A DISSERTATION ON

COMPARATIVE STUDY OF LICHTENSTEIN' S HERNIA REPAIR UNDER LOCAL ANAESTHESIA AND SPINAL ANAESTHESIA

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For the awards of the degree of

M.S. DEGREE BRANCH – I

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MAY 2018

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MEDICAL COLLEGE, SALEM

GOVERNMENT MOHAN KUMARAMANGALAM MEDICAL COLLEGE, SALEM

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*I solemnly declare that this dissertation "**COMPARATIVE STUDY OF LICHTENSTEIN' S HERNIA REPAIR UNDER LOCAL ANAESTHESIA AND SPINAL ANAESTHESIA" IN GOVERNMENT MOHAN KUMARAMANGALAM MEDICAL COLLEGE, SALEM** is a bonafide and genuine research work carried out by me under the guidance and supervision of **Prof Dr.C.RAJASEKARAN, M.S, Professor and Head of Department,** Department of General Surgery, Government Mohan Kumaramangalam Medical College Hospital, Salem, Tamil Nadu, India.*

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Date : 17/10/17

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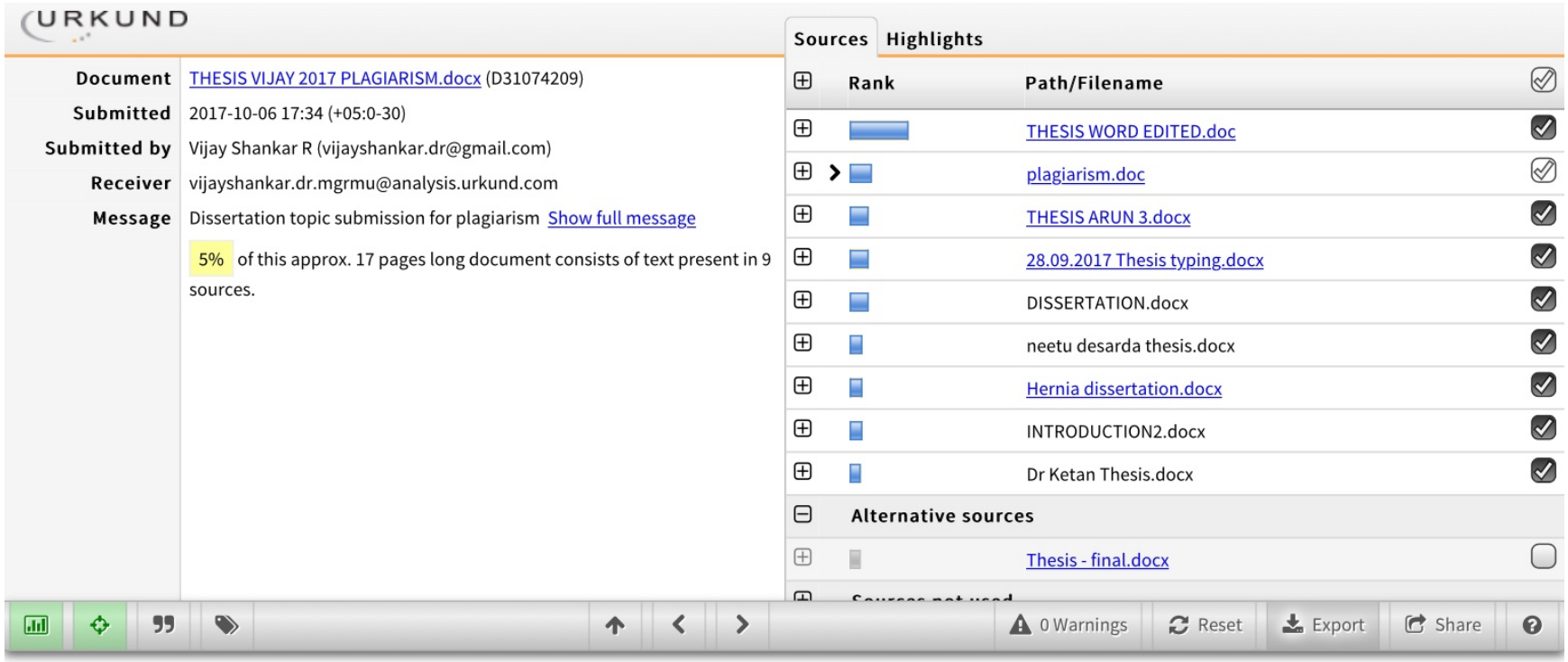

SKIN AND SUBCUTANEOUS TISSUE

The superficial fascia consists of two layers – superficial fatty layer Camper's and deep membranous layers called Scarpa's fascia.

When traced upwards Scarpa's fascia merges with the fatty layer and when traced downwards near the midline it passes across the pubic symphysis over the penis and in to the scrotum as Colle's fascia and laterally as fascia lata in thigh. The layer ends at a short distance below the inguinal ligament, fusing with the deep fascia along with horizontal line extending laterally from the pubic tubercle and the line of fusion is Holden's line.

Fig : 3 Arrangement of muscles above and below arcuate line

Fig : 4 Anterior abdominal wall muscles origin and insertion EXTERNAL OBLIQUE MUSCLE

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Name of the Presenter with Address	Title	Name of the Guide and Address	Whether it is Approved or not.
Dr. R. Vijayshankar, I Year, Post Graduate Student of MS (General Surgery), GMKMC, Salem-30.	"Comparative Study on Lichiensteins Repair Done Under Local Anaesthesia and Spinal Anaesthesia in GMKMCH, SALEM."	Dr. N. Tamilselvan, MS., Professor of General Surgery, GMKMC, Salem.	Approved

The Ethical Committee examined the studies in detail and is pleased to accord Ethical Committee approval for the above Post Graduate student of this College to carry out the studies with the following conditions.

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R. Vijay 6/1/16

To
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ABSTRACT

Inguinal hernia is one of the most common disease in male population. Treatment is surgical. While in the past, hernia surgery was done under general and spinal anaesthesia , in recent years the role of local anaesthesia plays a major role in terms of cost effectiveness, patients cooperation on table and time saved during surgery.

Aim of the study:

To compare safety and effectiveness of lichtenstein repair under local anaesthesia versus spinal anaesthesia in relation with post operative pain , complications and hospital stay

MATERIALS AND METHODS:

This prospective study of 50 cases of unilateral inguinal hernia admitted in Government Mohan Kumaramangalam Medical College Hospital, Salem was done in the period from DECEMBER 2015 to SEPTEMBER 2017. The cases were evaluated through proper history taking, clinical examination, operative procedure and post operative follow ups.

OBSERVATION:

In our study the mean age in group A was 44.36+/-11.69 and in group B was 40.44+/-10.18.Incidence of indirect inguinal hernia was common in age group of 21 to 45 years in group A and 22 to 47 years in group B.Direct hernia incidence was common in age group 47 to 71 years.

The time taken for hernioplasty under local anaesthesia was from 40 mins to 70 mins but to finish under spinal anaesthesia was prolonged from 40 mins to 100 mins.Hence local anaesthesia was a better choice.

The pain felt during surgery was significantly less in group A when compared to group B.Postop pain was measured using the visual analogue scale at 12 hrs , 24 hrs and 48 hrs.Mean pain was significantly less in group A as compared to group B.

Post operative complication were high in group B when compared to group A.Patients had complications like urinary retention ,headache.Spinal anesthesia related complications were high.

The number of analgesic doses received postoperatively was more in group A was very less compared to group B.Around 8 patients in group B received 5 to 6 analgesic doses postoperatively.Mean analgesic dose

received in group A patients (2.12+/-1.23) as compared to group B patients ((3.44+/-1.58)

Number of days of hospital stay was significantly less in group A when compared to group B.19 patients in group B had to stay 3 to 5 days in the hospital whereas in group A most of the patients were discharged on day 1 or 2.

Group A patients were cost effective than group B when the drugs used, number of analgesic doses used and number of days of hospital stay are considered.

CONCLUSION:

Lichtenstein tension free hernioplasty under local anaesthesia is an extremely safe day care operation .It is inexpensive and effective procedure and the benefits are low morbidity and early return to normal activities.It results in faster recovery speedy discharge and less anaesthesia related complications.

KEYWORDS

Inguinal hernia , mesh repair , local anaesthesia , spinal anaesthesia

CONTENTS

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LIST OF ABBREVIATIONS USED

Yrs-years

No of-number of

DOA-date of admission

DOS-date of surgery

DOD-date of discharge

DM-diabetes mellitus

RR-respiratory rate

BP-blood pressure

P/R-per rectum

Hb-hemoglobin

ECG-electrocardiogram

USG-ultrasound

SA-spinal anesthesia

LA-local anesthesia

THE KEY TO MASTER CHART

M-male

Y-years

NP-no pain

MI-mild pain

MD-moderate pain

WH-wound hematoma

TP-testicular pain

UR-urinary retention

HD-headache

INTRODUCTION

The saying goes “The history of hernia repair is the history of surgery”. The history of open hernia repair has gone through many stages of development beginning from the times of Greek, Romans and Egyptians. Hernia surgery saw an evolution in 19th century with the initial description by Marcy and Bassini.

HERNIA in latin means to TEAR or RUPTURE. It was actually derived from the greek word meaning to offshoot or to bulge. It is defined as an abnormal protrusion of the part or whole of a viscus through the wall of its containing cavity.

Elective inguinal hernia repair is the most commonly performed operation in general surgery. Patient safety and provision of optimum operating condition are the main criteria for the choice of anaesthetic technique. Inguinal hernia repair can be performed by using a variety of anaesthetic techniques such as general anaesthesia, regional anaesthesia in the form of spinal or epidural anaesthesia, paravertebral block and local anaesthesia. General and regional anaesthesia cause hemodynamic changes during induction and maintainence. However in developing countries like india, generalanaesthesia and regional anaesthesia are commonly used.

Local anaesthesia has been found to be the best anaesthesia for inguinal hernia repair. Studies comparing the recovery period of local, general and regional anaesthesia have shown that local anaesthesia is ideal for day care surgery. Local anaesthesia provides increased safety for patients, better post operative pain control and shorter recovery period, reduced duration of hospital stay and reduced cost hence local anaesthesia is acceptable and safe technique for inguinal hernia surgery.

REVIEW OF LITERATURE

HISTORY

Nyhus in 1989 said “My concerns relative to potentially increased incidence of infection or rejection of polypropylene mesh have not been warranted to date”

- Neumayer demonstrated in clinical trials that recurrence rate is higher for laproscopic inguinal hernia repairs when compoared to open repair

- Bassini asserted hernia as a mechanical disease caused by error of placing or moving of abdominal bowel, now it is indispensable to restore hernia to a condition able to regain its natural healthy state.

- In 1889 bassini published a study on 262 cases of hernia which were operated with low mortality and few recurrences

- In 1950s shouldice suggested a modification of bassini technique which consisted of two continuous sutures on deeper planes. one consists of fascia transversalis and iliopubic tract

and other consists of fascia transversalis,conjoint tendon and inguinal ligament.

- Halsted operation consists of placing the cord under the external oblique fascia.

- Anson and mcvay noted that tranversusabdominis and transversalis fascia are inserted on Coopers(pectineal) ligament and not pouparts ligament.

- Fruchard 1956 described myopectineal orifice which can be divided into three anatomical triangles medial, lateral , femoral which are sites of groin hernia.

- In 1984Lichenstein popularized routine use of mesh and coined the term tension free hernioplasty.

ANATOMY

Anterior abdominal wall is the one which includes the front and side walls of abdomen. Its called “anterolateral abdominal wall.” Incision and closure of the abdominal wall are among the most frequently performed surgical procedures. The knowledge of the layered structures of abdominal wall permits efficient and safe entry into the peritoneal cavity.

Anterior abdominal wall is composed of: (superficial to deep)

- Skin
- Superficial fatty layer of subcutaneous tissue - Campers’s fascia
- Deep membranous layer of subcutaneous tissue - Scarpa's fascia
- External oblique muscle
- Internal oblique muscle
- Transverse abdominis muscle
- Transversalis fascia
- Pre peritoneal fat and areolar tissue
- Peritoneum

The integrity of the anterior abdominal wall is primarily dependent upon the abdominal wall and their conjoined tendons. Nerves, blood vessels and lymphatics are present throughout.

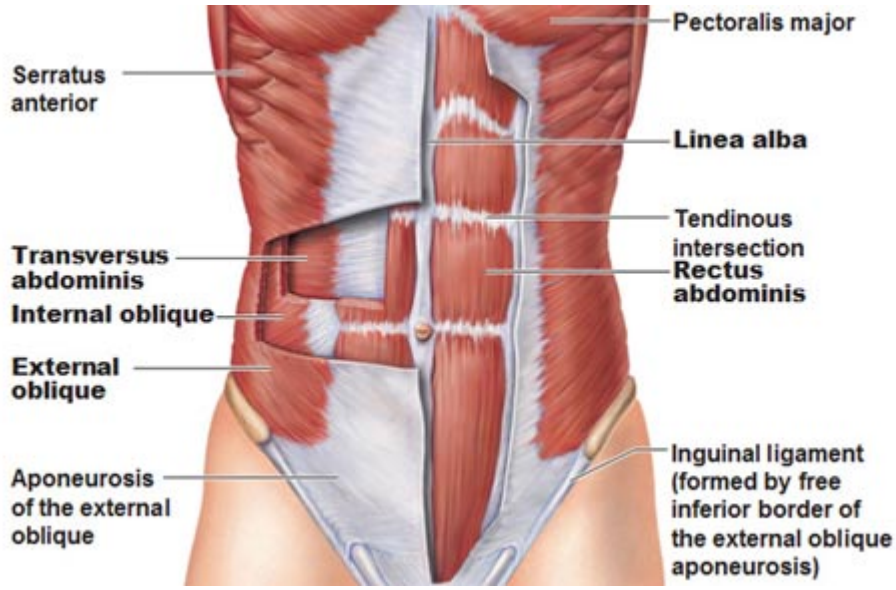


Fig : 1 Anterior abdominal wall muscles

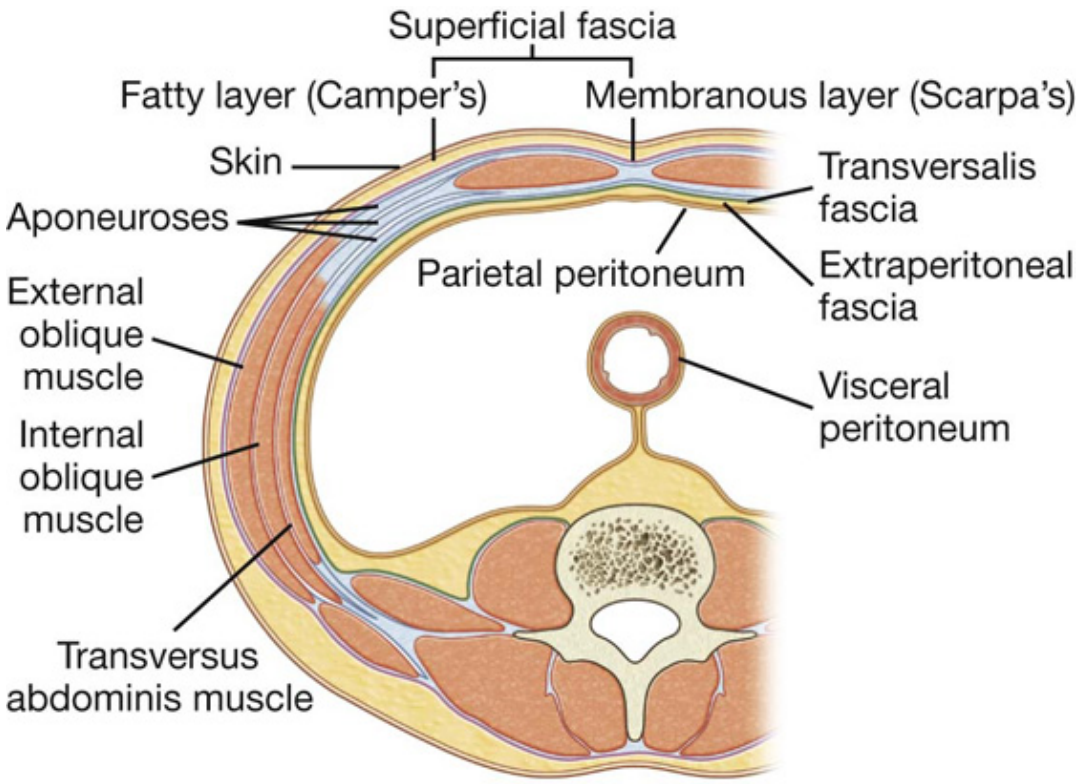


Fig : 2 Arrangements of muscles in anterior abdominal wall

SKIN AND SUBCUTANEOUS TISSUE

The superficial fascia consists of two layers – superficial fatty layer Camper's and deep membranous layers called Scarpa's fascia. When traced upwards Scarpa's fascia merges with the fatty layer and when traced downwards near the midline it passes across the pubic symphysis over the penis and in to the scrotum as Colle's fascia and laterally as fascia lata in thigh. The layer ends at a short distance below the inguinal ligament, fusing with the deep fascia along with horizontal line extending laterally from the pubic tubercle and the line of fusion is Holden's line.

