

A DISSERTATION ON
**“ROLE OF ILLIOINGUINAL NEURECTOMY IN
ENTRAPMENT SYNDROME IN INGUINAL
HERNIA REPAIR”**

Dissertation submitted to

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APRIL – 2013

CERTIFICATE

This is to certify that the dissertation titled **“ROLE OF ILIOINGUINAL NEURECTOMY IN ENTRAPMENT SYNDROME IN INGUINAL HERNIA REPAIR”** is the original work done by **Dr. P. MAHESH KUMAR**, post graduate in M.S., General surgery at the department of general surgery, madras medical college, Chennai 600 003 to be submitted to the Tamilnadu Dr.M.G.R Medical university, Chennai 600 032, towards the partial fulfillment of the requirement for the award of M.S., degree in General Surgery during the academic period from May 2010 – April 2013.

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DECLARATION

I solemnly declare that the dissertation titled “**ROLE OF ILIOINGUINAL NEURECTOMY IN ENTRAPMENT SYNDROME IN INGUINAL HERNIA REPAIR**” was done by me at Rajiv Gandhi Government General Hospital, Chennai-600003 during the period of May 2010 to November 2012 under the guidance and supervision of Prof G. Muralidharan M.S., The dissertation is submitted to the Tamil Nadu Dr.M.G.R Medical University, Chennai towards the partial fulfillment of the requirement for the award of **MS Degree in General Surgery Branch –I**

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ABSTRACT

Background and Objectives: Chronic post herniorrhaphy groin pain is defined as pain lasting > 3 months after surgery, which is one of the most important complication occurring after inguinal hernia repair, occurs with greater frequency than previously thought . Chronic groin pain is one of the most significant complication following inguinal hernia repair, and majority of chronic pain has been attributed to ilioinguinal nerve entrapment. Routine excision of the ilioinguinal nerve in an attempt to decrease the incidence of chronic groin pain caused by nerve entrapment, inflammation, fibrotic reactions around the nerve.

The purpose of the current study was to evaluate the effect of routine ilioinguinal nerve excision compared to nerve preservation on chronic groin pain and other sensory symptoms when performing lichtenstein 's inguinal hernia repair.

METHODS

A total of 100 patients admitted for inguinal hernia at Rajiv Gandhi Govt. General Hospital who met with inclusion criteria who underwent open mesh repair of inguinal hernia over the study period from may 2010 to november 2012. The ilioinguinal nerve

was identified and preserved in 50 patients(group A) and ilioinguinal neurectomy done in 50 patients(group-B) were evaluated for pain and other sensory symptoms at PoD-1, at one month, at second month, and at third months after surgery by using visual analogue scale.

RESULTS

100 patients are included in the study and it was divided into two groups namely one group with the preservation of ilioinguinal nerve consisting of 50 patients named as group A and another group with ilioinguinal neurectomy done consisting of 50 patients named as group B

The results showed the incidence of postoperative chronic groin pain months after surgery are 72% vs84% ($p=0.384$) at POD-1 ; 56 %vs 14%($p<0.05$) at 1 month ; 44%vs12%($p<0.05$) at 2 months ; and 28%vs8%)($p<0.05$) at 3 months in group A and B respectively by using Chi square test. The results showed that the incidence of postoperative chronic groin pain decreases in neurectomy group compared to nerve preservation group. The results showed no significant differences in hypoesthesia in either group, it is found to be 12% vs 44% at post operative day-1, 10% vs 36% at 1st month, 8% vs 32% at 2nd month, 8% vs 20% at 3rd month. And the P values are 0.001, 0.004, 0.005, 0.096 at

post operative day-1, 1st month, 2nd month and 3rd month respectively.

The incidence of post operative numbness was compared between Group A and Group B and the results of the follow up study are as follows : 36% vs 6% at day-1 (P=0.001), 32% vs 10% at 1st month (P=0.011), 20% vs 6% at 2nd month (P=0.045), 24% vs 6% at 3rd month (P=0.016). The interpretation of the results are that there is statistical significant difference between Group A and Group B regarding the incidence of post operative numbness.

CONCLUSION

The ilioinguinal neurectomy during Lichtenstein mesh hernia repair decreases the incidence of chronic groin pain after surgery. Furthermore the procedure is not significantly associated with additional morbidities in terms of local cutaneous neurosensory disturbances. So when performing Lichtenstein inguinal hernia repair, routine ilioinguinal neurectomy is a reasonable option.

KEYWORDS

Inguinal hernia; Groin; Lichtenstein; Polypropylene mesh; Herniorrhaphy; Ilioinguinal; Neurectomy; Mesh repair.

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ABBREVIATIONS

BC	Before Christ
AD	Anna Domini
VAS	Visual Analogue Scale
Cm	Centimeters
USG	Ultrasonogram
ECG	Electro Cardiogram
i.e.	That is
ECHO	Echo Cardiogram
ILN	Ilio Inguinal Nerve
CxR	Chest X-Ray
BP	Blood Pressure
IP	In Patient

**“ROLE OF ILIOINGUINAL
NEURECTOMY IN ENTRAPMENT
SYNDROME IN INGUINAL
HERNIA REPAIR”**

- A PROSPECTIVE STUDY

INTRODUCTION

Though Lichtenstein's hernia repair has reduced the incidence of recurrence of hernia to less than 2%, inguinodynia is one of the significant post-operative complications.

The incidence of inguinodynia is vastly underreported. The incidence of inguinodynia due to Lichtenstein's and the laparoscopic hernia repair are reported less than 1%.

The patients with inguinodynia less than 1% are referred for further treatment. The life-time risk of developing hernia in males is 15% and in females <5%.

Since the pain has a subjective component, the true incidence of inguinodynia is difficult to be determined by the studies. Nerve entrapment is one of the common causes of inguinodynia. Ilioinguinal nerve is the commonest nerve to be entrapped in entrapment neuropathy causing inguinodynia.

Elective ilioinguinal neurectomy eliminates the risk of entrapment neuropathy commonly caused by sutures, staples, tackers, direct nerve injury, mesh-related fibrosis and scar reactions. Various studies have shown that elective ilioinguinal

neurectomy does not causes neurosensory disturbances in the groin, groin numbness or quality of life as there is innervations from contralateral side

PRIMARY OBJECTIVES

To study role of ilioinguinal nerve for entrapment syndrome in LICHTENSTEIN hernia repair considering high incidence of entrapment syndrome and its consequent morbidity and also considering regain of sensation after few months which is lost due to neurectomy and comparing with Ilioinguinal nerve preservation during hernia repair

Secondary Objective

To study the incidence, agegroups, postoperative complications other than inguinodynia

REVIEW OF LITERATURE

HISTORICAL ASPECTS

The earliest reference is found in the ancient manuscript Egyptian Papyrus of Ebers (circa (1500B.C)

The ancient hindu surgeons treated hernia by severing the sac and cautery.

Heliodorus was the surgeon who performed the first hernia operation, he dissected the hernia sac from the cord structures and obliterated the neck of the sac by twisting the sac.

Paul of Aegina (A.D?607 or 625-90)performed the hernia surgery by twice tightening a knot and removing the cord, sac and the testis

Franco was the first to describe, and perform, an operation for strangulated hernia. Ambroise Pare (1510-90) advocated the use of truss for hernia treatment.

Lorenz Heister (1683-1758) differentiated direct from indirect hernias.

Through the eighteenth and the nineteenth century there were many developments, both in anatomy of the inguinal region as well as in hernia surgeries.

In 1754, Albrecht von Haller (1708-77) described congenital hernias. Pieter Camper (1722-89) in Holland described Camper's fascia and the surgical anatomy of the inguinal hernia. Franz K. Hesselbach (1759-1816) in Germany described Hesselbach's triangle. Astley Paston Cooper (1768-1841) described the ligament of Cooper (pectineal), the cremasteric fascia and the fascia transversalis.

Anders Adolph Retzius described the retroperitoneal space or the space of Retzius. George Lothessen (1868-1935) of Austria was the first to use Cooper's ligament for repair.

Eldorado Bassini (1844-1924) recommended surgery for hernia describing the procedure which brings together the transverse aponeurotic arch along with the transversalis fascia to the inguinal ligament with the sutures placed intermittently. Henry O. Marcy (1837-1924) introduced the procedure to form a competent internal ring, antiseptic use of animal sutures, and high tightening of the hernial sac.

G.L. Cheate was the first to describe the preperitoneal procedure. McEvedy sutured the conjoint tendon (area) to the iliopectineal ligament

E.Shouldice (1891-1965) of Toronto repaired the inguinal hernias by overlapping layers, with continuous suture.Chester McVay did hernial repair by suturing the roof of the transverse aponeurotic arch to Cooper’s ligament.

Gilbert did hernial repair by placing the mesh in the properitoneal space without any anchoring sutures. Robbins and Rutkow have extended this technique, with their work on the open mesh plug hernioplasty.



Figure-1: Antonio Scarpa (1752–1832) & Astely Cooper (1768-1841)



Figure-2: August Richter (1742-1812) & Edoardo Bassini (1844-1924)

ERA OF MINIMAL ACCESS SURGERY

In the last 2 decades there has been a significant development in the repair of inguinal hernias laparoscopically. Ger repaired an indirect inguinal laparoscopically in 1982, Arregui introduced TAPP (trans-abdominal preperitoneal repair) in 1991. Schultz & co workers (1990) described “plug & patch laparoscopic inguinal herniorrhaphy.

Dulucq in 1992, Ferzli et al. in 1992, Himpens in 1992, and Barry Mac Kernan and Laws in 1993, described the TEP technique (Total ExtraPeritoneal approach) anatomy

ANATOMY

The inguinal canal is an oblique intermuscular slit, about 3.75cm long, lying above the internal half of the inguinal ligament between the internal and the external ring. It is directed downwards, forwards and medially. In infants, the internal and the external ring are overlying each other and so there is no apparent obliquity.

The deep ring is a defect of the transversalis fascia and it lies half an inch above the mid inguinal point. The superficial inguinal ring is an opening in the external oblique aponeurosis $\frac{1}{2}$ an inch above the pubic tubercle.

Normally the aperture of the ring is kept smaller than the tip of little finger by the medial & lateral walls joined by intercommunications.

The inguinal ligament is the folded lower border, of the aponeurosis, of the external oblique forming the floor of the inguinal canal.

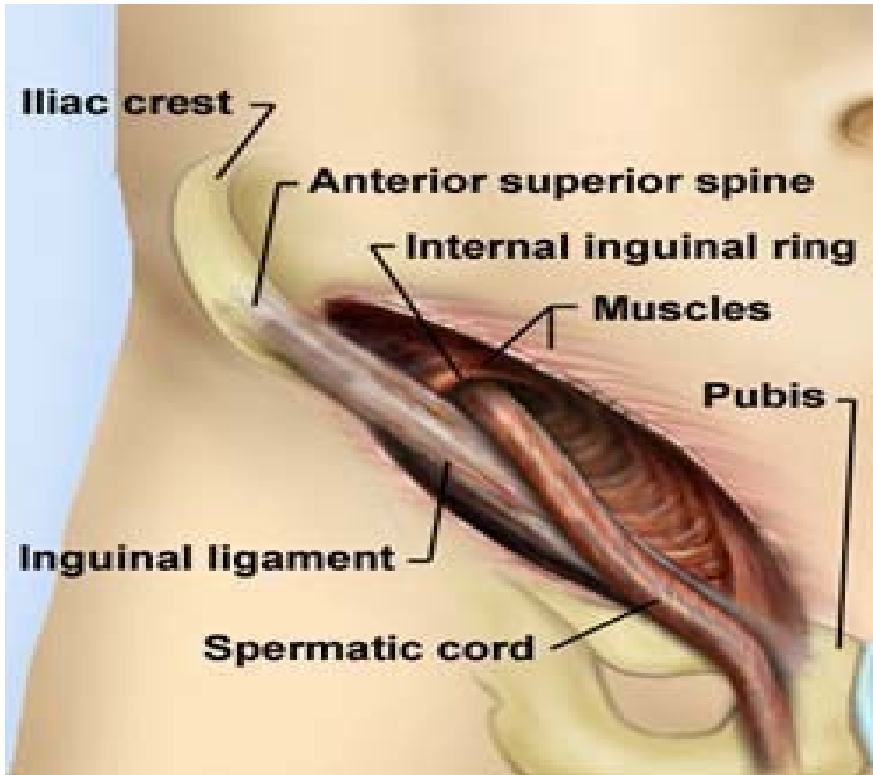


Fig-3: Anatomy of the inguinal canal

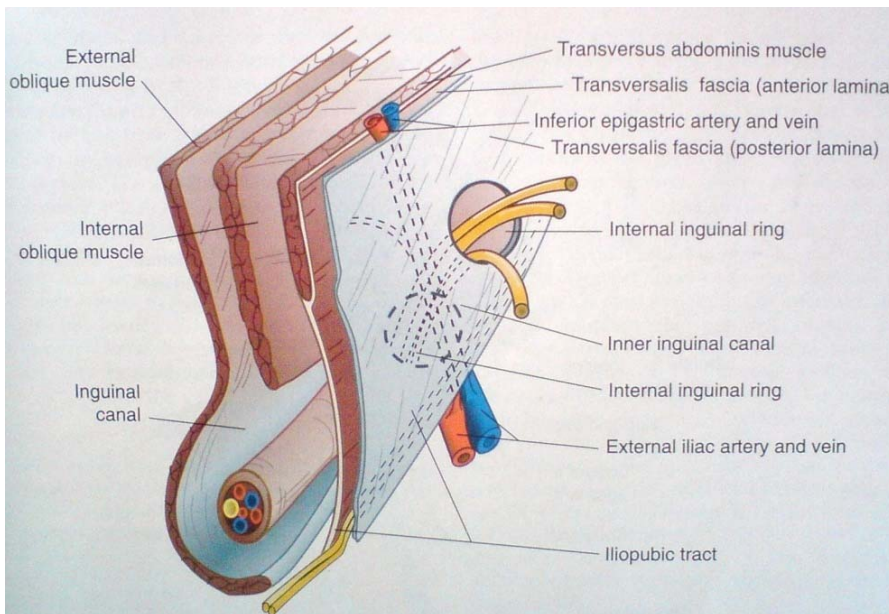


Fig-4: Anatomy of the inguinal canal

1. BOUNDARIES OF THE INGUINAL CANAL

The **Anterior wall** is formed by the following structures:

In its whole extent:

- 1) Skin
- 2) Superficial fascia
- 3) External oblique aponeurosis

In its lateral 1/3 rd:

The obliquus internus muscle

The Posterior wall is formed by the following structures:

In its whole extent:

- 1) Fascia transversalis
- 2) Extraperitoneal tissue
- 3) Parietal peritoneum

In its medial 2/3rd:

- 1) Conjoint tendon
- 2) Reflected part of inguinal ligament (medial end)

In its lateral 1/3rd:

Interfoveolar ligament (when present)

ROOF

Transverse aponeurotic arch formed by the internal oblique and the transversus abdominis muscles.

FLOOR

Inguinal ligament, along with the lacunar ligament in the medial end.

