

STUDIES ON SPINAL VS FIELD BLOCKS:

Studies on spinal vs GA:

Sarakatsianou C etal[8] 2019, study evaluated and compared the hemodynamic effects of spinal over general anesthesia among the non- high-risk subjects. The study subjects of 70, undergoing TAPP inguinal hernia repair were randomly studied in general or spinal anesthesia group. The hemodynamic status which included the heart rate (HR), mean arterial pressure (MAP), systolic blood pressure (SBP) and diastolic blood pressure (DBP) were recorded for both the groups during the process. The mean hemodynamic values, SBP, DBP and MAP post induction of analgesia was statistically insignificant for either group. However, the mean HR post induction of anesthesia was significant.This study showed that Spinal anesthesia was as efficient as general anesthesia.

A randomised control study by Sarakatsianou C etal[7] 2017, compared the outcome of pain among spinal anesthesia with general anesthesia for TAPP inguinal hernia repair in non-high-risk patients. This interim analysis included 70 adult American Society of Anesthesiologists I, II and III patients undergoing elective TAPP inguinal hernia repair were randomised to either general or spinal anesthesia. The results of this trial showed that postoperative morphine intake was markedly less just after the surgery among the SA group. The SA group showed a significant decrease in postoperative pain, especially within 8 h of post-operation. Thus, this study showed the increased efficiency of spinal anesthesia over regional anesthesia in the pain management of TAPP inguinal hernias repair procedure.

A retrospective study by Yildirim D et al[50] 2017,aimed to compare the performance of TEP inguinal hernia repair amongst individuals under SA to that under GA. This study involved 80 people as the study population. Sensorial T3 spinal anaesthesia was achieved by Hyperbaric bupivacaine and fentanyl. Whereas, tracheal intubation sevoflurane, rocuronium, Propofol and fentanyl were used for GA. All proceedings of Spinal Anaesthesia, intra operative, and postoperative complications with pain score were collected. The results of this study showed longer operative time in SA TEP group compared to GA TEP group (mean70.2 ±6.7 min vs 67.2 ±6.2 min $p < 0.038$).The mean pain scores in the SA TEP group were 0.23 ±0.42 at the first hour, 1.83 ±0.64 at 6 h and 1.28 ±0.45 at 24 h. These scores were significantly lower than the corresponding scores of 5.18 ±0.84 ($p < 0.001$), 2.50 ±0.55 ($p < 0.001$) and 1.58 ±0.55 in the GA TEP group. These results in relation to pain if considered the SA was most preferred than GA comparatively($p<0.004$). Hence, spinal anaesthesia TEP was the most preferred anaesthesia for inguinal hernia repair as the patients experienced less pain and required less analgesics.

A randomised prospective study conducted by Donmez T et al[51] 2016, evaluated and compared the surgical outcome of spinal anaesthesia and general anaesthesia treated for laparoscopic TEP inguinal repair. The study subjects of 50 were randomly selected to group I (GA TEP) or the group II (SA TEP). The anaesthetic agents used for GA were propofol, fentanyl, rocuronium, sevoflurane and tracheal intubation. The SA was achieved at level T3 with hyperbaric bupivacaine 15mg and fentanyl 10µg. All intra operative, post- operative complications, operative events and pain scores related to SA were noted. The estimation of the anesthetised technique was assessed by the direct questionnaire given to each subject after 3 months of surgery. The scores

of pains were less for 1 hr(P<0.0001) and 4 hr(P=0.002) for both SA and GA groups. The two groups showed no difference in regarding hospital stay, surgery time, recovery or complications. However, most patients who underwent surgery were contented with SA than GA (P<0.020). The study results suggest that TEP Inguinal hernia repair can be best be achieved under SA. This method of anaesthesia is best due to increased patient satisfaction because of reduced post- operative pain and better recovery.

Sinha R et al[52]2008, reviewed all the patients who visited over 8 years and underwent inguinal hernia repair under SA and GA. A total of 480 patients were included for review. Among the 480 464 had undergone unilateral TEP. The inclusion criteria were patients with complex hernia. The subjects were given tranquillity only if required, and GA was delivered in cases who did not respond to SA. A control group of 49 patients were included were TEP was performed under GA.

Only 3 patients had been converted to GA. The outcomes recorded were hypotension in 75 (15.63%) patients, postoperative vomiting in 10 (2.08%) patients. Whereas 15 (30.61%) patients complained of vomiting in patients administered GA. Patients of about 172 (35.83%) patients operated in SA required diclofenac injections for abdominal pain within 2 hrs of post operation and oral analgesics in 301 (62.71%) within the first 24 hours. The proportion of patients operated under GA 89.80% needed pain control injections just after the surgery and need of oral analgesics in the SA group. In about 25(5.21%) of subjects post- operatively, the postural headache had persisted for an about 2.6 days. The average time for discharge was 2.3 days. The

percentage of satisfaction level in patients for SA was 98.6% assessed by Kernofsky's performance status. Thus, the results support the use of SA in Inguinal hernial repair.

Studies on field blocks:

A prospective study by Thiyagarajan, S. et al[49] 2019, study evaluated the effect of regional anesthesia following continuous regional analgesia on postoperative pain and functional outcome following inguinal hernioplasty. A total of 72 patients who were to undergo open mesh inguinal hernioplasty were selected randomly to 3 groups: subarachnoid block alone (group SAB), general anesthesia alone (group GA), or subarachnoid block combined with a continuous transverse abdominis plane block (group TAP). Core Outcome Measures Index score was used for hernia patients (COMI-hernia) pre and post operatively to assess the pain and functional outcomes for a duration of 6 months. During the first 72 hours postoperatively, the pain was assessed at rest and during five different activities using the numerical rating scale. The results of this study showed that six months following the surgery, the COMI-hernia score was lower in group TAP than in group GA or group SAB (0.54±0.41 vs 0.88±0.43 and 1.00±0.54, respectively; $p<0.02$). Pain at rest ($p<0.02$) and during activities ($p<0.001$) was lowest in group TAP during the first 72 hours postoperatively. Hence, these study results suggest that SAB combined with continuous analgesia by a TAP catheter reduces the pain best with good functional outcome.

Mughal et al[53] 2018, study aimed to compare the laparoscopic-assisted TAP block with periportal local anesthetic infiltration in managing post-operative pain. This study wasa randomized controlled trial which was double-blinded in patients for

elective laparoscopic inguinal hernia repair. The case group underwent laparoscopic-assisted TAP block with 30 ml of 0.25% Bupivacaine. While the control group underwent the procedure with 15ml of 0.5% Bupivacaine at the periportal sites. The primary outcome measured was postoperative pain score, using a visual analogue scale (VAS) at rest and on coughing at 6,12,18 and 24hrs. A reduction in the pain scale in the count of 2 points(VAS) was used to evaluate the efficiency of the TAP block. A total of 60 patients were recruited, and 30 patients each were randomly selected to either groups. Both groups were matched with demographic details. The case group showed reduction in pain score at 3hr (3.1 vs 1.1 $p < 0.001$), at 6 hr (4.1 vs 1.7 $p < 0.001$) at rest and on coughing at 3hr (4.8 vs 2.1 $p < 0.001$). Thus, the study results showed good pain management with laparoscopic-assisted TAP block for patients undergoing elective laparoscopic inguinal hernia repair.

Khetarpal R et al[54] 2017, study aimed to compare the efficacy of paravertebral block (PVB) with spinal anesthesia (SA) for IHR with respect to postoperative analgesia and side effects for a walk in patients. This prospective, single-blind randomised controlled trial included Sixty American Society of Anesthesiologists Class I–II patients of 20–60 years who were appointed for IHR. These patients were randomized by a computer-generated list into two groups of thirty each, to receive either PVB (Group PVB: at T12–L2 levels, 10 ml of 0.5% levobupivacaine at each level) or SA (Group SA: at L3–L4/L2–L3 level, 2.5 ml of 0.5% levobupivacaine). Primary outcome was the duration of postoperative analgesia and time to reach discharge criteria. The secondary outcome was time to ambulation, time to perform the block, time to surgical anesthesia, total rescue analgesic consumption, adverse effects, hemodynamic changes, patient, and surgeon satisfaction. Student's t-test, Chi-square

test as applicable, and Statistical Package for Social Sciences (version 14.0, SPSS Inc., Chicago, IL, USA) was used. The results of this study found that time to the first analgesic requirement was 15.17 ± 3.35 h in Group PVB and 4.67 ± 1.03 h in Group SA ($P < 0.001$). Time to reach the discharge criteria was significantly shorter in Group PVB than Group SA ($P < 0.001$). Thus, the results of this study showed that PVB was beneficial in terms of prolonged postoperative analgesia and encouraging early ambulation compared to SA.

A meta-analysis by Bhakota et al[55]2015, systematically reviewed all evidence-based studies to find out the benefits of the neuraxial block in comparison to general anesthesia in patients who underwent IHR in adults. Search engines included were all evidence Medline, EMBASE, Cochrane Library, CINAHL, SCOPUS, SCI-EXPANDED as well as trial archives and session proceedings. The search included only Randomized controlled trials (RCT) that compared neuraxial block anesthesia (NABA) and general anesthesia (GA). The outcome parameters studied were postoperative pain, postoperative complications, and urinary retention. Only 7 RCT were found and studied. The total number of patients included for meta-analysis was 308 with an equal number of patients divided for both groups(154 each). The NABA and GA group showed a similar distribution of complications [OR 1.17, 95 % CI (0.52–2.66)]. Whereas, the urinary holding was seen to be less significant in the GA group compared to NABA group [OR 0.25, 95 % CI (0.08–0.74)]. The pain score for movement association at 24 hr post-surgery was significantly lower in the NABA group. The Time required for initial analgesia application was much shorter in the GA group [SMD 8.99, 95 % CI 6.10–11.89]. Hence, this analysis added to the evidence that NABA was the most preferred technique in managing postoperative

pain than GA. But the GA technique was advantageous in terms of less urinary retention.

Işıl C. T et al[56] 2014, study aimed to compare the efficacy of spinal anesthesia (SA) and paravertebral block (PVB) in unilateral inguinal hernia repair. This study included Sixty American Society of Anesthesia physical status (ASA) I-III patients aged between 18-64 years with unilateral inguinal hernia. Statistical analysis was done for 54 patients. Two groups, which were PVB and SA was assigned with 30 patients in each group. The mean arterial pressure (MAP) and heart rate (HR) were recorded during the operative period. The demographic variables, patient satisfaction, the onset times to reach peak sensory level, surgical data and onset time to reach modified Bromage 3 motor block were recorded. Postoperative pain at 0-24 with the visual analog scale (VAS)were also measured. The study outcomes showed that group SA, showed comparatively less preanesthetic measures, reduction in HR and MAP during the 10th-90th minute period. But in Group PVB, the time duration ofthe sensory block was advanced, whereas the paralysis rate was greater in Group SA ($p<0.01$).The Bromage scores were significantly different between the groups ($p<0.01$). The Group SA, showed higher VAS scores at 24hr, nausea, vomiting than compared to the PVB group ($p<0.01$). Hence, the study suggests paravertebral block as the choice of anesthesia for a unilateral hernia. Due to acceptable surgical anesthesia, maintenance of superior and prolonged duration of postoperative analgesia in IHR.

A multi arm randomised trial by Nordan P et al[24](2003),compared the efficacy of local anaesthesia (LA), regional and GA and their efficacy in patients undergoing hernial repair. The study included 616 patients and was randomly grouped to regional,

general or local anaesthesia. Thekey outcomes studied were initial and late postoperative complications. Subordinateoutcome studied were the length of postoperative hospital stays, the time duration of surgery and return to normal activity. The results of the study showed greater intraoperative tolerance for LA. With respect to primary and secondary outcomes, the local anaesthetic method was more superior than the other two during the early postoperative period. The outcomes showed by all 3 methods at 8 days and 30days follow- up was no different. The mean duration of surgery was longer with total anaesthesia time shorter in cases with LA than compared to regional and GA. Hence LA has an advantage over regional or GA due to shorter duration of hospital stay, decreased post-operative pain and less urinary problems.

Studies of Inguinal field block

A prospective randomised control trial by Mokini et al[57] 2015,assessed the pain scores after an ultrasound-guided inguinal field block (UGIB) and compared to subarachnoid block(SAB). This trial included 74 male adults. They were randomly assigned to receive iliohypogastric and ilioinguinal nerve blockwith Ropivacaine 5 mg/ml, up to 225 mg (37 patients) and SAB with hyperbaric Bupivacaine 10 mg/ml, 10-12 mg at L3-4 level (37 patients). The pain scores were evaluated verbally by Numerical Rating Scale, at 4 hours. The pain control drugs given during the hospital stay were Tramadol, Acetaminophen, Ketorolac, and for seven days, postsurgery after discharge. The results of this study showed that the Inert pain and dynamic pain at 4 hours and 6 hrscontrol in UGIB group was less compared tothe SAB group. The required dose of analgesia during hospital stay was less in UGIB group than SAB. This study results interprets inguinal field block to provide pain control at 4 hours

after surgery and also reduced the need for analgesic after hernia repair compared to SAB.

Shivakumar K. P et al[6] 2013, study evaluated the efficiency of field block for IHR, by assessing thequality of analgesia, duration, speed of recovery and hemodynamic stability. This study included 50 patients who suited for inguinal hernia repair. The study subjects were observed for quality a duration of analgesia, with PR, systolic, diastolic BP and hemodynamic stability. Post anesthesia recapture was evaluated by using "criteria for fast track eligibility for ambulatory anesthesia" after the surgery. Period of analgesia was evaluated with a subjective complaint of pain. The quality of analgesia was excellent in 72% of cases, good in 16%, fair in 8% and poor in 4%. The mean duration of analgesia was 201.02 min (160 min to 280 min). The hemodynamic state of all patients was well maintained. The ability to recover among all patients was good. This study showed that Inguinal field block to be efficient as they it is harmless technique providing lengthy analgesia with faster recovery time and no side effects.