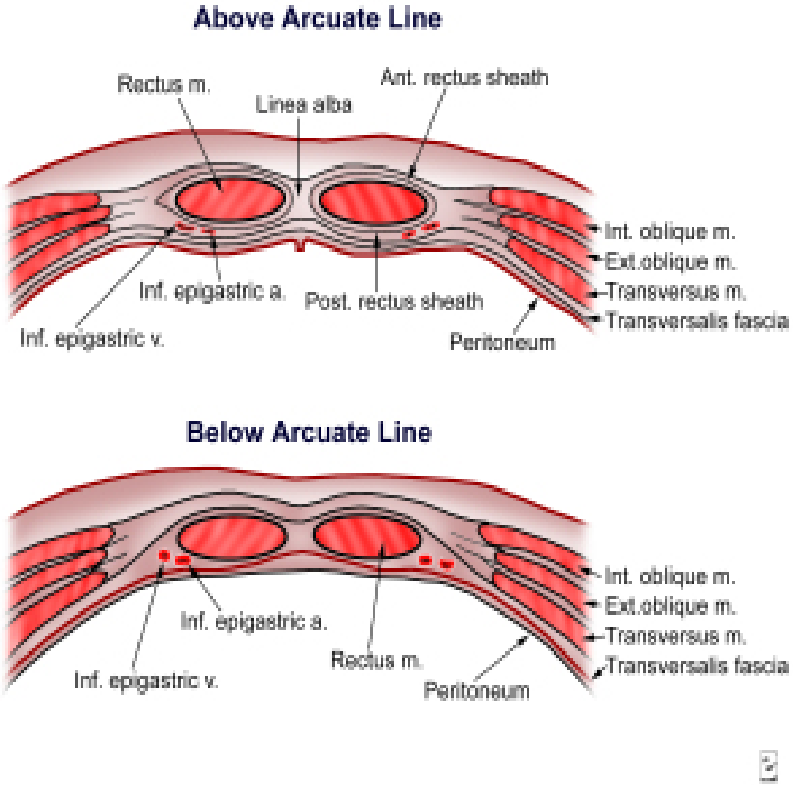


Fig : 3 Arrangement of muscles above and below arcuate line

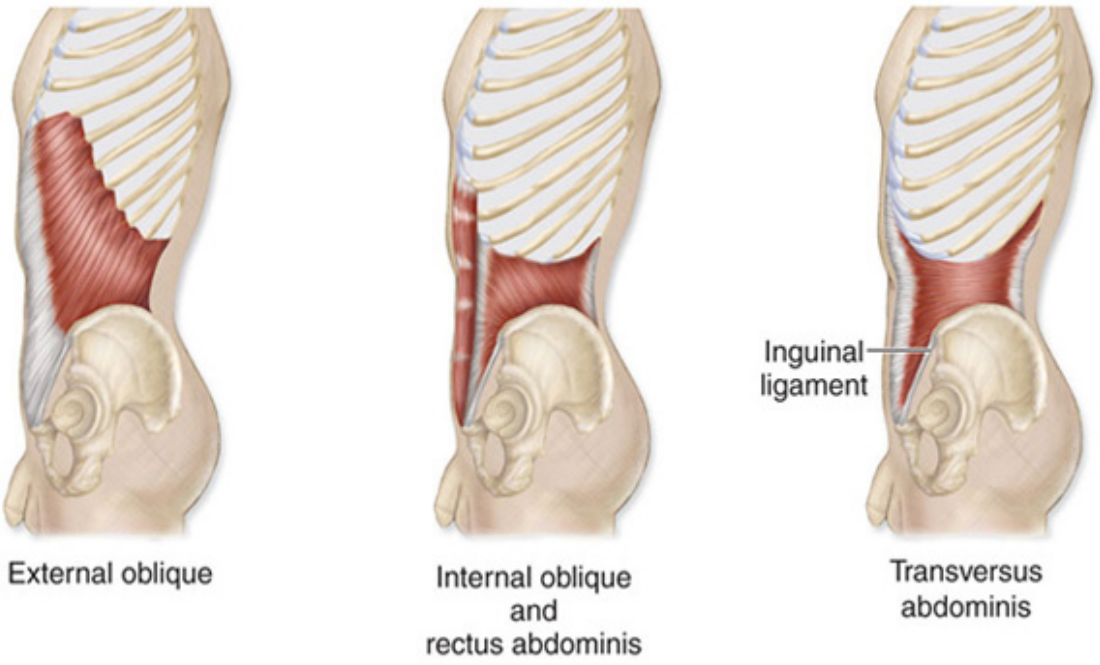


Fig : 4 Anterior abdominal wall muscles origin and insertion

EXTERNAL OBLIQUE MUSCLE

External oblique muscle is the most superficial of the anterolateral muscles of the abdomen. It is the longest thick flat abdominal wall muscle. It is directed medially and downward.

Origin:

LOWER EIGHT RIBS:External surface and lower border.

The lower slip- attaches with lattissmusdorsi.

Upper slip -interdigitates with serratus anterior.The upper most slip arises behind the junction of the rib with costal cartilage and passes obliquely downwards and backward to reach the 12^{th} rib.

Insertion:

Most of the fibres end in broad aponeurosis.

They run from above downwards and is inserted into the xiphoid process,linea alba, pubic symphysis,pectineal line of pubis, pubic crest.

Lower fibres are inserted directly into anterior border of outer lip of iliac crest.

Nerve supply-lower 6 thoracic nerves.

INTERNAL OBLIQUE: It lies just below the external oblique muscle.It runs forwards upwards and medially crossing external oblique fibres muscles at right angles.

Origin:

Lateral 2/3rd of inguinal ligament,

Thoracolumbar fascia,

Anterior 2/3 of intermittent area of iliac crest.

Insertion:

Most of the muscle fibres end as aponeurosis and inserted into 7th 8th 9th costal cartilages, linea alba, pubic crest and pectineal line of pubis.

Uppermost fibres inserted directly into lower 3rd or 4th ribs and costal cartilages.

Nerve supply-lower sixthoracic and first lumbar nerve

TRANSVERSUS ABDOMINIS MUSCLE.

Origin:

Lower 6 costal cartilages.

Anterior 2/3 rd of outerlip of iliac crest

Lateral 1/3rd of inguinal ligament

Thoracolumbar fascia

Fibres run horizontally forwards.

Insertion:

End in broad aponeurosis

Xiphoid process, Line alba,Pectineal line of pubis, Pubic crest.

Lowest fibres of the muscle fuse with internal oblique muscle forming the conjoint tendon.

Nerve supply:

Lower six thoracic nerves and first lumbar nerve.

RECTUS ABDOMINIS

Origin: Arise as two tendinousheads.

Lateral head-Lateral part of pubic crest

Medial head-Anterior pubic ligament

Insertion:

Muscle expands as it ascends, so insertion is broader than its origin.

It inserts at the front wall of thorax along a horizontal line passing from the xiphoid process and along theseventh, sixth and fifth costal cartilages

Nerve supply:

Lower six or seven thoracic nerves

TENDINOUS INTERSECTION of rectus abdominis:

These are three transverse fibrous bands which divides the muscle into smaller parts.

1. At the level of the umbilicus
2. At the level of lower border of thexiphoid process
3. One between the above two

Incomplete intersections may be present below umbilicus

Embryologically they represent different myotomes.

Functionally they make the muscle more powerful by increasing the number of muscle fibres.

PYRAMIDALIS

It's a small triangular muscle placed in front of the rectus abdominis.

The base is attached to the front of the pubic symphysis and apex inserted into the linea alba.

Nerve supply- the subcostal nerve

RECTUS SHEATH

It is aaponeurotic sheath covering the rectus abdominis. It has two walls anterior and posterior.

Formation:

Above the costal margin:

Anterior wall: External oblique aponeurosis

Posterior wall : Deficit - rest directly on fifth ,sixth and seventh costal cartilages

Below the costal margin and above the arcuate line

Anterior: External oblique aponeurosis anterior lamina of the internal oblique

Posterior: Posterior lamina of the internal oblique andthetransversus muscle aponeurosis.

Midway between the umbilicus and pubic symphysis

Ends in arcuate line or linea semi circularis.

Below the arcuate line:

Anterior wall: Aponeurosis of all three flat muscles of abdomen

Posterior wall: Defecit. Rests on fascia transversalis

LINEA ALBA

Band of dense fibres in the midline called linea alba joins both rectus muscles

PREPERITONEAL SPACE AND PERITONEUM

Pre peritoneal space is space between fascia transversalis and the parietal peritoneum.

Space of Retzius- It isprevesical space, just posterior to pubis

Space of Bogros–It is space just posterior to posterior lamina ransversalis fascia.

CLOSE RELATED STRUCTURES:

1. Inferior epigastric artery and vein
2. Round ligament
3. Vas deferens and pampiniform plexus
4. Spermatic cord

FRUCHARDS MYOPECTINEAL ORIFICE:

It is an osseomyo-aponeurotic tunnel through which all the groin hernias emerge. Its boundaries are:

Medial: lateral border of rectus sheath

Lateral: iliopsoas muscle

Inferior: pecten pubis with its covering fascia and the coopers ligament

Superior: arched fibres of internal oblique, transverse abdominis and the conjoint tendon

GROIN HERNIA

The various groin hernia are:

Direct , indirect and femoral hernia

BOUNDARIES OF INGUINAL CANAL

ANTERIOR: Aponeurosis of external oblique muscle and internal blique laterally.

POSTERIOR: Aponeurosis of the transverses abdominis muscle and transversalis fascia, medially posterior wall is reinforced by internal oblique aponeurosis.

SUPERIOR: Roof of canal formed by arched fibres of lower edge of internal oblique muscle and transverses abdominis muscle and aponeurosis.

INFERIOR: Shelving lower border of inguinal ligament and lacunar ligament

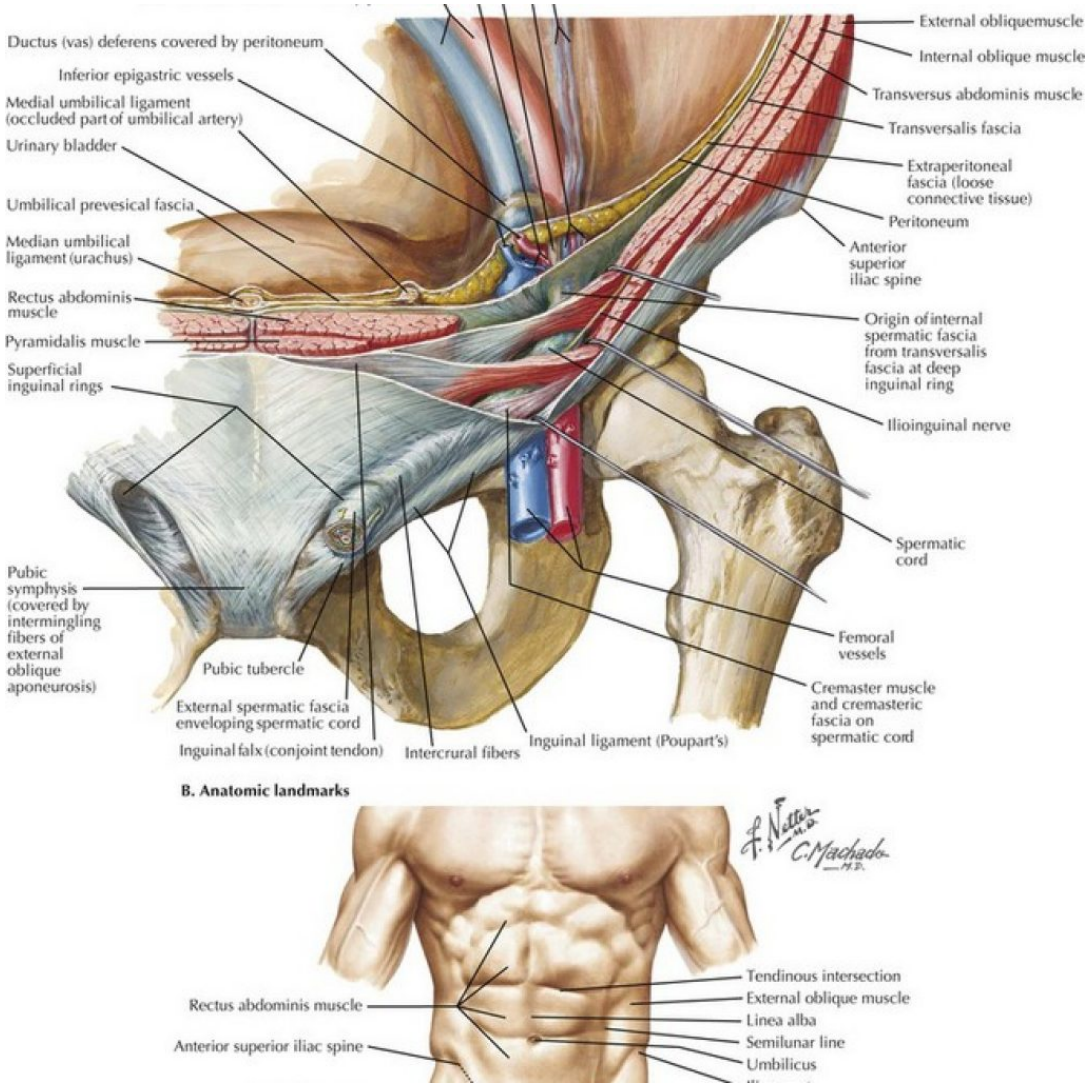


Fig : 5 Inguinal canal and its relations

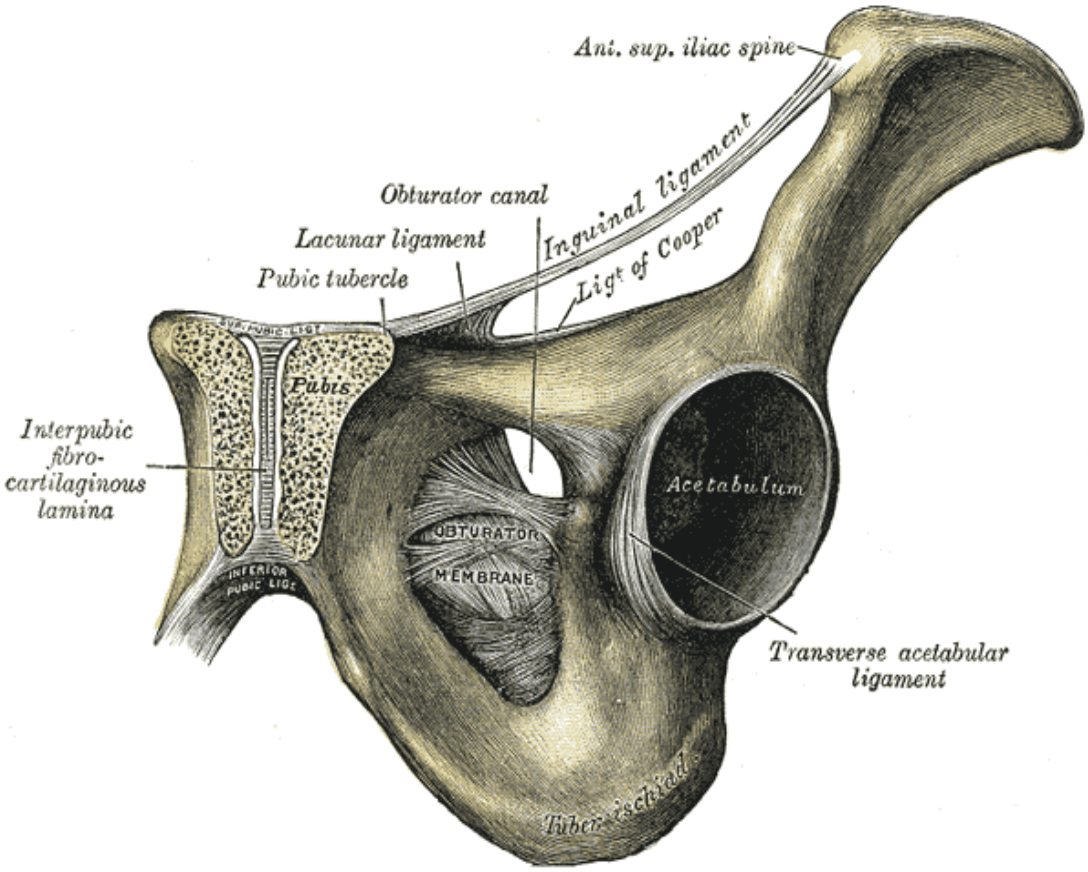


Fig : 6 Inguinal ligament

INGUINAL LIGAMENT

Also called pouparts or the groin ligament runs from the pubic tubercle to the anterior superior iliac spine

The base of the inguinal canal is formed by lower border of inguinal ligament.

It is the reflected part of external oblique aponeurosis.

BOUNDARIES OF DEEP RING:

Deep ring is also called internal inguinal ring. It is oval in shape forming the entry to inguinal canal and it is a normal defect in transversalis fascia and transverses aponeurosis.Anterior and posterior arms are thickening of transversalis fascia forming a sling. Inferior border formed by the ilio pubic tract.

BOUNDARIES OF SUPERFICIAL RING

Also called the external inguinal ring or subcutaneous ring. It is triangular in shape forming the exit of inguinal canal. It is a cleft in aponeurosis of external oblique and the base is related to pubic crest.Superior crus is formed by aponeurosis of external oblique and the inferior crus by inguinal ligament.

Hernia consists of:

Hernia sac

Contents in the sac

Coverings of the sac

The parts of the hernia sac are :

Mouth of the hernia sac that opens into the peritoneal cavity.

Neck of the sac that is the constricted part of the sac beyond the mouth

Body of the sac.

Fundus of the sac which is the most distal closed part of the sac.

INDIRECT INGUINAL HERNIA :

Herniation through deep ring where the sac follows the spermatic cord in males.

DIRECT INGUINAL HERNIA:

The ring of direct hernia is located in the triangle of hasselbach. The hernia sac passes through floor of the inguinal canal.

COVERINGS OF INGUINAL HERNIA:

INDIRECT HERNIA:

Peritoneum

Internal Spermatic Fascia(From Fascia Transversalis)

Cremastic Fascia(From Internal Oblique)

External Spermatic Fascia(From External Oblique)

Scrotum

DIRECT HERNIA

Peritoneum

Transversalis fascia(from fascia transversalis)

External spermatic fascia(from external oblique)

CONTENTS OF INGUINAL CANAL

Spermatic cord in male

Round ligament in female

Ilioinguinal nerve enters the inguinal canal by piercing the internal oblique muscle and emerges out through superficial inguinal ring.