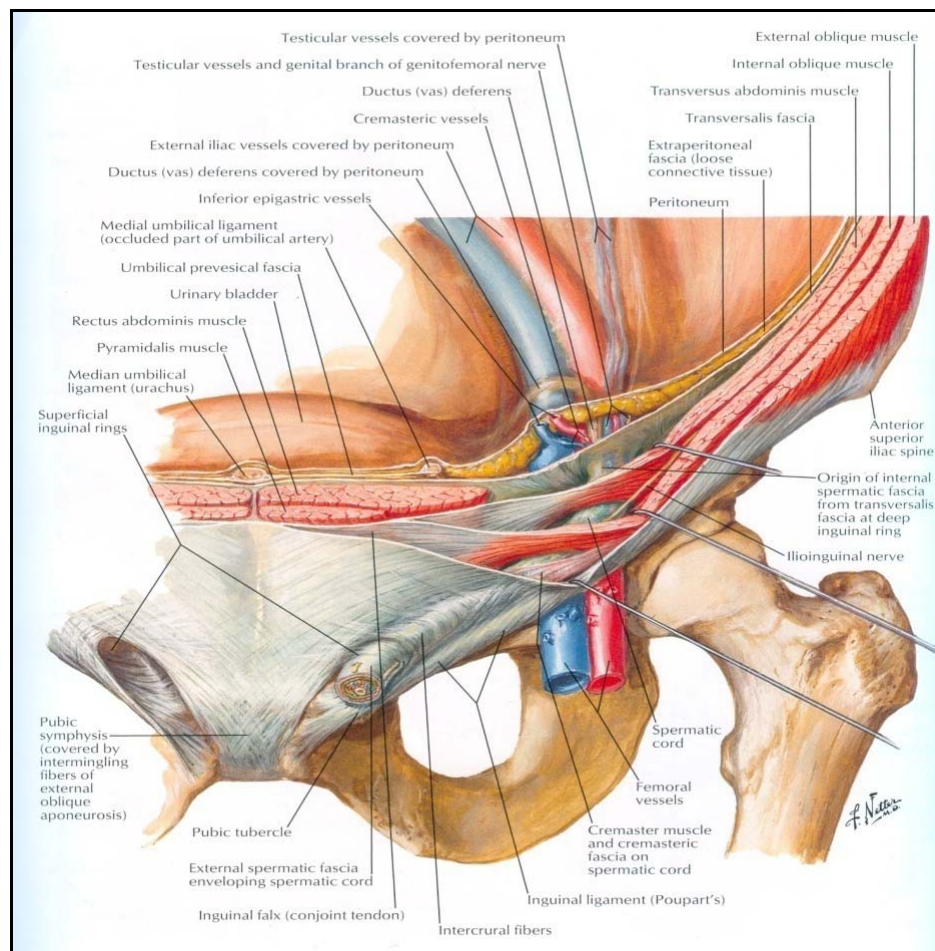


Figure-5: Layers of Abdominal wall forming the Inguinal canal and its contents

2. STRUCTURES PASSING THROUGH THE CANAL³⁵:

In males,

- a. Spermatic cord
- b. Vas deference and its artery
- c. Testicular artery
- d. Cremastic artery
- e. Pampiniform plexus of veins
- f. Obliterated remains of processus vaginalis
- g. Genital branch of Genitofemoral nerve
- h. Lymphatics

In females,

- 1) Obliterated processus vaginalis
- 2) Round ligament
- 3) Lymphatics from the uterus

3. HESSELBACH'S TRIANGLE

It is bounded by inferior epigastric artery, outer border of rectus & inguinal ligament on the lateral, medial & inferior aspects respectively.

Hesselbach's triangle is divided into medial and lateral halves by the obliterated umbilical artery (lateral umbilical ligament).

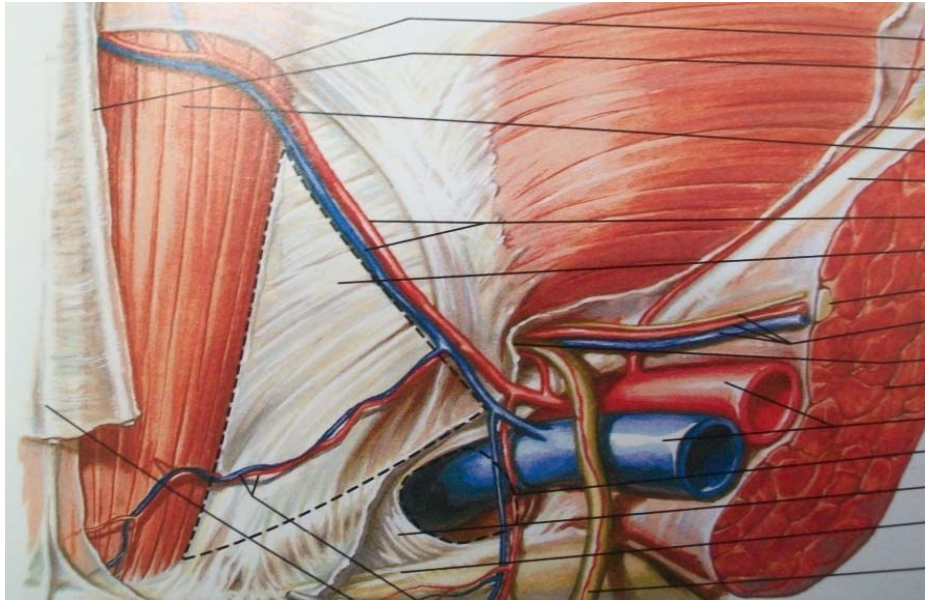


Fig-6: Hesselbach's Triangle

4. TRANSVERSALIS FASCIA

This is a portion of the endo-abdominal fascia that encloses the abdominal cavity and peritoneum. The portion which invests the transverses abdominis muscle and aponeurosis is called Transversalis fascia. Practically it forms part of the transverses muscle aponeurosis fascia complex. The transversalis fascia is somewhat like the letter 'V' with the open end pointing superolaterally to the groin and the diverging ends are called crurae. Most often, the posterior inguinal wall is represented only by this fascia and leads to a weak spot.

TYPES OF HERNIA

- 1) Inguinal
- 2) Femoral
- 3) Umbilical
- 4) Obturator
- 5) Epigastric
- 6) Paraumbilical
- 7) Spigelian
- 8) Diverication of recti
- 9) Superior lumbar
- 10) Inferior lumbar
- 11) Gluteal
- 12) Sciatic

PHYSIOLOGY

MECHANISM OF INGUINAL CANAL

- 1) Flap valve mechanism
- 2) Ball valve mechanism
- 3) Slit valve mechanism
- 4) Shutter mechanism of internal oblique
- 5) The superficial inguinal ring is guarded from behind by the conjoint tendon and the inguinal ligament.
- 6) The deep ring is guarded from the front by the fleshy fibres of the internal oblique.
- 7) The strength of the inguinal musculature is also maintained by the hormones

ETIOLOGY

- ❖ Remains of processus vaginalis
- ❖ Conditions raising intraabdominal pressure like straining at stools, straining at micturition, chronic cough
- ❖ Smoking
- ❖ Obesity
- ❖ Peritoneal dialysis

CLASSIFICATION OF GROIN HERNIAS

ANATOMICAL TYPES

Indirect inguinal hernia

An indirect hernial sac is in actuality a dilated persistent processus vaginalis. It passes through the deep ring, lies within the spermatic cord and follows the indirect course of the cord, to the scrotum.



Fig.-7: Indirect inguinal hernia

DIRECT INGUINAL HERNIA

The direct inguinal hernial sac is through Hasselbach's triangle



Fig-8: Direct inguinal hernia

NYHUS CLASSIFICATION OF INGUINAL HERNIAS

Type I – Indirect inguinal hernia

The internal inguinal ring is of normal size, configuration and structure. The boundaries are well delineated and the Hasselbach's triangle is normal (e.g., paediatric hernia). There is an indirect hernial sac which invariably extends from just distal to the internal abdominal ring to the mid inguinal canal.

TYPE II – INDIRECT INGUINAL HERNIA

The indirect inguinal ring is dilated and distorted but the posterior inguinal wall is intact. The inferior deep epigastric vessels are not displaced. The hernial sac is not scrotal but may occupy the entire inguinal canal.

TYPE III- POSTERIOR WALL DEFECTS

a) Direct inguinal hernia

The weakened transversalis fascia bulges outwards in front of the hernial mass.

All direct hernias, small or large, are type 3a.

b) Indirect inguinal hernia

The internal inguinal ring is dilated medially, encroaching on or destroying the transversalis fascia of the Hesselbach's triangle (e.g., massive scrotal, sliding or pantaloon hernias). These sliding hernias

always destroy a portion of the inguinal floor.

c) Femoral hernia

This is a specialized form of posterior wall defect.

TYPE IV- RECURRENT HERNIAS

- 1) Direct
- 2) Indirect
- 3) Femoral
- 4) Combination of the above

CLINICAL FEATURES

HISTORY

Age: Inguinal hernias occur at all ages. The peak times of presentation are in the pediatric age groups, late adolescents and between 40 and 60 years.

Occupation: Heavy work, especially lifting, puts a great strain on the abdominal muscles. If there is an underlying weakness, the appearance of a hernia may coincide with strenuous physical effort.

LOCAL SYMPTOMS

The commonest symptom is the Pain in the involved inguinal area while doing heavy work or strenuous exercise, and the pain shifts towards the corresponding testis.

Lump: A lump in the groin is the second most common complaint

Appearance of swelling during cough and reducibility while lying down. Swelling appears during cry in infants

SYSTEMIC SYMPTOMS

If the hernia is obstructing the lumen of a loop of bowel, the patient may complain of one or more of the four cardinal

symptoms of intestinal obstruction, namely:

- 1) Colicky abdominal pain
- 2) Vomiting
- 3) Abdominal distention
- 4) Absolute constipation

CLINICAL EXAMINATION

Presence of impulse on cough.

Ring occlusion test.

Finger invagination test.

Zieman technique

SYSTEMIC EXAMINATION

One should look for the common causes of a raised intraabdominal pressure, such as chronic bronchitis with coughing, chronic retention of urine, difficulty in micturition, ascites, intraabdominal masses and chronic constipation. Also one should look for any signs of intestinal obstruction, namely, distension, increased bowel sounds and visible peristalsis.

MANAGEMENT

All inguinal hernias should be repaired without delay because of the risk of complications such as incarceration and strangulation

PREOPERATIVE ASSESSMENT

Stop smoking, atleast for some weeks prior to operation.

Reduce weight before the operation (in grossly overweight patients). Particular attention should be paid to medication use, as the elderly frequent receive multiple drugs, creating an increased risk of drug interaction

Preoperative preparations

Preanesthetic medications

Nil per oral for 6 hours

Skin preparation done

Anaesthesia

Regional, local, general anaesthesia

The three main principles in the management of inguinal hernias are as follows

- 1) The normal anatomy should be reconstituted as far as

possible. The first layer to be defective, in either indirect or direct hernias, is the transversalis fascia. This should, therefore, be repaired first.

- 2) Only tendinous/ aponeurotic/ fascial structures should be sutured together.
- 3) The suture material must retain its strength for long enough to maintain tissue apposition and allow sound union of tissues to occur. A non absorbable, or very slowly absorbable, suture material must therefore be employed

LICHENSTEINS TENSION FREE HERNIOPLASTY & ILIOINGUINAL NEURECTOMY

- 1) Position of the patient
Supine position
- 2) Skin incision



Fig-9 - Skin Incision

The incision is placed 1.25 cm above and in line with the internal 2/3rd the inguinal ligament.



Fig-10 – External oblique Aponeurosis

Skin incision is deepened and the external oblique aponeurosis is opened till the level of superficial inguinal ring.

DISSECTION OF THE INGUINAL CANAL

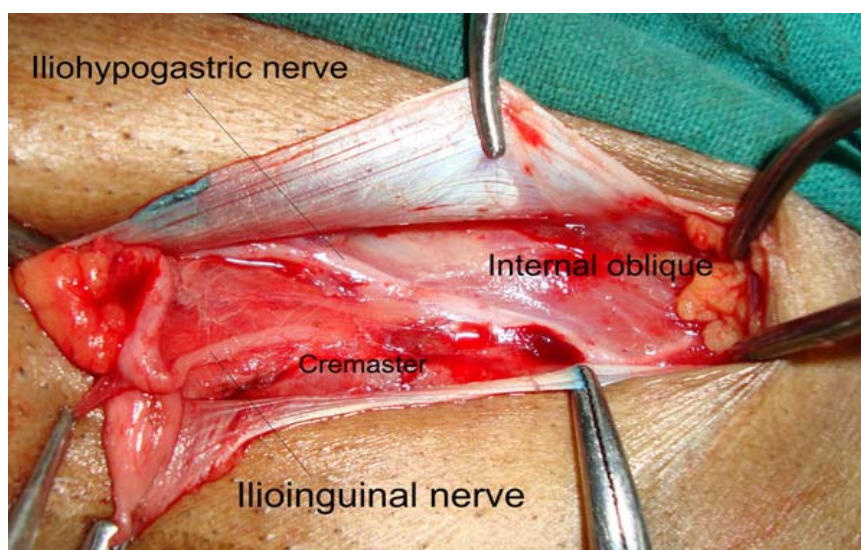


Fig-11: Upper flap of External Oblique Aponeurosis

The upper leaf of the external oblique aponeurosis is separated well above the transverse aponeurotic arch creating upper flap.

The lower leaf of External Oblique Aponeurosis is traced till the level of inguinal ligament creating lower flap.