LACUNAE OF LITERATURE

The literature studies of general anesthesia and spinal anesthesia for IHR have been studied and have shown a satisfactory result for spinal anesthesia. There have been studies comparing the various antiesthetic techniques, but till date literature comparing the efficacy of inguinal block and spinal anesthesia is very minimal.

MATERIALS & METHODS

Study site: This study was conducted in the department of surgery at Dr. Prabhakar Kore Hospital and MRC, KAHER, Belgaum

Study population: All the patients admitted in the department of surgery with a primary unilateral inguinal hernia in Dr. Prabhakar Kore Hospital and MRC, KAHER, Belgaum were considered as the study population.

Study design: The current study was a comparative study

Sample size: As per the MRD section of KLEH, the total number of inguinal hernia cases operated per year is 562, out of which unilateral cases are 60 on an average. Therefore, the estimated sample size was minimum of 60 patients. Accordingly, 30 patients were included in spinal anesthesia and 30 in inguinal field block.

Sampling method: All the eligible subjects were recruited into the study consecutively by convenient sampling till the sample size is reached.

Study duration: The data collection for the study was done between January 2018 to December 2018 for a period of 1 year.

Inclusion Criteria:

- Patients who gave Written informed consent.
- Patients aged 16 to 70 years.
- Patients with unilateral inguinal hernia.
- Patients with primary inguinal hernia.
- Patients with an uncomplicated hernia.

Exclusion criteria:

- Repair involving bilateral inguinal hernias
- Patients with Recurrent hernias
- Patients having irreducible hernias
- Patients with bleeding disorders
- Patients on anticoagulant therapy
- Pregnancy
- Patients with spinal deformities
- Patients who are having any allergies to the anesthetic drug

Methodology:

Once the informed consent was obtained from the study participants, alternate patients of unilateral inguinal hernia will be given either spinal anaesthesia or inguinal field block. Outcome variable in this study was the visual analogue pain scores measured on an ordinal scale with 6 categories, which were collapsed at the time of analysis to make it less cumbersome and the results more meaningful and conducive for interpretation.

The collapsed categories were: -

1. 'no hurt' or 'hurts a little'
2. 'Hurts little more' or 'hurts even more'
3. Hurts a whole lot' or 'hurts worst'.

Intra operative effectiveness was assessed by the operating surgeon's comfort by a 4-point scale.

1. Surgeon is completely comfortable
2. Somewhat comfortable
3. Uncomfortable and requested for supplemental local anaesthetic or general anaesthetic.

The only indication for post op analgesia was if the patient requires it. Inj. Diclofenac sodium 1mg/kg intramuscular dose was administered in such severe cases.

Inguinal field block-technique:

Local anesthetic used was 40ml mixture of equal volumes of 2 % of Lignocaine with adrenaline and 0.5% Bupivacaine. under strict aseptic precautions 15 ml of this drug mixture was injected in a fan shaped manner in the infero-medial quadrant between external oblique and internal oblique muscle, superficial to internal oblique using a 20-gauge short bevel needle inserted at a point 1 cm medial and inferior to ASIS [to block Ilioinguinal and Iliohypogastric nerves].

- 5ml of the drug mixture is infiltrated just lateral to the pulsations of femoral artery inferior to inguinal ligament[to block a femoral branch of genitor femoral nerve].
- 5 ml of the drug mixture was infiltrated just medial to pubic tubercle [to block a genital branch of genitor-femoral nerve].
- 5 ml of drug mixture was infiltrated sub cutaneously from pubic symphysis to umbilicus [to block cutaneous branches from the opposite side].

- 5 ml of drug mixture was infiltrated along the line of incision
- 5 ml of the mixture was infiltrated in the neck of the hernial sac to anasethetise the peritoneum.

Ethical considerations: Study was approved by institutional human ethics committee. Informed written consent was obtained from all the study participants and only those participants willing to sign the informed consent were included in the study. The risks and benefits involved in the study and the voluntary nature of participation were explained to the participants before obtaining consent. Confidentiality of the study participants was maintained.

Data collection tools: All the relevant parameters were documented in a structured study proforma.

Statistical Methods:

Pain scores, intra operative effectiveness etc., Were considered as primary outcome variables. Clinical presentation was considered as Secondary outcome variable. Study group (Spinal Vs Inguinal field block) was considered as Primary explanatory variable. Age, education, marital status, occupation, religion etc., were considered as a secondary explanatory variable was considered as Primary explanatory variables.

Descriptive analysis was carried out by mean and standard deviation for quantitative variables, frequency and proportion for categorical variables. Non normally distributed quantitative variables were summarized by the median and interquartile range (IQR). Data was also represented using appropriate diagrams like a bar diagram, pie diagram and box plots.

All Quantitative variables were checked for normal distribution within each category of explanatory variable by using visual inspection of histograms and normality Q-Q plots. Shapiro- wilk test was also conducted to assess normal distribution. In Shapiro wilk test p value of >0.05 was considered as normal distribution.

For normally distributed Quantitative parameters, the mean values were compared between study groups using Independent sample t-test (2 groups) / ANOVA (>2 groups). For non-normally distributed Quantitative parameters, Medians and Interquartile range (IQR) were compared between study groups using Mann Whitney u test (2 groups) / Kruskal Wallis test (> 2 groups). The change in the quantitative parameters, before and after the intervention was assessed by paired t-test (In case of two time periods) or one-way repeated measures ANOVA (In case of comparison across more than 2 time periods).

If a statistically significant difference was found in ANOVA, appropriate post -hoc test (LSD/ Bonferroni) was used to assess statistical significance of pair wise comparisons.

Categorical outcomes were compared between study groups using Chi square test /Fisher's Exact test (If the overall sample size was < 20 or if the expected number in any one of the cells is < 5, Fisher's exact test was used.)

P value < 0.05 was considered statistically significant. IBM SPSS version 22 was used for statistical analysis.[58]

RESULT

A total of 60 subjects were included in the final analysis.

Table 1: Descriptive analysis of the study group in the study population (N=60)

Study group	Frequency	Percentages
Spinal	30	50.00%
Inguinal field block	30	50.00%

Among the study population, 50% of participants were Spinal group and another 50% of participants were Inguinal field block group. (Table 1)

Table 2: Comparison of mean of age between study groups (N=60)

Parameter	Age (Mean± SD)	Mean difference	95% CI		P value
			Lower	Upper	
Spinal	46.93 ± 17.3	7.67	-0.86	16.19	0.077
Inguinal field block	39.27 ± 15.66				

The mean age of subjects in the spinal group was 46.93 ± 17.3 years and it was 39.27 ± 15.66 years in Inguinal field block group. The difference (7.67) in the age between the two groups was statistically not significant (P Value 0.077). (Table 2 & Figure 1)

Figure 1: Error bar chart of comparison of the mean of age between study groups (N=60)

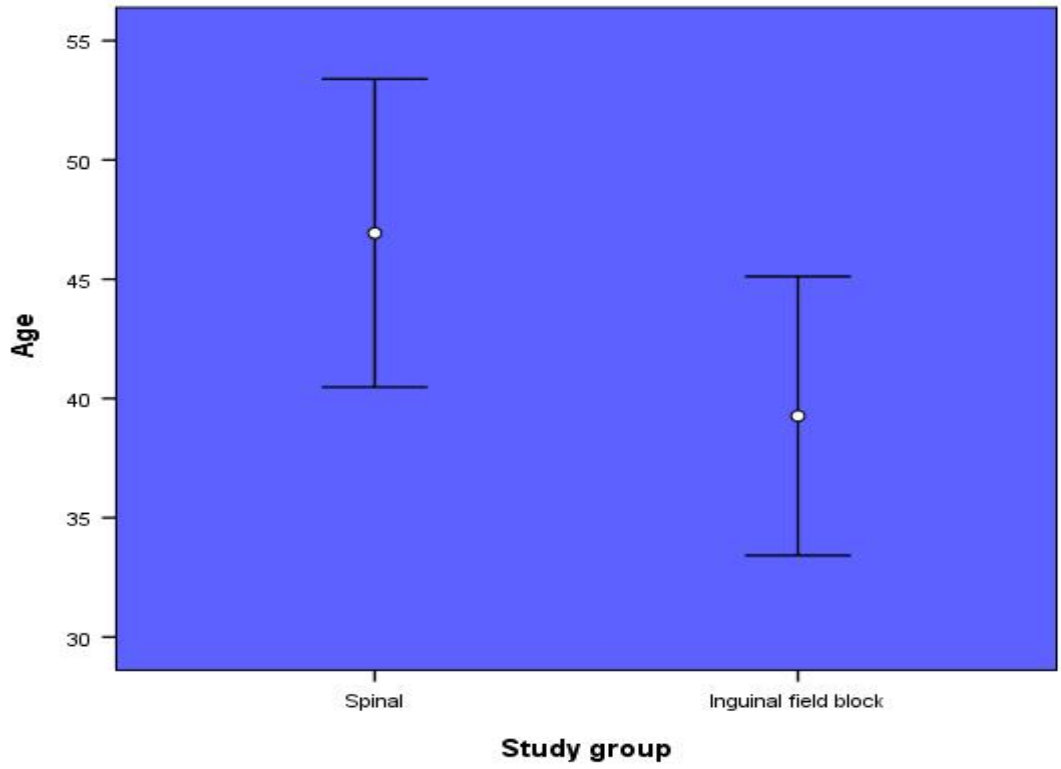


Table 3: Comparison of education between the study group (N=60)

Education	Study group	
	Spinal (N=30)	Inguinal field block (N=30)
Illiterate	12 (40%)	11 (36.66%)
Primary school	1 (3.333%)	4 (13.33%)
Middle school	4 (13.33%)	6 (20%)
High school	12 (40%)	6 (20%)
Diploma/Intermediate	1 (3.33%)	2 (6.66%)
Graduate/Post graduate	0 (0%)	1 (3.33%)

In a spinal group, majority of 12 (40%) participants were an illiterate and high school for each, 4 (13.33%) participants were middle school and only 1 (3.33%) participants were primary school and diploma/intermediate foe each respectively. In Inguinal field

block group, majority of 11 (36.66%) participants were illiterate, 6 (20%) participants were middle school and high school for each, 2 (6.6%) participants were diploma/intermediate and only 1 (3.3%) participants were graduate/post graduate for each. (Table 3 & Figure 2)

Figure 2: Clustered bar chart of comparison of education between the study group (N=60)

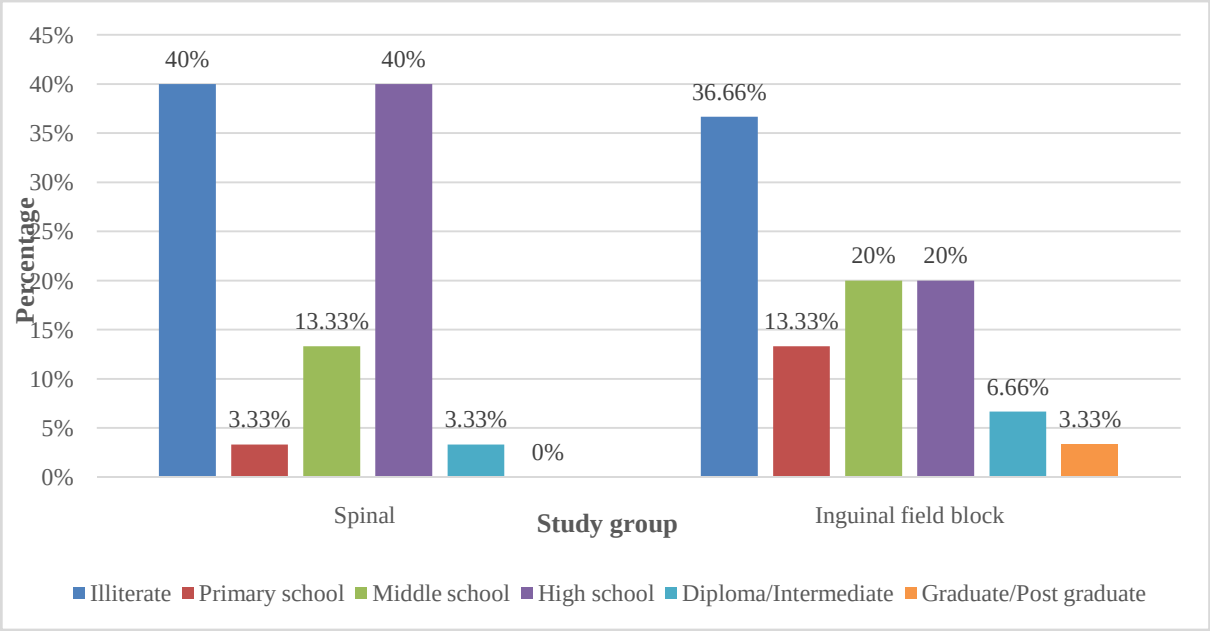


Table 4: Comparison of religion between the study group (N=60)

Religion	Study Group		Fisher exact P value
	Spinal (N=30)	Inguinal Field Block (N=30)	
Hindu	27 (90%)	27 (90%)	1.000
Muslim	3 (10%)	3 (10%)	

In the spinal group, 27 (90%) participants were Hindu and 3 (10%) participants were Muslim. In Inguinal Field Block group, 27 (90%) participants were Hindu and 3 (10%) participants were Muslim. The difference in the proportion of religion between the study groups was statistically not significant (P value 1.000). (Table 4 & Figure 3)

Figure 3: Clustered bar chart of comparison of religion between Study Group (N=60)

