



COMPARISON OF INGUINAL HERNIA REPAIR UNDER LOCAL ANAESTHESIA VERSUS SPINAL ANAESTHESIA

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ABSTRACT **Background:** Inguinal hernia is one of the most common diseases in the males. Treatment of this pathology is exclusively surgical. While in the past hernia surgery was carried out mainly under general and spinal anaesthesia, in recent years there has been growing emphasis on the role of local anaesthesia. Local anaesthesia for inguinal hernia repair is cost-effective, but fear of intra-operative pain may hinder its widespread use. **Objectives:** To evaluate the safety and effectiveness of inguinal hernia repair under local anaesthesia. To compare the inguinal hernia repair under local anaesthesia versus spinal anaesthesia in relation with post operative pain, complications and hospital stay. **Material and Methods:** This prospective study comprised of 50 cases of inguinal hernia which were randomly divided into two groups of 25 each named group A and group B. Inguinal hernia mesh repair was done under local anaesthesia in group A and under spinal anaesthesia in group B. All the parameters were recorded intra and postoperatively in both groups. Data was compiled and subjected to statistical analysis by using "paired student t test". **Conclusion:** Tension-free mesh repair under local anaesthesia is simple, safe, cost effective, very low rates of complications and a speedy discharge.

KEYWORDS :

INTRODUCTION

Inguinal hernia is a common condition occurring in both the sexes and at all ages. The life time risk for inguinal hernia in men is 27% and for women is 3%.

The presence of a hernia is of itself was an indication for surgical intervention to avoid the potential complication of obstruction and strangulation in the past century. Recently this view has been changed to immediate elective repair versus a wait and watch approach for asymptomatic groin hernias.

The goal of hernia repair should be the restoration of the normal anatomic relationships in the area with elimination of fascial defects which could serve as a focal point for incarceration of abdominal contents.

The pre-operative work up for a patient undergoing herniorrhaphy depends not only upon the patient's medical condition and risk factors but also on the type of anaesthesia to be used. The type of anaesthesia to be used should be chosen after discussion among the surgeon, the anaesthetologist and the patient. The surgeon's and the patient's preference for a particular type of anaesthesia plays a major role in the decision.

In this study we have chosen hernia repair under local anaesthesia because of all the technique it has the least impact on the function of other organ systems, simplifying the task of patient selection and pre operative evaluation.

The reason for using inguinal field block in groin hernia repair is in addition to simplicity and safety, the great advantage of local anaesthesia is the ability to produce relatively long lasting pain relief, low risks of cardiovascular instability and urinary retention in the post operative period as well as prompt resumption of unrestricted physical activity by the patient.

The two essential criteria for the choice of anaesthetic technique for a given surgical operations are patient safety and the provision of optimum operating conditions for the surgeon.

AIM OF THE STUDY

1. To evaluate the safety and effectiveness of inguinal hernia repair

under ultrasound guided local anaesthesia

- To compare the inguinal hernia repair under ultrasound guided local anaesthesia versus spinal anaesthesia in relation with post operative pain, complications and hospital stay.

DIAGNOSIS AND CLASSIFICATION

Expansile impulse on coughing at the site of normal hernia orifices.

Inguinal hernia- Incomplete

Complete

Inguinal hernia- Indirect

Direct

S.No.	Indirect hernia	Direct hernia
1.	Any age	Elderly people
2.	Males are affected 20 times more commonly than females	Females are not affected
3.	In 2/3 rds of cases it is unilateral only in 1/3 rd cases both sides are involved	More than half the cases are bilateral
4.	Frequently the hernia is complete with pyriform shape. When in complete it is oval shaped. The hernia descends obliquely downwards and medially	The hernia is always incomplete and it is of spherical shape. This hernia appears as a forward bulge
5.	Reduces on manipulation	Reduces spontaneously
6.	Zieman technique - cough impulse is felt on the index finger	Impulse is felt on the middle finger
7.	Invagination test - the finger goes upward, backwards and outwards	Finger goes directly backwards
8.	Ring occlusion test- Hernia will not bulge out	A bulge is present medial to the occluding finger
9.	Sac is antero lateral to the cord structures	Sac is postero medial to the cord structures
10.	Sac is covered by all the layers	Sac is not covered by the internal spermatic fascia and the cremasteric fascia
11.	Sac may be congenital or acquired	Sac is always acquired
12.	Inferior epigastric artery is medial to the sac at the neck	Inferior epigastric artery is lateral to the sac at the neck