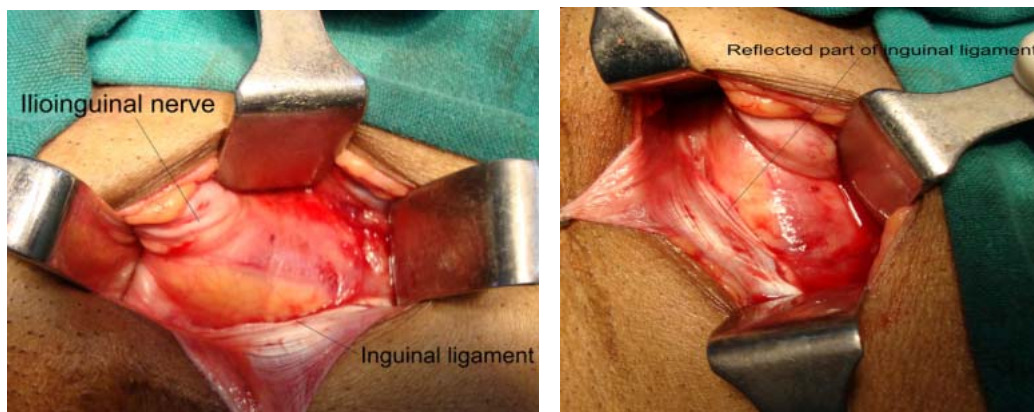


Fig-12: Lower flap of External Oblique Aponeurosis

The cord structures is lifted along with the ilioinguinal nerve

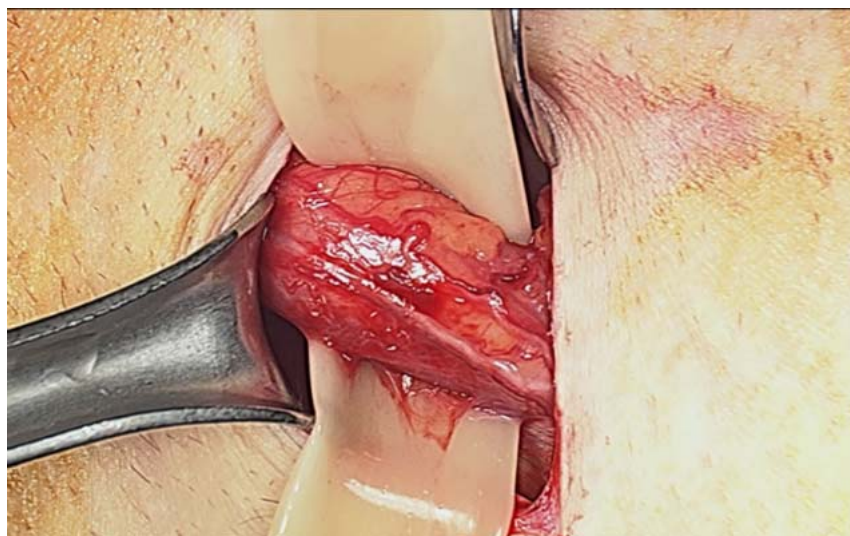


Fig-13: Cord Structures along with Ilioinguinal nerve

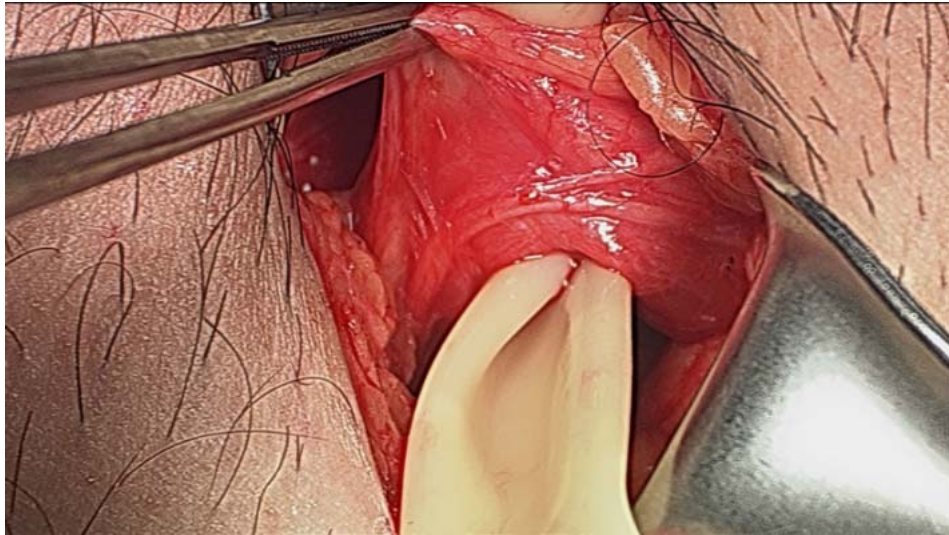


Fig-14: Genital branch of Genitofemoral nerve

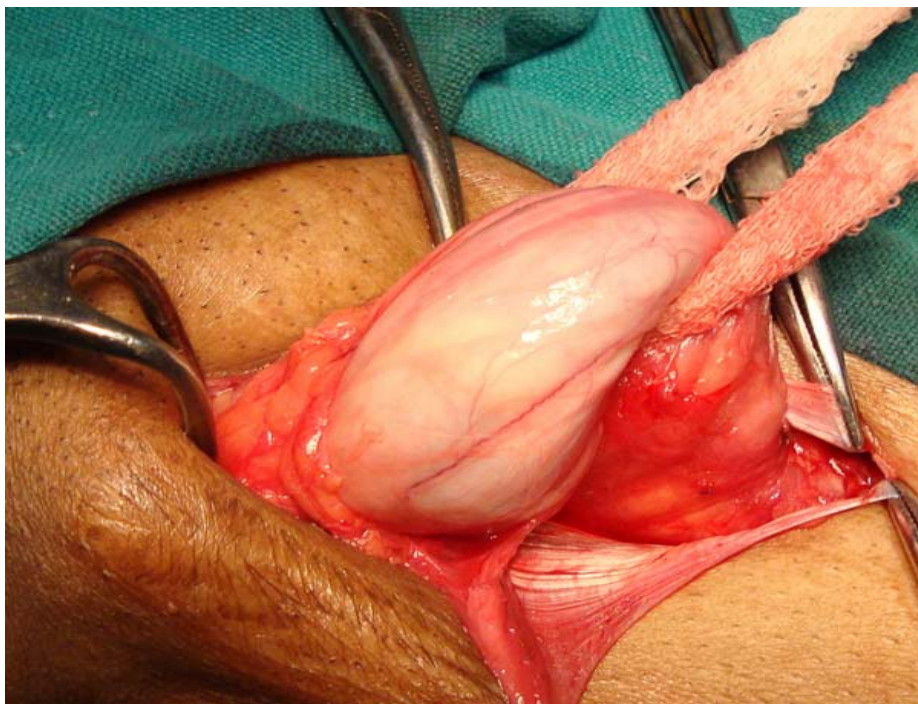


Fig-15: Cord structures

ELECTIVE ILIOINGUINAL NEURECTOMY

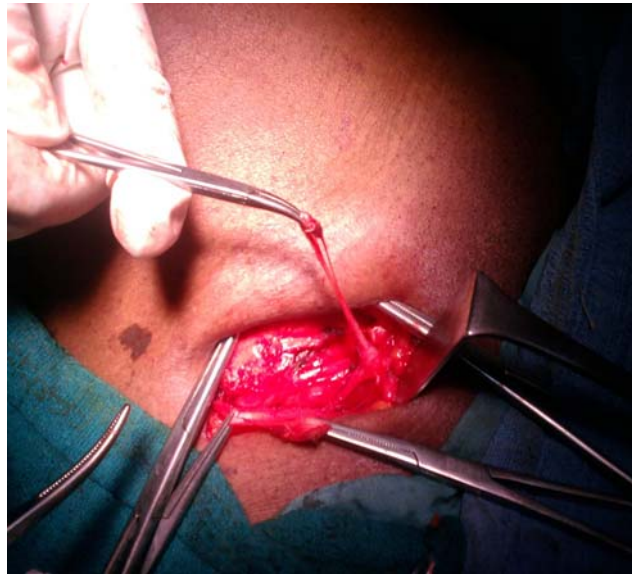


Fig-16: Ilioinguinal Neurectomy

The fascia derived from the Cremasteric muscle is opened at the level of deep inguinal ring to look for indirect sac.

Complete stripping and resection of cremaster is unnecessary exposing the genital nerve, paravasal nerves & vas deferens

The indirect sac is dissected from the cord and transfixed.

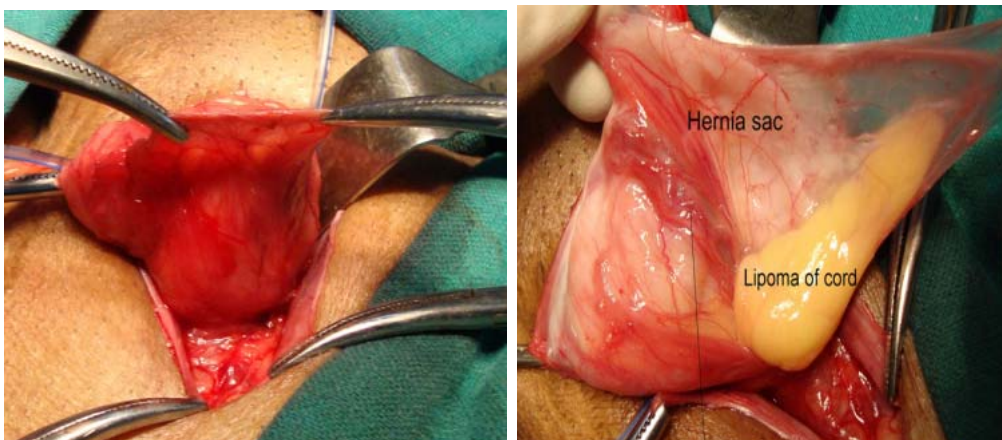


Fig-17: Dissection of the Indirect hernial sac

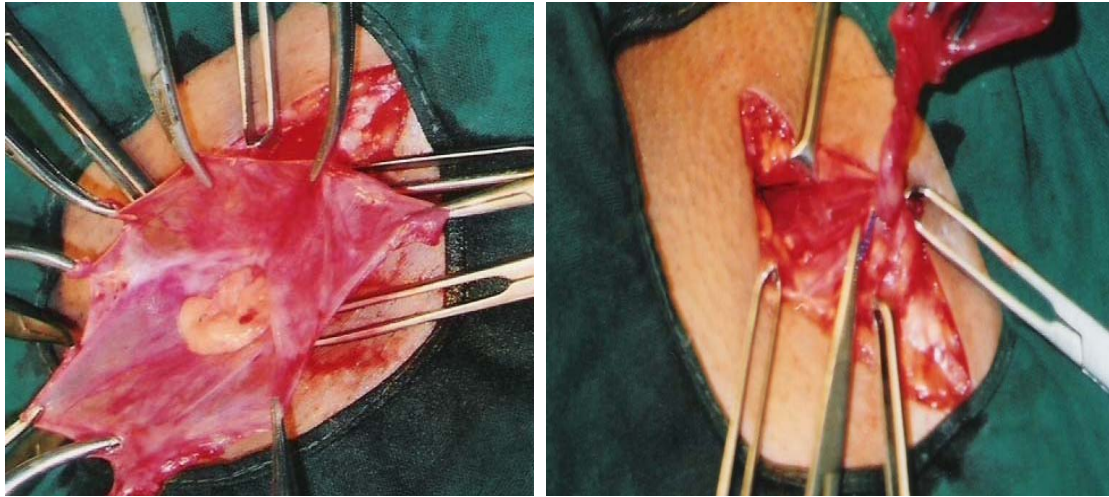


Fig-18: Content of the Sac and Transfixation of the Sac

In case of complete non-sliding hernia sac is transected at the level of mid point of inguinal canal and the distal sac is divided anteriorly alone

In case of direct inguinal hernia direct sac are invaginated .femoral ring is routinely evaluated. 16x8cm prolene mesh is sutured to the pubic bone overlapping the pubic bone for 1 to 2cm.



Fig-19: Fixation of the Lower edge of the Mesh

The lower edge of the mesh is attached to the inguinal ligament by continuous 4 or 5 sutures extending from pubic bone to the level of the deep inguinal ring with prolene. The lateral end of the mesh is cut with upper 2/3 rd & lower 1/3 rd and the tails are crossed and sutured to the inguinal ligament just lateral to the internal ring with the the prolene suture. Upper leaf of the mesh is anchored to the tranverse aponeurotic arch with 2 intermittent sutures.

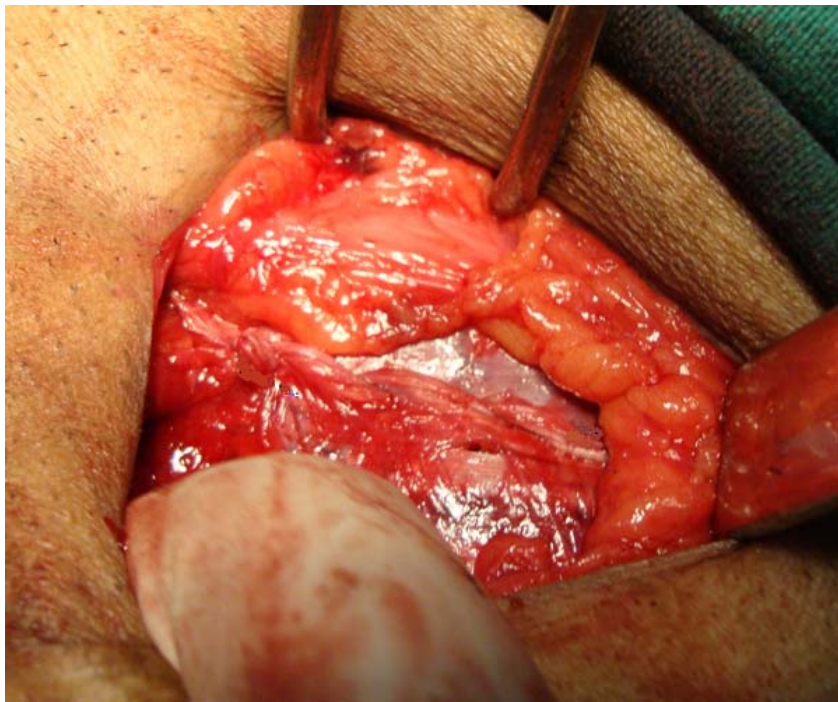


Fig-20: Closure of External Oblique Aponeurosis

The cord structure sare placed over the mesh and the wound close in layers.

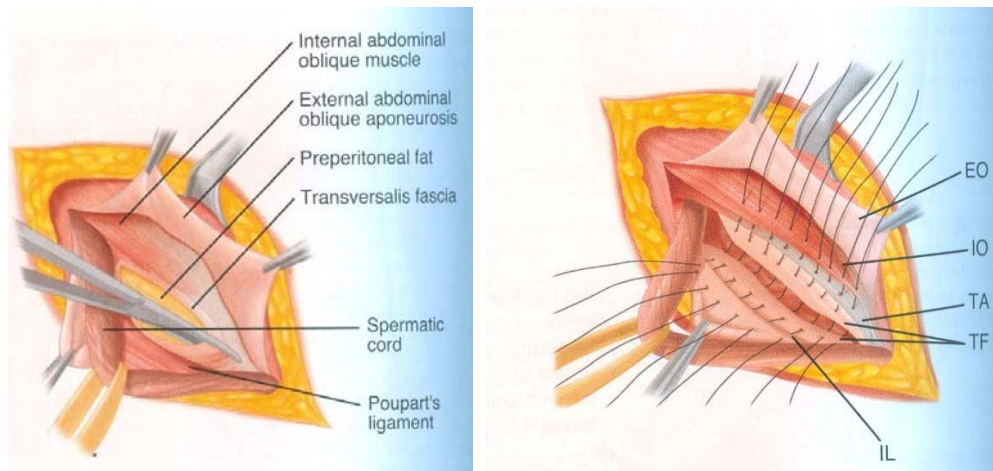


Fig-21: Bassini Repair

RECONSTRUCTIVE PROCEDURES

The Modified Bassini repair

The classical operation was first described by Bassini in 1888. It essentially consists of strengthening the weakest part of the inguinal canal namely the posterior wall by stitching the lower border of the conjoint muscle and tendon to the inguinal ligament

THE SHOULDICE REPAIR

This repair is probably the most popular of those using only local tissues. It is basically a multilayered Bassini operation. Repair of the transversalis fascia and tightening of the internal ring is the basis of this type of repair.

Repair of the transversalis fascia: The transversalis fascia is repaired and the deep ring is carefully reconstituted using a double

breasting technique. Sutures should be placed about 2-4 mm apart and bites of different depth should be taken so that an irregular 'broken saw tooth' effect is produced.

Reinforcement with the conjoint tendon: The posterior wall is further strengthened by approximating the transverse aponeurotic arch with the inguinal ligament and the lower end of the external oblique aponeurosis

The cord is now laid on this four layered tissue repair and the external oblique aponeurosis is closed in front of the cord in single or double layer.

NEURALGIA

Post operative pain or neuralgia following hernioplasty, represents the most worrisome complication of the inguinal region due to the involvement ilioinguinal, iliohypogastric, genital branch of the genitofemoral nerve in open inguinal hernia repair and the lateral femorocutaneous nerve (commonly) in laparoscopic inguinal hernia repair.

TEMPORAL PATTERNS OF PAIN AND TIMING OF ONSET

- 1) Immediate onset of pain following hernioplasty is usually caused by:

- a. Local trauma to the tissue involved, including nerve entrapment or direct injury to ilioinguinal, iliohypogastric or genitofemoral nerves.
 - b. Soft tissue or fascia injury, due to tearing of a suture or staple, abruptly away, from tissue that has been transfixed with or without mesh.
- 2) Inguinal pain immediately following hernia repair that is similar / identical with pre-operative inguinal pain is usually seen in the following
- a. Lumbosacral spine disease
 - b. Periostitis pubis
 - c. Missed hernia
- 3) Delayed onset of pain, increasing in intensity, following inguinal hernia repair can be caused by:
- a. Neuralgia due to entrapment of nerve by fibrotic reaction
 - b. Occult recurrent hernia

The following *key principles* can help avoid recurrence and decrease post op somatic pain.

- 1) Mesh should cover the area 2 cm medial to the pubic bone & hesselbach triangle area lateral to the internal ring for about 5 cm
- 2) the internal ring is recreated by crossing the tails of the mesh
- 3) Securing the mesh with 2 interrupted sutures on the upper edge and one continuous suture (with no more than 3-4 passes) on the lower edge of the mesh to prevent folding and movement of the mesh in the groin.
- 4) Positioning the mesh in a slightly relaxed position to Counteract the forward protrusion of the transversalis fascia when the patient is in standing position

INFECTION

Infection of the hernia wound or mesh is an uncommon postoperative complication. When an infection does occur, skin flora is the most likely etiology and appropriate gram-positive antibiotics should be initiated. Patients who undergo mesh placement during groin herniorrhaphy are at a slightly higher risk of postoperative wound infection.

BLADDER INJURY

The urinary bladder may be inadvertently injured during dissection of a direct inguinal hernia sac however this occurs rarely during repair of an indirect defect.

The bladder can also participate in a sliding hernia, so that a portion of the bladder wall is adherent to the sac in a direct defect. Because of the potential for this complication, direct sacs should be inverted into the peritoneal cavity so that excessive dissection can be avoided.