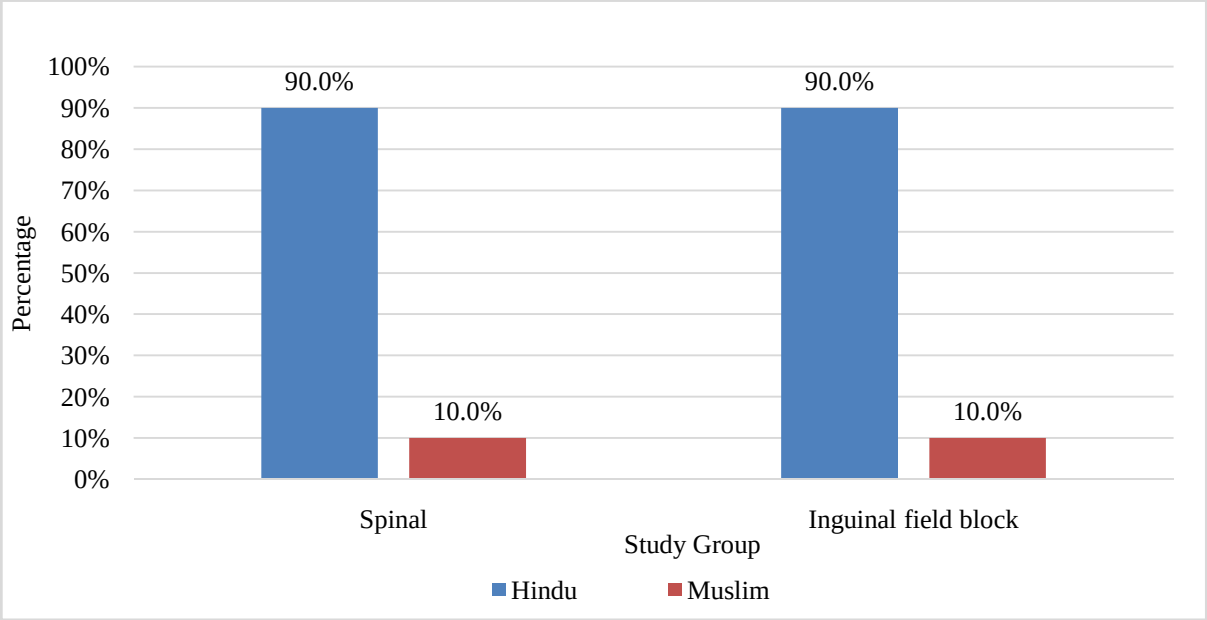


Table 5: Comparison of marital status between the study group (N=60)

Marital Status	Study Group		Chi square	P value
	Spinal (N=30)	Inguinal Field Block (N=30)		
Married	23 (76.67%)	20 (66.67%)	0.739	0.390
Unmarried	7 (23.33%)	10 (33.33%)		

The difference in study group between marital status is found to be insignificant with a P- value of 0.390, with the majority of 23 (76.67%) participants were married in the spinal group. (Table 5 & Figure 4)

Figure 4: Clustered bar chart of comparison of marital status between the study group (N=60)

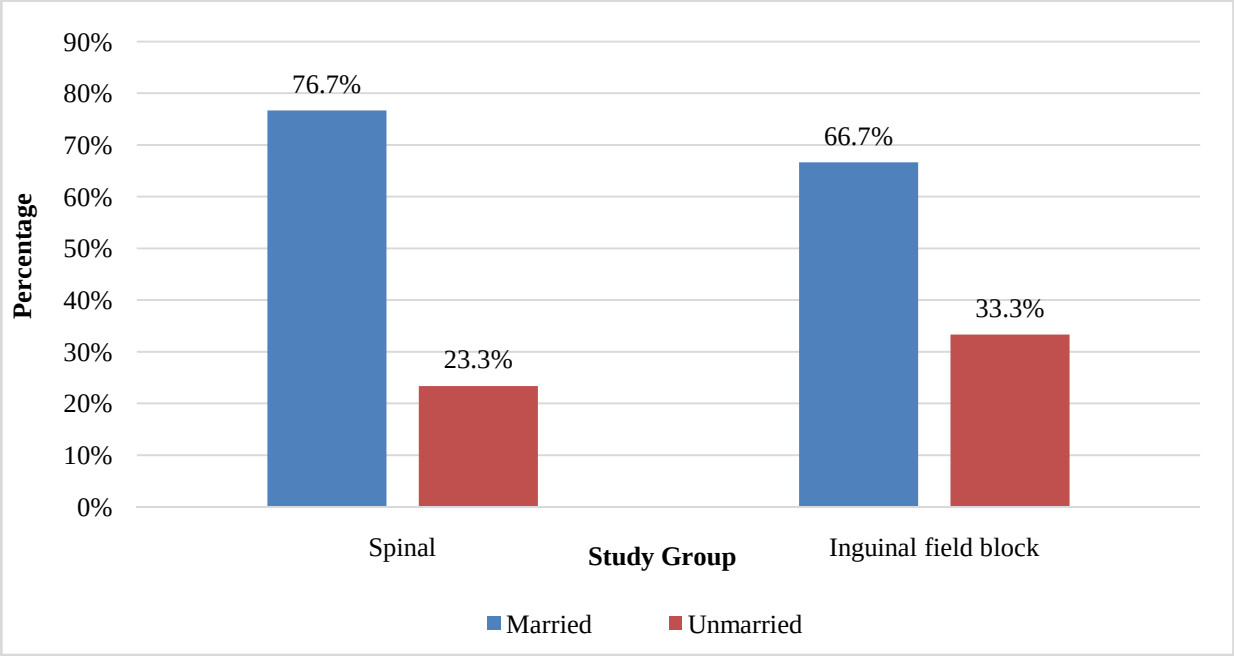


Table 6: Comparison of occupation between the study group (N=60)

Occupation	Study Group	
	Spinal (N=30)	**Inguinal Field Block (N=30)**
Student	4 (13.33%)	5 (16.67%)
Unemployed	2 (6.67%)	0 (0%)
Skilled Worker	24 (80%)	25 (83.33%)

In the spinal group, 4 (13.33%) participants were student, 2 (6.67%) participants were unemployed and 24 (10%) participants were skilled workers. In Inguinal Field Block group, 5 (16.67%) participants were a student and 25 (83.33%) participants were skilled workers. (Table 6 & Figure 5)

Figure 5: Clustered bar chart of comparison of occupation between the study group (N=60)

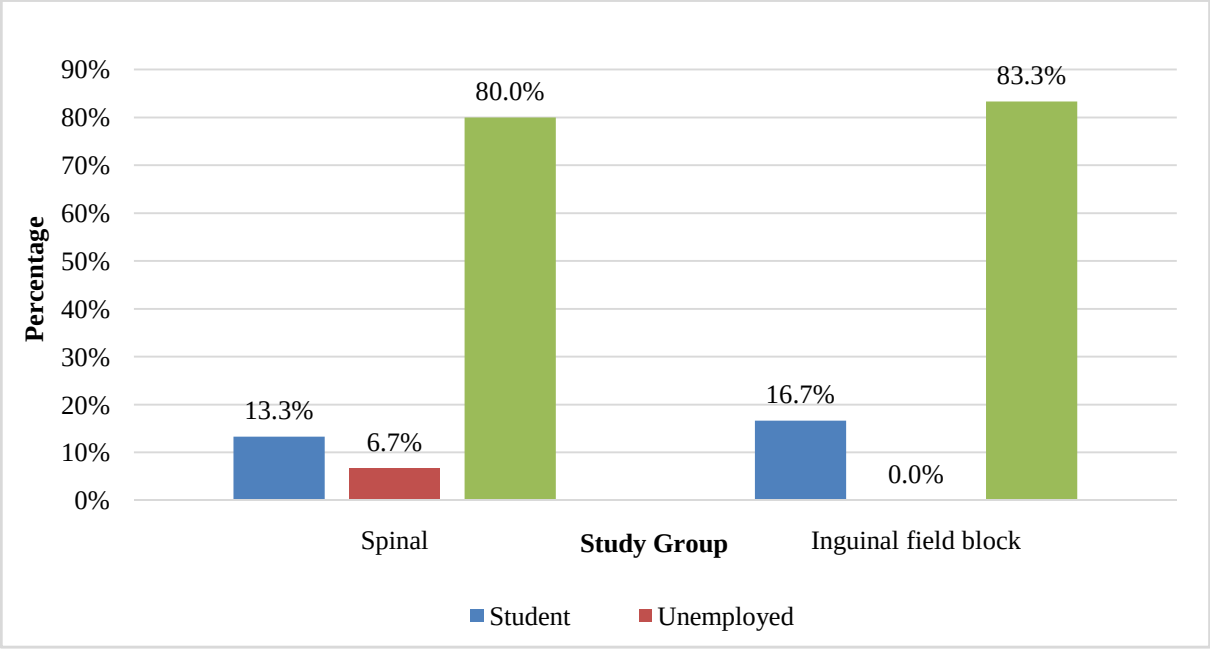


Table 7: Comparison of socio-economic status between the study group (N=60)

Socio economic status	Study group		Chi square	P value
	Spinal (N=30)	Inguinal field block (N=30)		
Lower class	9 (30%)	2 (6.66%)	7.861	0.020
Upper lower class	13 (43.33%)	11 (36.66%)		
Lower middle class	8 (26.66%)	17 (56.66%)		

The difference in study group across socio economic status is found to be significant with a P- value of 0.020, with a majority of 13 (43.33%) participants were upper lower class in spinal group. (Table 7 & Figure 6)

Figure 6: Clustered bar chart of comparison of socio-economic status between the study group (N=60)

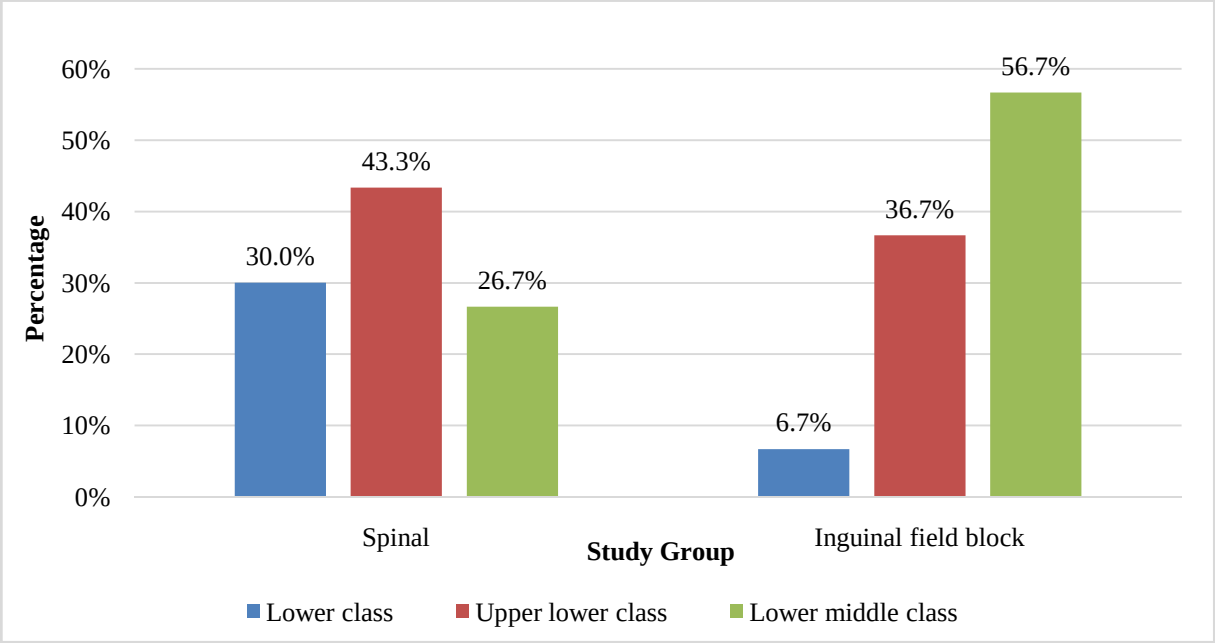


Table 8: Comparison of chief complaints between the study group (N=60)

Chief Complaints	Study group		Chi square	P-value
	Spinal (N=45)	Inguinal field block (N=45)		
Swelling in left groin	11 (36.66%)	9 (30%)	0.300	0.584
Swelling in right groin	19 (63.33%)	21 (70%)		

The difference in study group between chief complaints is found to be insignificant with a P- value of 0.584, with a majority of 19 (63.33%) participants had swelling in rt groin in the spinal group. (Table 8 & Figure 7)

Figure 7: Clustered bar chart of comparison of chief complaints between the study group (N=60)

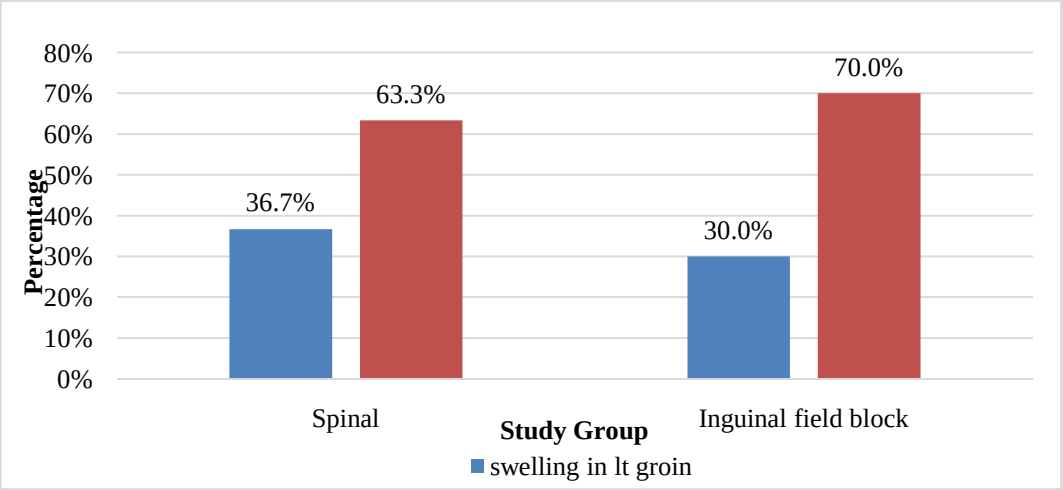


Table 9: Comparison of history of presenting complaints between the study group (N=60)

History of presenting complaints	Study group		Chi square	P-value
	Spinal (N=45)	Inguinal field block (N=45)		
Pain				
Present	6 (20%)	7 (23.33%)	0.098	0.754
Nil	24 (80%)	23 (76.66%)		
Swelling				
Present	30 (100%)	30 (100%)	*	*
Absent	0 (0%)	0 (0%)		
Systemic symptoms				
constipation	1 (3.33%)	0 (0%)	*	*
heavy labour	1 (3.33%)	0 (0%)		
Nil	28 (93.33%)	30 (100%)		
Other complaints				
Present	30 (100%)	30 (100%)	*	*
Absent	0 (0%)	0 (0%)		