13.	Neck is narrow	Neck is wide
14.	Conventionally the sac is excised	Usually the sac is not excised
15.	Chances of strangulation are high	Chances of strangulation are less

Nyhus Classification – 1993

Type I- Indirect, small - normal internal ring, sac in Canal

Type II- Indirect, Medium - Enlarged internal ring sac not in scrotum

Type III- A- Direct, floor only

B- combined- Indirect, large encloaching into direct, floor

C - Femoral

Type IV-Recurrent

A Direct

B Indirect

C Femoral

D Combination of A-B-C

Local Anaesthetic Block For Hernioplasty

Definition:

Local anaesthesia is a transient reversible loss of all modalities of sensation including pain, touch, temperature and pressure in a circumscribed anatomical area due to interruption of peripheral nerve conduction to CNS without loss of consciousness.

Composition Of L.a. Solution

No.	Component	Name	Function	Concentration
1	LA agent	Lignocaine	Provides local analgesia	Ligno caine 2% with adrenaline 1 : 100000 conc conc- 2.23ug/ml
2	Vaso constriction	Adrenaline	1.Decreases absorption of L.A 2.prolongs duration of action 3.Decreases toxicity of L.A 4.causes vaso constriction	Solution with 1: 200000 conc is equal to 0.05 mg/ml
3.	Reducing agent	Sodium meta bi sulphate	Vaso constrictor present in solution is unstable and may oxidize on exposure to sun. The agent competes with vaso constrictor for sunlight	0.5 mg / ml
4.	Preservative	Methyl paraben	Added to give shelf life of 2 years or more. Causes allergy	1 mg / ml
5.	Fungicide	Thymol	-	-
6.	Salt	Na cl	Makes the solution iso tonic	5 – 6 mg
7.	Vehicle	Distilled water	-	-

Lignocaine :

Amide linked drug

- Intermediate potency and duration
- 3 mg / kg body weight
- 7 mg / kg body weight if adrenaline is added

onset of action- within 3 minutes

Usual duration- 1 hour to 1hr 30 minutes

With adrenaline- 2 hours

Concentration for field block- 0.5 to 1 %

1 % containing lignocaine Hcl - 10 mg / ml & Adr 5 micro g / ml

Maximum recommended dose in adults- 200 mg

Bupi vaccine

- Amide linked drug
- High potency with long duration

Duration of action- 3 – 6 hours

Dose- 2 mg / Kg body wt

Available as- 0.25 % or 0.5 % solution Addition of adrenaline does not increase the duration.

0.5 % solution – Bupi vaccine 5 mg / ml

Spinal Anaesthesia

Spinal anesthesia involves administering local anesthetic into the subarachnoid space.

Anatomy

1. The spinal canal extends from the foramen magnum to the sacral hiatus. The boundaries of the bony canal are the vertebral body anteriorly, the pedicles laterally, and the spinous processes and laminae posteriorly

Vertebral anatomy.

2. Three interlaminar ligaments bind the vertebral processes together:
 - a. Superficially, the supraspinous ligament connects the apices of the spinous processes.
 - b. The interspinous ligament connects the spinous processes on their horizontal surface.
 - c. The ligamentum flavum connects the caudal edge of the vertebrae above to the cephalad edge of the lamina below. This ligament is composed of elastic fibers and is usually recognized by its increased resistance to the passage of a needle.
3. The spinal cord extends the length of the vertebral canal during fetal life, ends at about L3 at birth, and moves progressively cephalad to reach the adult position near L1 by 2 years of age. The conus medullaris, lumbar, sacral, and coccygeal nerve roots branch out distally to form the cauda equina. Spinal needles are placed in this area of the canal (below L2) because the mobility of the nerves reduces the danger of trauma from the needle.
4. The spinal cord is invested in three meninges:
 - a. The pia mater.
 - b. The arachnoid, which lies between the pia and the dura mater.
 - c. The dura mater, which is a tough fibrous sheath running longitudinally the length of the spinal cord and is tethered caudally at S2.
5. The subarachnoid space lies between the pia mater and the arachnoid and extends from the attachment of the dura at S2 to the cerebral ventricles above. The space contains the spinal cord, nerves, cerebrospinal fluid (CSF), and blood vessels that supply the spinal cord.
6. CSF is a clear colorless fluid that fills the subarachnoid space. The total volume of CSF is 100 to 150 mL, whereas the volume in the spinal subarachnoid space is 25 to 35 mL. CSF is continuously formed at a rate of 450 mL/day by secretion or ultrafiltration of plasma from the choroid arterial plexuses located in the lateral, third, and fourth ventricles. CSF is reabsorbed into the bloodstream through the arachnoid villi and granulations that protrude through the dura to lie in contact with the endothelium of the cerebral venous sinuses.