HEMORRHAGE

Bleeding can occur from either arteries or veins, at all anatomic levels, during an inguinal hernia repair. Superficially, subcutaneous hematoma or severe ecchymosis can result from careless ties or cautery to the superficial vessels. On a deeper plane injury to the cremasteric, internal spermatic or inferior epigastric vessels can cause hematoma. All control of bleeding must be done under direct vision. Blind clamping must not be done

TESTICULAR INJURY

Edema of the scrotum or testis may be secondary to edema or hematoma of the inguinal canal that tracks inferomedially to the scrotum in a dependent fashion. Orchitis can be defined as post-

operative inflammation of the testicle following inguinal hernia repair. Clinical manifestations usually occur within 24-72 hours, namely painful enlargement of the testicle [2-3 times the normal size], with a woody hard consistency, associated with low grade fever

Ischaemic orchitis may subside completely without any residual damage to the testicle, but, in some patients testicular atrophy occurs. It is important that the patient be reassessed periodically for atleast 2 months because atrophy may become apparent at that time.

VAS DEFERENS INJURY

Injury to the vas is a rare complication. Transection of the vas is the most serious form of this injury. This requires immediate reanastomosis in the child or young adult, but, may only require ligation of both ends in the older adult patient. Minor injuries to the vas can be avoided by using gentle atraumatic traction only and by avoiding complete grasping or squeezing of the vas.

Chronic pain is defined as “pain lasting for 3 months or more,” as per the International Association for the Study of Pain.

❖ Chronic groin pain can be Nociceptive or Neuropathic provoked by movement or it may occur spontaneously. There

is an abnormality in conduction.

NOCICEPTIVE PAIN

- ❖ Activation of nociceptors
- ❖ Due to tissue injury or inflammatory reaction
- ❖ Transmitted to brain by a-delta fibres or c-fibres

NEURO PATHIC PAIN CAUSED BY

- ❖ Direct nerve injury
 - Structural changes such as axonotemesis or neurotmesis due to cutting, thermal or traction injuries leading to neuroma formation
 - Entrapment injuries by suture, fixating devices, wrinkled mesh or meshoma
- ❖ Neuropathic pain is subdivided into three sub groups: Peripherally generated, Centrally generated, and Sympathetically maintained.
- ❖ Classic causes of chronic pain are osteitis pubis, and ilioinguinal nerve entrapment.
- ❖ The majority of chronic pain has been attributed to

ilioinguinal nerve entrapment.

- ❖ Postoperative pain is assessed using a visual analogue scale
- ❖ (none, mild, moderate, severe) assigning numerical values of 0 to 10

NEUROMA PAIN

Caused by proliferation of nerve fibres beyond the neurilemma following complete or partial nerve section. Pain is exquisite at the site of the neuroma and simulates an electric shock.

DEAFFERENTATION PAIN

A burning pain, following partial or complete nerve section or entrapment in a ligature with chronic paroxysmal exacerbations.

PROJECTED PAIN

The intact nerve is encased in a callus or entrapped in a ligature..

REFERRED PAIN

The lesion is at a distance such as an inflammation around a suture or the stump of the peritoneal sac.

RISK FACTORS FOR CHRONIC PAIN FOLLOWING HERNIORRHAPHY

- ❖ Preoperative pain may indicate complicated disease pathology prior to surgical intervention resulting in stretching,

entrapment, or inflammation of inguinal nerves. It may also indicate the presence of psychological predisposition and lowered pain threshold among these patients increasing potential for postoperative pain.

- ❖ Direct injury to nerves that results in either partial or complete transection can lead to neuroma formation and contusion, crushing, cautery damage, suture compression can cause the subsequent development of chronic pain.
- ❖ Some have implicated the role of mesh as well. It has been demonstrated experimentally that when peripheral nerve tissue comes in contact with polypropylene mesh, myelin degeneration, edema, and fibrosis result and can lead to neuralgia and peripheral neuropathy.
- ❖ The implantation of mesh which induces scar formation through increased inflammation also has been suggested as a cause of neuropathic pain.

ILIOINGUINAL NERVE

Ilioinguinal nerve originates from the ventral component of L1 nerve root in common with iliohypogastric nerve.

After its initial retroperitoneal course it enters the plane between the transverse abdominis and internal oblique muscle just near the anterior end of the iliac crest and then the nerve enters the inguinal canal piercing the internal oblique muscle medial to the anterior superior iliac spine.

The nerve is in relation to the spermatic cord in the inguinal canal protected by the internal spermatic fascia and finally it exits through the superficial inguinal ring dividing into scrotal and genital branches supplying the base of the penis, corresponding hemiscrotum, and upper inner thigh.

In 18% of cases ilioinguinal nerve pierces the external oblique aponeurosis 1-2 cm above the superficial inguinal ring

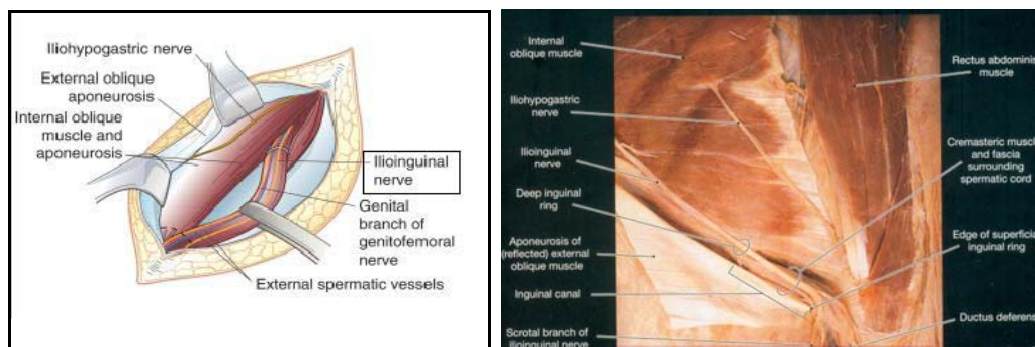


Fig-22 : Ilioinguinal nerve

In females the ilioinguinal nerve supplies the mons pubis and labium majora.

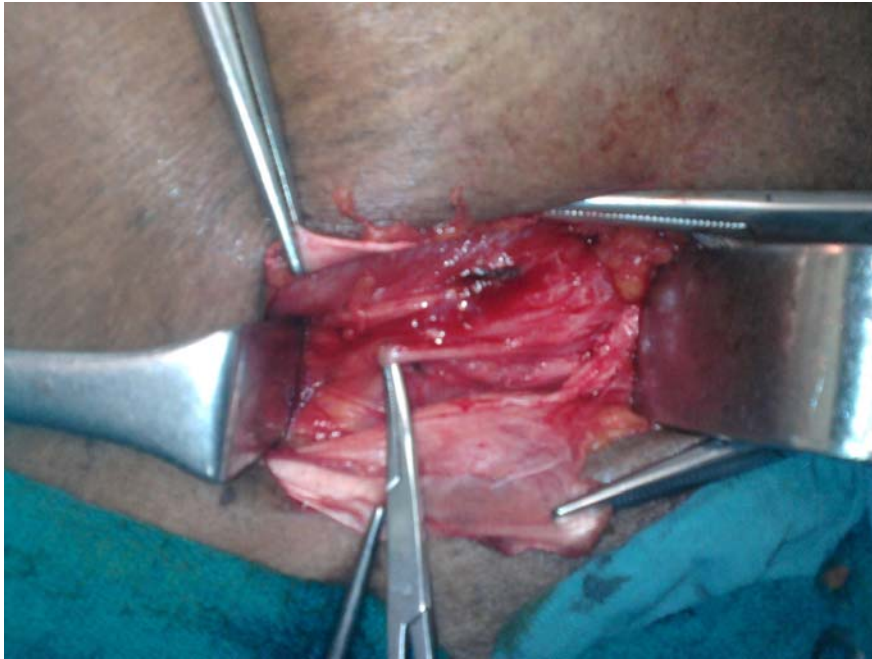


Fig-23: Ilioinguinal nerve

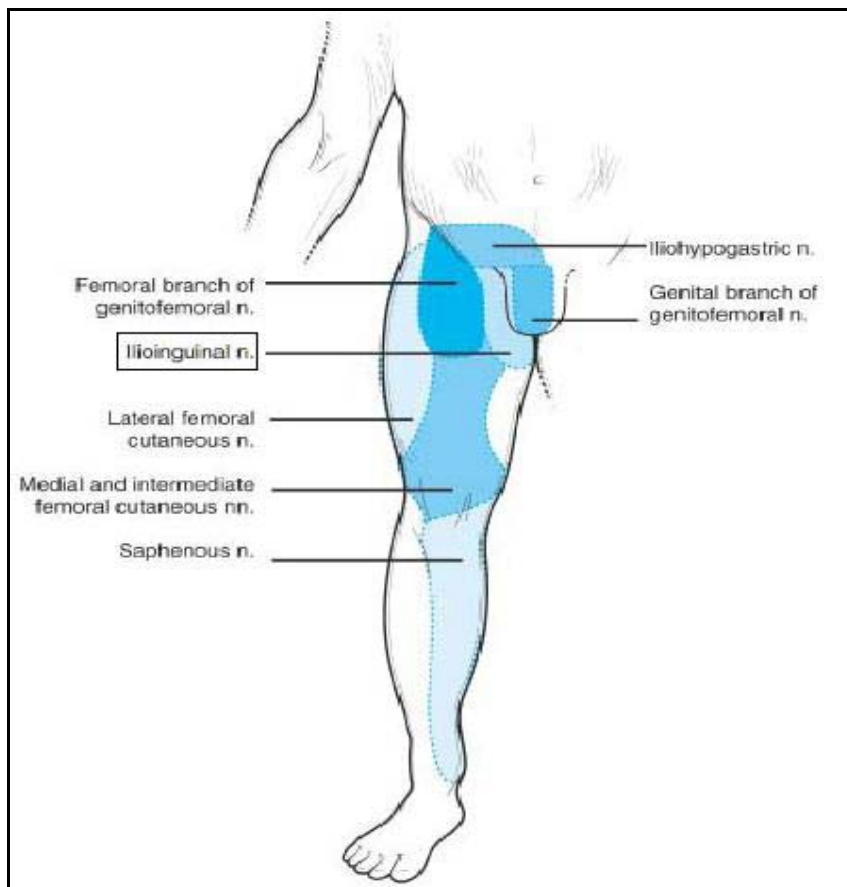


Fig-24: sensory distribution of ilioinguinal nerve

ILIOHYPOGASTRIC NERVE

- ❖ Iliohypogastric nerve originates from ventral component of L1 nerve root.
- ❖ After its initial retroperitoneal course the nerve divides into lateral and anterior branch above the iliac crest. The nerve enters the inguinal canal few centimeters internal to the anterior iliac spine piercing the interior oblique muscle and lying between the internal oblique and external oblique and it is higher up in position compared to ilioinguinal nerve.
- ❖ The lateral branch of iliohypogastric nerve supplies the posteriolateral gluteal skin.
- ❖ The anterior branch exits from the external oblique aponeurosis 1 inch above the superficial inguinal ring supplying the skin of hypogastric region.

GENITOFEMORAL NERVE

- ❖ Genitofemoral nerve originates from L1 & L2 within the Psoas major muscle
- ❖ It divides into genital and femoral branches. Femoral branch enters the femoral triangle penetrates femoral sheath and fascia lata and supplies the skin of the femoral triangle and it

has communication with the anterior cutaneous nerve of the thigh.

- ❖ Genital branch of genitofemoral nerve enters the inguinal canal either through the deep inguinal ring or through the fascia transversalis.
- ❖ Genital branch of genitofemoral nerve is one of the component of the cord structures. Genital branch of genitofemoral nerve supplies the cremasteric muscle which is responsible for cremasteric reflex.
- ❖ In the female, it accompanies the round ligament of the uterus.

VARIATIONS IN THE SENSORY NERVES

- ❖ Ilioinguinal nerve is found within the cremasteric muscle;
- ❖ Ilioinguinal nerve may not enter the inguinal canal rather it pierces the external oblique aponeurosis above the inguinal canal
- ❖ Common nerve roots of ilioinguinal and iliohypogastric nerve predisposes to the complete absence of the ilioinguinal nerve or one of the branch of ilioinguinal nerve may join the

iliohypogastric nerve.

- ❖ Abnormally the ilioinguinal nerve may join & descend with in the genital branch of genitofemoral nerve.
- ❖ In addition, the ilioinguinal & iliohypogastric nerve are disproportionate in their size

SURGICAL MANOUVERS CAUSING NERVE INJURY

- ❖ The ilioinguinal nerve is enclosed by internal spermatic fascia and the practice of placing the nerve below the Poupart's ligament after separating from the cord structures destroys the overlying protective fascia resulting in nerve injury.
- ❖ The ilioinguinal nerve without overlying internal spermatic fascia comes in direct contact with the mesh resulting in scarring and fibrosis.
- ❖ The protective fascia of genital branch of genitofemoral nerve is damaged by grasping the cord from the inguinal floor and pulling it with thumb and index finger may result in nerve injury by perineural scarring and fibrosis induced by the direct contact of the nerve with the mesh.
- ❖ Mesh should not be anchored to the internal oblique muscle

to prevent injury to the intramuscular component of the iliohypogastric nerve.

PROTECTIVE FACTORS PREVENTING NERVE INJURY IN INGUINAL CANAL

- ❖ Ilioinguinal nerve and iliohypogastric nerve are protected by the investing fascia of the internal oblique muscle
- ❖ Genital branch of genitofemoral nerve is protected by the deep cremasteric fascia

PRACTICAL SCENARIO

- ❖ In daily practice surgeons identify three nerves in less than 40% of cases
- ❖ Literature states identification in 70-90% of cases
- ❖ Course of ilioinguinal nerve and iliohypogastric nerve consistent with text books only in 42% of cases

NEUROPATHIC PAIN & PROBLEMS IN IDENTIFYING THE NERVES

- ❖ Neuropathic pain is usually caused by actual nerve involvement as a result of
 - Chronic inflammatory reaction occurring around the nerves resulting in fibrosis.

- Mechanical inclusion of one or more nerves by staple, sutures or mesh.
- The nerve damage caused by electrocautery, crushing, stretching, total or partial division of the nerve.
- The predominant cause of injury to the nerve is failure to identify and protect the nerves, and lack of knowledge regarding the anatomical variations of the sensory nerves during the surgery for hernia.

DIFFICULTIES IN IDENTIFYING THE NERVE IN INGUINODYNIA

- ❖ Many interneural communications are commonly present between the sensory nerves in the inguinal canal namely ilioinguinal, iliohypogastric, and genital branches of the genitofemoral nerves.
- ❖ The sensory dermatomes of the three nerves in the inguinal canal are overlapping each other.
- ❖ The ilioinguinal and iliohypogastric nerve are originating from the L1 ventral ramus and there is communication to the genitofemoral nerve from 1st lumbar nerve at its origin.
- ❖ The cause for inguinodynia may be more than one nerve.

DIAGNOSIS OF NEURALGIA

The activities like stretching the upper body or twisting the upper body or stooping causes compression or traction of the involved nerves causing a sharp pain usually near the inguinal scar radiating to the involved dermatome of the scrotum, upper inner thigh and labia.

The pressure applied over the superficial inguinal ring or just above it usually results in tenderness in 75% of patients.

The neuropathic pain complex can also be reproduced by tapping the skin medial to the anterosuperior spine of the iliac bone or over an area of localized tenderness (Tinel's test). The chronic groin pain can also be triggered by the application of pressure over the previous surgical inguinal scar or close to it.

Signs of a disturbed neurophysiological equilibrium including decreased sensation, numbness or increased sensation in the region of the distribution of the nerve.

Symptoms usually increase with hip hyperextension (patients walk with the trunk in a forward-flexed posture).

Patients have limited social and physical activities

Sleep disturbances and psychiatric disturbances

Local infiltration of anesthetic, with or without steroid, should result in relief within 10 minutes. Abdominal needle electromyography may be helpful in determining the severity of nerve injury, but electromyography is neither sensitive nor specific.

PREVENTION OF NEURALGIA

- 1) During the surgical dissection over enthusiastic handling of the nerves in the inguinal canal is avoided to prevent the nerve injury.
- 2) Iliohypogastric and Ilioinguinal nerve are commonly injured while separating the upper and lower leaf of the external oblique aponeurosis from the underlying internal oblique muscle and its aponeurosis.