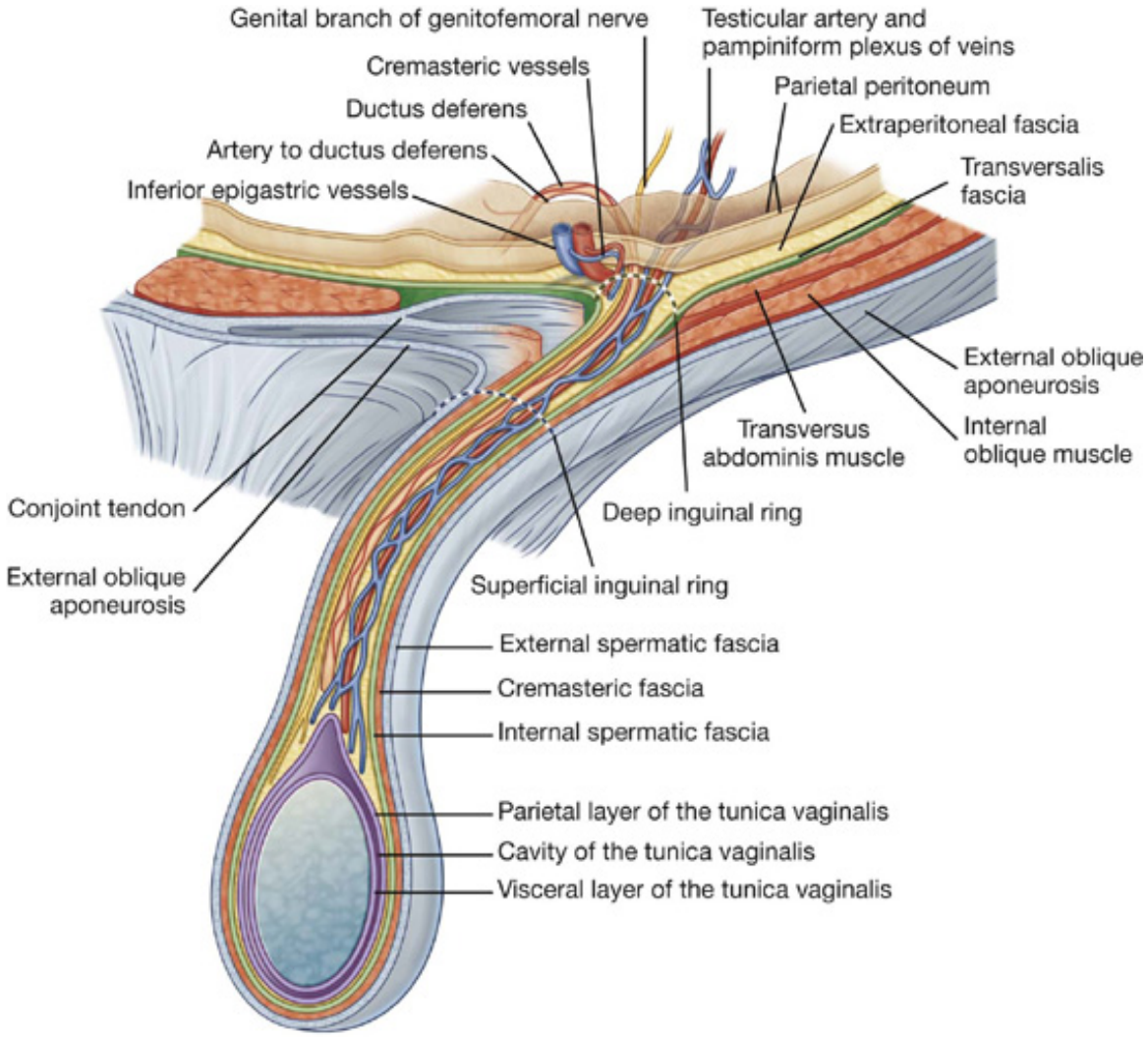


Fig : 7 Layers of spermatic cord

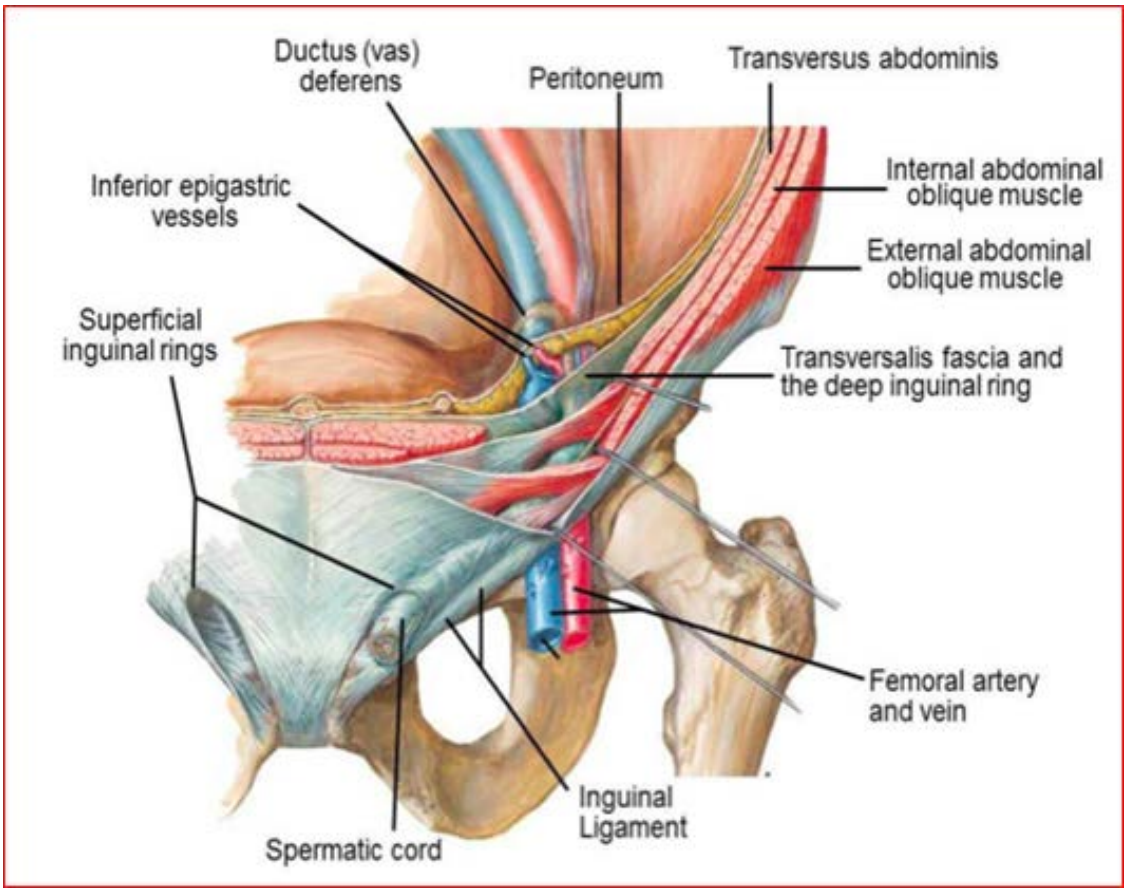


Fig : 8 Femoral artery relation to inguinal ligament

CONSTITUENTS OF SPERMATIC CORD

Vas deferens

Testicular artery

Artery to vas

Artery to cremaster

Pampiniform plexus of veins

Testicular lymphatics

Testicular sympathetic plexus

Genital branch of genitofemoral nerve

BLOOD SUPPLY

The anterolateral abdominal wall has blood supply from lumbar artery and last 6 intercostal artery, deep circumflex iliac artery and superior and inferior epigastric arteries.

The lumbar and intercostal artery together with ilioinguinal, iliohypogastric, intercostal nerve pass between internal oblique and transverse abdominus muscle. Finally at midline, it supplies the rectus muscle by the perforator arteries and communicates with the inferior and superior epigastric arteries.

SUPERIOR EPIGASTRIC ARTERY:

It is a branch of Internal mammary artery and reaches posterior surface of the rectus abdominis muscle. It descends through rectus muscle and anastomosis with epigastric artery.

INFERIOR EPIGASTRIC ARTERY:

It is a branch of External iliac artery and is just proximal to inguinal ligament. It courses through the preperitoneal space and enters into rectus muscle at level of semilunar line of Douglas.

The deep circumflex artery arises from external iliac artery just before or near the inferior epigastric artery and supplies the anterior abdominal wall musculature.

VENOUS DRAINAGE

Upper abdomen drains into superior vena cava through internal mammary, intercostal long thoracic veins.

Below the umbilicus, the abdomen drains into inferior vena cava through superficial epigastric, circumflex iliac and pudendal veins via saphenous vein.

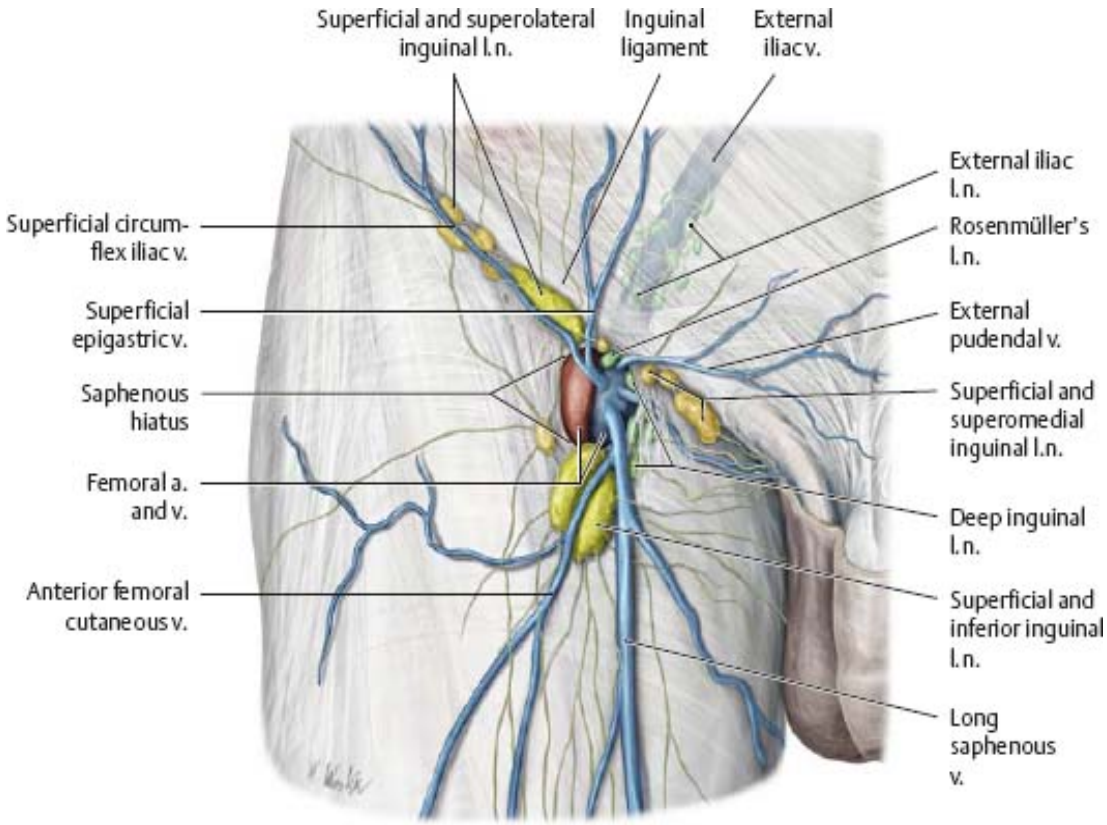


Fig : 9 Venous drainage

LYMPHATIC SUPPLY

Above umbilicus level, anterior abdominal wall lymphatics drains into the axillary group of lymph nodes.

Abdominal wall below the umbilicus level drains into the superficial inguinal nodes.

NERVE SUPPLY

Anterior abdominal wall is innervated or supplied by 7-12 thoracic nerve.

Motor supplies is provided by 7th and 8th nerve. Ilioinguinal and iliohypogastric nerves- the sensory innervations to hypogastrium and lower abdominal wall.

The Neurovascular innervations in the anterior abdominal wall is peculiar and it passes between internal oblique muscle and transverse abdominis muscle.

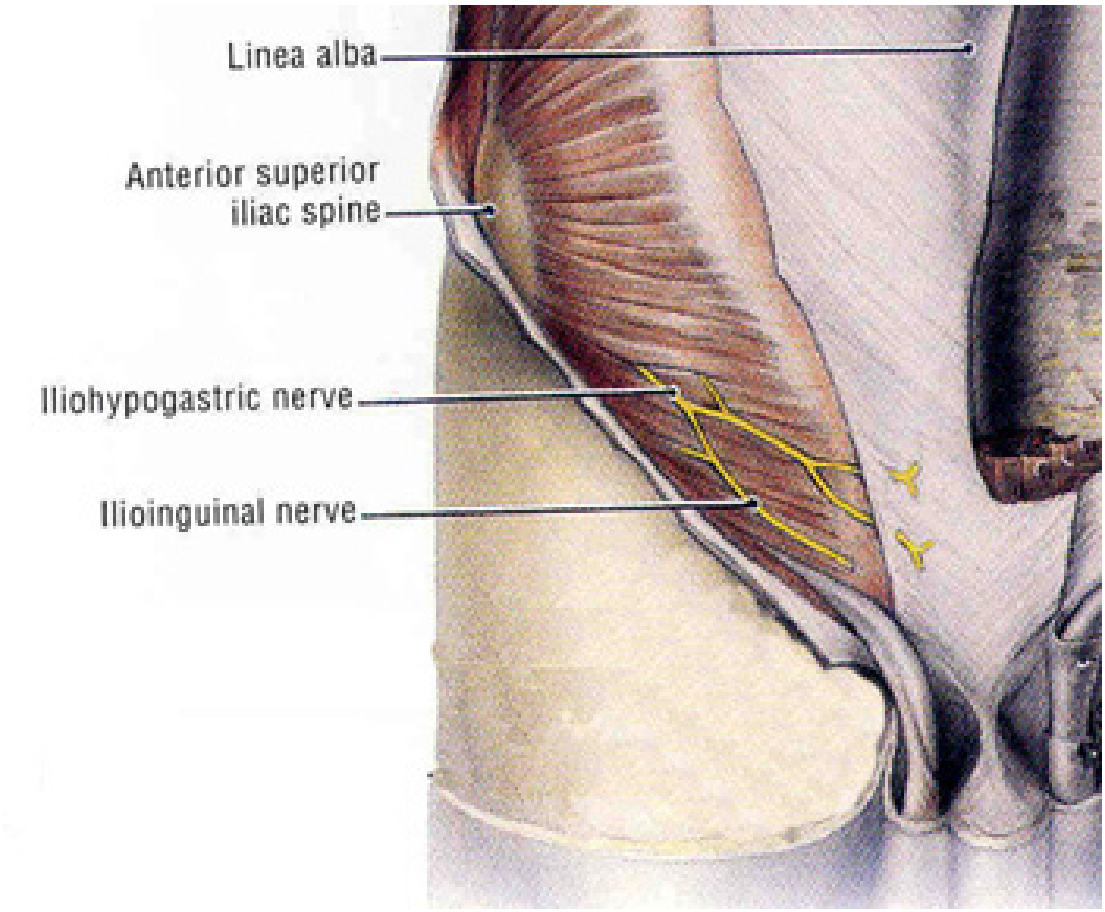


Fig :10 Ilioinguinal and iliohypogastric nerve

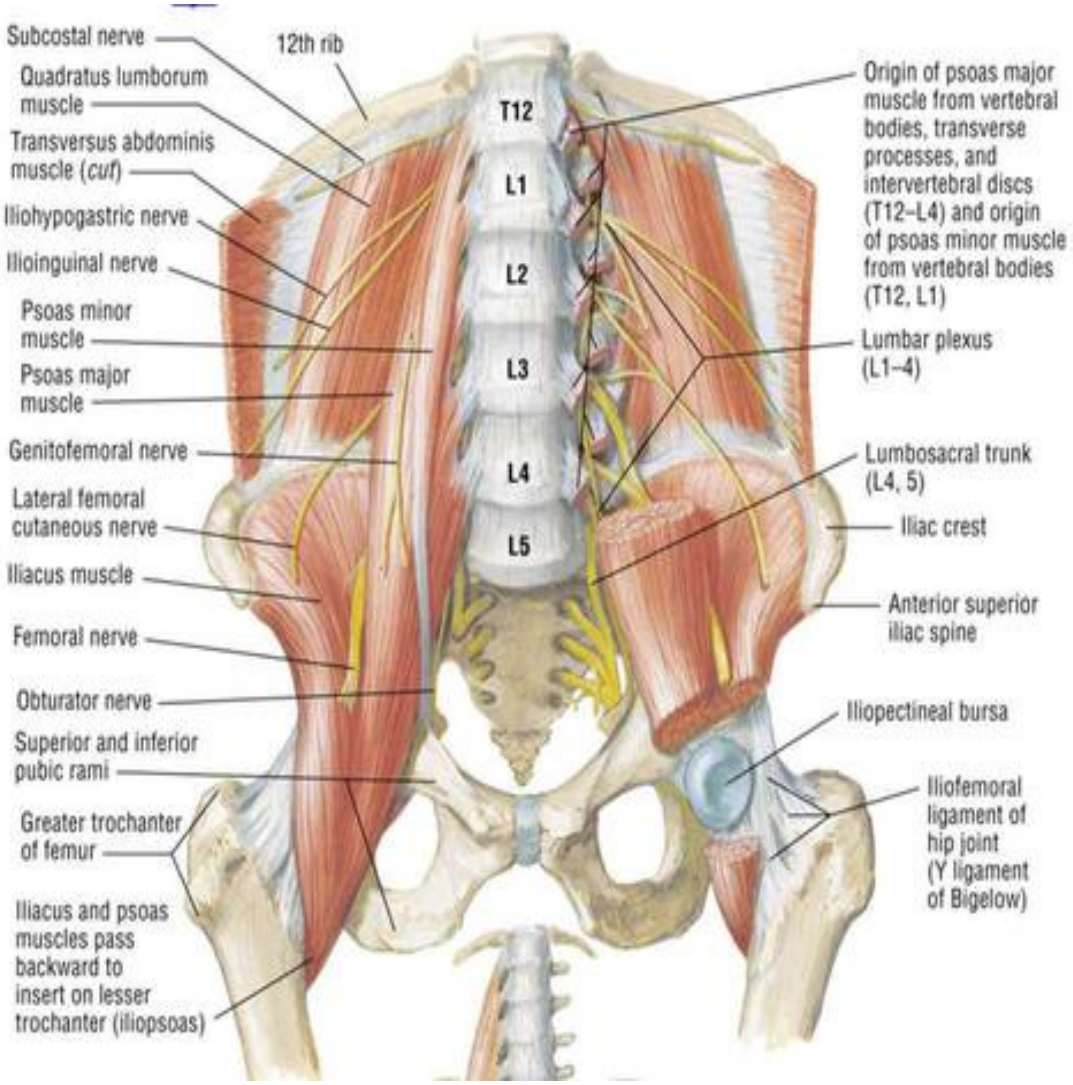


Fig : 11 Lumbosacral plexus

HASSELBACHS TRIANGLE

The medial part of inguinal canal is hasselbachs triangle bounded.

Laterally by inferior epigastric vessels.

Medially by lateral border of rectus sheath.

Base formed by upper concave surface of medial part of inguinal ligament and lacunar ligament.

Classification of groin hernia:NYHUS

Nyhus classified groin hernia into 4 types based on anatomical defects

Type 1 - presence of persistent processusvaginalis

Type 2 - patulous deep ring (small indirect inguinal hernia)

Type 3 - deep inguinal ring or inguinal canal has variable defects (large indirect inguinal hernia , sliding hernia , pantaloon hernia)

Type 4 - recurrent hernias

GILBERTS CLASSIFICATION

Type 1 – indirect hernia (small)

Type 2 – indirect hernia (medium)

Type 3 – indirect hernia (large)

Type 4 – direct hernia (entire floor)

Type 5 – direct hernia (diverticulum)

Type 6 – direct and indirect hernia (combined)

Type 7 – femoral hernia

OGILVIE HERNIA

Usually the direct hernia is acquired.

It occurs through a small circular defect in the conjoint tendon where it gets inserted into the rectus abdominis muscle.

TYPES OF INGUINAL HERNIA

Complete hernia

In this the hernial sac reaches the bottom of the scrotum and the testis usually not felt separately.

Incomplete hernia

Here the hernial sac does not reach the bottom of the scrotum

Incomplete hernia can be bubonocele or funicular.

Funicular type

In this type the hernial sac passes through the superficial inguinal ring into root of scrotum and reaches the upper part of testis

Bubonocele type

Here the hernial sac remains in the inguinal canal and does not descend beyond the superficial inguinal ring.

Pantaloon hernia

Also called as saddle bag or dual hernia.Here both the direct and indirect component is seen on the same side.The direct and indirect sac is seen on either side of the inferior epigastric vessels.

COMPLICATED HERNIAS

These occur when the hernias are not treated early.They are

Irreducible hernias

The hernia becomes irreducible when there is adhesions between the hernial contents in long standing hernias.Irreducible hernias need not present with obstruction everytime.

Obstructed hernias

Obstructed hernias occur when the content of hernial sac is bowel and the patient present with colicky abdominal pain.Usually the patient presents with abdominal pain, vomiting, obstipation and abdominal distension.Tenderness is usually seen over the hernial site.This usually occurs when the neck of the sac is narrow and peristalsis is usually seen at the hernial site.

Strangulated hernias

When the obstructed hernia is not dealt with at the appropriate time it leads to impairment of blood supply to the hernial contents and leads to ischemic necrosis and may also lead to gangrene.

When the content is omentum the symptoms are mild and in long standing cases it goes for ischemic necrosis followed by localized abscess formation.

Whereas when the content is bowel the patient develops symptoms like severe tenderness , fever , vomiting , constipation and patient develops features of localized peritonitis.Later the bowel might perforate or gets gangrenous.

PATHOPHYSIOLOGY

Inguinal hernias may be classified as congenital or acquired. A wide range of studies were conducted in finding out the precise cause of inguinal hernias, however the most satisfying cause was the weakness of abdomional wall musculature whereas congenital hernias were considered to be an impedance of normal development rather than acquired weakness.During normal development testis descends from intraabdominal space into the scrotum in the third trimester preceded by the descent of gubernaculum and the diverticulum of peritoneum which

protrudes through inguinal canal and becomes processus vaginalis.In the third trimester processus vaginalis closes and eliminates the peritoneal opening at the internal inguinal ring. Failure of this results in patent processus vaginalis and hence proves the high incidence of indirect inguinal hernias in preterm babies.