**** No statistical test was applied-due to 0 subjects in the cell***

The difference in study group between the history of pain is found to be insignificant with a P- value of 0.754, with a majority of 7 (23.33%) participants had pain in Inguinal field block group. In the spinal group and inguinal field group, 30 (100%) participants had swelling and other complaints for each. In the spinal group, only 1 (3.33%) participants had constipation and heavy labour for each. (Table 9)

Table 10: Comparison of personal history between the study group (N=60)

Personal history	Study group		Chi square	P-value
	Spinal (N=30)	Inguinal field block (N=30)		
Diet				
Veg	23 (76.66%)	7 (23.33%)	17.067	<0.001
Non veg	7 (23.33%)	23 (76.66%)		
APP				
Good	30 (100%)	30 (100%)	*	*
Reduced	0 (0%)	0 (0%)		
Sleep				
Adequate	30 (100%)	30 (100%)	*	*
In adequate	0 (0%)	0 (0%)		
B/B				
Normal	30 (100%)	28 (93.3%)	*	*
Abnormal	0 (0%)	2 (6.7%)		
Habits				
Absent	29 (96.66%)	30 (100%)	*	*
Present	1 (3.333%)	0 (0%)		

**** No statistical test was applied-due to 0 subjects in the cell***

The difference in study group between diet is found to be significant with a P- value of <0.001, with majority of 23 (76.66%) participants were veg in the spinal group and non-veg in inguinal field group. (Table 10 & Figure 8)

Figure 8: Clustered bar chart of comparison of diet between study groups (N=60)

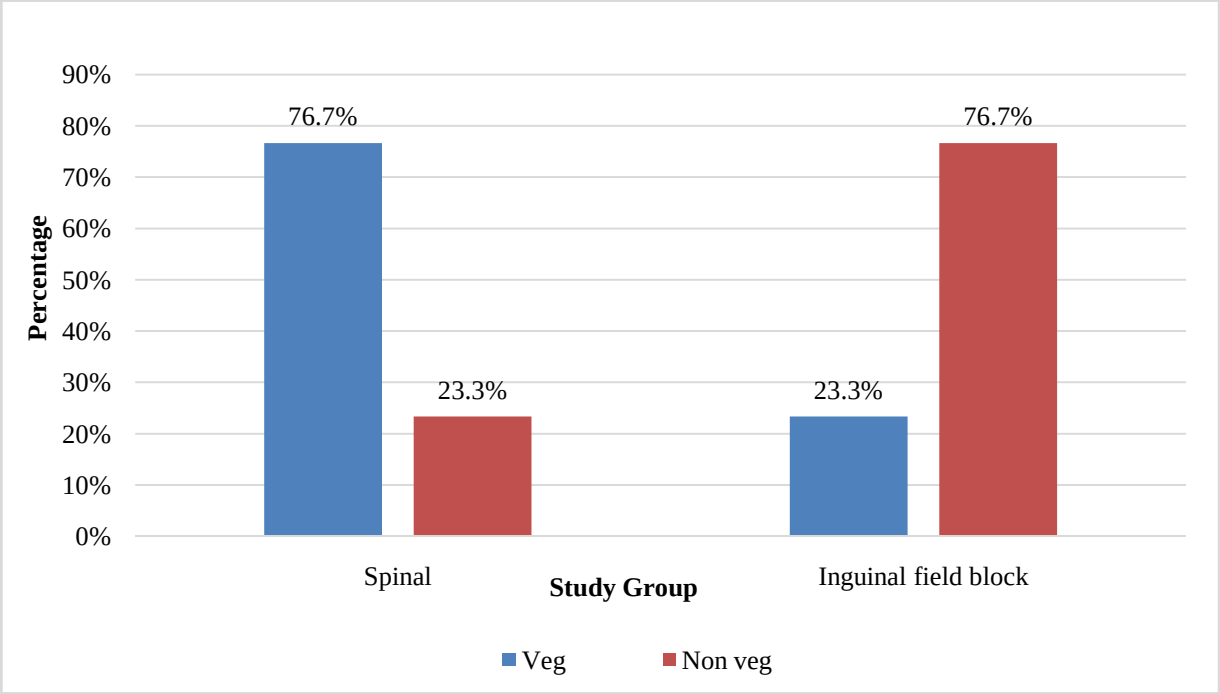


Table 11: Comparison of mean of vital signs parameters between the study groups (N=60)

Parameter	Study group		P value
	Spinal (N=30) (Mean± SD)	Inguinal field block (N=30) (Mean± SD)	
PR (mints)	78.63 ± 4.37	76.77 ± 4.83	0.122
RR (mints)	17.53 ± 1.43	16.93 ± 1.95	0.179
Temperature (°F)	98.6 ± 0	98.6 ± 0	1.000

The mean PR of subjects in the spinal group was 78.63 ± 4.37 minutes and it was 76.77 ± 4.83 minutes in inguinal field group. The difference in the PR (in mints) between the two groups was statistically not significant (P Value 0.122). The mean RR of subjects in the spinal group was 17.53 ± 1.43 minutes and it was 16.93 ± 1.95 minutes in inguinal field group. The difference in the RR (in minutes) between the

two groups was statistically not significant (P Value 0.179). The mean temperature of subjects in the spinal group was 98.6 ± 0 (°F) and it was 98.6 ± 0 (°F) in inguinal field group. The difference in the temperature between the two groups was statistically not significant (P Value 0.122). (Table 11)

Table 12: Comparison of local examination between the study group (N=60)

Local examination	Study group		Chi square	P-value
	Spinal (N=30)	Inguinal field block (N=30)		
Swelling				
Positive	0 (0%)	0 (0%)	*	*
Negative	30 (100%)	30 (100%)		
Skin over swelling				
Yes	29 (96.66%)	30 (100%)	*	*
No	1 (3.333%)	0 (0%)		
Cyanosis				
Yes	0 (0%)	0 (0%)	*	*
No	30 (100%)	30 (100%)		
Position of penis				
Normal	22 (73.33%)	13 (43.33%)	5.557	0.062
Shifted to left	7 (23.33%)	15 (50%)		
Shifted to right	1 (3.333%)	2 (6.666%)		

**** No statistical test was applied-due to 0 subjects in the cell***

In the spinal group, 29 (96.66%) participants had skin over swelling. In inguinal field group, all of them 100% of participants had skin over swelling. The difference in study group across the position of the penis is found to be insignificant with a P- value of 0.062, with the majority of 22 (73.33%) participants had normal in the spinal group. In the spinal group and inguinal field group, 30 (100%) participants had palpation caugh impulse and reducibility for each. In the spinal group and inguinal field group, 30 (100%) participants had per abdomen percussion and auscultation for each.(Table 12)

Table 13: Comparison of clinical impression between the study group (N=60)

Clinical impression	Study group	
	Spinal (N=30)	**Inguinal field block (N=30)**
LT-UDIH	0 (0%)	1 (3.333%)
LT-UDIIH	0 (0%)	1 (3.333%)
LT-URDIH	8 (26.66%)	4 (13.33%)
LT-URIIH	1 (3.333%)	3 (10%)
RT-URDIH	14 (46.66%)	5 (16.66%)
RT-URIIH	7 (23.33%)	16 (53.33%)

**** No statistical test was applied-due to 0 subjects in the cell***

In the spinal group and inguinal field group, 30 (100%) participants had hernioplasty.(Table 13)

Table 14: Comparison of pain score between the two groups at different follow-up time periods

Pain score	Study group		Mann Whitney U test (P value)
	Spinal Median (IQR)	**Inguinal field block Median (IQR)**	
6 hrs	3 (3, 3)	2 (2, 3)	<0.001
12 hrs	3 (2, 3)	2 (2, 2)	<0.001
18hrs	2 (2, 2)	1 (1, 2)	<0.001
24 hrs post operatively	2 (1, 2)	1 (1, 1)	<0.001

Among the people with the spinal group, the median pain score at 6 hours was 3 (IQR 3 to 3) and it was 2 (IQR 2 to 3) in people with inguinal field group. The difference in the pain score at 6 hours between two groups was statistically significant (P Value <0.001). Among the people with the spinal group, the median pain score at 12 hours was 3 (IQR 2 to 3) and it was 2 (IQR 2 to 2) in people with inguinal field group. The

difference in the pain score at 12 hours between two groups was statistically significant (P Value <0.001). Among the people with the spinal group, the median pain score at 18 hours was 2 (IQR 2 to 2) and it was 1 (IQR 1 to 2) in people with inguinal field group. The difference in the pain score at 18 hours between two groups was statistically significant (P Value <0.001). Among the people with the spinal group, the median pain score at 24 hours post operatively was 2 (IQR 1 to 2) and it was 1 (IQR 1 to 1) in people with inguinal field group. The difference in the pain score at 24 hours post operatively between two groups was statistically significant (P Value <0.001). (Table 14&Figure 9)

Figure 9: Line diagram of comparison of pain score between the two groups at different follow-up time periods (N=60)

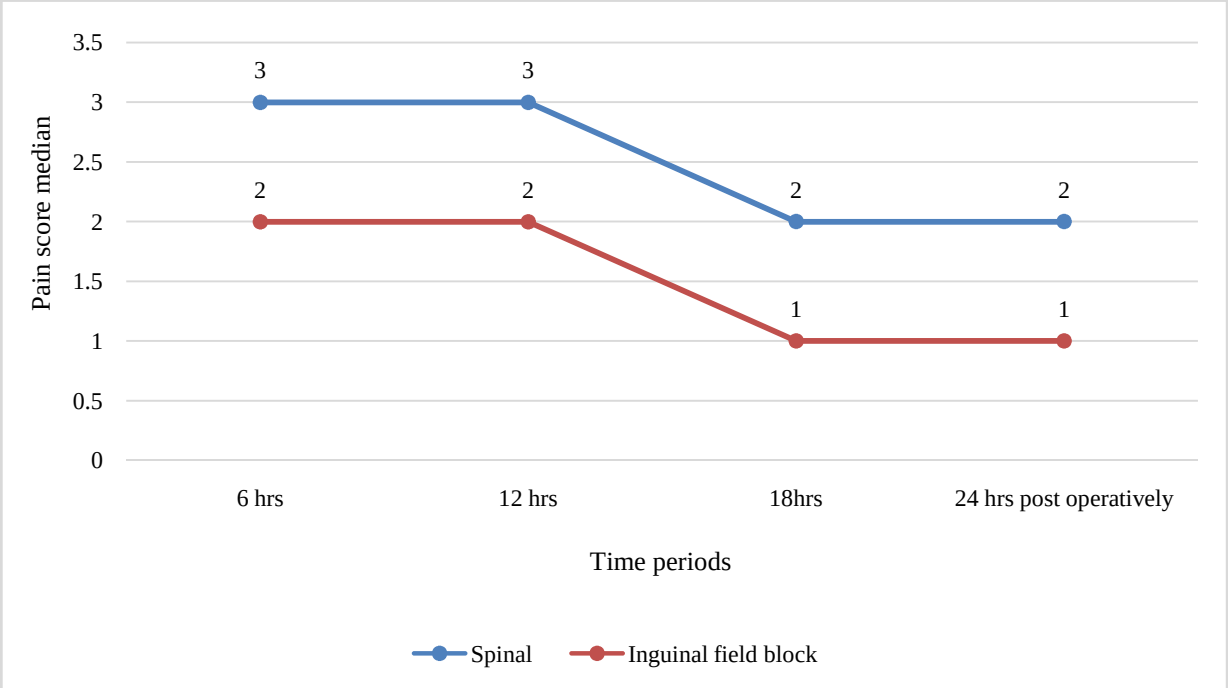
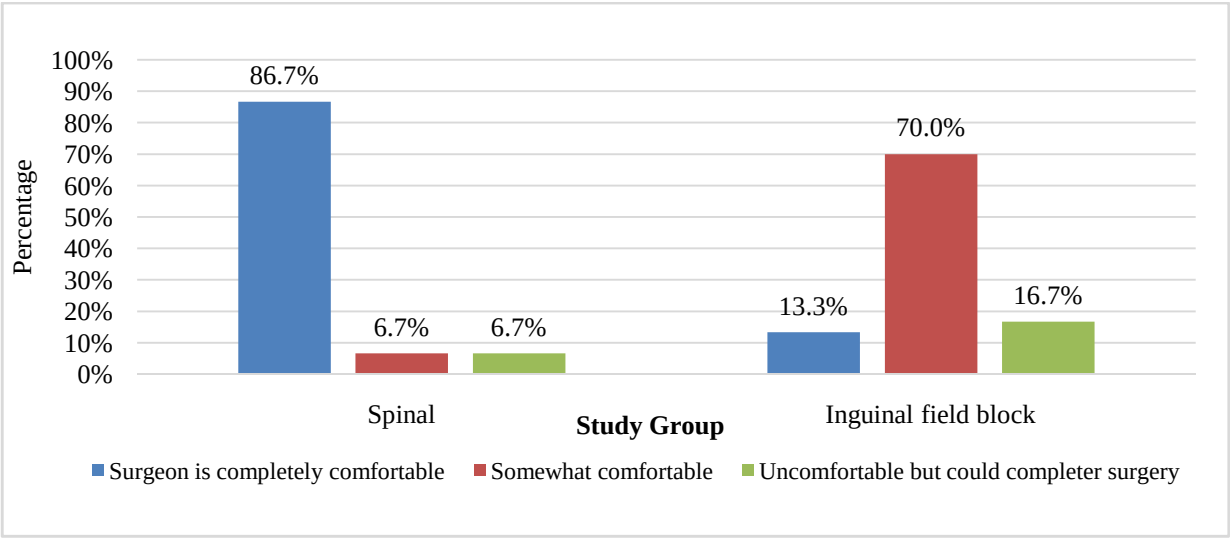


Table 15: Comparison of intraoperative effectiveness between the study group (N=60)

Intraoperative effectiveness	Study group		Chi square	P value
	Spinal (N=30)	Inguinal field block (N=30)		
Surgeon is completely comfortable	26 (86.67%)	4 (13.33%)	33.115	<0.001
Somewhat Comfortable	2 (6.67%)	21 (70%)		
Uncomfortable but could completer surgery	2 (6.67%)	5 (16.67%)		

The difference in study group between intraoperative effectiveness is found to be significant with a P- value of <0.001, with a majority of 26 (86.67%) Surgeon had completely comfortable in the spinal group. (Table 15& Figure 10)

Figure 10: Clustered bar chart of comparison of intraoperative effectiveness between the study group (N=60)



DISCUSSION

IHR is a minimal invasive surgical procedure which often requires less recovery time and return to routine work. This can be achieved by an effective anaesthetic technique with minimal side effects and post-operative care.[59] The anaesthetic technique preferred for IHD mainly depends on the specialist, the technique, duration of analgesia, pain management at both during and post- operative, and recovery time.[15, 59] Literature till date has shown general anaesthesia as the most preferred choice for IHR (60-70%), followed by spinal anaesthesia (10-20%) and local infiltration (5-10%).[60] In recent times field blocks are slowly popularising as it has benefits of low anaesthetic risk, fast ambulation, less urinary retention , good anaesthetic time and less need for analgesics.[6] Studies on inguinal field block for IHR are very scanty and in regard to this the present study aimed to evaluate the efficiency of Inguinal field block with spinal anaesthesia in inguinal hernia patients.