The stripping of the Cremasteric muscle from the cord stretchers and isolating the cord stretchers injures the genital branch of genitofemoral nerve.

It is better to sacrifice the nerve during surgery intentionally.

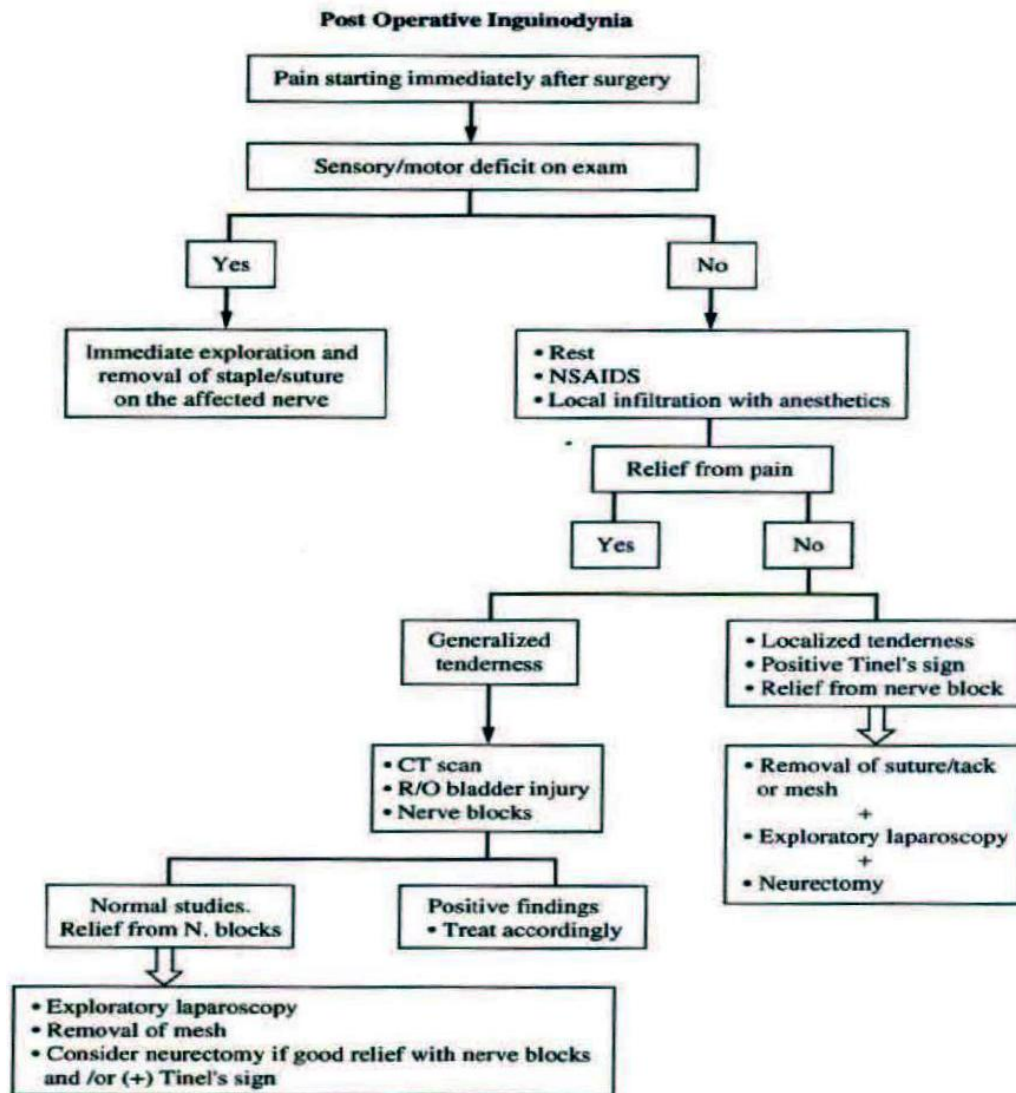
The intentional sacrifice of the nerve causes sensory impairment in the areas distributed by the concerned nerves

and it is better for the patient to tolerate the sensory impairment than to suffer from chronic inguinal neuralgia. The sensory impairment caused by sacrifice of the nerve is temporary and the sensation is regained within few months by contralateral neural supply or by the overlapping of adjoining neural dermatomes.

While doing inguinal hernia repair by laparoscopy, tackers or staples or sutures should not be placed below the iliopubic tract thereby preventing the nerve injury.

In laparoscopic repair, nerve injury can be prevented by avoiding tack or staple placement below the iliopubic tract.⁵⁴

MANAGEMENT OF NEURALGIA



A. CONSERVATIVE MANAGEMENT

Oral medication such as

- ❖ Antiepileptic medications, such as gabapentin, carbamazepine or lamotrigine.
- ❖ Non Steroidal Anti-inflammatory Drugs.
- ❖ Tricyclic antidepressants, such as amitriptyline.
- ❖ Oral steroids.

2 Topical application: Capsaicin cream, topical lidocaine (Lidoderm patch) or tramadol

3 Local nerve block in the affected groin: Local nerve block combining cortisone with a local anaesthetic along the known course of a nerve 2–3 cm medial to and below the anterior superior iliac alleviates pain. This modality may serve as both a diagnostic and therapeutic maneuver (repeated 4–5 times weekly).

4. Transcutaneous electrical nerve stimulation (TENS) - peripheral nerve stimulation can provide good relief when the condition is limited to the distribution of one major nerve.

5. Physical therapy (acupuncture)

CRITERIA FOR SURGICAL TREATMENT

In the present scenario there is no definitive protocol to assess the patients suffering from inguinodynia and to select the patients for surgical treatment.

Exploration of the groin is required if the chronic groin pain does not subside with the treatment with oral analgesics and or local nerve(s) blockade(s).

Neurectomy is recommended if the chronic groin pain improves completely or there is definitive improvement in pain with the block of the nerve(s) locally.

There is no defined intervals between each nerve blockades and there is no defined frequency of nerve blockades that can be done and the opinion has varied among the surgeons worldwide.

TIMING OF SURGICAL INTERVENTION

The timing of surgical intervention should ideally be at least 6 months after herniorrhaphy to give adequate time for any temporary neural impairment to settle and time to try medical management.

SURGICAL MANAGEMENT

Various surgical options are proposed for the management of post operative chronic inguinal neuralgia in recent years. There is no definitive protocol for the surgical management of post operative chronic neuralgia till date.

1. Exploration of the inguinal canal after Lichenstein's Hernia repair is not the ideal first option to be done since it is very difficult to identify the nerve solely responsible for the chronic groin pain. Re-exploration of the inguinal canal after the initial Lichenstein's Hernia repair is prone to injure the uninvolved sensory nerves in the inguinal canal due to extensive scarring, fibrotic reactions caused by the mesh plasty. Moreover more than a single nerve is involved in the chronic inguinal neuralgia.

Similarly during the re-exploration surgery for the Inguinodynia just dividing the nerves without complete removal is not a recommended option. The neurectomy of the ilio-inguinal, ilio-hypogastric and genital branch of the genitofemoral nerve i.e. triple neurectomy is the most recommended surgical option as documented by various studies in the present decade.

In Triple neurectomy the entire nerve in the inguinal canal

and as far as laterally to the deep inguinal ring should be excised so that various intercommunications between the sensory nerves can also be included in the procedure. The proximal end of the excised sensory nerve in the inguinal canal is buried within the fibers of Internal oblique muscle to prevent the formation of neuroma.

Any prolene suture that has included the nerve during the previous procedure is removed, the mesh that is fixed to the involved nerve along its course should also be removed.

The burial of the proximal end of the excised nerve inside the Internal oblique muscles prevent the contact of the proximal end of the nerve and external oblique aponeurosis thereby eliminating the chance of traction of the nerve during walking or active movements of the hip thereby preventing the incidence of chronic groin pain.

2. Mesh removal

The Inguinal hernia repair by mesh plasty induces acute and chronic inflammatory reactions related to the mesh resulting in adhesions and causing mechanical entrapment of the adjoining nerves in the inguinal canal.

A study has shown that mesh removal with neurectomy of the three sensory nerves in the inguinal canal has resulted in

improvement of the inguinodynia in 60% of patients.

In addition to the inflammatory reactions, mechanical entrapment the mesh may fold itself or it may wrinkle resulting in the formation of meshoma causing chronic groin pain.

Each surgeon has the responsibility of advising every patient regarding the occurrence of inguinodynia and its symptoms. The surgeon should take care that he should not include the nerves in the inguinal canal while suturing in case of open hernia repair or applying staples or tackers in case of laparoscopic hernia repair.

METHODOLOGY

SUBJECT SELECTION

The patients admitted with uncomplicated hernia at RGGGH, Chennai are considered eligible for study. 100 male patients diagnosed with uncomplicated inguinal hernia are randomly selected and divided into study group A with 50 male patients undergoing prophylactic ilioinguinal neurectomy and group B with 50 male patients undergoing preservation of ilioinguinal nerve.

All the patients selected undergo open mesh hernia repair by LICHTENSTEIN hernia repair and are followed post operatively

INCLUSION CRITERIA

Uncomplicated inguinal hernia (direct & indirect) Age-18-80 yrs

EXCLUSION CRITERIA

- ❖ Patients below 18 years and above 80 years.
- ❖ Patients with diabetes mellitus.
- ❖ Patients with bilateral inguinal hernia
- ❖ Patients with recurrent hernias
- ❖ Large inguinoscrotal hernia
- ❖ Peripheral neuropathy
- ❖ Impaired cognitive function

- ❖ Previous surgery in the inguinal region
- ❖ Limited mobility
- ❖ Female gender

SCREENING PROCEDURES

Clinical history, Detailed Clinical Examination, Routine Laboratory investigations, USG abdomen in selected cases.

FOLLOW UP PROCEDURES / VISITS

Period of follow up being 3 months from the day of surgery.

- ❖ P.O.D 1,
- ❖ AT 1st MONTH.
- ❖ AT 2nd MONTH
- ❖ AT 3rd MONTH.
- ❖ Post operative pain will be assessed using Visual analogue scale

STATISTICAL ANALYSIS

In this study the results of the two groups were compared and analyzed by using Chi square test.