MATERIAL AND METHODS

This prospective study was conducted in Madurai Medical College Madurai for a period from September 2016 to August 2017 this study included 50 cases of inguinal hernia. After admission to the hospital detailed history was taken and thorough clinical examination was done. Routine investigations like hemoglobin, total leucocyte count, differential leucocyte count, erythrocyte sedimentation rate, random blood sugar, renal function tests chest X- ray and electrocardiogram were done in every case. Written consent was taken in every case. Patients were divided randomly into two groups of 25 each named Group A and Group B. Patients in group A were subjected to inguinal hernia mesh repair under local anaesthesia and patients in group B were subjected to inguinal hernia mesh repair under spinal anaesthesia. In group A patients, anaesthetic solution was consist of 50:50 mixture of 1% xylocaine and 0.5% bupivacaine with 1:2, 00,000 epinephrine. A skin wheal was raised cm from the iliac crest along the line joining anterior superior iliac spine to umbilicus. A needle was then passed through this to strike the inner surface of ilium just below the crest. 10 ml of the solution was deposited as needle was slowly withdrawn. The injection was repeated with the needle reinserted at a slightly steeper angle and 5 ml of solution was deposited. Second point of block was 2cm above the mid inguinal point. The needle was inserted perpendicularly until it pierced the aponeurosis of external oblique. 10 ml of solution was deposited at this depth and 5 ml as needle was withdrawn over 2 cm. Next a wheal was raised over the pubic tubercle

and subperiosteal injection of 3 cc of solution was made. The block was completed by a subcutaneous infiltration along the line of surgical incision and 10 ml of solution was deposited.

In group B patients, regional anaesthesia in the form of spinal was given by using 0.5 % bupivacaine. Under all aseptic conditions subarachnoid puncture was performed using a midline lumbar approach with patient in sitting or lateral position. Using 26 gauge spinal needle in L₃ – L₄ interspace. 12.5mg (2.5cc) of 0.5 % bupivacaine was injected in subarachnoid space after getting free flow of cerebrospinal fluid (CSF). Patient was turned supine. In case of inadequate or no effect local or spinal anaesthesia was converted into general anaesthesia and patient was not included in the study.

Exclusion Criteria:

1. Complicated hernia like
Irreducible hernia,
Obstructed hernia,
Strangulated hernia
All patients who underwent emergency operations.
2. Patients who underwent bilateral herniorrhaphy,
3. Previous appendectomy.
4. Recurrent hernia.
5. Obese patients
6. Huge hernia
7. Groin hernia other than inguinal hernia
8. Anxious patients and refused to give consent

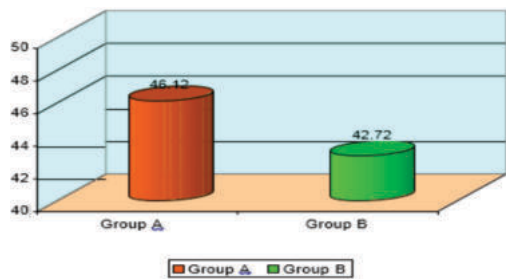
Tension free Lichtenstein hernioplasty was done in both groups Material used for hernioplasty was Polypropylene Prosthetic mesh with dimensions of 15x7.5cm. After the surgery following observations were made:- Any pain or discomfort to the patient during surgery under local anaesthesia.

Post operative, Pain at the incision site, Urinary retention , Wound haematoma, Sepsis, Headache , Testicular pain/Swelling. Follow up of the patients were carried out on 3rd and 7th postoperative days as out patient. In follow up patients were assessed for any wound sepsis, persistent pain at incisional site and any other complication. All the data collected was statistically analysed by using the “Paired Student t test”. The post operative pain, complications and hospital stay were compared in the two groups A & B.