Total study subjects included in the study was 60. The two groups SA (spinal anesthesia) and the IFB (inguinal field block) group had 30 subjects each. The mean age of the subjects in the SA group was 46.93 ± 17.3 years and in the IFB was 39.27 ± 15.66 years. A study by Mokini et al[57], had study subjects age between 18–95 years. Another study by Sivakumar et al[6], had study subjects aged between 18-60 years.

Majority of patients from either group were an illiterate and minor number with middle school and diploma degree. The religion status of the study group was recorded, where the majority of the participants in either group were Hindus and minor were Muslims. Pseudocholinesterase deficiency can be inherited or acquired, and this is particularly encountered in Hindus especially the Visayas community and

the Jewish or the Parsi community people. Individuals who are deficient for this enzyme may be sensitive to some anaesthetic agents and muscle relaxants. The deficiency of pseudocholinesterase with the administration of succinylcholine or mivacurium often lead to respiratory failure, lengthy paralytic state and apnea. This genetic defect does not come to light until the subjects are exposed to succinylcholine or mivacurium.[61] In the present study the type of anaesthetic used was for IFB was 2% Lignocaine with 0.5% of Bupivacaine and for achieving SA 0.5 % of Bupivacaine was used. Though there were a majority of Hindus in the study groups the subjects with pseudocholinesterase enzyme deficiency were not encountered.

Majority of patients in the present study were skilled workers, with few of them unemployed and students and all the participants were of the upper lower class and lower middle class. Majority of patients had a chief complaint of swelling of groin while the history of present illness had pain history in the majority of patients and least percentage with constipation and heavy labour. Majority of subjects in the IFB group were nonvegetarians and vegetarians in the spinal group.

The vital signs among the study group, the pulse rate in the spinal group were78.63 ± 4.37 minutes and it was 76.77 ± 4.83 minutes in inguinal field group. The mean RR of subjects in the spinal group was 17.53 ± 1.43 minutes and it was 16.93 ± 1.95 minutes in inguinal field group. The mean temperature of subjects in the spinal group was 98.6 ± 0 (°F) and it was 98.6 ± 0 (°F) in inguinal field group.

The post -operative outcome of surgery noticed as swelling in the groin region, 29 of cases in the SA group had swelling and all cases in the IFB group had swelling in the

groin region. A study by Sivakumar et al[6], with 50 patients who underwent IHR under IFB had no post- operative complications recorded. In the spinal group and inguinal field group, 30 (100%) participants had palpation cough impulse and reducibility for each. In the spinal group and inguinal field group, 30 (100%) participants had per abdomen percussion and auscultation for each. Majority of patients where comfortable with spinal anesthesia procedure whereas, among the inguinal group were uncomfortable with the procedure.

The present study showed postoperative pain scores at 6hrs and 12 hrs for SA was 3 and IF (inguinal field) group was 2. Pain scores at 18 and 24 hrs the for SA group was 2 and IF group1 respectively. The pain scores at all time intervals showed statistical significance with $p<0.001$. A meta-analysis[25], of 69 studies assessed the pain with regional field techniques with spinal anaesthesia (SA). Regional technique, comparatively had better pain management postoperatively compared to SA. Another randomised study[62], comparing GA with IFB for IHR, showed less postoperative pain score, with fast ambulation, speedy recovery and no micturition problems with IFB technique. A similar study by Mokini et al[57], assessed the efficiency of IFB with SAB in IHR. But in this study the IFB technique was guided by an ultrasound. This study used numerical value scale rated by the patients (scale of 0-10) for assessing the pain the authors categorised scale as NRS, 0 = no pain, 10 = worst pain ever felt, NRS <3 slight pain, 4–5 moderate pain, and >6 severe pain. The ultrasound IFB technique had better pain control during the first post-operative day and comparatively reduced the intake of analgesics for 7 days after surgery over SAB technique. The present study the used visual analogue scale to rate the pain scores and the pain scores for IFB technique was less at 6hrs to 24 hrs post operatively, compared to SA technique.

Conclusion

Spinal anaesthesia is considered to be very effective in IHR compared to other techniques of anaesthesia. In this study the post- operative pain scores at different interval of time showed less pain in IFB group compared to SA group with no adverse events recorded with both groups.

Summary

Inguinal hernia are the most common hernias reported among the general population. The inguinal hernial repair are commonly operated by either general, spinal anaesthesia or field bocks. The anaesthetic technique used in surgeries of IHR are GA and SA. There has been vast literature comparing the feasibility and efficiency of GA and SA technique. Whereas the IFB has been least studied. Hence the present studied aimed to compare the effectiveness of inguinal field block versus spinal anaesthesia by assessing intraoperative effectiveness and post- operative pain measured by the visual analogue scale, in inguinal hernia repair.

Total study subjects included in the study was 60. The two groups SA (spinal anesthesia) and the IFB (inguinal field block) group had 30 subjects each. The mean age of the subjects in the SA group was 46.93 ± 17.3 years and in the IFB was 39.27 ± 15.66 years. Majority of patients from either group were an illiterate and minor number with middle school and diploma degree. The religion status of the study group was recorded, where the majority of the participants in either group were Hindus and minor were Muslims. Majority of patients in the present study were skilled workers, with few of them unemployed and students and all the participants were of the upper lower class and lower middle class. Majority of patients had a chief complaint of swelling of groin while the history of present illness had pain history in the majority of patients and least percentage with constipation and heavy labour. Majority of subjects in the IFB group were nonvegetarians and vegetarians in the spinal group.

The vital signs among the study group, the pulse rate in the spinal group were 78.63 ± 4.37 minutes and it was 76.77 ± 4.83 minutes in inguinal field group. The mean RR of subjects in the spinal group was 17.53 ± 1.43 minutes and it was 16.93 ± 1.95 mints in inguinal field group. The mean temperature of subjects in the spinal group was 98.6 ± 0 (°F) and it was 98.6 ± 0 (°F) in inguinal field group.

The postoperative pain scores at 6hrs and 12 hrs for SA was 3 and IF (inguinal field) group was 2. Pain scores at 18 and 24 hrs the for SA group was 2 and IF group1 respectively. The pain scores at all time intervals showed statistical significance with $p<0.001$. Hence, the IFB technique could be a better choice than SA in post- operative pain management.

Limitations:

Comparison of Variables such as duration of anaesthesia intra-operatively, duration of hospital stay, analgesic intake and the ambulatory period between SA and IFB could have yielded better results.

Recommendations:

- Inguinal field blocks techniques are not much performed by the anaesthetist which allows further studies to explore the feasibility of this technique among other techniques.
- IFB and ultrasound-guided IFB as a part of newer techniques should be considered for future research.

BIBLIOGRAPHY

1. Kingsnorth BD. Short practice of surgery. 23rd ed. London: Bailey and Love; 2000. p. 1348.
2. Kulacoglu H, Alptekin A. Current options in local anesthesia for groin hernia repairs. Acta Chir Iugosl. 2011;58(3):25-35.
3. Hair A, Duffy K, McLean J, Taylor S, Smith H, Walker A, et al. Groin hernia repair in Scotland. Br J Surg. 2000;87(12):1722-6.
4. Bay-Nielsen M, Kehlet H, Strand L, Malmstrøm J, Andersen FH, Wara P, et al. Quality assessment of 26,304 herniorrhaphies in Denmark: a prospective nationwide study. Lancet. 2001;358(9288):1124-8.
5. Prakash D, Heskin L, Doherty S, Galvin R. Local anaesthesia versus spinal anaesthesia in inguinal hernia repair: A systematic review and meta-analysis. Surgeon. 2017;15(1):47-57.
6. Shivakumar KP, Mahantesha JS, Ajjappa A. Field Block for Inguinal Hernia Repair- a Clinical Study. J Evol medi Dental Sci. 2013;2(5):452-61.
7. Sarakatsianou C, Georgopoulou S, Baloyiannis I, Chatzimichail M, Vretzakis G, Zacharoulis D, et al. Spinal versus general anesthesia for transabdominal preperitoneal (TAPP) repair of inguinal hernia: interim analysis of a controlled randomized trial. Am J Surg. 2017;214(2):239-45.
8. Sarakatsianou C, Georgopoulou S, Tzovaras G, Perivoliotis K, Papadonta ME, Baloyiannis I. Hemodynamic effects of anesthesia type in patients undergoing laparoscopic transabdominal preperitoneal inguinal hernia repair under spinal vs general anesthesia. Hernia. 2019;23(2):287-98.

9. Akcaboy EY, Akcaboy ZN, Gogus N. Ambulatory inguinal herniorrhaphy: paravertebral block versus spinal anesthesia. Minerva Anestesiol. 2009;75(12):684-91.

10. Song D, Greilich NB, White PF, Watcha MF, Tongier WK. Recovery profiles and costs of anesthesia for outpatient unilateral inguinal herniorrhaphy. Anesth Analg. 2000;91(4):876-81.

11. Mishra M, Mishra SP, Singh SP. Comparison of spinal with paravertebral block for elective open inguinal hernia repair. World J Med Res. 2016;5 (1):1-6.

12. Rosenberg J, Bisgaard T, Kehlet H, Wara P, Asmussen T, Juul P, et al. Danish Hernia Database recommendations for the management of inguinal and femoral hernia in adults. Dan Med Bull. 2011;58(2):C4243.

13. Kehlet H, Aasvang E. Groin hernia repair: anesthesia. World J Surg. 2005;29(8):1058-61.

14. Kehlet H, Bay Nielsen M. Anaesthetic practice for groin hernia repair--a nation-wide study in Denmark 1998-2003. Acta Anaesthesiol Scand. 2005;49(2):143-6.

15. Burney RE, Prabhu MA, Greenfield ML, Shanks A, O'Reilly M. Comparison of spinal vs general anesthesia via laryngeal mask airway in inguinal hernia repair. Arch Surg. 2004;139(2):183-7.

16. Rafi AN. Abdominal field block: a new approach via the lumbar triangle. Anaesthesia. 2001;56(10):1024-6.

17. Hebbard P, Fujiwara Y, Shibata Y, Royse C. Ultrasound-guided transversus abdominis plane (TAP) block. Anaesth Intensive Care. 2007;35(4):616-7.

18. O'Donnell BD, McDonnell JG, McShane AJ. The transversus abdominis plane (TAP) block in open retropubic prostatectomy. Reg Anesth Pain Med. 2006;31(1):91.

19. Elamin G, Waters PS, Hamid H, O'Keeffe HM, Waldron RM, Duggan M, et al. Efficacy of a Laparoscopically Delivered Transversus Abdominis Plane Block Technique during Elective Laparoscopic Cholecystectomy: A Prospective, Double-Blind Randomized Trial. J Am Coll Surg. 2015;221(2):335-44.

20. Chetwood A, Agrawal S, Hrouda D, Doyle P. Laparoscopic assisted transversus abdominis plane block: a novel insertion technique during laparoscopic nephrectomy. Anaesth. 2011;66(4):317-8.

21. Palumbo P, Amatucci C, Perotti B, Zullino A, Dezzi C, Illuminati G, et al. Outpatient repair for inguinal hernia in elderly patients: still a challenge? Int J Surg. 2014;12 Suppl 2:S4-7.

22. Saeed M, Andrabi WI, Rabbani S, Zahur S, Mahmood K, Andrabi SI, et al. The impact of preemptive ropivacaine in inguinal hernioplasty--a randomized controlled trial. Int J Surg. 2015;13:76-9.

23. Mireskandari SM, Karvandian K, Iranpour Y, Shabani S, Jafarzadeh A, Samadi S, et al. Comparison between General Anesthesia and Epidural Anesthesia in Inguinal Herniorrhaphy Regarding the Incidence of Urinary Retention. J Anesth Clin Res 2016;7(4):614.

24. Nordin P, Zetterstrom H, Gunnarsson U, Nilsson E. Local, regional, or general anaesthesia in groin hernia repair: multicentre randomised trial. Lancet. 2003;362(9387):853-8.

25. Joshi GP, Rawal N, Kehlet H, Bonnet F, Camu F, Fischer HB, et al. Evidence-based management of postoperative pain in adults undergoing open inguinal hernia surgery. Br J Surg. 2012;99(2):168-85.

26. Ozgün H, Kurt MN, Kurt I, Cevikel MH. Comparison of local, spinal, and general anaesthesia for inguinal herniorrhaphy. Eur J Surg. 2002;168(8-9):455-9.

27. Pere P, Harju J, Kairaluoma P, Remes V, Turunen P, Rosenberg PH. Randomized comparison of the feasibility of three anesthetic techniques for day-case open inguinal hernia repair. J Clin Anesth. 2016;34:166-75.