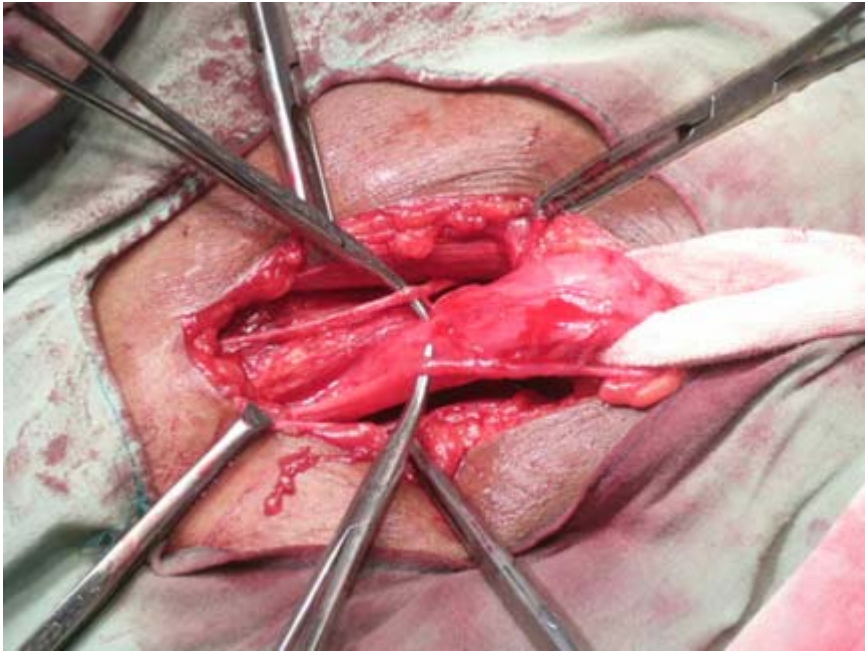


Fig-25: Group A : Ilioinguinal nerve preservation

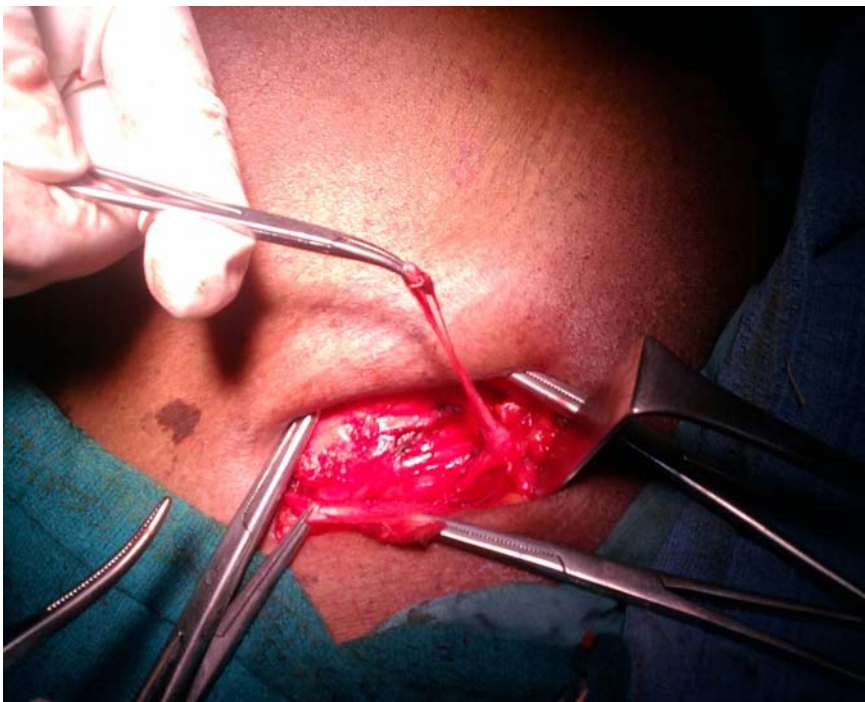


Fig-26: Group B - Ilioinguinal neurectomy

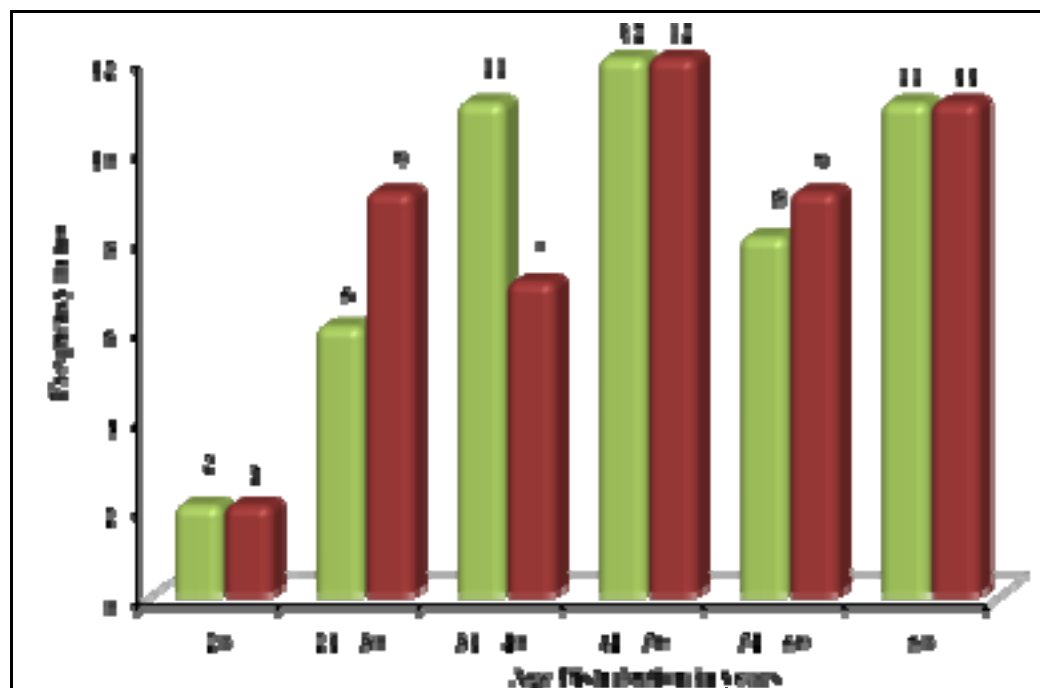
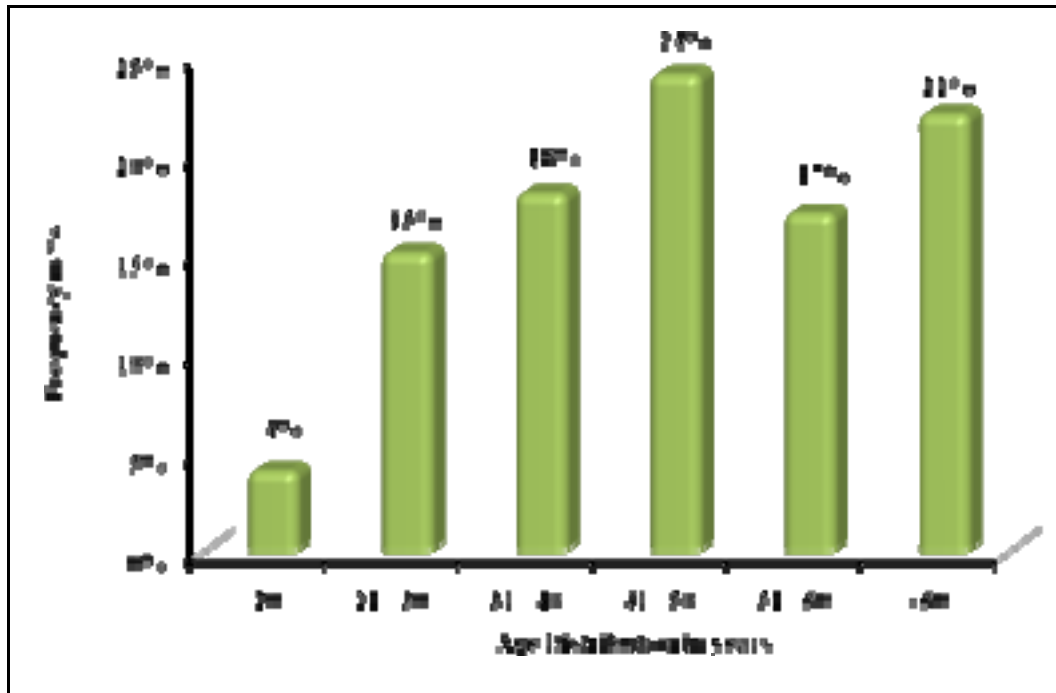
RESULT AND OBSEVATIONS

In this study titled “role of ilioinguinal neurectomy in entrapment syndrome in inguinal hernia repair” conducted in madras medical college&rajiv Gandhi govt general hospital,Chennai from may 2010 to November 2012 A Total of 100 Patients of uncomplicated inguinal hernia who underwent Lichtenstein mesh Hernioplasty included for this Prospective comparative study, & 100 patients completed the study protocol fully.

PATIENTS DEMOGRAPHY

Table & Graph-1 Age at Presentation

Age group (in years)	No of patients	Percentage (%)	Group A	Group B
< 20	4	4.0%	2	2
21 - 30	15	15.0%	6	9
31 - 40	18	18.0%	11	7
41 - 50	24	24.0%	12	12
51 - 60	17	17.0%	8	9
> 60	22	22.0%	11	11

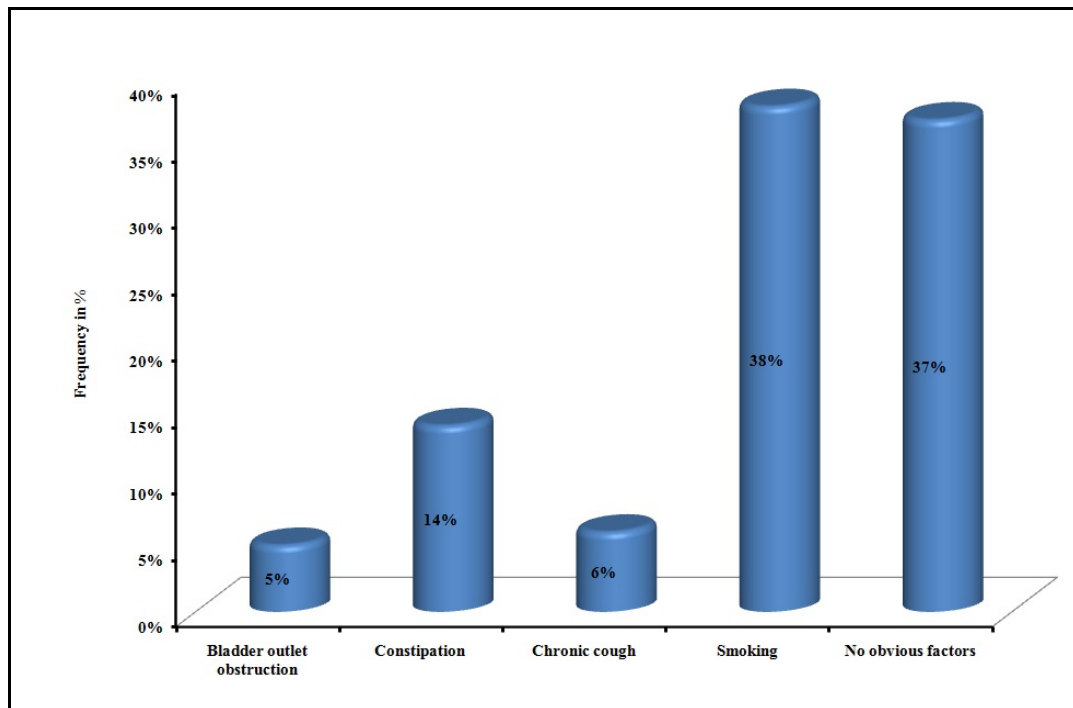


In this study the age of the patients ranged between 18 years to 80 years . The youngest patient included in this study series was 19years, and eldest was 74 years old. Almost 24% of the patients were in 41-50 age group. This includes 12% in group A and 12%in group B.

PREDISPOSING FACTORS

Table & Graph -2: Predisposing Factors

Factors	No of patients	Percentage
Bladder outlet obstruction	5	5%
Constipation	14	14%
Chronic cough	6	6%
Smoking	38	38%
No obvious factors	37	37%

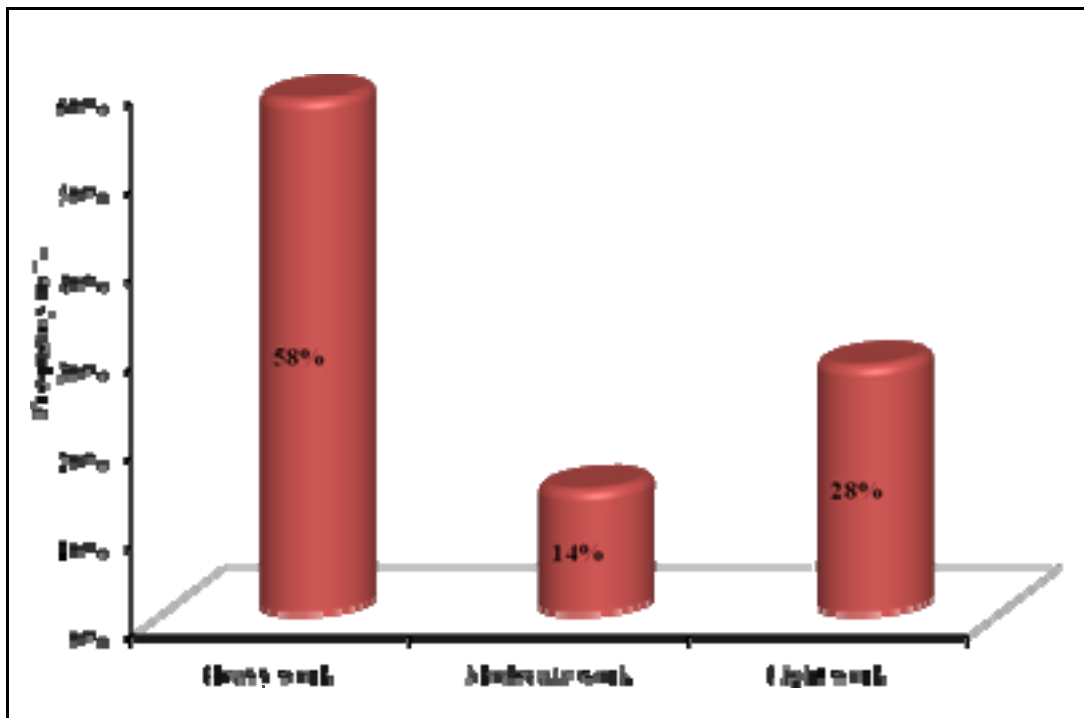


In this study 5% of the patients showed the features of bladder outlet obstruction, 14% had constipation, 6% had chronic cough, 24% of patients work was lifting heavy weight eg, farmers, and 38% were smokers.

RELATION WITH OCCUPATION

Table & Graph -3: Relation with occupation

Occupation	No of patients	Percentage
Heavy work	58	58%
Moderate work	14	14%
Light work	28	28%

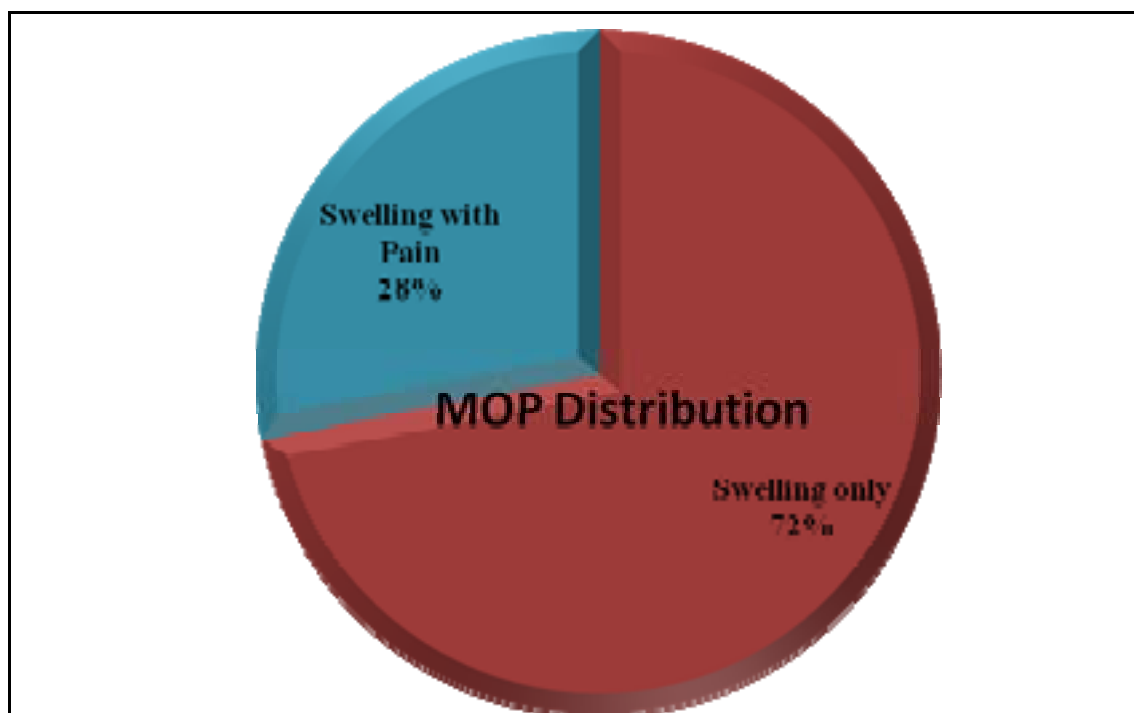


The present study shows that 58 % patients were involved in heavy and strenuous work like Agricultural labour, Manual labour, and construction workers .14 % of patients were involved with moderate work like Cooks, Teachers and Drivers. And 28% of patients involved with light work.

MODE OF PRESENTATION

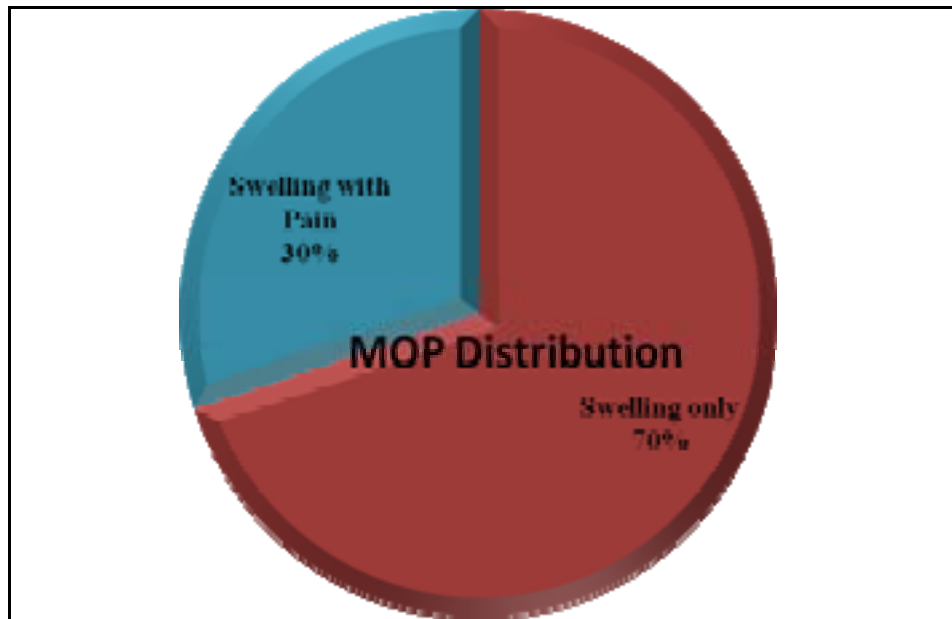
Table & Graph -4 Mode of presentation

MOP	No of patients	Percentage (%)	Group A	Group B
Swelling only	72	72.0%	35	37
Swelling with Pain	28	28.0%	15	13

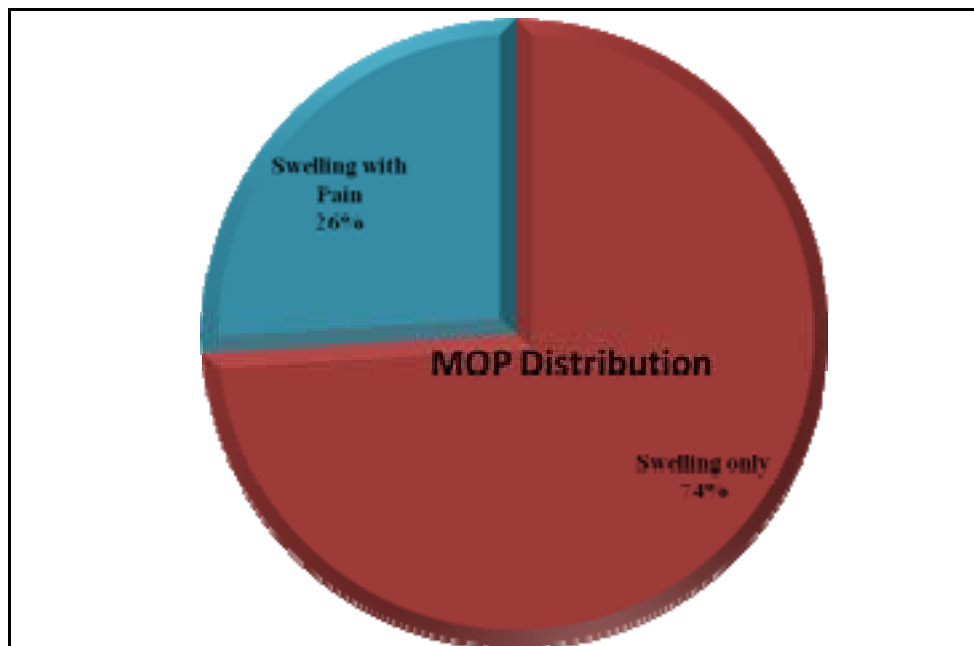


Without exception all the patients presented with swelling, Of these 72 % of patients presented with swelling only , While 28 % patients presented with both swelling and pain.