However presence of patent processsus vaginalis predisposes to the development of inguinal hernia with the presence of risk factors like inherent muscle weakness , family history and strenuous activity.

In the case of acquired inguinal hernias there is a documented cause as per several studies. It is nothing but sternuous physical activity. Repeated physical exertion increases the intraabdominal pressure. This process in combination with patent processus vaginalis or through age related weakness of abdominal muscles leads to inguinal hernia.

Inguinal hernia with positive family history was associated with 8 fold lifetime incidence of inguinal hernia.

COPD significantly increases the incidence of direct inguinal hernias due to increased intraabdominal pressure. Several studies has suggested that obesity was a protective factor. Risk of inguinal hernia in obese men was only 50% that of normal weight males whereas the risk in overweight

males was 80% that of non obese men. A possible explanation to this is the increased difficulty in detecting inguinal hernias in these induviduals.

CAUSES OF INGUINAL HERNIA

As a result of several studies conducted the presumed causes of groin hernia were

Birth weight < 1.5kg

Family history of hernia

Copd

Constipation and prostatism which increases intraabdominal pressure

Ascites

Previous right lower quadrant incision

Cigarette smoking – acquired collagen defects

Heavy weight lifting

Connective tissue disorders

Some of the connective tissue disorders are Osteogenesis imperfecta, ehlers danlos syndrome, hurler, hunters syndrome and marfans syndrome.

In some of the studies microscopic examination of skin of inguinal hernia patients demonstrated less ratio of type 1 to type3 collagen. Type 3

collagen does not contribute significantly to wound tensile strength as type 1. Also studies reveal disaggregated collagen tracts with decreased

Some studies found the association of concentration of extracellular matrix elements with hernia formation. As a conclusion of several studies the current evidence suggests hernias have a multifactorial etiology with both environmental and hereditary influences.

MECHANISMS WHICH PREVENT HERNIA:

These mechanisms prevent inguinal hernia when the intra abdominal pressure increases they are as follows

Shutter mechanism – The internal oblique arched fibres

Ball valve mechanism – Usually the superficial ring is plugged by spermatic cord when the cremaster muscle contracts

Flap valve mechanism – the inguinal canal being obliquely placed plays a pivotal role in this mechanism which causes approximation of anterior and posterior walls

Slit valve mechanism – The superficial ring formed by external oblique aponeurosis has two crura which acts like a slit

PRINCIPLES OF HERNIA SURGERY:

Some of the important principles in performing an hernia surgery include administration of prophylactic antibiotics , and regarding the incisions made for surgery- it has to be generous enough especially in case of strangulated hernias

The importance of mopping or draining the fluid in case of long standing hernial sac in order to prevent the entry of the fluid into the peritoneal cavity as the fluid is highy contaminated.

In case of hernial sac containg a part of the gut, care should be taken for the optimal inspection of viability of the gut, which can be assessed by signs like return of peristalsis, presence of arterial pulsation, change of colour to pink etc.

While performing the reduction of hernial contents, the patient should be put on the head down position and reduction is done by gently squeezing the intestine in order to avoid injuries to the bowel.

Reduction en masss should be avoided, as the swelling seems to disappear while the constricton ring and strangulation may persist.

OPEN APPROACH

In open inguinal hernia repair several techniques are available where anatomical repair and repair using prosthetic material is also done.Tissue repair is done when prosthetic material cannot be used in conditions like obstructed or strangulated hernia where infection of prosthetic material is high.

RECURRENT HERNIA

Early recurrence is due to technical reasons.So when proper techniques are followed recurrence is less.

Late recurrence is usually due to the tissue failure.

Causes of recurrent hernia are as follows:

Repair under tension

Absorbable suture materials used

Smoking

Wound hematoma

Wound infection

Large hernia sometimes

Increased intra abdominal pressure

TISSUE REPAIRS

Tissue repairs are usually done when prosthetic materials cannot be used , like contamination of field, viability of sac contents is doubtful.Proper surgical anatomy knowledge is required for effective anatomical repair.

HERNIOTOMY

It is usually done in children when there is patent processusvaginalis.It is not done in adults as the recurrence rate is very high and hence it is reinforced with herniorraphy or hernioplasty.

BASSINI REPAIR

This procedure was introduced by Bassini and this procedure is not used currently due to the recent advanced techniques which have low recurrence rates.In this repair the cord and sac are separated and sac ligated high and then the tranversalis fascia seen superiorly is dissected off from the preperitoneal fat from pubic tubercle upto the deep ring.Now the internal oblique , tranversusabdominis and transversalis fascia are approximated with the reflected edge of the inguinal ligament thereby providing further strengthening of the posterior abdominal wall and reinforces the medial border of deep ring.

MODIFIED BASSINI

Here the fascia transversalis is not laid open as in Bassini s repair and it is approximated by continuous locking sutures using prolene.Later the conjoint tendon is approximated to the inguinal ligament.But this method is becoming obsolete nowadays.

SHOULDICE REPAIR

In this repair several tissue layers are approximated , therefore the recurrence rate is less and the tesion is equally distributed.In this repair after the cord structures and sac are separated and sac ligated, the genital branch of genitofemoralnerve is divided and various layers are dissected carefully.Initially superior and inferior flap of transversalis fascia is raised above and below.

Then the inferior flap of transversalis fascia is approximated with the lateral edge of rectus and continued laterally with posterior part of superior flap of transversalis fascia upto the deep ring.Now the superior flap of transversalis fascia is approximated with the inguinal ligament below and it is tied with original stitch.

Then again the internal oblique, transverses abdominis is approximated with external oblique aponeurosis starting from the internal ring and

continued medially and the similar procedure done again laterally upto to the internal ring.

McVay REPAIR

This repairs both inguinal and femoral hernia when prosthetic material cannot be used.Once spermatic cord and sac are separated the superior flap of transversalis fascia is raised and the coopers ligament is delineated and the superior flap of transversalis fascia is approximated to the coopers ligament and lateral to deep ring a transition stitch is taken from the superior flap of transversalis fascia and approximated to inguinal ligament.Thereby the deep ring and femoral hernia is repaired anatomically.

DARNING

It is a modification of herniorraphy where the conjoint tendon is approximated with the inguinal ligament without tension using 1 polypropylene sutures.

Here in this technique the various crossing in the suture acts as mesh.

KUNTZ OPERATION

Here the orchidectomy is done by removing the cord and testis

It is done in elderly individual.

Inguinal canal is repaired separately

HAMILTON BAILEY OPERATION

Here the cord is removed at the inguinal canal

Testis is left behind which gets its supply from the scrotal vessels and survives

The testis is left in its position for psychological reasons

The inguinal canal is repaired routinely as usual.

Now lets see the hernia repair using the prosthesis which is a milestone in the history of hernia surgery.

PROSTHETIC REPAIR

Nowadays prosthetic repair of inguinal hernia is one of the commonest procedure followed in most of the circumstances.

PLUG AND PATCH TECHNIQUE

It is the modification of lichtenstein'srepair. Here the three dimensional prosthetic plug is placed around the spermatic cord at the internal ring after the sac is reduced in case of indirect inguinal hernia. Incase of direct inguinal hernia the plug is sutured to the internal oblique aponeurosis , inguinal ligament and coopers ligament, then the mesh is

fixed in the floor of inguinal ligament and the rest of the procedure is similar to lichtensteins repair.

PROLENE HERNIA SYSTEM

In this repair the mesh provides reinforcement to the posterior and anterior aspect of abdominal wall.Incase of indiect inguinal hernia the preperitoneal space is approached through the defect in the deep ring and in direct hernia the transversalis fascia flap is raised and the preperitoneal space is approached. In this system the mesh has anonlay and an underlay flap with a cylindrical connector. Here while placing the mesh the underlay flap is placed through the defect in deep ring into the preperitoneal space and the intraabdominal pressure fixes the mesh in position and the on lay part of mesh is taken out through the opening around the spermatic cord and it is fixed to the floor of the inguinal canal.So dual reinforcement is achieved in this system.

STOPPAS REPAIR

It is nothing but giant prosthetic reinforcement of the huge visceral sac. Here incase of unilateral hernias a low transvere incision of 8-10cm (pfannensteil incision) is made above the deep ring and the transversalis fascia is cut and the preperitoneal space is entered and dissected from

umbilicus upto the pubic symphysis and laterally 1cm medial to the anterior superior iliac spine.

Medially the coopers ligament is exposed.Incase of bilateral hernia the preperitoneal space entered is dissected between both the anterior superior iliac spine and both the inguinal canals are exposed.Whereas in direct hernias the transversalis fascia is approximated to the coopers ligament thereby providing repair of posterior wall of inguinal canal and reducing the laxity.

Before placing the mesh adequate size of the mesh is selected so that it covers the entire area below the umbilicus and extends below between the pubic symphysis and anterior superior iliac spines. The mesh is fixed medially at the space of retzius and laterally in the iliac fossa above the spermatic cord. The mesh should not be cut to accommodate the cord as the possibility of recurrence is high hence fixed using interrupted sutures. Incase of bilateral hernias the mesh is fixed at the inferior end and the transversalis fascia is sutured.

PROSTHESIS

An ideal mesh is the one which has the following featues

Flexible

Strong

Easy to handle

Inexpensive

Inert immunologically

Contraction resistant

Resistant to infection

SYNTHETIC MESH MATERIAL

Polypropylene

Polyester

They are hydrophobic and most importantly permanent. They produce inflammatory reaction and little of scarring.

Polypropylene + polyglygolic acid

Polytetrafluroethylenemesh(PTFE)

Polyglycolic acid mesh(Vicryl mesh)

Dacron mesh

The following features in a mesh has to be looked into when selecting the mesh for hernia repair.They are

Material of the mesh

Weight

Thickness

Porosity

Strength

Absorbability

The light weight meshes are preferred as there is less postoperative pain when used.

The disadvantage of these synthetic mesh is that they are very expensive.

BIOLOGICAL MESH

These meshes are not used routinely as they are not as effective as the synthetic meshes. Only the cross linked biological meshes are effective when compared to the non cross-linked meshes.

FIXATION TECHNIQUES

There are various techniques of fixing the mesh. Some of them are

Stapling

Suturing – most commonly followed

Tacking of prosthesis

Fibrin glue fixation

Self gripping mesh

Mesh migration is one of the most common complication after hernioplasty. This can be prevented by fixing the mesh in hernia repair and thereby preventing recurrences.

COMPLICATIONS

Pain is the most common symptom after any surgery. After hernioplasty it can be acute or chronic. It can be

Somatic

Neuropathic

Visceral pain

Incase of neuropathic pain the possible nerves damaged are

Ilioinguinal

Iliohypogastric

Genitofemoral nerve

Femoral nerve

Lateral cutaneous nerve

Patients have a severe pain when there is an entrapment of the nerves in laproscopic repair. In this case it is preferred to remove the mesh and to fix the mesh after careful dissection of the entrapped nerve or triple neurectomy is preferred when the patient does not improve with the use of analgesics like nsaids or corticosteroids.

LICHTENSTEIN HERNIOPLASTY

position :supine

Anaesthesia :spinalanaesthesia

Incision :inguinal incision starting medially at pubic tubercle and laterally extending beyond deep inguinal ring 2cm above and parallel to inguinal ligament

Superficial fatty layer of camper and deep membranous layer of scarpa are incised. superficial epigastric vessels are coagulated and cut.

Medially superficial external pudendal vessels and laterally superficial circumflex iliac vessels need coagulation and division.

External oblique aponeurosis is exposed. A nick is made and incised medially dividing superficial inguinal ring, laterally external oblique incised beyond deep inguinal ring. Upper flap dissected to expose conjoint tendon and lower flap dissected to expose inguinal ligament. Pubic tubercle is defined.

Spermatic cord and hernia sac are dissected. In indirect hernia, inguinal hernia sac lies anterolateral to cord and in direct hernia lies posteromedial to cord.

Hernia sac dissected from fundus to neck of sac. Opening of hernia sac at fundus, reduction of contents and transfixation of sac and distal sac excised.

Reinforcement of posterior wall by placement of polypropylene mesh.

Mesh is fixed at the fascia over pubic tubercle and laterally along the inguinal ligament beyond deep inguinal ring.

Medially fixed to lateral border of rectus sheath and above to conjoint tendon and fish tailing done at the area of spermatic cord using 2 o polypropylene.

External oblique closed and new superficial inguinal ring created. Subcutaneous tissue and skin closed in layers. Dressing done.

Scrotal bandage is applied.

AIMS AND OBJECTIVES

1. To study the efficacy of lichtensteinshernioplasty under local anesthesia compared to spinal anesthesia
2. Feasibility of infilteration of local anesthesia
3. Cost effectiveness of anesthesia used
4. Time saved during surgery
5. Patient s cooperation on table assessment with regards to pain
6. Immediate post operative pain
7. Complications of spinal anesthesia like
   Post spinal headache
   Urinary retention
   Other complications considered are
   Wound hematoma
   Wound sepsis
   Testicular pain
   Testicular swelling
   Recurrence
   Respiratory complications
   Thromboembolism
8. Reduction in number of days of hospital stay

   And also to determine whether the technique of local anaesthesia was a better acceptable alternative to spinal anaesthesia.

MATERIALS AND METHODS IN OUR STUDY:

TITLE

Comparative study of lichtenstein's repair done under local anaesthesia and spinal anaesthesia

OBJECTIVE OF THE STUDY

To compare safety and effectiveness of lichtenstein's repair under local anaesthesia versus spinal anaesthesia in relation with post operative pain, complications and hospital stay

SOURCES OF DATA

This prospective study was conducted in Mohan Kumaramanagalam Medical College Hospital Salem for a period of two years from January 2016 to December 2017.

METHODS AND COLLECTION OF DATA

This study includes 50 cases of inguinal hernia. After admission detailed history was taken and thorough clinical examination was done. Routine investigations like

haemoglobin

total leucocyte count

differential count

erythrocyte sedimentation rate

random blood sugar

renal function tests

chest x ray

electrocardiogram

ultrasound

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 (lichtenstein's) repairunder local anaesthesia and patients in group B were subjected to inguinal hernia mesh (lichtenstein's) repair under spinal anaesthesia.

STUDY DESIGN

Prospective study

STUDY PERIOD

January 2016 to December 2017.

PLACE OF STUDY

Govt Mohan Kumaramangalam Medical College Hospital , Salem

SAMPLE SIZE

50 cases

ETHICAL CLEARANCE

Obtained from institutional ethical committee

INCLUSION CRITERIA

- Patients with primary uncomplicated inguinal hernia
- Patients aged above 20 years
- Patients with unilateral hernia

EXCLUSION CRITERIA

- Patients with recurrent hernia
- Patients below 20 years
- Patients with bilateral hernia , femoral hernia
- Patients with complicated hernias like – irreducibility , obstruction , strangulation , incarceration
- Patients with preoperative chronic pain problems
- Patients with psychiatry illness , pregnancy , diabetes mellitus

STUDY METHODOLOGY

In this study patients who met inclusion and exclusion criteria , written informed consent was obtained.

In proforma , history , clinical examination are noted.

Routine investigations like

- haemoglobin
- total leucocyte count
- differential count
- erythrocyte sedimentation rate
- random blood sugar
- renal function tests
- x ray chest pa view
- x ray abdomen erect
- electrocardiogram

Ultrasound abdomen and pelvis were done in every case.

25 patients underwent hernioplasty under local anaesthesia and another 25 patients underwent hernioplasty under spinal anaesthesia

SURGICAL TECHNIQUE

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. Anaesthetic mixture was injected 2.5 cm from iliac crest along the line joining anterior superior iliac spine to umbilicus. The needle was then passed through this to strike the inner surface of ilium just below the crest.10ml of solution was injected. The injection was repeated with needle reinserted at a slightly steeper angle and 5ml of solution was injected. Second point of block was 2cm above the mid inguinal point.The needle was inserted perpendicularly until it pierced the external oblique aponeurosis.10ml of solution was injected at this level and 5ml as the needle was withdrawn over 2cm.Next solution was injected over pubic tubercle subperiosteal injection of 3cc of solution was made. Femoral nerve was blocked just below the inguinal ligament. The block was completed by a subcutaneous infilteration along the line of surgical incision and 10ml of solution was deposited. Then it was infilterated once deep ring was identified. In group B regional anaesthesia in the form of spinal was given using 0.5% bupivacaine. Using 26 gauge spinal needle in L3-L4 interspace 2.5cc of 0.5% bupivacaine was injected in subarachnoid space after getting free flow of cerebrospinal fluid. In

case of inadequate or no effect local or spinal anaesthesia was converted into general anaesthesia and patient was not included in the study.

Tension free hernioplasty was done in both the groups. Polypropylene prosthetic mesh was used. Following observations were made :- any pain during surgery done under local, postoperative pain, pain at incision site, urinary retention, wound hematoma, sepsis, headache, testicular pain/swelling. Follow up was done at 3rd postoperative day and during follow up patient looked for wound sepsis, pain at incision site and other complications. All the data was analysed statistically between two groups.

POST OPERATIVE EVENTS

Patient was shifted to the ward and analgesics and antibiotics given. Oral fluids were initiated after 8 hours of surgery incase of spinal anaesthesia and after two hours of surgery in local anesthesia. If patients were hemodynamically stable and clinically normal they were discharged on the first post operative those who underwent surgery under local anesthesia. Patients were asked to review immediately if symptomatic or after one week. They were followed up regularily.

ASSESSMENT TOOLS

PER OPERATIVE

- Per op time
- Per op pain

POST OPERATIVE COMPLICATIONS

Pain

It is due to sharp and blunt dissection and adequate analgesics were given

Headache

Proper posture to prevent post spinal headache

Testicular pain

Edema or hematoma is looked for and inguinodynia is ruled out

Wound hematoma

It is due to inadequate hemostasis. Evacuation of hematoma to prevent mesh infection

Wound sepsis

Adequate dressing done everyday and culture sensitive antibiotics prescribed

Urinary retention

Hot fomentation given. If not successful bladder catherterisation done.

Respiratory complication

Adequate bronchodilators and use of incentive spirometry and chest physiotherapy given

Thromboembolism

Treated based on severity

Recurrence

Impulse of cough seen post surgery.

Hospital stay

Number of days of stay in hospital is noted down and compared between local and spinal anaesthesia.

OBSERVATION AND RESULTS

The youngest patient in the group A was 21 years old and in group B was 22 years old. The oldest patient in group A was 71 years old and in group B was 67 years old. The mean age was 44.36+/-11.69 in group A and in group B was 40.44+/-10.18.