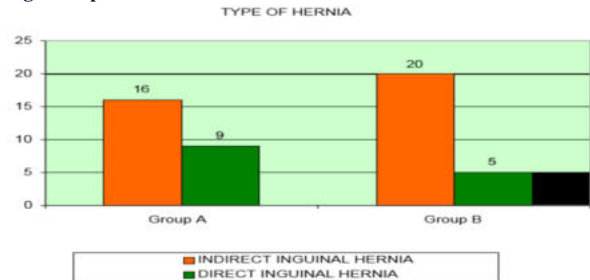
OBSERVATION AND RESULTS

TABLE -1

AGE	Group A	Group B
Mean	46.12	42.72
SD	15.26	14.255
p value	0.42 Not significant	
minimum age	18	24
maximum age	75	76



Age Comparison



Type Of Hernia

TABLE -2

TYPE OF HERNIA	Group A	Group B
INDIRECT INGUINAL HERNIA	16	20
DIRECT INGUINAL HERNIA	9	5
Total	25	25

TABLE -3

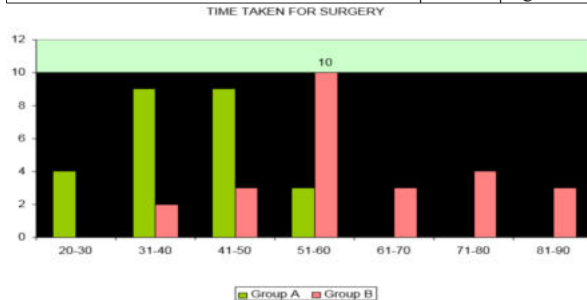
SIDE	Group A	Group B	Group A %	Group B %
RIGHT	17	15	68	60
LEFT	8	10	32	40
Total	25	25	100	100



Side Comparison

TABLE -4

TIME TAKEN FOR SURGERY IN MINUTES	Group A	Group B
20-30	4	0
31-40	9	2
41-50	9	3
51-60	3	10
61-70	0	3
71-80	0	4
81-90	0	3
Total	25	25
MEAN	40.32	61.52
SD	10.015	14.344
P	<0.001	Significant



MEAN SURGERY TIME IN MINUTES

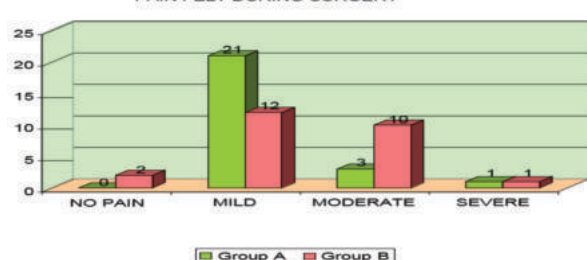
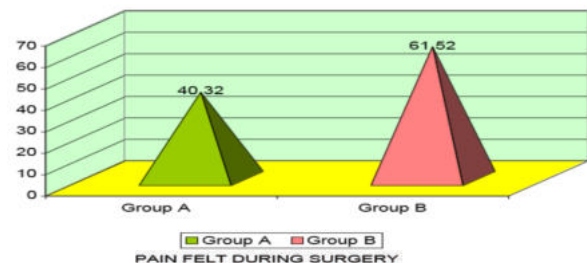
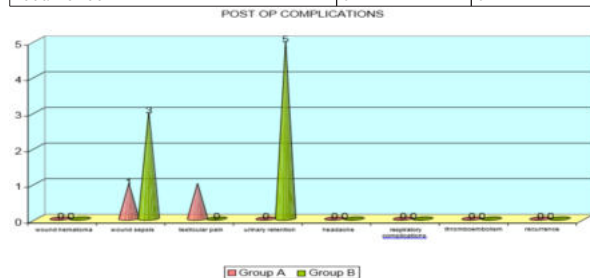


TABLE – 5

Pain Felt During Surgery Using Pain Scale	Group A	Group B
NO PAIN	0	2
MILD	21	12
MODERATE	3	10
SEVERE	1	1
Total	25	25

TABLE - 6

POST OP COMPLICATIONS	Group A	Group B
wound hematoma	0	0
wound sepsis	1	3
testicular pain	1	0
urinary retention	0	5
headache	0	0
respiratory complications	0	0
thromboembolism	0	0
recurrence	0	0