GROUP-A



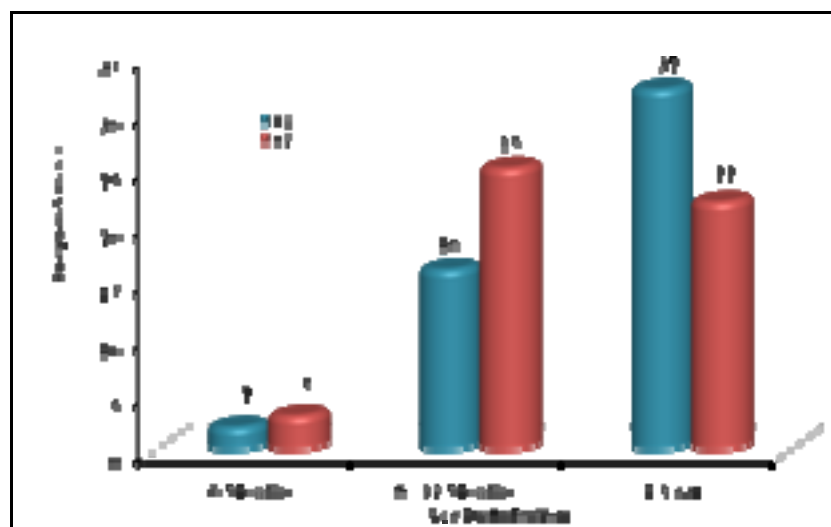
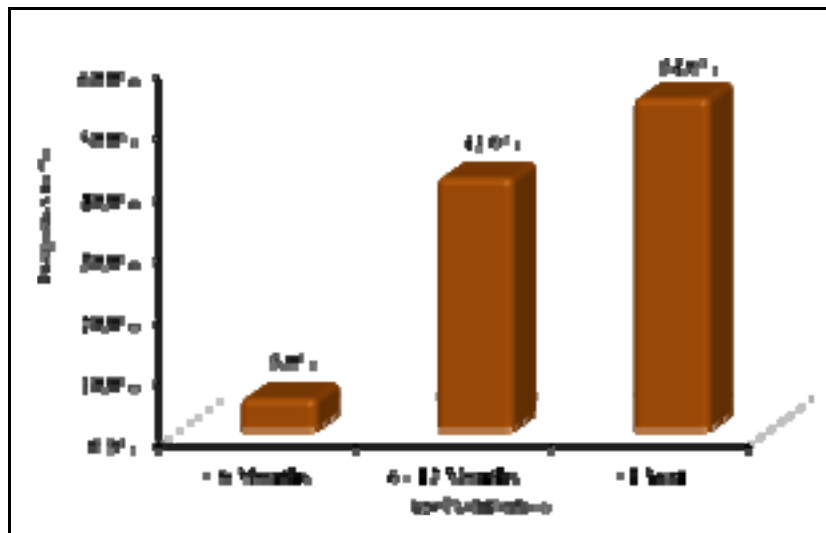
GROUP-B



DURATION OF ILLNESS

Table & Graph -5- Duration of illness Duration

Duration	No of patients	Percentage (%)	Group A	Group B
< 6 Months	5	5.0%	2	3
6 - 12 Months	41	41.0%	16	25
> 1 Year	54	54.0%	32	22

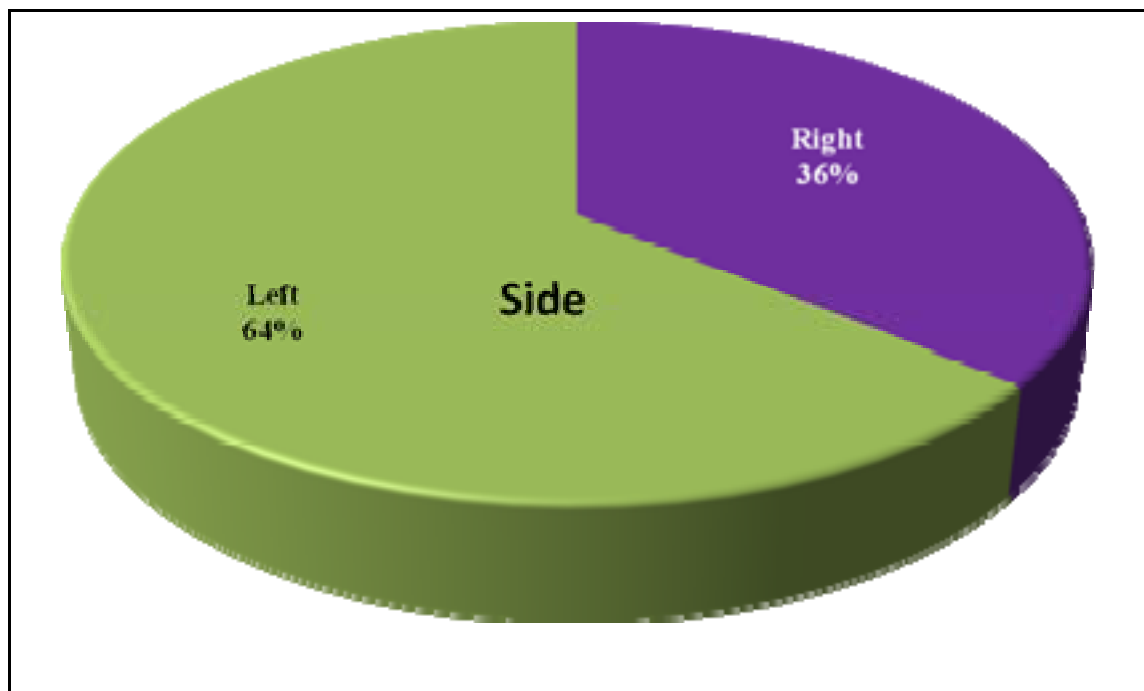


Majority of the patients in this study ie, 46 % of patients presented with in 1 year of the onset of hernia and were operated, and 54 % presented later than a year for operation.

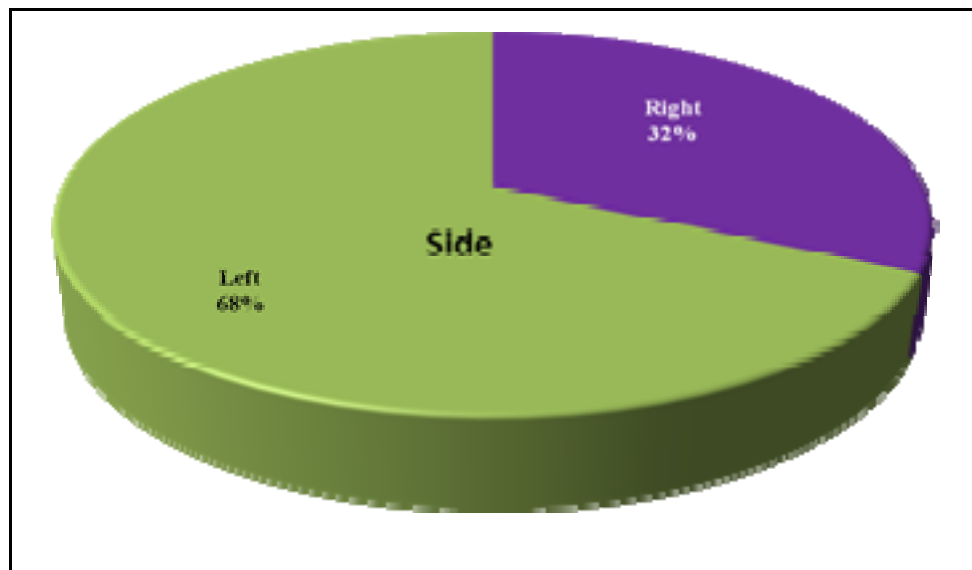
LOCATION OF THE HERNIA

Table & Graph - 6: Location of hernia

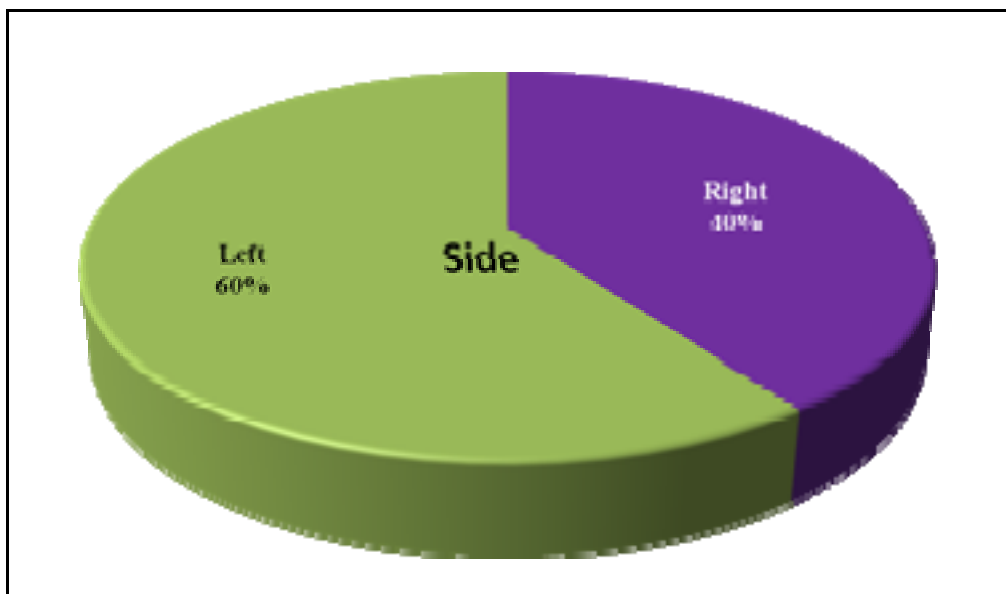
Side	No of patients	Percentage (%)	Group A	Group B
Right	36	36.0%	20	16
Left	64	64.0%	30	34



GROUP-A



GROUP-B

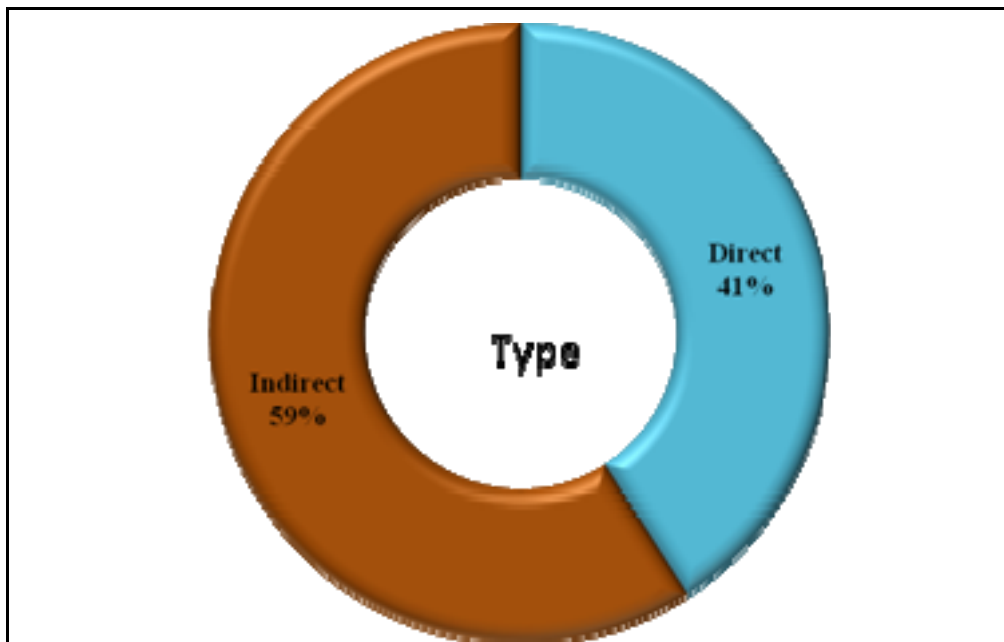


The Present study showed that hernia was more common on left side ie, 64%. Right side hernia comprised about 36 %

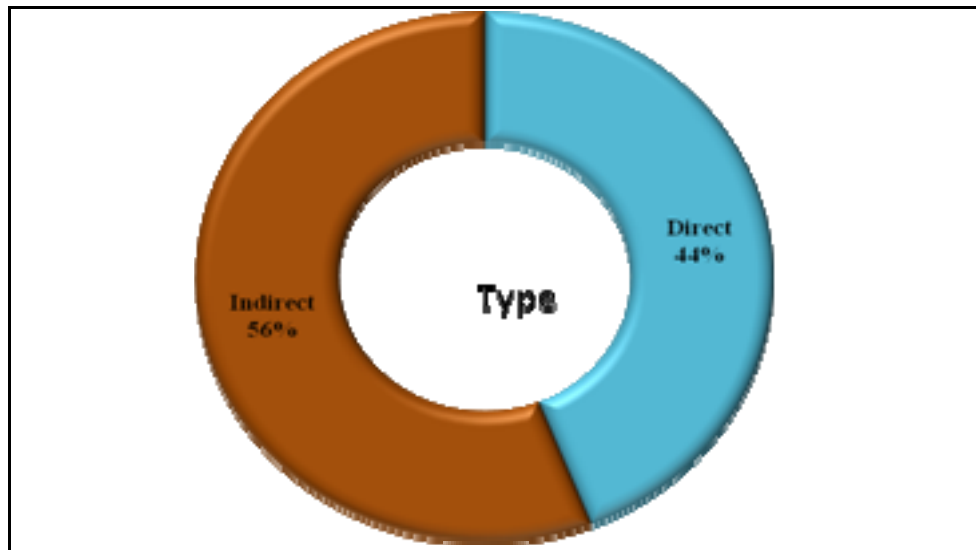
TYPE OF INGUINAL HERNIA

Table & Graph 7: Type of Hernia

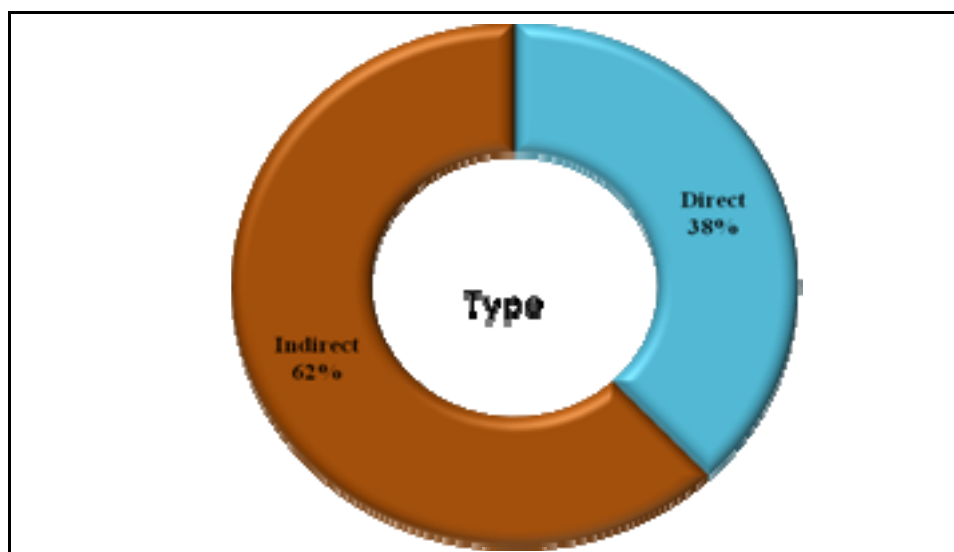
Type	No of patients	Percentage (%)	Group A	Group B
Direct	41	41.0%	22	19
Indirect	59	59.0%	28	31