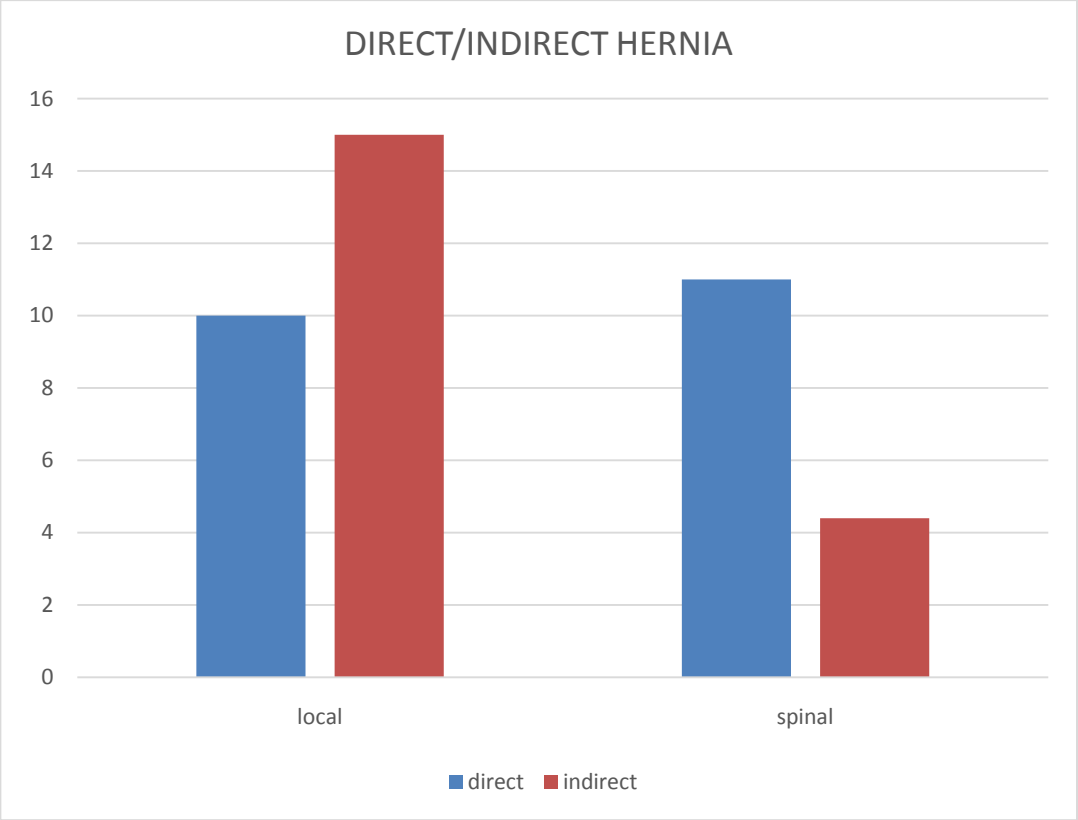


Chart : 1 Incidence of direct and indirect hernia

The incidence of indirect inguinal hernia was high compared to direct hernia in both the groups. In group A 15 (60%) patients had indirect inguinal hernia and 10 (40%) patients had direct hernia.

In group B 14 (56%) patients had indirect inguinal hernia and 11(44%)patients had direct inguinal hernia.

Incidence of indirect inguinal hernia was common in the age group of 21 to 45 years in group A and 22 to 47 years in group B.

Direct hernia incidence was common in the age group of 47 to 71 years in group A and 39 to 67 in group B.

Incidence of right sided inguinal hernia was 18(72%) patients in group A and 16(64%) patients in group B.Around 7(28%) patients had left sided inguinal hernia in group A and 9(36%) patients in group B.

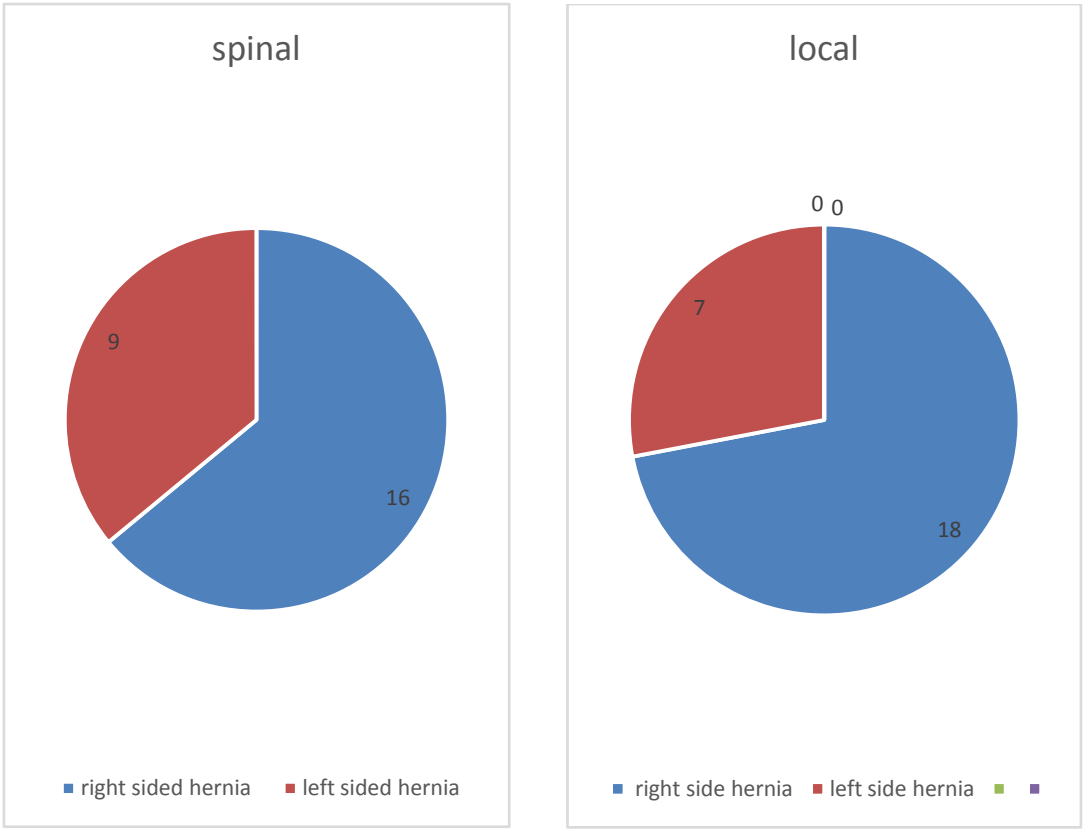


Chart 2 : Incidence of hernia right/left side

The time taken to complete the surgery was calculated from the time of anesthesia till dressing. TABLE 1.

Table 1Time taken for surgery

Time taken (in minutes)	Group A (local anesthesia)		Group B(spinal anesthesia)	
	No of cases	Percentage	No of cases	Percentage
30-40	4	16%	1	4%
41-50	9	36%	3	12%
51-60	9	36%	2	8%
61-70	3	12%	11	44%
71-80	0	-	1	4%
81-90	0	-	4	16%
91-100	0	-	3	12%

The time taken to finish hernioplasty under local anaesthesia was from 40 mins to 70 mins. But the time taken to finish under spinal anaesthesia was prolonged ranging from 40 minsto 100 mins. The taken for the spinal anaesthesia was significantly prolonged. Hence local anaesthesia was a better choice..(p value < 0.05).

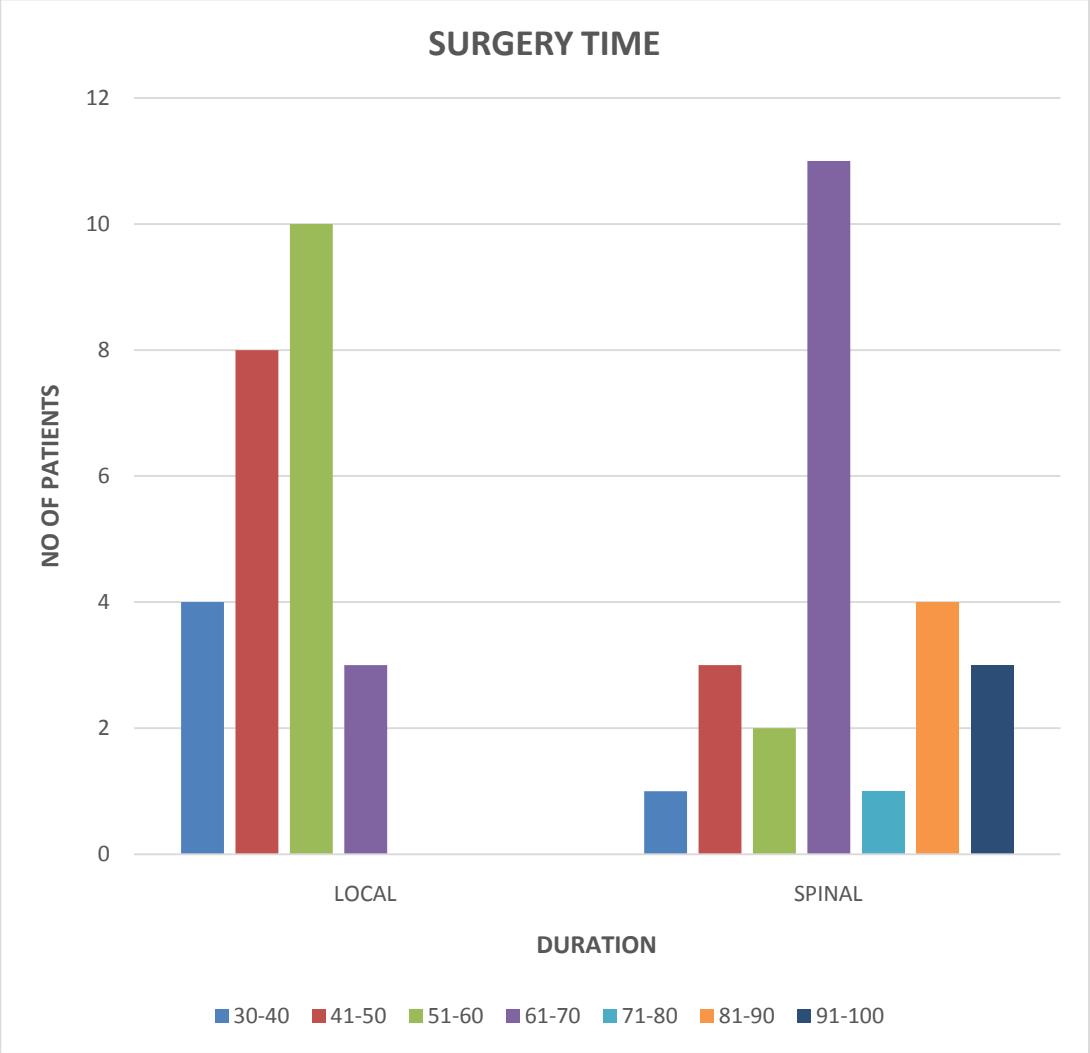


Chart 3: Duration of surgery

Table 2 pain felt during surgery

Pain during surgery	Group A (local anesthesia)		Group B (spinal anesthesia)	
	No of cases	Percentage	No of cases	Percentage
No pain	7	28%	-	-
Mild	11	44%	16	64%
moderate	6	24%	9	36%
severe	1	4%	-	-

Pain was calculated during the surgery and 11 patients(44 %) had mild pain in group A and 16 patients(64%) in group B. 7 patients(28%) in group A had no pain. 6 patients (24%) in group A had moderate pain whereas 9 patients (36 %) in group B had moderate pain.Severe pain was felt by 1 patient (4%) in group A. Pain was significantly less in group A patients when compared to group B.(p value <0.05)

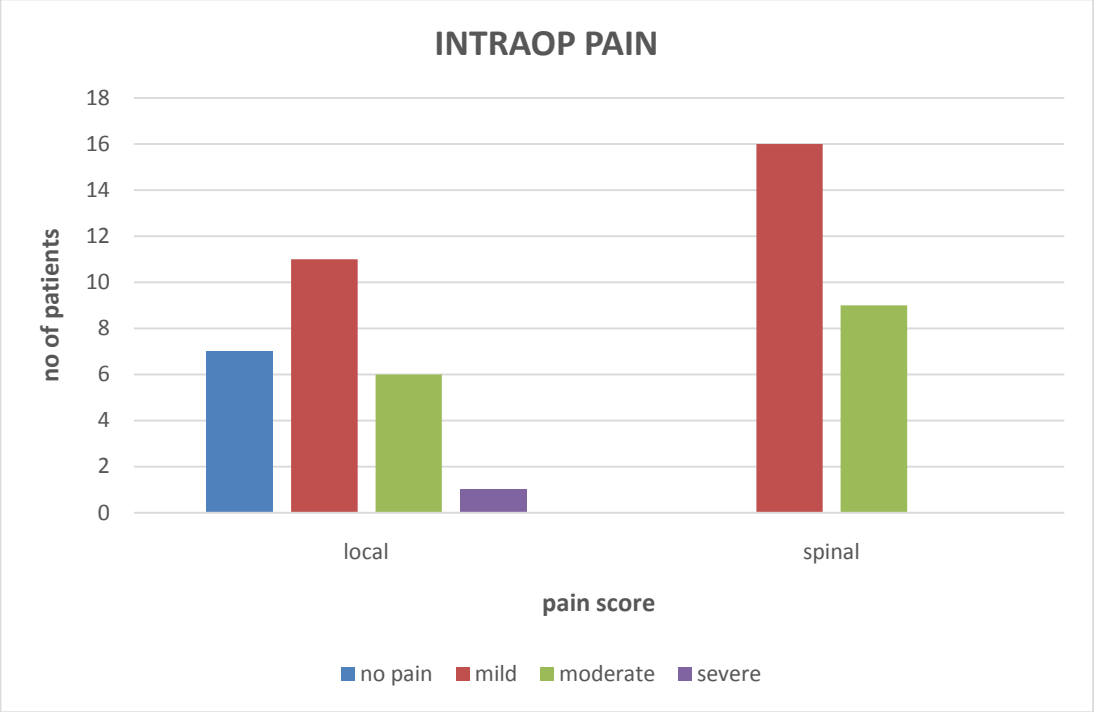


Chart 4: Intraop pain

Intra op pain was seen more among the patients who received spinal anaesthesia though severe pain was seen only in one patients who received local anaesthesia.

Post operative pain was recorded at 12hours and 48 hours after operation by using visual analogue scale(VAS) pain scoring system in TABLE 3.

Table 3 (visual analogue score)postoperative pain score

Time interval (in hours)	Group A(local anesthesia)		Group B(spinal anesthesia)		t-value	p-value
	Mean	S.D	Mean	S.D		
12	2.80	0.70	3.48	0.87	3.02	0.004
24	2.00	0.70	2.88	0.92	3.73	0.000
48	0.20	0.40	2.08	0.95	9.05	0.000

Visual analogue scale was used to assess the post operative pain in both the groups. Mean pain was significantly less in group A as compared to group B.(p value <0.05)

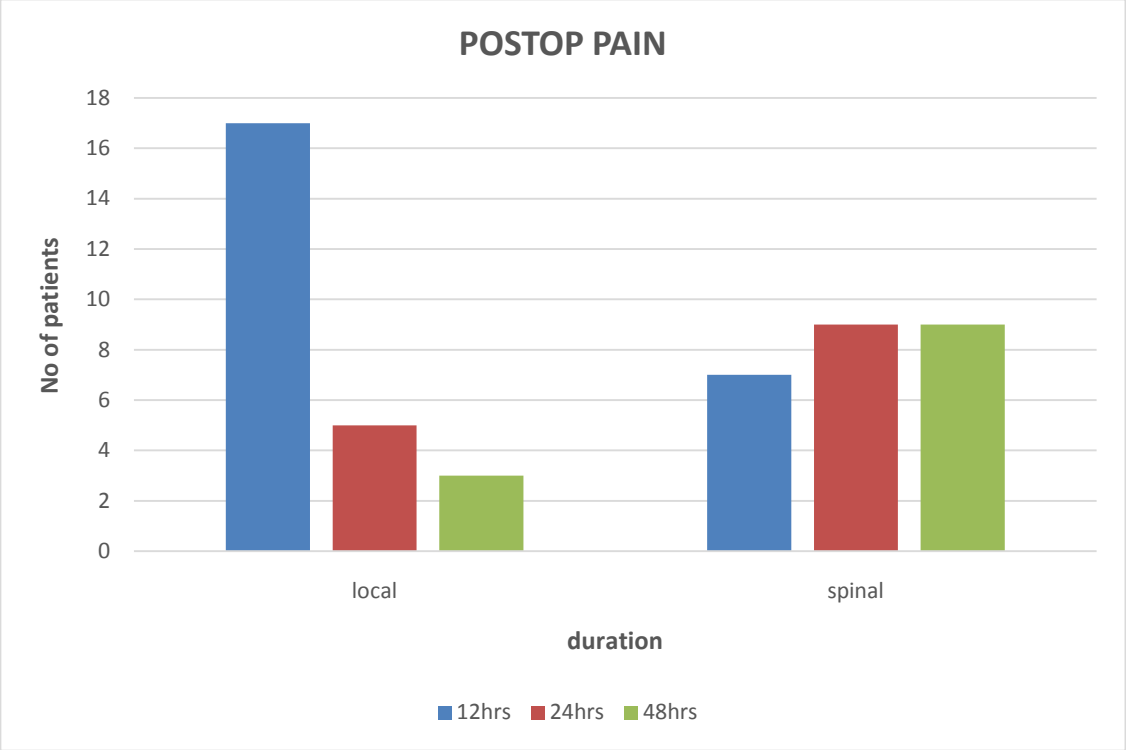


Chart 5: Post op pain score

Post op pain score at 24hrs and 48hrs was more among the patients who received spinal anaesthesia.Post op pain was significantly less in group A when compared to group B.

TABLE 4 incidence of post operative complications

Post operative complications	Group A(local anesthesia)		Group B(spinal anesthesia)	
	No of cases	percentage	No of cases	Percentage
Wound sepsis	-	-	-	-
Wound hematoma	1	4%	1	4%
Testicular pain /swelling	1	4%	-	-
Urinary retention	-	-	6	24%
Headache	-	-	3	12%
Respiratory complication	-	-	-	-
Thromboembolism	-	-	-	-
recurrence	-	-	-	-

Post op complications were significantly less in group A compared to group B. (p value < 0.05) .