28. Thota RS, Sathish R, Patel R, Dewoolkar L. Taylor's approach for combined spinal epidural anesthesia in post spine surgery: A case report. Int J Anesthesiol. 2006;10(2):1-3.

29. Ozyurt G, Basagan-Mogol E, Bilgin H, Tokat O. Spinal anesthesia in a patient with severe thoracolumbar kyphoscoliosis. Tohoku J Exp Med. 2005;207(3):239-42.

30. Shoeibi G, Babakhani B, Mohammadi SS. The efficacy of ilioinguinal-iliohypogastric and intercostal nerve co-blockade for postoperative pain relief in kidney recipients. Anesth Analg. 2009;108(1):330-3.

31. Wehbe SA, Ghulmiyyah LM, Dominique el KH, Hosford SL, Ehleben CM, Saltzman SL, et al. Prospective randomized trial of iliohypogastric-ilioinguinal nerve block on post-operative morphine use after inpatient surgery of the female reproductive tract. J Negat Results Biomed. 2008;7(1):11.

32. Bischoff JM, Koscielniak-Nielsen ZJ, Kehlet H, Werner MU. Ultrasound-guided ilioinguinal/iliohypogastric nerve blocks for persistent inguinal

postherniorrhaphy pain: a randomized, double-blind, placebo-controlled, crossover trial. Anesth Analg. 2012;114(6):1323-9.

33. Willschke H, Marhofer P, Bosenberg A, Johnston S, Wanzel O, Cox SG, et al. Ultrasonography for ilioinguinal/iliohypogastric nerve blocks in children. Br J Anaesth. 2005;95(2):226-30.

34. van Schoor AN, Boon JM, Bosenberg AT, Abrahams PH, Meiring JH. Anatomical considerations of the pediatric ilioinguinal/iliohypogastric nerve block. Paediatr Anaesth. 2005;15(5):371-7.

35. Karmakar MK. Thoracic paravertebral block. Anesthesiology. 2001;95(3):771-80.

36. Tighe SQM, Greene MD, Rajadurai N. Paravertebral block. Contin Educ Anaesth Crit Care Pain. 2010;10(5):133-7.

37. Eason MJ, Wyatt R. Paravertebral thoracic block-a reappraisal. Anaesth. 1979;34(7):638-42.

38. Law LS, Tan M, Bai Y, Miller TE, Li YJ, Gan TJ. Paravertebral Block for Inguinal Herniorrhaphy: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. Anesth Analg. 2015;121(2):556-69.

39. Hadzic A, Kerimoglu B, Loreio D, Karaca PE, Claudio RE, Yufa M, et al. Paravertebral blocks provide superior same-day recovery over general anesthesia for patients undergoing inguinal hernia repair. Anesth Analg. 2006;102(4):1076-81.

40. Coveney E, Weltz CR, Greengrass R, Iglehart JD, Leight GS, Steele SM, et al. Use of paravertebral block anesthesia in the surgical management of breast cancer: experience in 156 cases. Ann Surg. 1998;227(4):496-501.

41. Baeriswyl M, Kirkham KR, Kern C, Albrecht E. The Analgesic Efficacy of Ultrasound-Guided Transversus Abdominis Plane Block in Adult Patients: A Meta-Analysis. Anesth Analg. 2015;121(6):1640-54.

42. Kwon W, Bang S, Soh H, Jeong WJ, Lee SC, Choi BJ. Abdominal peripheral nerve block as the only anesthetic technique for totally extraperitoneal endoscopic inguinal hernia repair: two case reports. Medicine (Baltimore). 2018;97(24):e10964.

43. McDonnell JG, O'Donnell BD, Farrell T, Gough N, Tuite D, Power C, et al. Transversus abdominis plane block: a cadaveric and radiological evaluation. Reg Anesth Pain Med. 2007;32(5):399-404.

44. Bellows CF, Berger DH. Infiltration of suture sites with local anesthesia for management of pain following laparoscopic ventral hernia repairs: a prospective randomized trial. JSLS. 2006;10(3):345-50.

45. Young MJ, Gorlin AW, Modest VE, Quraishi SA. Clinical implications of the transversus abdominis plane block in adults. Anesthesiol Res Pract. 2012;2012:731645.

46. Jain S, Kalra S, Sharma B, Sahai C, Sood J. Evaluation of Ultrasound-Guided Transversus Abdominis Plane Block for Postoperative Analgesia in Patients Undergoing Intraperitoneal Onlay Mesh Repair. Anesth Essays Res. 2019;13(1):126-31.

47. Sinha A, Jayaraman L, Punhani D. Efficacy of ultrasound-guided transversus abdominis plane block after laparoscopic bariatric surgery: a double blind, randomized, controlled study. Obes Surg. 2013;23(4):548-53.

48. Kıtlık A, Erdogan MA, Ozgul U, Aydogan MS, Ucar M, Toprak HI, et al. Ultrasound-guided transversus abdominis plane block for postoperative

analgesia in living liver donors: A prospective, randomized, double-blinded clinical trial. J Clin Anesth. 2017;37:103-7.

49. Thiyagarajan S, Velraj J, Hussain Ahmed MI, Murugesan R. Subarachnoid block with continuous TAP catheter analgesia produces less chronic pain and better functional outcome after inguinal hernioplasty: a randomized controlled observer-blinded study. Reg Anesth Pain Med. 2019;44(2):228-33.

50. Yildirim D, Hut A, Uzman S, Kocakusak A, Demiryas S, Cakir M, et al. Spinal anesthesia is safe in laparoscopic total extraperitoneal inguinal hernia repair. A retrospective clinical trial. Wideochir Inne Tech Malo Inwazyjne. 2017;12(4):417-27.

51. Donmez T, Erdem VM, Sunamak O, Erdem DA, Avaroglu HI. Laparoscopic total extraperitoneal repair under spinal anesthesia versus general anesthesia: a randomized prospective study. Ther Clin Risk Manag. 2016;12:1599-608.

52. Sinha R, Gurwara AK, Gupta SC. Laparoscopic total extraperitoneal inguinal hernia repair under spinal anesthesia: a study of 480 patients. J Laparoendosc Adv Surg Tech A. 2008;18(5):673-7.

53. Mughal A, Khan A, Rehman J, Naseem H, Waldron R, Duggan M, et al. Laparoscopic-assisted transversus abdominis plane block as an effective analgesic in total extraperitoneal inguinal hernia repair: a double-blind, randomized controlled trial. Hernia. 2018;22(5):821-6.

54. Khetarpal R, Chatrath V, Kaur A, Jassi R, Verma R. Comparison of Spinal Anesthesia and Paravertebral Block in Inguinal Hernia Repair. Anesth Essays Res. 2017;11(3):724-9.

55. Bakota B, Kopljar M, Baranovic S, Miletic M, Marinovic M, Vidovic D. Should we abandon regional anesthesia in open inguinal hernia repair in adults? Eur J Med Res. 2015;20(1):76.

56. Işıl CT, Çınar AS, Oba S, Işıl RG. Comparison of Spinal Anaesthesia and Paravertebral Block in Unilateral Inguinal Hernia Repair. Turk J Anaesthesiol Reanim. 2014;42(5):257-63.

57. Mokini Z, Vitale G, Aletti G, Sacchi V, Mauri T, Colombo V, et al. Pain control with ultrasound-guided inguinal field block compared with spinal anesthesia after hernia surgery: a randomized trial. Surg. 2015;157(2):304-11.

58. IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.

59. Junger A, Klasen J, Benson M, Sciuk G, Hartmann B, Sticher J, et al. Factors determining length of stay of surgical day-case patients. Eur J Anaesthesiol. 2001;18(5):314-21.

60. Callesen T, Bech K, Kehlet H. One-thousand consecutive inguinal hernia repairs under unmonitored local anesthesia. Anesth Analg. 2001;93(6):1373-6.

61. Soliday FK, Conley YP, Henker R. Pseudocholinesterase deficiency: a comprehensive review of genetic, acquired, and drug influences. Aana j. 2010;78(4):313-20.

62. Aasbo V, Thuen A, Raeder J. Improved long-lasting postoperative analgesia, recovery function and patient satisfaction after inguinal hernia repair with inguinal field block compared with general anesthesia. Acta Anaesthesiol Scand. 2002;46(6):674-8.

ANNEXURE- I – CONSENT FORM

COMPENSATION:-Taking part in the study will not affect the cost of treatment i.e. it will be similar to the cost of standard procedure. In the event that you become injured as a result of taking part in this study, treatment will be offered to you or you will be given information about where to receive medical care. But you/your insurance company will be responsible for the costs. However, no reimbursement, compensation or free medical care will be given.

CONFIDENTIALITY: - Every effort will be made to protect the confidentiality of the information you provide. This means that the researchers will not let anyone, not a part of the study, see the information you provide. Only Dr. Saipriya Natarajan and Dr. V.M Uppin will have access to the information collected. Results of this study may be published but your name will not be revealed.

VOLUNTARY PARTICIPATION / WITHDRAWAL: - Taking part in this study is voluntary; you may choose not to enroll in this study. Your decision will not change the present or future health care services offered to you at KLES Dr. Prabhakar Hospital, BELAGAVI. The alternative that you have is to undergo the traditional procedure that is carried out in KLES Hospital.

If you have any queries about the study, you may contact
If you need any further information regarding your rights as a study participant, you may also contact Dr.Roopa M. Bellad(Mobile No.9480275601), Chairman of Institutional Ethics Committee, JNMC, and Belagavi-10

INTRODUCTION AND PURPOSE:-

You are requested to participate in a study that is an attempt to find out the effectiveness of local anesthesia compared to spinal anesthesia in assessing the post operative pain in inguinal hernia repair..

Inguinal hernias comprise 96% of the groin hernia complaints. While surgical technique used to conduct inguinal hernia has advanced in recent years, the route of anesthesia administered is still in debate. Spinal anesthesia though is the standard of care for inguinal hernia repairs, it comes with its own drawbacks such as post spinal headache, increased post operative time, increased post op pain, urinary retention, increased anesthetic failures & hypotension. Local anesthesia in the other hand has good patient satisfaction, decreased post operative pain & post op stay, no urinary retention, its cost effective, simple , safe & gives extended post op analgesia.

BENEFITS: - This study aims in decreasing post operative pain in inguinal hernia repair.

RISK INVOLVED:-The side effects of this study are nil

CONSENT TO PARTICIPATE IN THE STUDY

I Mr./Ms._____ have been explained about the research study, the need of the study, the intervention, their risks, benefits and alternatives available in my own vernacular language.

I voluntarily agree to participate in this study by signing up this form below. I understand that I may withdraw at any time from this study. I have been given adequate time to clarify my doubts about the study and my rights as a study participant.

My signature / thumb impression below indicates that I have read or information in the consent been read to me including the risks and benefits and have cleared my doubts.

Name of participant: Signature/LTI:

Name of legally authorized Representative (if applicable): Relationship with participant: Signature/LTI:

Name of witness: Signature:

Name of investigator: Signature:

Date:

Place:

ANNEXURE- II – PROFORMA

PROFORMA / QUESTIONNAIRE TO BE USED FOR DATA COLLECION

The proposed proforma / questionnaire to be used for data collection for the study titled is as follows:- *A ONE YEAR STUDY TO COMPARE THE EFFECTIVENESS OF LOCAL ANAESTHESIA AND SPINAL ANAESTHESIA IN ASSESSING POST OPERATIVE PAIN IN INGUINAL HERNIA REPAIR*

- **INDIVIDUAL PATIENT-**

Name: **IP No.:**

Age: **gender:** **D.O.A:**

Address:

Education:

Religion: **Marital Status:**

Occupation: **Socio-Economic Status:**

- **CHIEF COMPLAINTS:**

- **HISTORY OF PRESENTING COMPLAINTS:**

1. **pain-**

2. swelling-

3. systemic symptoms-

4. other complaints-

❖ **PAST HISTORY** –

❖ **PERSONAL HISTORY-**

❖ **GENERAL PHYSICAL EXAMINATION**:

Pallor / Icterus / Cyanosis / Clubbing / Edema / Lymphadenopathy

Vital Signs: PR: /min; BP: mmHg; RR: /min; Temp:

❖ **LOCAL EXAMINATION-**

Position of patient:

Inspection :

1. swelling-

2. skin over swelling-

3. cough impulse-

4. position of penis –

Palpation:

1. cough impulse

2. reducibility

Percussion-

Auscultation-

❖ **PER ABDOMINAL EXAMINATION**

Inspection :

Palpation :

percussion:

Auscultation :

❖ **SYSTEMIC EXAMINATION**

CNS:

CVS:

R S:

CLINICAL IMPRESSION:

INVESTIGATIONS:

MANAGEMENT :

POST OPERATIVE PERIOD:

ASSESSMENT OF THE EFFECTIVENESS OF LOCAL ANESTHESIA(GROUP A) VS SPINAL ANESTHESIA (GROUP B) WILL BE MADE ON THE BASIS OF POST OPERATIVE PAIN USING THE VISUAL ANALOGUE SCALE.

Administration of anesthetic :

1. LOCAL ANESTHESIA: **40 ML MIXTURE OF WQUAL VOLUMES OF 2% LIGNOCAINE WITH ADRENALINE + 0.5% BUPIVACAINE.**

2. SPINAL ANESTHESIA: **3.5 ML OF 0.5% BUPIVACAINE HEAVY.**

VISUAL ANALOGUE SCALE FOR POST OPERATIVE PAIN ASSESSMENT:

0= 'no hurt'
1='hurts a little'
2='hurts little more'
3= 'hurts even more'
4='hurts a whole lot'
5='hurts worst'

These 6 categories will be collapsed into 3 categories at the time of analysis to make it less cumbersome & the results more meaningful & conducive for interpretation. The collapsed categories will be-

1-" No hurt " or " hurts a little"
2-" Hurts a little more" or " Hurts even more"
3-" Hurts a whole lot" or " Hurts worst "

pain measurement through visual analogue scale will be measured at

- 6 hrs
- 12 hrs
- 18 hrs and
- At the end of 24 hrs post operatively.