Post Op Complications

DISCUSSION

In present study the age of the patients in group A was in the range of 22-77 years and in group B was 18-76 years. The mean age was 46.2±16.64 years in group A and 42.56±16.71 years in group B. All the patients were male. The study conducted by Kark AE et al (1998) showed that out of total 3175 patients, 97% of the patients operated were males and ranged between 15-92 years of age. The study conducted by Song et al (2000) included 50 patients with mean age of patients 42±18 years in the group operated under local anaesthesia and 39±14 years in the group operated under spinal anaesthesia. 43 patients were males and 7 were females. Several other studies like by Ryan et al (1984), Young Dy (1987), O' Dwyer et al (2002), Erdem F (2003) 16 also showed similar results. Age and sex incidence of patients in our study were similar to that in other studies. In this present study 16(64%) patients had indirect inguinal hernia in group A and 20(80%) patients in group B. Direct type of inguinal hernia was present in 9(36%) patients of group A and 5(20%) patients of group B. The results of our study were almost similar to the other studies.

In present study 17(68%) patients in group A and 15(60%) patients in group B had right sided inguinal hernia. Left sided hernia was present in 8(32%), patients in group A and 10(40%) in group B. The results of present study were comparable to the studies conducted by others. Right side of inguinal hernia is more common due to the later descent of right testis and high incidence of patent processus vaginalis on the right side. In present study the mean operative time was 42.8±8.6 minutes in group A and 64.45±13.7 minutes in group B. The results of our study were similar to the other studies conducted by Song et al (2000), Job C et al (1979) 2 and Young DV (1987) 2.

Pain is the most common concerned factor to the patient undergoing surgery. Although pain is typically regarded as primary indicator of tissue damage, it does not always correlate with an identifiable causative injury. The perception of pain is supported by sensory neurons (nociceptors) and neural afferent pathways. In the present study in group A, 17(68%) patients felt mild pain and five (20%) patients felt moderate pain. However in group B, 11(44%) patients felt mild pain and 14(56%) patients felt moderate pain. The difference is statistically significant. The results of our study were comparable to other studies. The study conducted by Earle AS (1960) 124 on 46 patients showed 23 (50%) patients experienced slight pain and remaining 23 (50%) felt no pain during inguinal hernia repair under local anaesthesia. Study done by Baskerville PA et al (1983) on 129 patients operated under local anaesthesia demonstrated that 93% patients felt no pain during operation and 7% said operation was painful. Pain during operation is felt in of large hernia operated under

local anaesthesia, if dissection is difficult due to adhesions of the sac, and this may lead to conversion of local anaesthesia to general anaesthesia. If local anaesthesia is given by experienced surgeon, it is well accepted by the patients. Studies done by Wellword et al (1998) 27, Amid P et al (1998), Song D et al (2000), Callesen T et al (2001) 6 demonstrated that conversion of local anaesthesia to general anaesthesia was because of pain during dissection or reposition of the hernia sac. The inguinal hernia repair is a common surgery with almost no mortality. The emphasis is on low rates of recurrence and other complications like wound haematoma, wound sepsis, testicular pain swelling, urinary retention, headache and respiratory complications. The choice of anaesthesia and surgical technique depend on low complication rates. In present study wound sepsis was present in 1 (4%) patient of group A and 3 (12%) patients of group B. No patients in either group had wound haematoma. The results of our study were comparable to the other studies. In the present study there was no urinary retention in group A patients whereas 5 (20%) patients of group B had urinary retention after surgery. Accumulated data from other hernia literature suggest that incidence of urinary retention is lowest with local anaesthesia compared with both regional and spinal anaesthesia. Results of present study were similar to the studies conducted by Teasdale et al (1982), Young DV (1987) 2, Callesen et al (2001) 6 others. Although the exact cause of high frequency urinary retention in spinal anaesthesia group patients is not known, it is thought to be secondary to prolonged block of bladder autonomic innervation. It may be also related to age of the patient and volume of fluid received. Fluids restriction during operation can reduce the risk of urinary retention.

CONCLUSION

The Lichtenstein tension free hernioplasty under local anaesthesia (Ultrasound guided) has opened a new era in hernia surgery without the risk of serious morbidity. This procedure offers an extremely safe day care operation for the adults and very old with disabling disease. It is an inexpensive and effective procedure and the economic benefits are enhanced by the low morbidity, low recurrence rate, and early return to normal activities. It results in faster short-term recovery, speedier discharge, less anaesthesia related complications. In times to come it may be considered as the gold standard procedure for groin hernia repair.

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