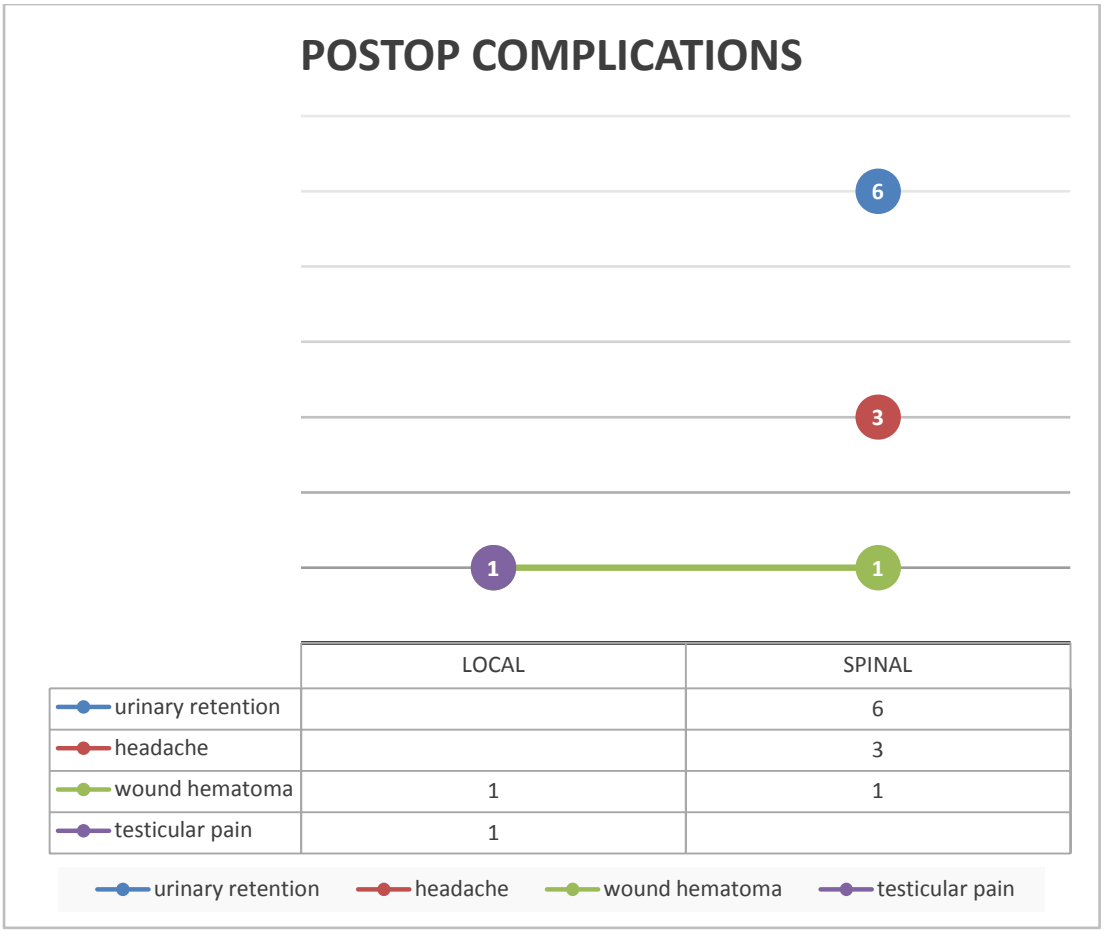


Chart 6: Post op complications

Post op complications like urinary retention and post spinal headache was seen more among patients who received spinal anaesthesia. Patients who received local anaesthesia had much less complications compared to spinal anaesthesia.

Table 5 Number of analgesic doses received postoperatively

No of analgesic doses	Group A(local anesthesia)		Group B(spinal anesthesia)	
	No of cases	Percentage	N of cases	Percentage
0	-	-	-	-
1	11	44%	2	8%
2	3	12%	5	20%
3	10	40%	10	40%
4	-	-	-	-
5	-	-	4	16%
6	1	4%	4	16%
Mean+/-S.D	2.12+/-1.23		3.44+/-1.58	

Mean analgesic dose received was statistically significantly less in group A patients (2.12+/-1.23) as compared to group B patients (3.44+/-1.58)

(P value < 0.05)

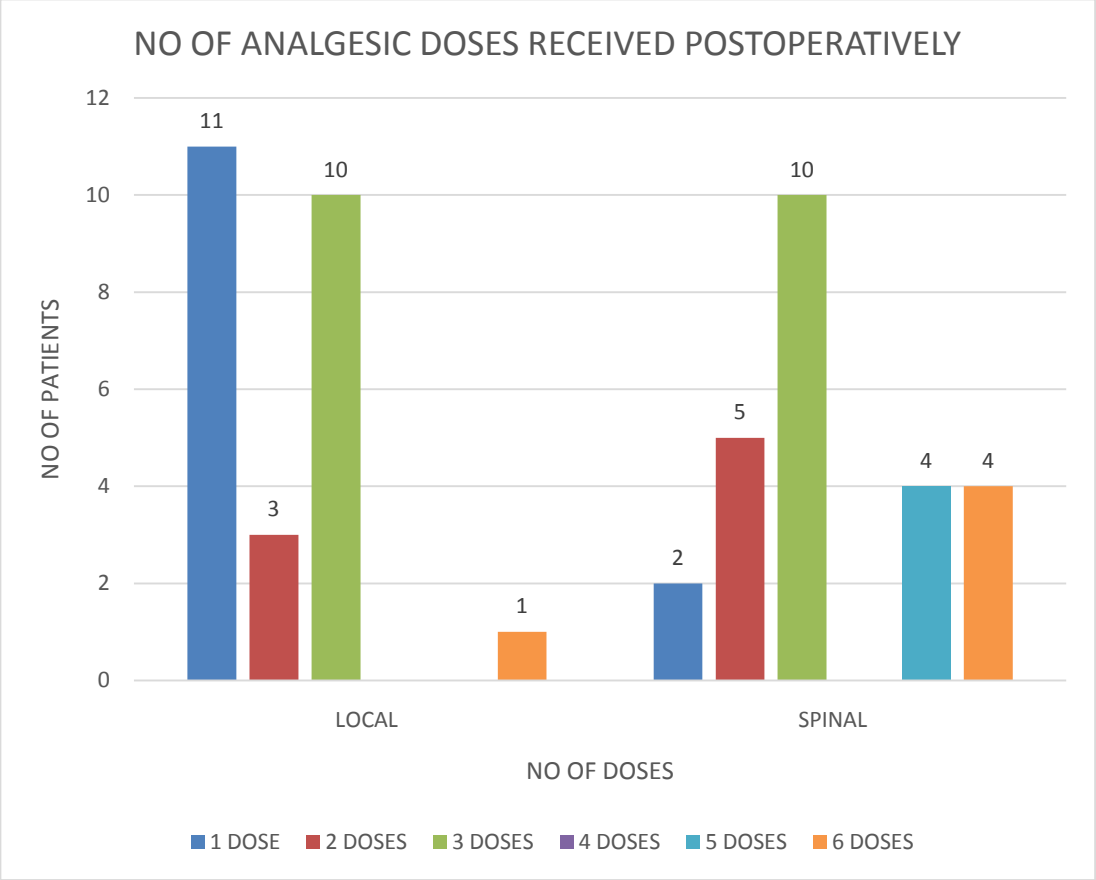


Chart 7: No of analgesic doses received postoperatively

Group A patients received less no of analgesic doses compared to group B patients.

Table 6 No of days of stay in hospital

No of days of stay	Group A(local anesthesia)		Group B(spinal anesthesia)	
	No of cases	Percentage	No of cases	Percentage
1	20	80%	3	12%
2	5	20%	3	12%
3	-	%	5	20%
4	-	%	12	48%
5	-	%	2	8%

The number of days of hospital stay was significantly less in group A when compared to group B . (p value < 0.05) .

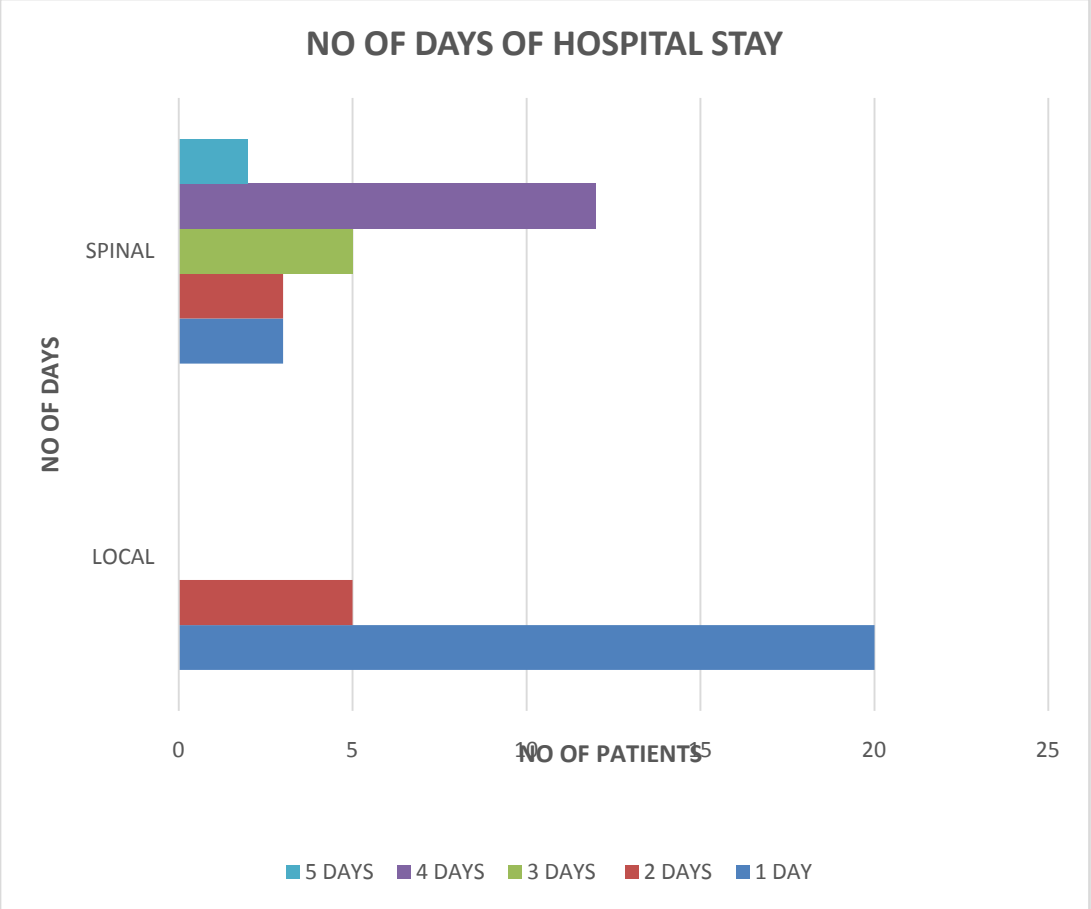


Chart 8: No of days of hospital stay

Patients in group A were discharged on the 2nd post operative day whereas patients in group B were discharged on the 4th and 5th post operative day. No of days of hospital stay among group A patients was significantly less.

DISCUSSION

I have studied 50 patients and among them the youngest patient who underwent hernioplasty under local anaesthesia was 21 years old and oldest was 71 years old.Among the patients who underwent under spinal anaesthesia youngest was 22 years old and the oldest was 67 years old. The mean age was 44.36 in group A and 40.44 in group B.

In both the groups the incidence of indirect inguinal hernia was high. In group A 15 patients had indirect inguinal hernia and 10 patients had direct inguinal hernia. In group B 14 patients had indirect inguinal hernia and 11 patients had direct inguinal hernia. The incidence was indirect inguinal hernia was common in the age group of 21 to 45 years in group A and 22 to 47 years in group B. Direct hernia was seen in the age group of 47 to 71 years in group A and 39 to 67 years in group B. Direct hernia was common among the older age group as per the study.

Around 7 patients in group A had left sided hernia and 9 patients in group B had left sided hernia. Therefore right sided hernia was more common among the study groups.

The time taken to complete hernioplasty in group A was 30 – 40 mins in 4 patients, 41- 50 mins in 9 patients , 51- 60 patients in 9 patients and 61 – 70 mins in 3 patients. Majority of patients surgery was

completed with 40 to 70 mins. Whereas in group B it took 30- 40 mins in 1 patient , 41 – 50 mins in 3 patients , 51 – 60 mins in 2 patients , 61 – 70 mins in 11 patients ,71 – 80 mins in 1 patient, 81 – 90 mins in 4 patients and 91 – 100 mins in 3 patients.About 32% of patients in group B the surgery time was prolonged ranging from 40 to 100 mins.

Hence the surgery time was significantly prolonged in patients who underwent hernioplasty under spinal anaesthesia when compared to local anaesthesia.(p value <0.05).

Hence local anaesthesia was better compared to spinal anaesthesia when the time taken for surgery is considered.The results of our study are very similar to other studies conducted by Song et al and Job et al when mean operative time was considered.

The pain felt during surgery in this study was graded as no pain, mild, moderate and severe pain. The pain was due to dissection of sac and cord in case of huge hernias and chronic hernias where adhesions are usually found. Meticulous dissection of ilioinguinal nerve reduces the pain in patients postoperatively. The results were as follows. In group A around 7 patients had no pain, 11 patients had mild pain , 6 patients had moderate pain and 1 had severe pain whereas in group B 16 patients had mild pain and 9 patients had moderate pain. None of the patients in group B had severe pain. Hence the pain felt during surgery was significantly

less in group A compared to group B.(p value < 0.05) Therefore local anaesthesia is better anaesthesia in the modern day practise.

Tuerkoy et al had investigated the benefits of local anaesthesia while performing hernia surgery. Similarly Kehlet also found decreased post operative pain and analgesia usage in patients who underwent hernioplasty under local anaesthesia. These findings were consistent with our study.

The post operative pain in patients is due to excessive tissue handling, wound infection/hematoma, urinary retention ,traction on tissues. Post operative pain in these patients were assessed based on the Visual Analogue Scale. Here in our study pain was assessed from (1-10) at 12 hours , 24 hours , 48 hours. The mean at 12 hrs , 24 hrs and 48 hrs in group A was found to be 2.80+/-0.70 , 2.00+/-0.70 , 0.20+/-0.40 whereas in case of group B the mean at 12 hrs , 24 hrs and 48 hrs was 3.48+/-0.87 , 2.88+/-0.92 , 2.08+/-0.95 respectively. Here in our study the post operative pain in the group A was significantly less when compared to group B.(p value < 0.05).

The incidence of post operative complications like wound sepsis, hematoma, testicular pain, urinary retention, headache, recurrence was considered. Urinary retention was thought to be due to autonomic blockade which was common in spinal anaesthesia. Mesh infection was

not seen in any of the patients and recurrence was also not seen in any patient as proper surgical technique does reduces the chances of recurrence. Among group A 1 patient had wound hematoma post operatively and another 1 had testicular pain whereas in group B 1 patient had wound hematoma , 6 patients (24%) had urinary retention and 3 patients (12%) had headache. Patients who had urinary retention was relieved by catherisation in four patients. Hencepost operative complications were significantly less in group A when compared to group B (p value < 0.05)

According to the study performed by Shulman AG et al, there was no incidence of mesh infection in the patients.

In the study conducted by Kark AE et al, the mortality was reported to be nil and the overall sepsis rate was found be around 0.9% which was consistent with our study.

The number of analgesic doses received postoperatively was compared between both the groups in the study. In group A 11 patients (44%) received one analgesic dose , 3 patients (12%) received two analgesic doses post operatively and 10 patients (40%) received three analgesic doses and 1 patient (4%) received six doses post operatively. But in group B 2 patients (8%) received one analgesic dose, 5 patients (20%) received two analgesic doses, 10 parients (40%) received three

analgesic doses , 4 patients (16%) received five analgesic doses and another 4 patients (16%) received six analgesic doses postoperatively. Therefore the mean analgesic dose received was statistically significantly less in group A(2.12+/-1.23) when compoared to group B(3.44+/-1.58) with (p value < 0.05).The post operative analgesic dose required was less as the local anaesthesia given during the surgery had long postoperative analgesic effect.

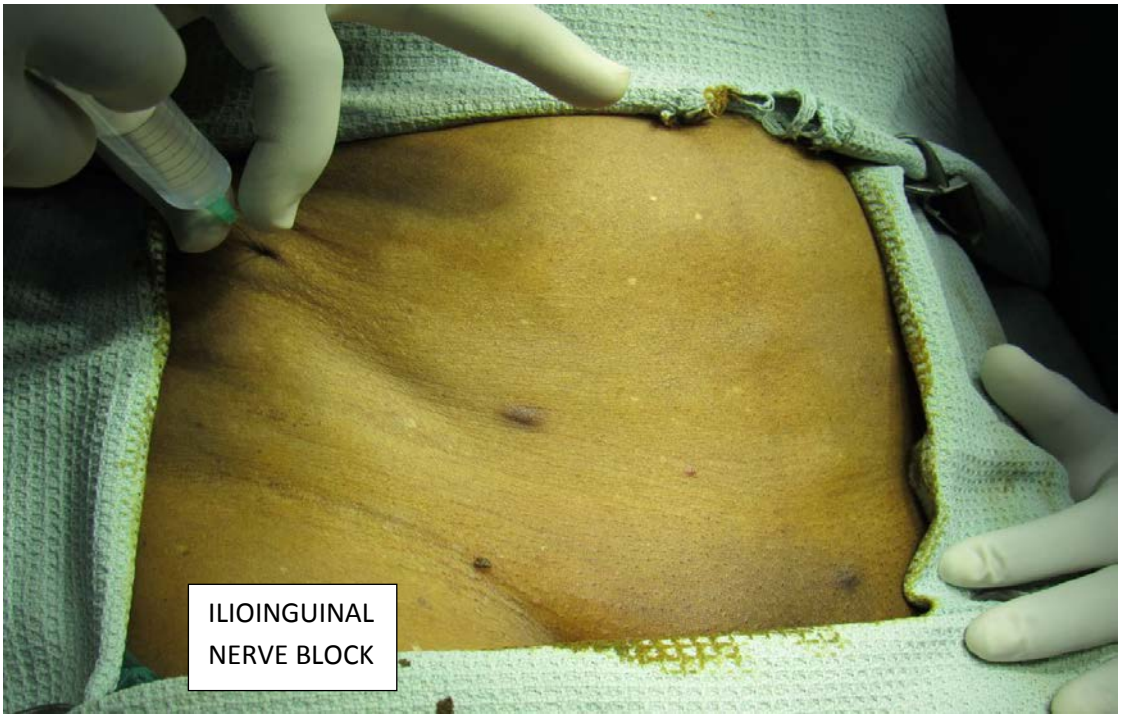
The number of days of hospital stay was compared in both the groups and among the patients who underwent hernioplasty under local anesthesia 20 patients (80%) were discharged in 24 hours and another 5 patients (20%) in 48 hours. The 20 patients in group A had no complications and had no pain after 24 hours and hence discharged. On follow up the post operative period was uneventful and wound was healthy and there was no recurrence. Whereas in group B 3 patients (12%) were discharged on day 1 , another 3 patients (12%) on day 2, 5 patients (20%) on day 3 , 12 patients (48%) on day 4 and 2 patients (8%) on day 5.So group B patients had to stay for a longer time in the hospital. This was related to the complication related to spinal anaesthesia which delayed the time of discharge in these patients. Urinary retention and headache seen in group B patients attributed to the longer stay in the hospital and the post operative pain which was more in group B led to the

delayed time of discharge. So the number of days of stay in hospital was significantly less in patients who received local anaesthesia.

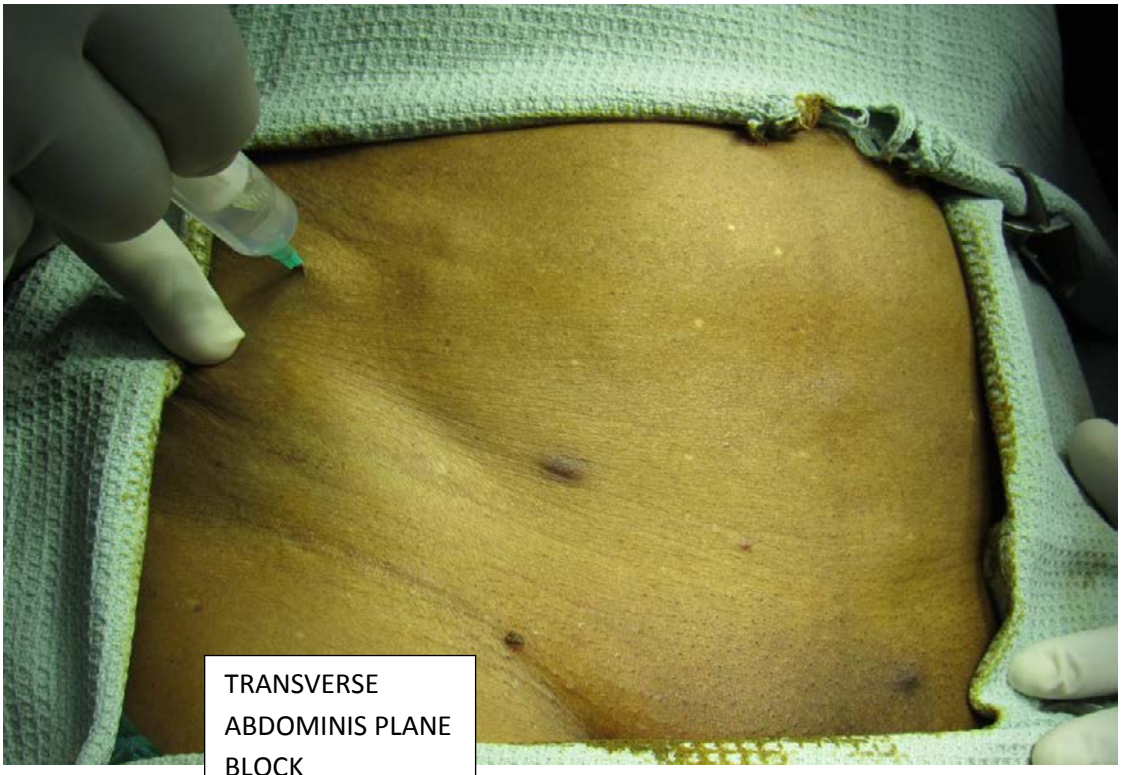
When cost effectiveness of the procedure was considered the patients in group A had less complication, less analgesic doses required, local anaesthesia was used during the surgery, less number of days of stay in hospital .