ANNEXURE- III – ETHICAL CLEARANCE LETTER

K.L.E.UNIVERSITY'S
JAWAHARLAL NEHRU MEDICAL COLLEGE,
NEHRU NAGAR, BELAGAVI-590010 (KARNATAKA-INDIA)
(Accredited 'A' Grade by NAAC)

Website: http://www.jnmc.edu
E-Mail : dome.rjnmc.edu

Phone: (+ 91-(0)831 Office : 2471350
Principal: 2471701
Fax No. +91 (0)831 – 2470759

Ref: MDC/DOME/ 20 **Date: 22/11/2017**

To,

PG student in Surgery,
J.N.Medical College,
BELAGAVI.

Sub: Institutional Ethical Clearance for the study.

With reference to the above, we wish to inform you that your proposed research project titled **"SPINAL ANESTHESIA VERSUS INGUINAL FIELD BLOCK IN ASSESSING INTRAOPERATIVE EFFECTIVENESS & POST OPERATIVE PAIN USING VISUAL ANALOGUE SCALE FOR INGUINAL HERNIA REPAIR – A ONE YEAR COMPARATIVE STUDY",** is ethical and justifiable. The proposed research project has been cleared by the JNMC Institutional Ethics Committee on Human Subjects Research.

(Dr. Arathi Darshan)
Member Secretary
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

(Dr. Roopa M Bellad)
Chairman,
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

ANNEXURE- IV – PHOTOGRAPHS

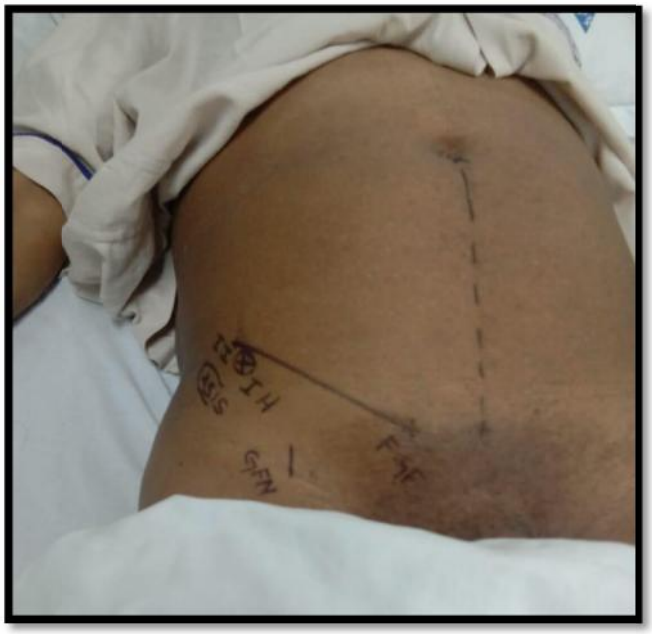
CLINICAL IMAGES:

Figure 1:

Figure 2:

Figure 3:

Figure :4



1- line joining ASIS(anterior superior iliac spine) to the pubic tubercle.
2- imaginary line drawn from pubic symphysis till the umbilicus
3- X- point where a 20G short bevel needle is inserted which is 1cm medial and inferior to ASIS.
4- II-Ilioinguinal nerve. IH-Iliohypogastric nerve
5- GFN-genital branch of genitofemoral nerve
6- FGN- femoral branch of genito femoral nerve.

Figure : 5

Figure : 6

4: MASTER SHEET

S. No	IP.No	Study group	Age	Address	Education	Religion	Marital status	Occupation	Socio economic status	Chief Complaints	Pain	Swelling
1	8,61,874	Spinal	18	bgmdist	Hight school	Hindu	Unmarried	Student	Lower middle class	swelling in rt groin	nil	present
2	8,45,181	Spinal	55	bgmdist	Middle school	Muslim	Married	Skilled Worker	Upper lower class	swelling in rt groin	nil	present
3	8,67,886	Spinal	66	bgmdist	Middle school	Hindu	Married	Unemployed	Upper lower class	swelling in lt groin	nil	present
4	8,65,627	Spinal	66	bgmdist	Illiterate	Hindu	Married	Skilled Worker	Upper lower class	swelling in rt groin	present	present
5	8,94,206	Spinal	65	RAMDURG	Illiterate	Hindu	Married	Skilled Worker	Upper lower class	swelling in lt groin	present	present
6	8,55,180	Spinal	43	bgmdist	Hight school	Hindu	Married	Skilled Worker	Lower middle class	swelling in lt groin	nil	present
7	8,46,621	Spinal	35	bgmdist	Hight school	Hindu	Married	Skilled Worker	Lower middle class	swelling in rt groin	present	present
8	8,90,626	Spinal	27	bgmdist	Hight school	Hindu	Married	Skilled Worker	Lower middle class	swelling in rt groin	nil	present
9	8,68,778	Spinal	70	bgmdist	Illiterate	Hindu	Married	Skilled Worker	Upper lower class	swelling in rt groin	present	present
10	8,78,433	Spinal	58	bgmdist	Hight school	Hindu	Married	Skilled Worker	Upper lower class	swelling in rt groin	nil	present
11	8,72,847	Spinal	45	bgmdist	Hight school	Hindu	Married	Skilled Worker	Lower middle class	swelling in rt groin	nil	present
12	#NULL!	Spinal	48	bgmdist	Hight school	Hindu	Unmarried	Student	Lower middle class	swelling in rt groin	present	present
13	8,90,349	Spinal	65	bgmdist	Illiterate	Hindu	Unmarried	Skilled Worker	Lower class	swelling in rt groin	nil	present
14	8,11,321	Spinal	50	bgmdist	Illiterate	Hindu	Married	Skilled Worker	Lower class	swelling in lt groin	nil	present
15	8,91,851	Spinal	62	bgmdist	Illiterate	Hindu	Married	Skilled Worker	Lower class	swelling in lt groin	nil	present
16	8,79,939	Spinal	45	bgmdist	Hight school	Hindu	Married	Skilled Worker	Upper lower class	swelling in rt groin	present	present
17	8,93,716	Spinal	61	bgmdist	Illiterate	Hindu	Married	Skilled Worker	Lower class	swelling in lt groin	nil	present
18	8,93,506	Spinal	70	bgmdist	Illiterate	Hindu	Married	Skilled Worker	Lower class	swelling in lt groin	nil	present
19	8,96,004	Spinal	69	bgmdist	Illiterate	Hindu	Married	Skilled Worker	Upper lower class	swelling in rt groin	nil	present
20	#NULL!	Spinal	25	bgmdist	Diploma/Intermediate	Hindu	Unmarried	Student	Lower class	swelling in rt groin	nil	present
21	8,67,546	Spinal	32	bgmdist	Illiterate	Muslim	Married	Skilled Worker	Lower class	swelling in rt groin	nil	present
22	9,11,887	Spinal	39	bgmdist	Hight school	Hindu	Married	Skilled Worker	Upper lower class	swelling in lt groin	nil	present
23	9,14,331	Spinal	17	bgmdist	Hight school	Hindu	Unmarried	Student	Upper lower class	swelling in rt groin	nil	present
24	9,16,629	Spinal	20	bgmdist	Hight school	Muslim	Unmarried	Skilled Worker	Upper lower class	swelling in lt groin	nil	present
25	#NULL!	Spinal	70	bgmdist	Illiterate	Hindu	Married	Unemployed	Lower class	swelling in rt groin	nil	present
26	9,14,745	Spinal	50	bgmdist	Hight school	Hindu	Married	Skilled Worker	Upper lower class	swelling in lt groin	nil	present

27	8,86,997	Spinal	24	bgmdist	Middle school	Hindu	Unmarried	Skilled Worker	Lower middle class	swelling in rt groin	nil	present
28	9,18,058	Spinal	40	bgmdist	Middle school	Hindu	Married	Skilled Worker	Upper lower class	swelling in rt groin	nil	present
29	8,65,361	Spinal	35	bgmdist	Primary school	Hindu	Married	Skilled Worker	Lower class	swelling in rt groin	nil	present
30	9,02,707	Spinal	38		Illiterate	Hindu	Married	Skilled Worker	Lower middle class	swelling in lt groin	nil	present
31	8,46,472	Inguinal field block	21	bgm	Graduate/Post graduate	Hindu	Unmarried	Student	Lower middle class	swelling in rt groin	nil	present
32	9,03,815	Inguinal field block	50	bgm	Middle school	Hindu	Married	Skilled Worker	Lower middle class	swelling in rt groin	nil	present
33	8,99,855	Inguinal field block	21	bgm	Diploma/Intermediate	Hindu	Unmarried	Student	Upper lower class	swelling in rt groin	nil	present
34	8,89,199	Inguinal field block	32	bgm	Primary school	Hindu	Unmarried	Skilled Worker	Upper lower class	swelling in lt groin	nil	present
35	8,63,286	Inguinal field block	34	bgmdist	Illiterate	Hindu	Married	Skilled Worker	Lower middle class	swelling in rt groin	nil	present
36	8,74,674	Inguinal field block	19	bgmdist	Diploma/Intermediate	Hindu	Unmarried	Skilled Worker	Lower middle class	swelling in rt groin	nil	present
37	8,59,412	Inguinal field block	18	bgmdist	Hight school	Hindu	Unmarried	Student	Lower middle class	swelling in lt groin	nil	present
38	8,63,137	Inguinal field block	60	bgmdist	Illiterate	Muslim	Unmarried	Skilled Worker	Upper lower class	swelling in lt groin	nil	present
39	8,62,135	Inguinal field block	48	bgmdist	Illiterate	Muslim	Married	Skilled Worker	Upper lower class	swelling in lt groin	nil	present
40	8,97,067	Inguinal field block	46	bgmdist	Illiterate	Hindu	Married	Skilled Worker	Upper lower class	swelling in rt groin	nil	present
41	8,68,456	Inguinal field block	57	bgmdist	Illiterate	Hindu	Married	Skilled Worker	Upper lower class	swelling in lt groin	nil	present
42	8,92,553	Inguinal field block	65	bgmdist	Illiterate	Hindu	Married	Skilled Worker	Lower class	swelling in rt groin	nil	present
43	8,63,286	Inguinal field block	32	bgmdist	Illiterate	Hindu	Married	Skilled Worker	Upper lower class	swelling in rt groin	nil	present
44	8,93,736	Inguinal field block	34	bgm	Hight school	Hindu	Married	Skilled Worker	Lower middle class	swelling in rt groin	present	present
45	8,79,720	Inguinal field block	19	bgm	Hight school	Hindu	Unmarried	Student	Lower middle class	swelling in rt groin	nil	present
46	8,77,539	Inguinal field block	40	bgmdist	Primary school	Hindu	Married	Skilled Worker	Lower middle class	swelling in rt groin	nil	present
47	8,80,615	Inguinal field block	26	bgm	Middle school	Hindu	Unmarried	Skilled Worker	Lower middle class	swelling in rt groin	nil	present
48	8,54,136	Inguinal field block	66	bgmdist	Middle school	Hindu	Married	Skilled Worker	Lower middle class	swelling in lt groin	present	present
49	8,88,245	Inguinal field block	37	bgm	Primary school	Hindu	Married	Skilled Worker	Lower middle class	swelling in rt groin	nil	present
50	8,76,844	Inguinal field block	38	bgmdist	Middle school	Hindu	Married	Skilled Worker	Lower class	swelling in rt groin	nil	present
51	8,95,081	Inguinal field block	23	bgmdist	Hight school	Hindu	Married	Skilled Worker	Upper lower class	swelling in rt groin	nil	present
52	8,87,866	Inguinal field block	27	bgmdist	Hight school	Hindu	Unmarried	Skilled Worker	Upper lower class	swelling in rt groin	nil	present
53	8,78,133	Inguinal field block	50	bgmdist	Hight school	Hindu	Married	Skilled Worker	Upper lower class	swelling in rt groin	nil	present
54	8,78,305	Inguinal field block	40	bgmdist	Middle school	Hindu	Married	Skilled Worker	Lower middle class	swelling in lt groin	present	present
55	8,88,868	Inguinal field block	46	bgmdist	Illiterate	Muslim	Married	Skilled Worker	Lower middle class	swelling in lt groin	present	present
56	9,01,288	Inguinal field block	35	bgmdist	Illiterate	Hindu	Married	Skilled Worker	Lower middle class	swelling in rt groin	present	present
57	8,58,056	Inguinal field block	60	bgmdist	Illiterate	Hindu	Married	Skilled Worker	Lower middle class	swelling in rt groin	present	present
58	8,72,915	Inguinal field block	18	bgmdist	Primary school	Hindu	Unmarried	Student	Lower middle class	swelling in rt groin	present	present
59	8,55,631	Inguinal field block	46	bgmdist	Middle school	Hindu	Married	Skilled Worker	Lower middle class	swelling in rt groin	nil	present
60	8,83,797	Inguinal field block	70	bgmdist	Illiterate	Hindu	Married	Skilled Worker	Upper lower class	swelling in lt groin	nil	present

S. No	Systemic symptoms	Other complaints	Diet	APP	Sleep	B/B	Habits	Pallor	Icterus	Cyanosis	Clubbing	Edema	Lymphadenopathy	PR (min)	RR (min)	Temperature (° F)	Swelling	Skin over swelling	Cough impulse	Position of penis	Palpation Caugh impulse
1	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	86	18	98.6	Positive	Yes		normal	Positive
2	constipation	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	78	20	98.6	Positive	Yes		normal	Positive
3	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	78	16	98.6	Positive	Yes		normal	Positive
4	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	81	20	98.6	Positive	Yes		normal	Positive
5	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	80	20	98.6	Positive	Yes		normal	Positive
6	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	80	16	98.6	Positive	Yes		normal	Positive
7	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	74	18	98.6	Positive	Yes		shifted to left	Positive
8	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	78	18	98.6	Positive	Yes		shifted to left	Positive
9	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	80	18	98.6	Positive	Yes		normal	Positive
10	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	78	17	98.6	Positive	Yes		normal	Positive
11	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	80	18	98.6	Positive	Yes		normal	Positive
12	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	87	16	98.6	Positive	Yes		normal	Positive
13	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	67	16	98.6	Positive	Yes		normal	Positive
14	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	80	16	98.6	Positive	Yes		normal	Positive
15	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	74	18	98.6	Positive	Yes		normal	Positive
16	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	80	17	98.6	Positive	Yes		shifted to left	Positive
17	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	76	20	98.6	Positive	Yes		normal	Positive
18	nil	nil	Non veg	Good	Adequate	Normal	Present	No	No	No	No	No	No	85	14	98.6	Positive	Yes		normal	Positive
19	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	76	18	98.6	Positive	Yes		normal	Positive
20	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	80	18	98.6	Positive	Yes		shifted to left	Positive
21	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	78	16	98.6	Positive	Yes		normal	Positive
22	heavy labour	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	76	18	98.6	Positive	Yes		normal	Positive
23	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	78	18	98.6	Positive	Yes		shifted to left	Positive
24	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	76	18	98.6	Positive	Yes		shifted to right	Positive
25	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	80	16	98.6	Positive	Yes		normal	Positive
26	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	78	18	98.6	Positive	Yes		normal	Positive
27	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	69	16	98.6	Positive	Yes		shifted to left	Positive
28	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	86	18	98.6	Positive	Yes		normal	Positive

29	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	82	18	98.6	Positive	Yes		shifted to left	Positive
30	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	78	18	98.6	Positive	No	Positive	normal	Positive
31	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	72	16	98.6	Positive	No		shifted to left	Positive
32	nil	nil	Non veg	Good	Adequate	Abnormal	Absent	No	No	No	No	No	No	76	16	98.6	Positive	No		shifted to left	Positive
33	nil	nil	Non veg	Good	Adequate	Abnormal	Absent	No	No	No	No	No	No	74	17	98.6	Positive	No		shifted to left	Positive
34	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	74	16	98.6	Positive	No		normal	Positive
35	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	80	18	98.6	Positive	No		shifted to left	Positive
36	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	80	18	98.6	Positive	No		shifted to left	Positive
37	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	72	16	98.6	Positive	No		shifted to right	Positive
38	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	73	20	98.6	Positive	No		normal	Positive
39	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	76	16	98.6	Positive	No		normal	Positive
40	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	78	20	98.6	Positive	No		normal	Positive
41	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	82	16	98.6	Positive	No		normal	Positive
42	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	74	18	98.6	Positive	No		shifted to left	Positive
43	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	74	18	98.6	Positive	No		shifted to left	Positive
44	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	72	14	98.6	Positive	No		shifted to left	Positive
45	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	78	18	98.6	Positive	No		shifted to left	Positive
46	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	70	17	98.6	Positive	No		normal	Positive
47	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	80	16	98.6	Positive	No		normal	Positive
48	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	78	20	98.6	Positive	No		shifted to right	Positive
49	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	90	12	98.6	Positive	No		normal	Positive
50	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	80	19	98.6	Positive	No		normal	Positive
51	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	82	18	98.6	Positive	No		shifted to left	Positive
52	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	70	16	98.6	Positive	No		shifted to left	Positive
53	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	76	18	98.6	Positive	No		normal	Positive
54	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	78	12	98.6	Positive	No		normal	Positive
55	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	68	18	98.6	Positive	No		normal	Positive
56	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	72	17	98.6	Positive	No		shifted to left	Positive
57	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	80	16	98.6	Positive	No		shifted to left	Positive
58	nil	nil	Veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	78	16	98.6	Positive	No		shifted to left	Positive
59	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	84	18	98.6	Positive	No		shifted to left	Positive
60	nil	nil	Non veg	Good	Adequate	Normal	Absent	No	No	No	No	No	No	82	18	98.6	Positive	No		normal	Positive

S. No	Reducibility	Inspection	Palpation	Percussion	Auscultation	CNS	CVS	RS	Clinical impression	Management	Local anesthesia
1	Positive	Negative	Negative	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	No
2	Positive	Negative	Negative	resonant	Negative	No	No	No	RT-URDIH	HERNIOPLASTY	No
3	Positive	Negative	Negative	resonant	Negative	No	No	No	LT-URDIH	HERNIOPLASTY	No
4	Positive	Negative	Negative	resonant	Negative	No	No	No	RT-URDIH	HERNIOPLASTY	No
5	Positive	Negative	Negative	resonant	Negative	No	No	No	LT-URDIH	HERNIOPLASTY	No
6	Positive	Negative	Negative	resonant	Negative	No	No	No	LT-URDIH	HERNIOPLASTY	No
7	Positive	Negative	Negative	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	No
8	Positive	Negative	Negative	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	No
9	Positive	Negative	Negative	resonant	Negative	No	No	No	RT-URDIH	HERNIOPLASTY	No
10	Positive	Negative	Negative	resonant	Negative	No	No	No	RT-URDIH	HERNIOPLASTY	No
11	Positive	Negative	Negative	resonant	Negative	No	No	No	RT-URDIH	HERNIOPLASTY	No
12	Positive	Negative	Negative	resonant	Negative	No	No	No	RT-URDIH	HERNIOPLASTY	No
13	Positive	Negative	Negative	resonant	Negative	No	No	No	RT-URDIH	HERNIOPLASTY	No
14	Positive	Negative	Negative	resonant	Negative	No	No	No	RT-URDIH	HERNIOPLASTY	No
15	Positive	Negative	Negative	resonant	Negative	No	No	No	LT-URDIH	HERNIOPLASTY	No
16	Positive	Negative	Negative	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	No
17	Positive	Negative	Negative	resonant	Negative	No	No	No	LT-URDIH	HERNIOPLASTY	No
18	Positive	Negative	Negative	resonant	Negative	No	No	No	LT-URDIH	HERNIOPLASTY	No
19	Positive	Negative	Negative	resonant	Negative	No	No	No	RT-URDIH	HERNIOPLASTY	No
20	Positive	Negative	Negative	resonant	Negative	No	No	No	RT-URDIH	HERNIOPLASTY	No
21	Positive	Negative	Negative	resonant	Negative	No	No	No	RT-URDIH	HERNIOPLASTY	No
22	Positive	Negative	Negative	resonant	Negative	No	No	No	LT-URDIH	HERNIOPLASTY	No
23	Positive	Negative	Negative	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	No
24	Positive	Negative	Negative	resonant	Negative	No	No	No	LT-URIIH	HERNIOPLASTY	No
25	Positive	Negative	Negative	resonant	Negative	No	No	No	RT-URDIH	HERNIOPLASTY	No
26	Positive	Negative	Negative	resonant	Negative	No	No	No	LT-URDIH	HERNIOPLASTY	No
27	Positive	Negative	Negative	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	No
28	Positive	Negative	Negative	resonant	Negative	No	No	No	RT-URDIH	HERNIOPLASTY	No
29	Positive	Negative	Negative	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	No
30	Positive	Negative	Negative	resonant	Negative	No	No	No	RT-URDIH	HERNIOPLASTY	No

31	Positive	Positive	Positive	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
32	Positive	Positive	Positive	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
33	Positive	Positive	Positive	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
34	Positive	Positive	Positive	resonant	Negative	No	No	No	LT-UDIIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
35	Positive	Positive	Positive	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
36	Positive	Positive	Positive	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
37	Positive	Positive	Positive	resonant	Negative	No	No	No	LT-URIIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
38	Positive	Positive	Positive	resonant	Negative	No	No	No	LT-URIIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
39	Positive	Positive	Positive	resonant	Negative	No	No	No	LT-URDIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
40	Positive	Positive	Positive	resonant	Negative	No	No	No	RT-URDIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
41	Positive	Positive	Positive	resonant	Negative	No	No	No	LT-UDIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
42	Positive	Positive	Positive	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
43	Positive	Positive	Positive	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
44	Positive	Positive	Positive	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
45	Positive	Positive	Positive	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
46	Positive	Positive	Positive	resonant	Negative	No	No	No	RT-URDIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
47	Positive	Positive	Positive	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
48	Positive	Positive	Positive	resonant	Negative	No	No	No	LT-URIIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
49	Positive	Positive	Positive	resonant	Negative	No	No	No	RT-URDIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
50	Positive	Positive	Positive	resonant	Negative	No	No	No	RT-URDIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
51	Positive	Positive	Positive	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
52	Positive	Positive	Positive	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
53	Positive	Positive	Positive	resonant	Negative	No	No	No	RT-URDIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
54	Positive	Positive	Positive	resonant	Negative	No	No	No	LT-URDIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
55	Positive	Positive	Positive	resonant	Negative	No	No	No	LT-URDIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
56	Positive	Positive	Positive	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
57	Positive	Positive	Positive	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
58	Positive	Positive	Positive	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
59	Positive	Positive	Positive	resonant	Negative	No	No	No	RT-URIIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE
60	Positive	Positive	Positive	resonant	Negative	No	No	#NULL!	LT-URDIH	HERNIOPLASTY	40 ML mixture of WQUAL volumes of 2% Lignocaine with adherence+0.5% BUPIVACAINE

S. No	spinal anesthesia	Pain score 6 hrs	Pain score 12 hrs	Pain score 18hrs	Pain score 24 hrs post operatively	Intraoperative effectiveness
1	3.5ML of 0.5% BUPIVACAINE heavy	3	3	2	2	Surgeon is completely comfortable
2	3.5ML of 0.5% BUPIVACAINE heavy	3	2	2	1	Surgeon is completely comfortable
3	3.5ML of 0.5% BUPIVACAINE heavy	3	3	2	2	Surgeon is completely comfortable
4	3.5ML of 0.5% BUPIVACAINE heavy	2	2	1	1	Surgeon is completely comfortable
5	3.5ML of 0.5% BUPIVACAINE heavy	3	2	2	2	Surgeon is completely comfortable
6	3.5ML of 0.5% BUPIVACAINE heavy	3	2	2	1	Surgeon is completely comfortable
7	3.5ML of 0.5% BUPIVACAINE heavy	3	2	2	2	Surgeon is completely comfortable
8	3.5ML of 0.5% BUPIVACAINE heavy	3	3	2	2	Surgeon is completely comfortable
9	3.5ML of 0.5% BUPIVACAINE heavy	3	2	2	2	Surgeon is completely comfortable
10	3.5ML of 0.5% BUPIVACAINE heavy	3	3	2	2	Surgeon is completely comfortable
11	3.5ML of 0.5% BUPIVACAINE heavy	3	3	2	1	Surgeon is completely comfortable
12	3.5ML of 0.5% BUPIVACAINE heavy	2	2	2	1	Surgeon is completely comfortable
13	3.5ML of 0.5% BUPIVACAINE heavy	3	3	2	2	Surgeon is completely comfortable
14	3.5ML of 0.5% BUPIVACAINE heavy	3	3	2	1	Surgeon is completely comfortable
15	3.5ML of 0.5% BUPIVACAINE heavy	3	3	2	2	Surgeon is completely comfortable
16	3.5ML of 0.5% BUPIVACAINE heavy	3	3	2	2	Surgeon is completely comfortable
17	3.5ML of 0.5% BUPIVACAINE heavy	3	3	2	2	Surgeon is completely comfortable
18	3.5ML of 0.5% BUPIVACAINE heavy	3	3	3	2	Surgeon is completely comfortable
19	3.5ML of 0.5% BUPIVACAINE heavy	3	3	2	2	Surgeon is completely comfortable
20	3.5ML of 0.5% BUPIVACAINE heavy	3	3	2	2	Surgeon is completely comfortable
21	3.5ML of 0.5% BUPIVACAINE heavy	3	2	1	1	Surgeon is completely comfortable
22	3.5ML of 0.5% BUPIVACAINE heavy	3	2	2	2	Surgeon is completely comfortable
23	3.5ML of 0.5% BUPIVACAINE heavy	3	3	2	2	Surgeon is completely comfortable
24	3.5ML of 0.5% BUPIVACAINE heavy	3	3	2	2	Surgeon is completely comfortable
25	3.5ML of 0.5% BUPIVACAINE heavy	3	2	2	1	Surgeon is completely comfortable
26	3.5ML of 0.5% BUPIVACAINE heavy	999	999	999	999	999
27	3.5ML of 0.5% BUPIVACAINE heavy	999	999	999	999	999
28	3.5ML of 0.5% BUPIVACAINE heavy	999	999	999	999	999
29	3.5ML of 0.5% BUPIVACAINE heavy	999	999	999	999	999
30	3.5ML of 0.5% BUPIVACAINE heavy	3	3	2	1	Surgeon is completely comfortable

31	No	2	2	1	1	Somewhat comfortable
32	No	3	2	1	1	Somewhat comfortable
33	No	3	3	2	1	Uncomfortable but could completer surgery
34	No	3	2	2	1	Somewhat comfortable
35	No	2	2	1	1	Somewhat comfortable
36	No	3	2	1	1	Somewhat comfortable
37	No	3	2	1	1	Uncomfortable but could completer surgery
38	No	2	2	1	1	Somewhat comfortable
39	No	1	1	1	1	Surgeon is completely comfortable
40	No	2	2	1	1	Surgeon is completely comfortable
41	No	2	2	1	1	Somewhat comfortable
42	No	2	2	1	1	Somewhat comfortable
43	No	1	1	1	1	Uncomfortable but could completer surgery
44	No	2	2	1	1	Somewhat comfortable
45	No	3	2	2	1	Somewhat comfortable
46	No	3	3	2	2	Somewhat comfortable
47	No	2	2	1	1	Surgeon is completely comfortable
48	No	2	2	1	1	Somewhat comfortable
49	No	2	2	2	1	Uncomfortable but could completer surgery
50	No	3	3	2	1	Somewhat comfortable
51	No	3	2	2	2	Somewhat comfortable
52	No	2	2	1	1	Surgeon is completely comfortable
53	No	3	2	2	1	Somewhat comfortable
54	No	3	2	2	2	Somewhat comfortable
55	No	2	2	1	1	Somewhat comfortable
56	No	3	2	2	1	Somewhat comfortable
57	No	1	1	1	1	Somewhat comfortable
58	No	2	2	1	1	Somewhat comfortable
59	No	2	1	1	1	Somewhat comfortable
60	No	2	2	1	1	Uncomfortable but could completer surgery