CONCLUSION

The Lichtenstein’s hernioplasty done under local anaesthesia is a new advent among the hernia repairs done nowadays. When done under local anaesthesia the morbidity is less and it is considered as a safe day care procedure in both young and adult patients. Hernioplasty done under local anaesthesia has a speedier recovery, less pain. The anaesthesia related complications are much less when compared to spinal anaesthesia. Therefore Lichtenstein’s hernioplasty under local anaesthesia is gaining immense attention currently among the groin hernia repairs.

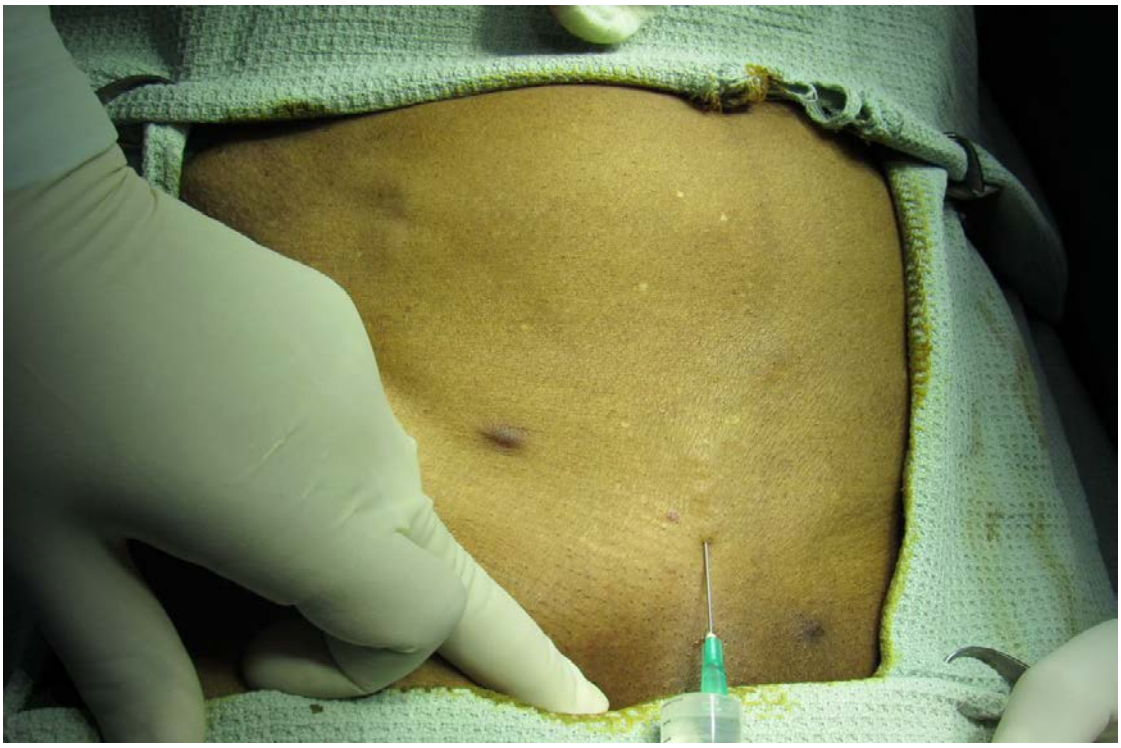


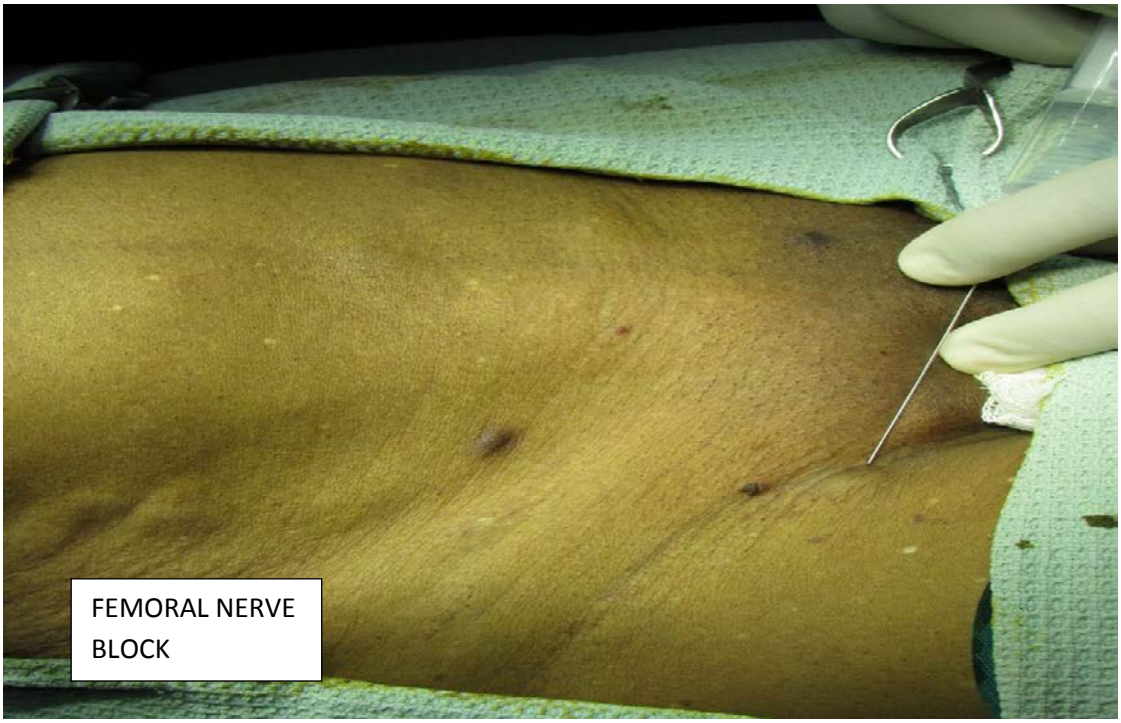
ILIOINGUINAL NERVE BLOCK



TRANSVERSE ABDOMINIS PLANE BLOCK

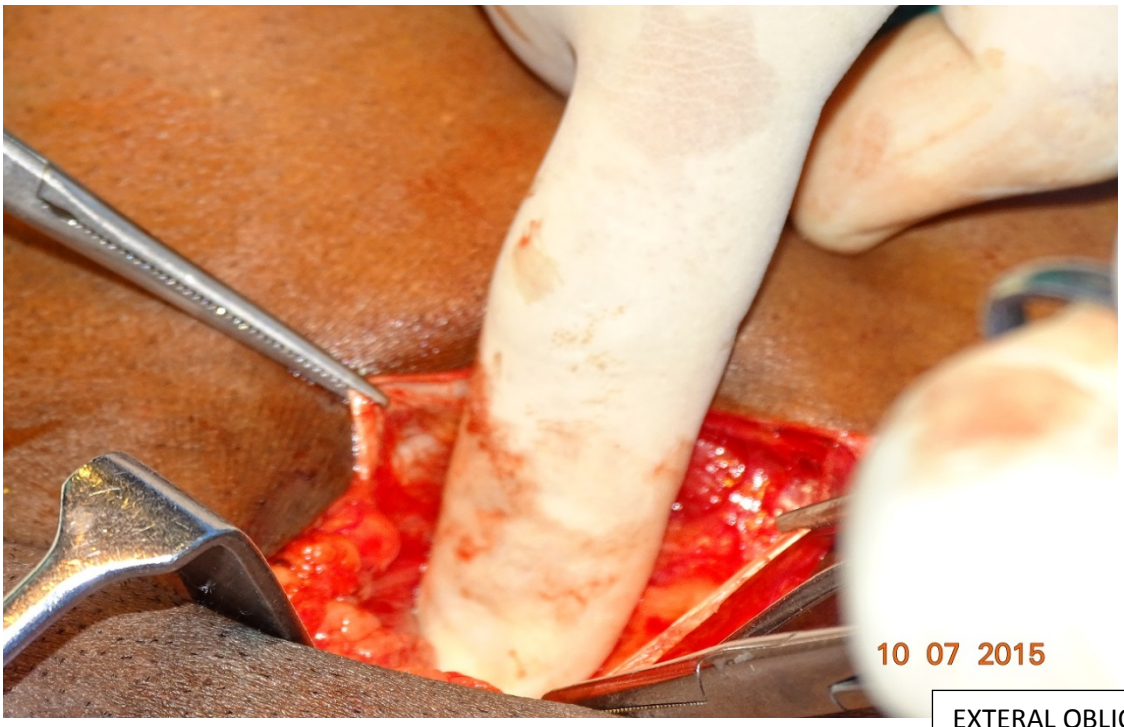
INFILTERATION ALONG PUBIC TUBERCLE



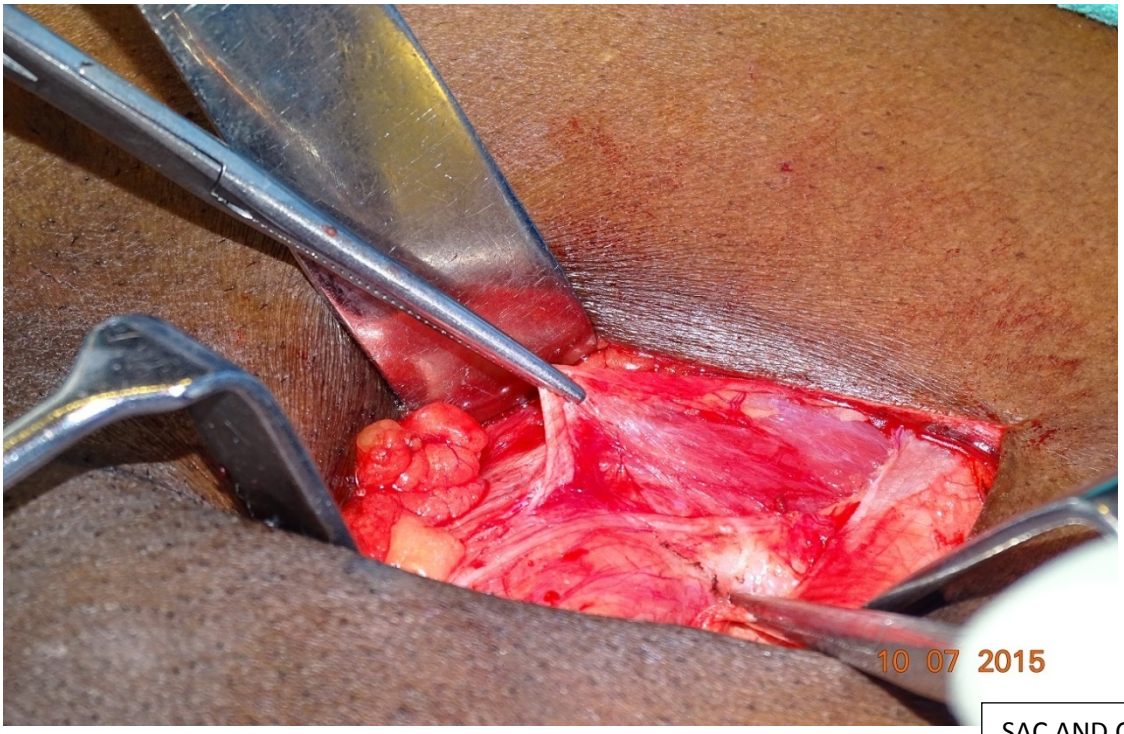

FEMORAL NERVE
BLOCK


INFILTERATION ALONG
THE LINE OF INCISION

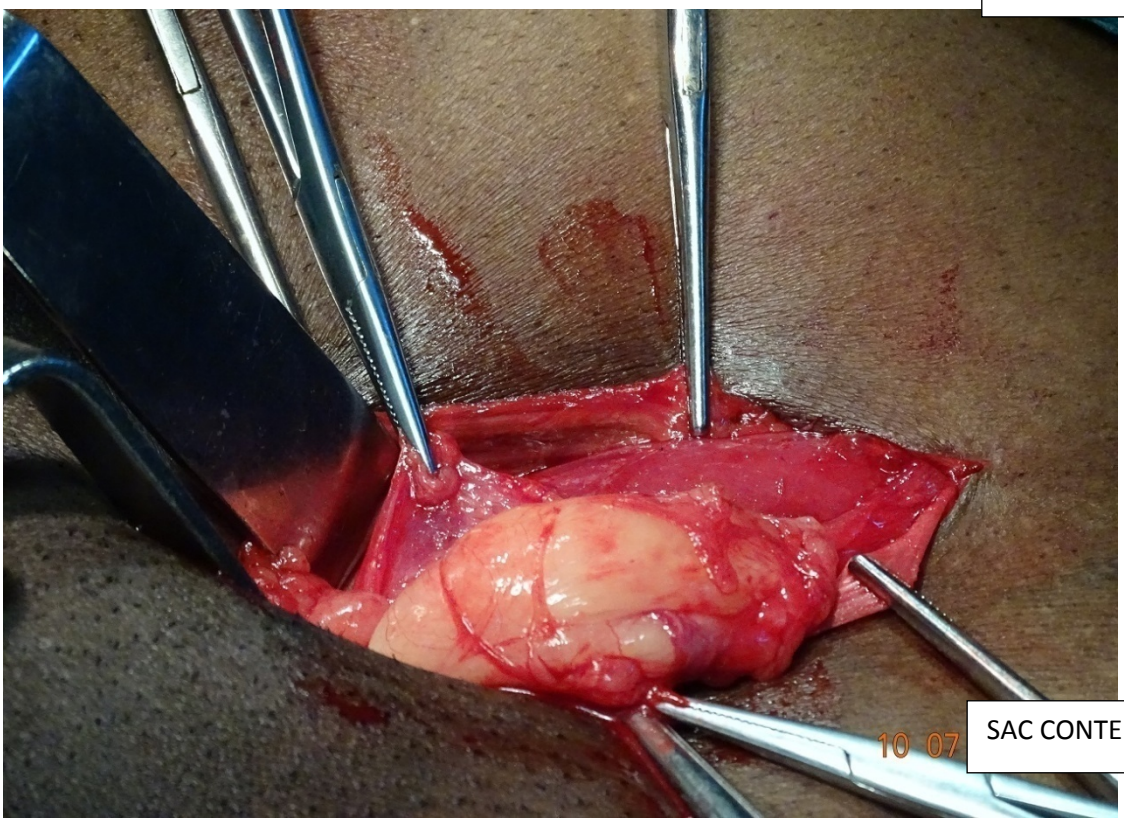
INCISION MARKED



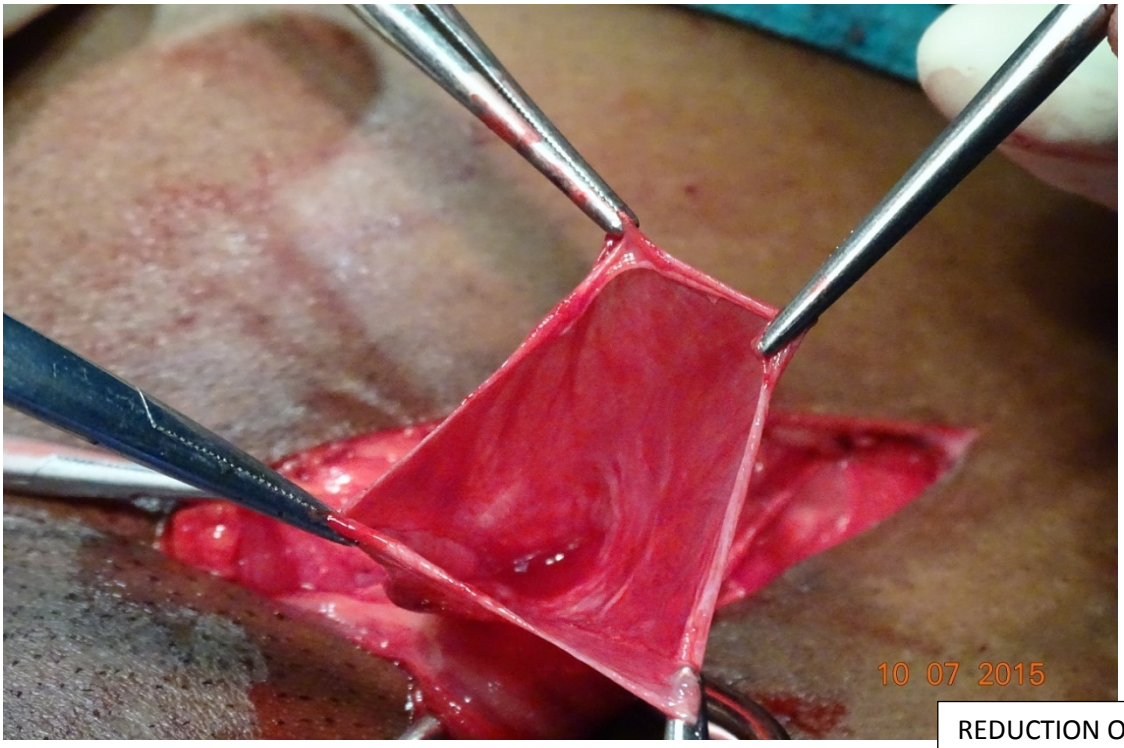
EXTERAL OBLIQUE SPLAYED APART



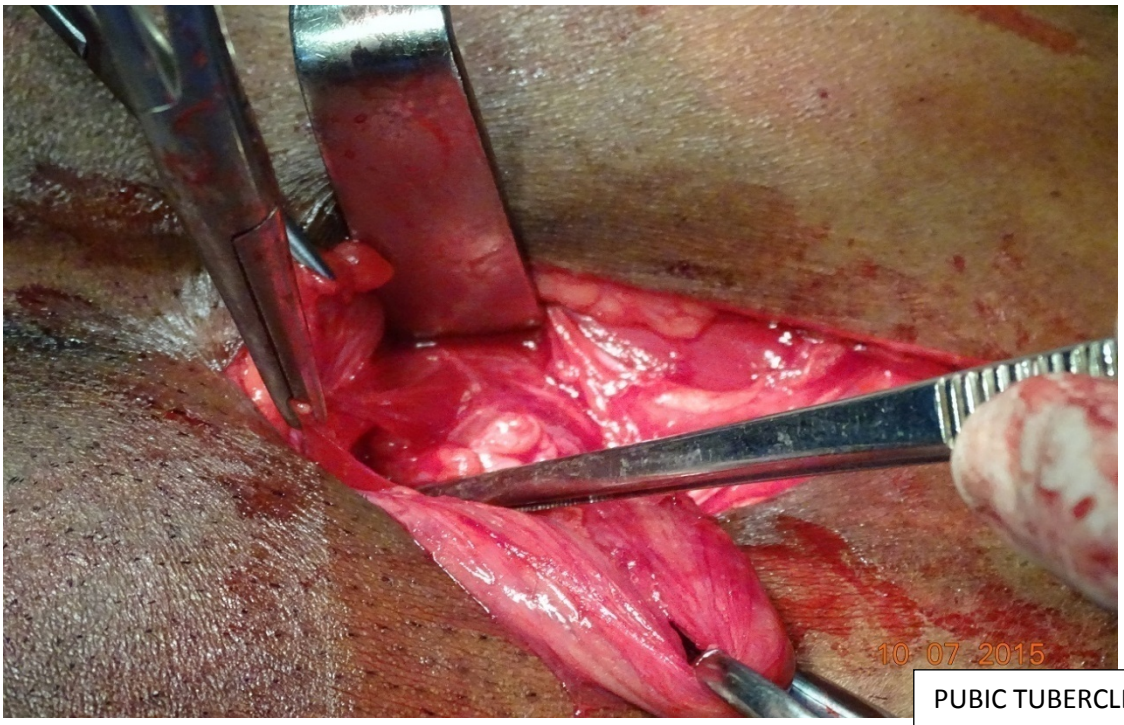
SAC AND CORD STRUCTURES



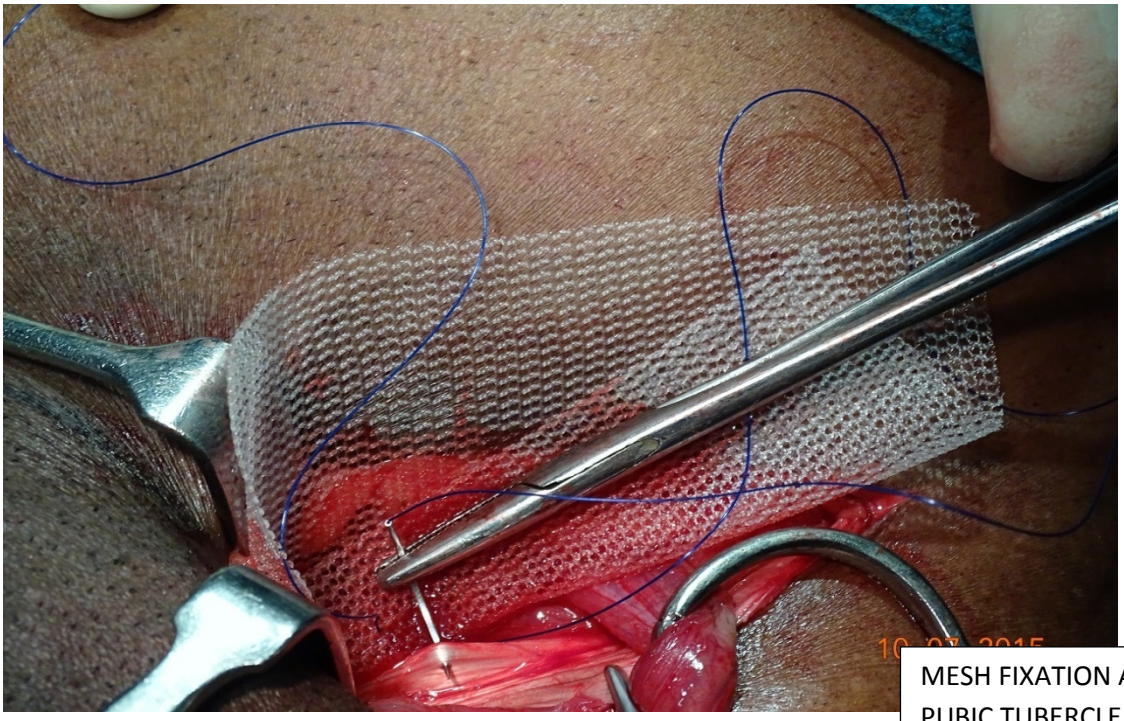
SAC CONTENTS



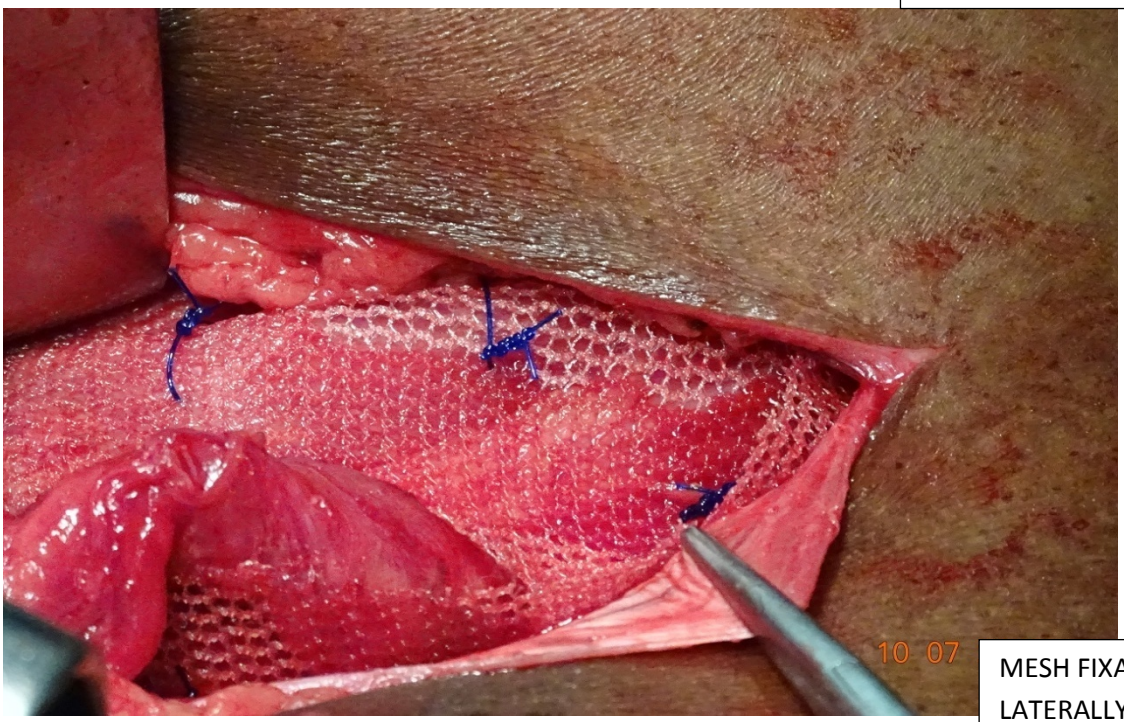
REDUCTION OF SAC CONTENTS



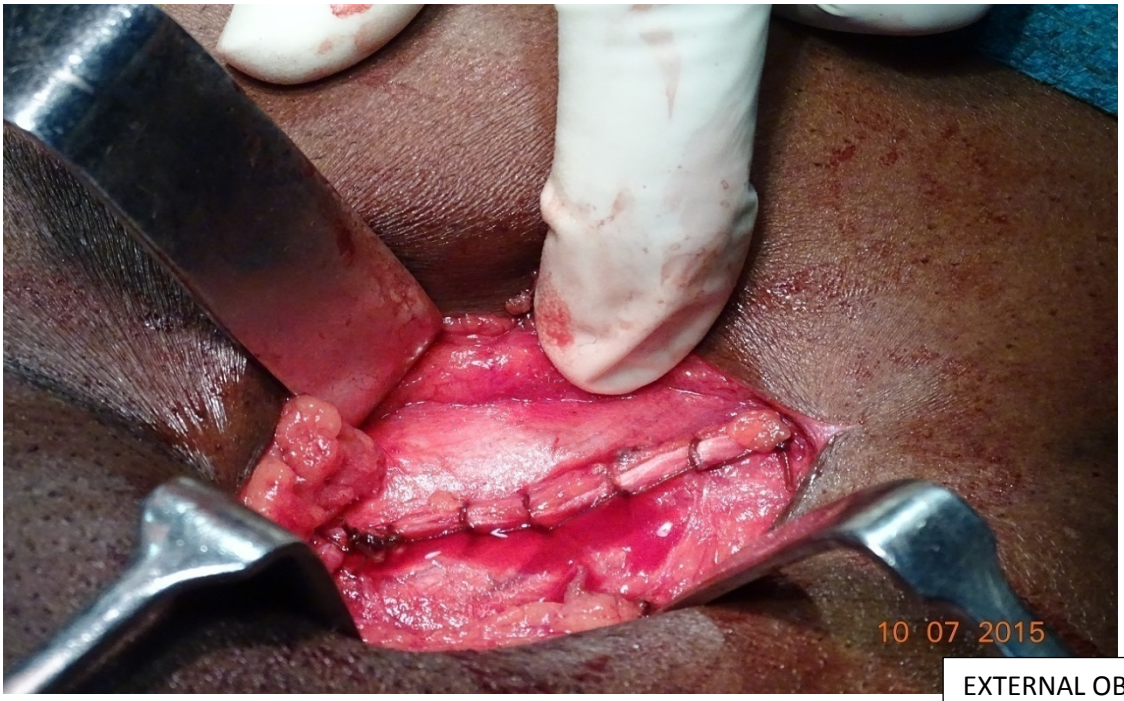
PUBIC TUBERCLE IDENTIFICATION



MESH FIXATION AT PUBIC TUBERCLE AND ALONG INGUINAL LIG



MESH FIXATION LATERALLY & SUPERIORLY



EXTERNAL OBLIQUE CLOSURE

SKIN CLOSURE

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PROFORMA

CASE OF INGUINAL HERNIA

Name:

Address:

Age/sex:

religion:

O.P No:

I.P No:

D.O.A:

D.O.S:

D.O.D:

B. CHIEF COMPLAINTS:

Duration of symptoms:

C.**PAST HISTORY:**

1. DM/HT/BA
2. TB
3. EPILEPSY
4. PREVIOUS SURGERY
5. JAUNDICE
6. CIRRHOSIS

D.**PERSONAL HISTORY:**

SMOKER

ALCOHOLIC

E.**INITIAL ASSESSMENT OF PATIENT**

1.Vitals:

PR :

BP :

RR :

Temperature :

2.GENERAL SIGNS:

Pallor

Tongue

Skin

Icterus

Cyanosis

Lymphadenopathy:

K.SYSTEMIC EXAMINATION:

CVS

RS

CNS

ABDOMEN:

INGUINO SCROTAL REGION :

EXTERNAL GENITALIA:

PER RECTAL EXAMINATION

CLINICAL DIAGNOSIS

INVESTIGATIONS

A. HB%

B. GROUPING & TYPING

C. BT/CT

D. PCV

E. HBSAG HIV

F. ECG

G. URINE: Macro

Micro

Albumin

Sugar

H. BLOOD:

RBS

BLOOD UREA

SER.CREATININE

I. CHEST X RAY PA VIEW

J. X-RAY ABDOMEN ERECT

K. ABDOMEN & PELVIS USG :

L.PULMONARY FUNCTION TEST:

PRE-OPERATIVE DIAGNOSIS:

OPERATIVE PROCEDURE:

ANESTHESIA:

INCISION:

SURGICAL PROCEDURE:

POST-OPERATIVE PERIOD / COMPLICATIONS:

1.Postoperative Pain

2.Retention Of Urine

3.Hesitency

4.Scrotal Swelling

5.Wound Infection

6.Reduction Of Hospital Stay

7.Antibiotic Usage

8.Testicular Pain

9.Headache

PATIENT CONSENT FORM

STUDY TITLE: "COMPARATIVE STUDY ON LICHIENSTEIN S REPAIR DONE UNDER SPINAL ANAESTHESIA AND LOCAL ANAESTHESIA"

STUDY CENTRE: DEPARTMENT OF GENERAL SURGERY ,GMKMCH,SALEM

PARTICIPANT NAME : AGE : SEX:

I.P. NO :

I confirm that I have understood the purpose of surgical/invasive procedure for the above study. I have the opportunity to ask the question and all my questions and doubts have been answered to my satisfaction.

I have been explained about the possible complications that may occur during and after medical/ surgical procedure. I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving any reason.

I understand that investigator, regulatory authorities and the ethics committee will not need my permission to look at my health records both in respect to the current study and any further research that may be conducted in relation to it, even if I withdraw from the study. I understand that my identity will not be revealed in any information released to third parties or published, unless as required under the law. I agree not to restrict the use of any data or results that arise from the study.

I hereby consent to participate in this study for various surgical/invasive procedures and their outcomes.

Time :

Date : Signature / Thumb Impression Of Patient

Place :

Patient's name:

Signature of the investigator : _____

Name of the investigator : _____

LICHTENSTEIN HERNIOPLASTY UNDER LOCAL ANESTHESIA

S.No	NAME	AGE	IP NO	SIDE	DIRECT/ INDIRECT	ANALGESIC DOSES	SURGERY TIME	INTRA OP PAIN	POST OP PAIN	POST OP COMP	HOSPITAL STAY
1	SURIYA	21	33155	RIGHT	INDIRECT	3	51-60	NP	12hrs	nil	1
2	SHEIKMOYIDEEN	34	46574	RIGHT	INDIRECT	3	51-60	NP	12hrs	nil	1
3	SHARATH	25	47239	RIGHT	INDIRECT	3	61-70	NP	12hrs	nil	1
4	PRAKASH	36	36156	RIGHT	INDIRECT	3	61-70	NP	12hrs	nil	1
5	SUNDRAM	43	52929	RIGHT	INDIRECT	3	61-70	MI	12hrs	wh	2
6	NALLATHAMBI	44	51307	RIGHT	INDIRECT	2	30-40	MI	12hrs	nil	1
7	DURAISAMY	47	42375	RIGHT	DIRECT	2	30-40	MI	12hrs	nil	1
8	SELVAM	48	16479	RIGHT	DIRECT	2	30-40	NP	12hrs	nil	1
9	PALANIVEL	41	7983	RIGHT	INDIRECT	6	30-40	MI	12hrs	tp	2
10	SHANMUGAM	42	48952	RIGHT	INDIRECT	1	41-50	NP	12hrs	nil	1
11	MANI	47	10663	RIGHT	DIRECT	1	41-50	MI	12hrs	nil	1
12	ELUMALAI	35	56659	RIGHT	INDIRECT	1	41-50	MI	12hrs	nil	1
13	PUGALENTHI	25	49999	RIGHT	INDIRECT	1	41-50	NP	12hrs	nil	1
14	RADHAKRISHNAN	54	5823	RIGHT	DIRECT	1	41-50	MI	12hrs	nil	1
15	MANIKAM	63	7754	RIGHT	DIRECT	1	41-50	MI	12hrs	nil	1
16	NATESAN	65	23222	RIGHT	DIRECT	1	41-50	MI	12hrs	nil	2
17	RAMASAMY	71	47238	RIGHT	DIRECT	1	41-50	MI	12hrs	nil	2
18	KALIYAPPAN	48	33186	RIGHT	DIRECT	1	51-60	MI	24hrs	nil	1
19	PERIYASAMY	49	54821	LEFT	DIRECT	1	51-60	MD	24hrs	nil	1
20	PALANISAMY	45	4606	LEFT	INDIRECT	1	51-60	MD	24hrs	nil	1
21	SUBRAMANI	52	5975	LEFT	DIRECT	3	51-60	MD	24hrs	nil	1
22	RAJESH	42	48359	LEFT	INDIRECT	3	51-60	MD	24hrs	nil	1
23	KATHIRESAN	43	10231	LEFT	INDIRECT	3	51-60	MD	48hrs	nil	2
24	BASHA	44	42363	LEFT	INDIRECT	3	51-60	MD	48hrs	nil	1
25	SIVALINGAM	45	37687	LEFT	INDIRECT	3	51-60	SV	48hrs	nil	1

LICHTENSTEIN HERNIOPLASTY UNDER SPINAL ANESTHESIA

S.No	NAME	AGE	IP NO	SIDE	DIRECT/ INDIRECT	ANALGESIC DOSES	SURGERY TIME	INTRA OP PAIN	POST OP PAIN	POST OP COMP	HOSPITAL STAY
1	KRISHNAKUMAR	22	61840	RIGHT	INDIRECT	2	51-60	MD	12hrs	nil	1
2	VINOTH	23	79132	RIGHT	INDIRECT	2	51-60	MD	12hrs	nil	1
3	KUMAR	24	28724	RIGHT	INDIRECT	2	61-70	MI	12hrs	nil	1
4	ANBALAGAN	35	72534	RIGHT	INDIRECT	2	61-70	MI	12hrs	nil	2
5	PONNAMBALAM	46	53815	RIGHT	INDIRECT	2	61-70	MI	12hrs	nil	2
6	ARULRAJ	42	73856	LEFT	INDIRECT	1	30-40	MI	12hrs	hd	4
7	ELANGO	43	67312	RIGHT	DIRECT	3	61-70	MI	12hrs	nil	3
8	RANGANATHAN	41	316451	RIGHT	DIRECT	3	61-70	MI	24hrs	ur/hd	4
9	MANI	40	26924	RIGHT	INDIRECT	3	61-70	MI	24hrs	nil	3
10	DHANAPAL	47	45290	LEFT	INDIRECT	3	61-70	MI	24hrs	nil	3
11	MADHU	39	47329	LEFT	DIRECT	3	41-50	MI	24hrs	ur	4
12	RAMACHANDRAN	38	86253	LEFT	INDIRECT	3	61-70	MI	24hrs	ur	4
13	RAMESH	24	36134	LEFT	INDIRECT	3	61-70	MI	24hrs	ur	4
14	SANNASI	41	15990	LEFT	DIRECT	3	61-70	MI	24hrs	ur	2
15	AYYANAR	42	65308	RIGHT	DIRECT	3	41-50	MI	24hrs	nil	4
16	ALAGUVEL	45	63650	RIGHT	DIRECT	3	41-50	MI	24hrs	nil	3
17	NOUSHATH	46	36512	RIGHT	DIRECT	5	81-90	MI	48hrs	nil	3
18	SENTHILKUMAR	52	47129	RIGHT	DIRECT	5	81-90	MI	48hrs	ur	4
19	PERIYASAMY	47	3578	LEFT	DIRECT	5	81-90	MD	48hrs	hd	4
20	SHANMUGAM	39	25167	LEFT	INDIRECT	1	61-70	MD	48hrs	nil	4
21	SHAKTHIVEL	37	64289	LEFT	INDIRECT	5	81-90	MD	48hrs	nil	4
22	MANIVANAN	34	52760	RIGHT	INDIRECT	6	91-100	MD	48hrs	nil	4
23	ARULKUMAR	43	63850	RIGHT	INDIRECT	6	71-80	MD	48hrs	wh	5
24	LAKSHMANAN	54	16131	RIGHT	DIRECT	6	91-100	MD	48hrs	nil	5
25	PAKKISAMY	67	64892	RIGHT	DIRECT	6	91-100	MD	48hrs	nil	4