GROUP-A



GROUP-B

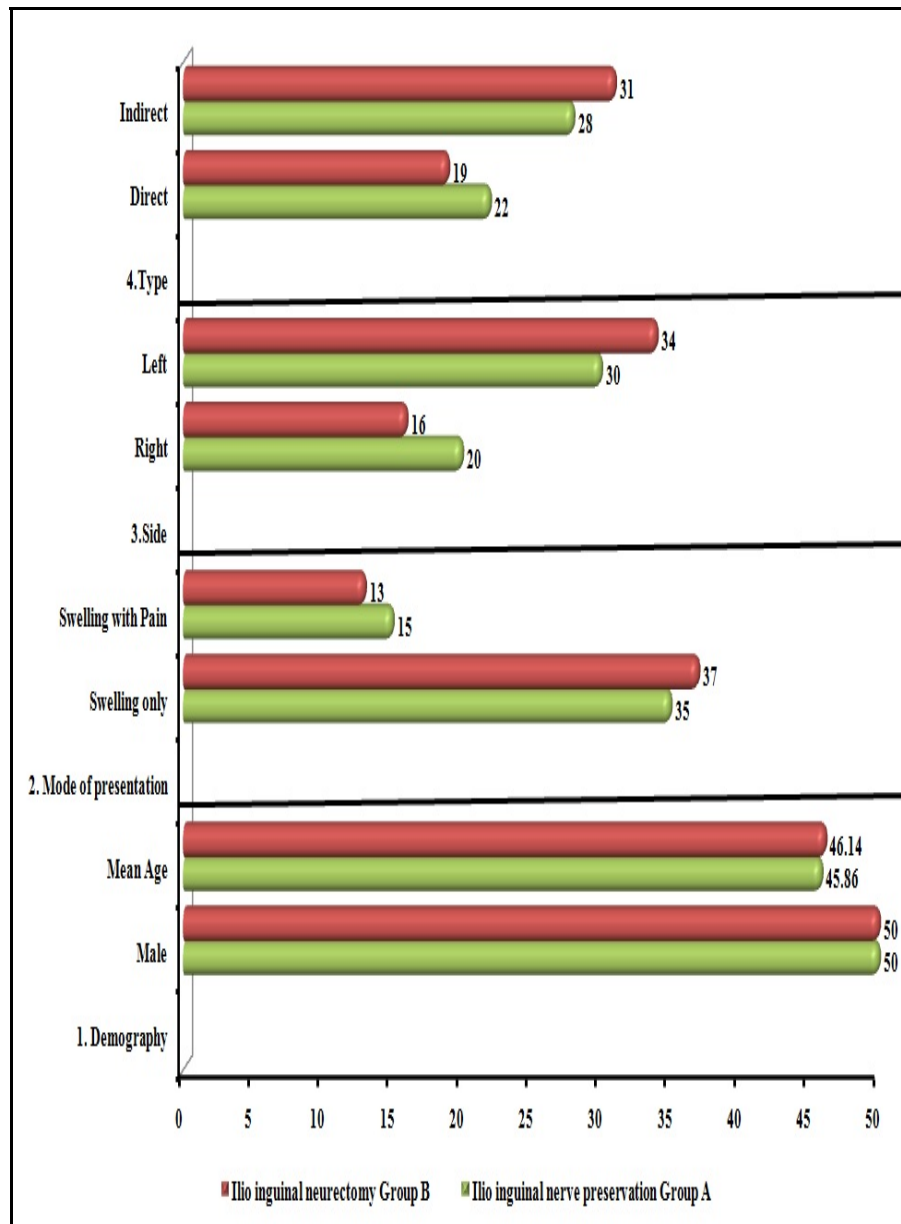


In this present study 59 cases were belongs to indirect hernia and 41cases belongs to direct hernia contributing 59% Vs 41% respectively.

COMPARISON OF STUDY GROUPS

Table and graph -8: Comparison of study groups

Comparison of	Ilio inguinal nerve preservation Group A	Ilio inguinal neurectomy Group B
1. DEMOGRAPHY		
Male	50	50
Mean Age	45.86 ± 14.6	46.14 ± 15.8
2. MODE OF PRESENTATION		
Swelling only	35	37
Swelling with Pain	15	13
3. SIDE		
Right	20	16
Left	30	34
4. TYPE		
Direct	22	19
Indirect	28	31



In the present study Preservation of ilioinguinal nerve (GROUP A) during Lichtenstein Inguinal hernia repair was performed in 50 patients mean age of 45.86 ± 14.6 years

Of the 50 patients, 35 patients presented with swelling in the groin only, where 15 patients presented with swelling associated with pain.

Of the 50 male patients, 2(4%) showed features of bladder outlet obstruction, 8(16%) had constipation, and 3(6%) had chronic cough.

Regarding type, 20(40%) patients had right sided inguinal hernia and 30(60%) had left sided inguinal hernia.

Of the 50 patients, 22(44%) cases were direct inguinal hernia, and 28(56%) cases were indirect hernia.

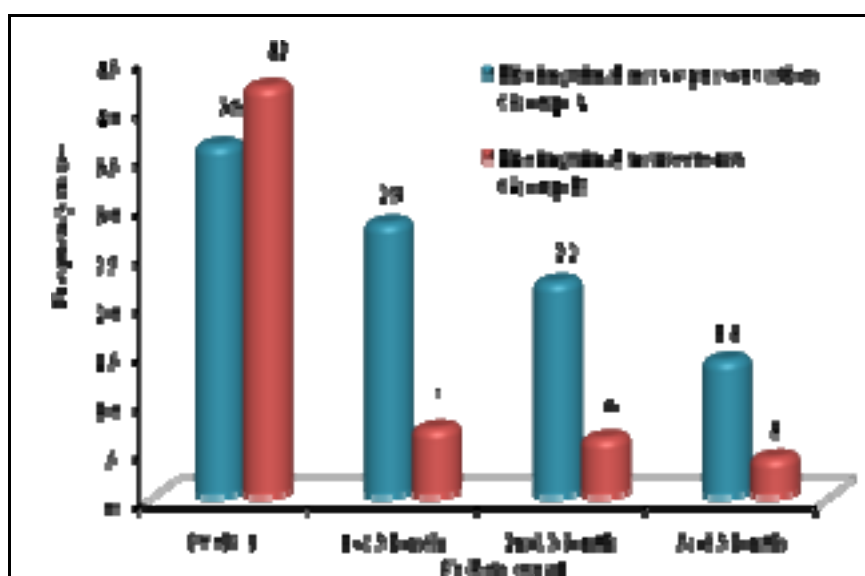
Routine excision of ilioinguinal nerve during Lichtenstein hernia (group B) repair was performed in 50 patients, all are male patients with mean age of 46.14 ± 15.8 years.

Of the 50 patients, 37(74%) patients presented with swelling in the groin only, whereas 13(26%) are presented with swelling associated with pain. 3(6%) patients showed features of bladder outlet obstruction, 6 (12%) had constipation, 3(6%) had chronic cough.

Of the 50 patients, 16 (34%) had right sided inguinal hernia, 34(68%) had left sided inguinal hernia, 19(38%) patients were direct inguinal hernia, and 31(62%) were indirect hernia.

Table & Graph -9: Incidence of post operative neuralgia

Follow-up at	Ilio inguinal nerve preservation Group A	Ilio inguinal neurectomy Group B	P - Value
POD-1	36	42	0.384
1st Month	28	7	0.000
2nd Month	22	6	0.001
3rd Month	14	4	0.013



In the present study the incidence of post operative neuralgia in group A (ilioinguinal nerve preservation) was compared with group B (ilioinguinal nerve excised) during Lichtenstein hernioplasty.

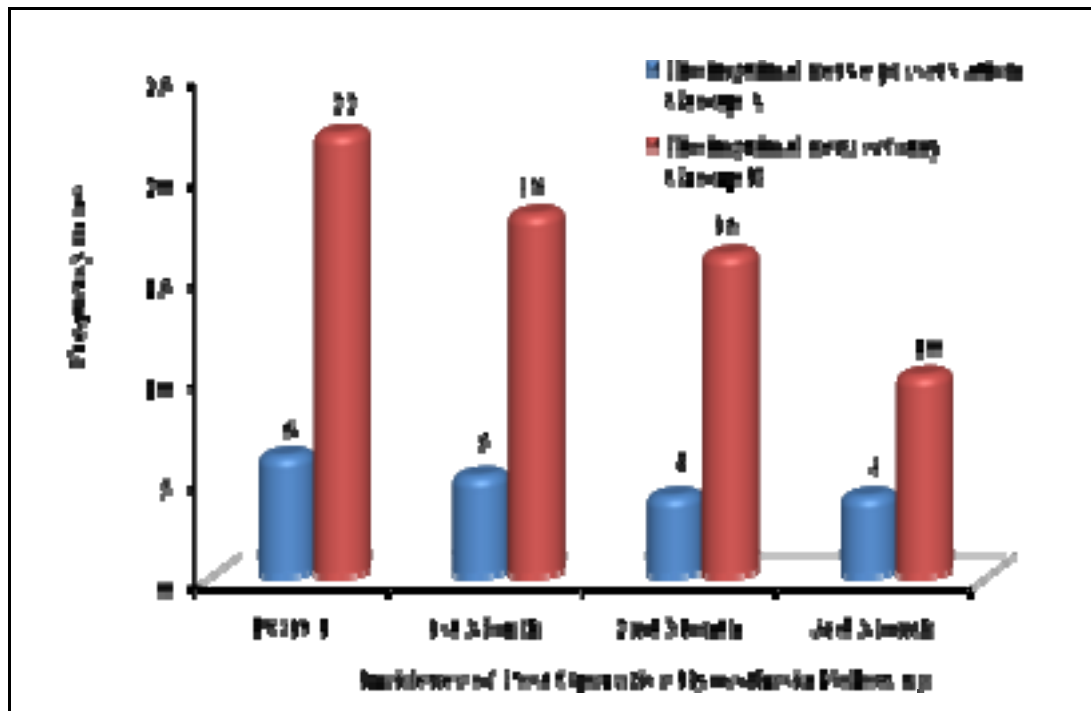
The results of the follow up visits are 72% vs 84% (p0.384) at POD-1 ; 56 %vs 14%(p<0.05) at 1 month ; 44%12%(p<0.05) at 2 months ; and 28%vs 8%)(p<0.05) at 3 months in group A and group B respectively.

Table-9 (a): Post operative pain severity score (VAS)

Follow up & Severity	Group A (N=50)				Group B(N=50)			
	0	1	2	3	0	1	2	3
POD-1	14	29	5	2	8	39	3	0
1ST MONTH	22	20	4	4	43	6	1	0
2ND MONTH	28	16	3	3	44	5	1	0
3rd month	36	8	3	3	46	4	0	0

Table & Graph -10: Incidence of post operative Hypoesthesia

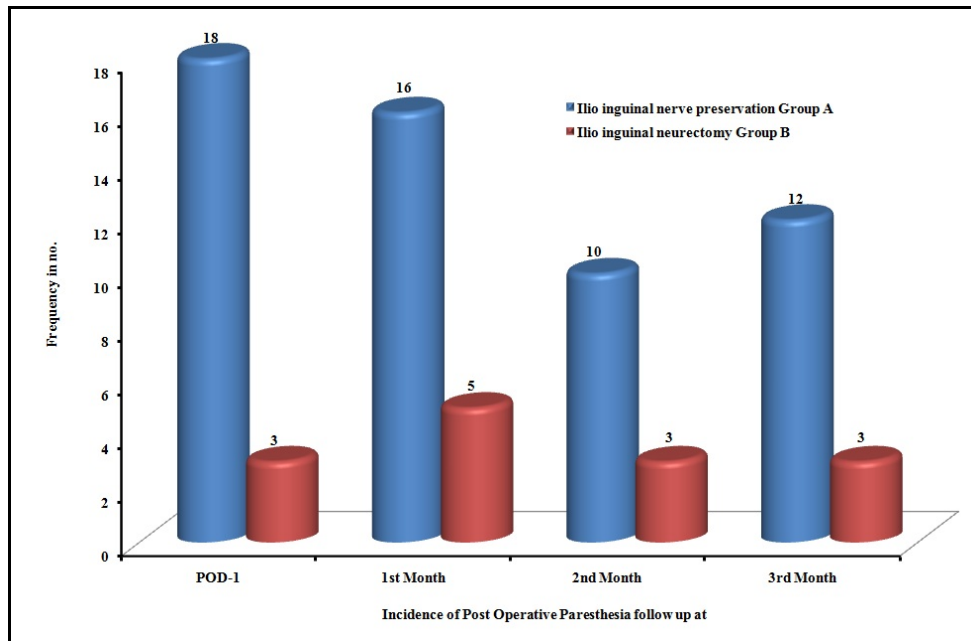
Incidence of Post Operative Hypoesthesia Follow up at	Ilio inguinal nerve preservation Group A	Ilio inguinal neurectomy Group B	P - Value
POD-1	6	22	0.001
1st Month	5	18	0.004
2nd Month	4	16	0.005
3rd Month	4	10	0.096



In the present study the incidence of post operative groin hypoesthesia was compared between group A and group B. The results of the follow up visits are 12%vs44%%($p < 0.05$) at POD-1; 10%36%%($p < 0.05$) at 1 month 8%va32%%($p < 0.05$) at 2nd months ; and 8vs20%($p > 0.05$)in group A and B respectively. Here the p value was found to be insignificant ($p > 0.05$).

Table & Graph -11: Incidence of post operative Paresthesia

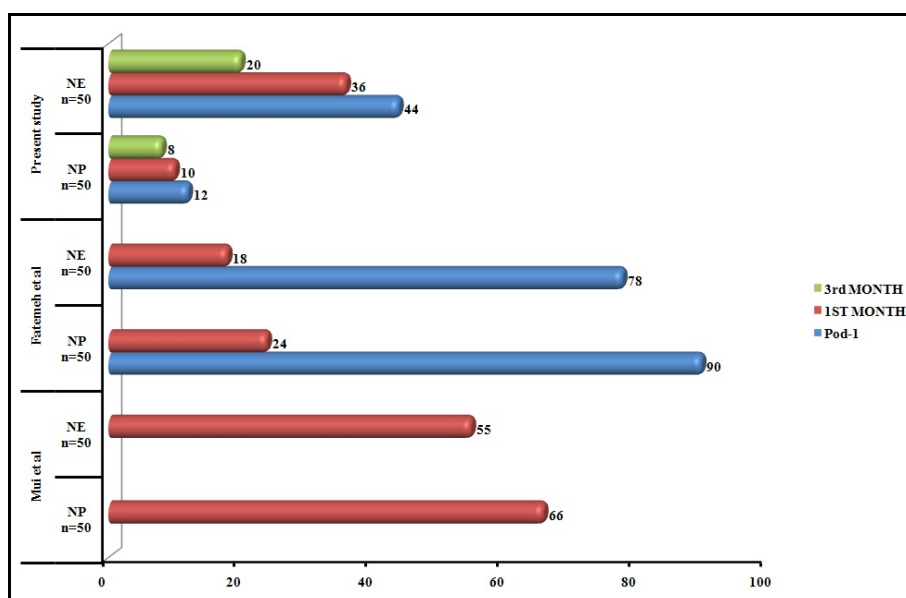
Incidence of Post Operative Paresthesia Followup at	Ilio inguinal nerve preservation Group A	Ilio inguinal neurectomy Group B	P - Value
POD-1	18	3	0.001
1st Month	16	5	0.011
2nd Month	10	3	0.045
3rd Month	12	3	0.016



In the present study the incidence of post operative numbness was compared between group A and B. The results of the follow up visits are 36% vs 6% (p<0.05) at POD-1 ; 32% vs 10% (p< 0.05) at 1 month 20% vs 6% (p<0.05) at 2nd months ; and 24% vs 6% (p<0.05) at 3 months. The difference was significant (p-value <0.05).

Table & Graph -12: Comparison of incidence of hypoesthesia

Studies	Mui et al		Fatemeh et al		Present study	
	NP n=50 (%)	NE n=50 (%)	NP n=50 (%)	NE n=50 (%)	NP n=50 (%)	NE n=50 (%)
Pod-1	–	–	45 (90)	39 (78)	6 (12)	22 (44)
1ST MONTH	31 (66)	26 (55)	12 (24)	9 (18)	5 (10)	18 (36)
3rd MONTH	–	–	–	–	4 (8)	10 (20)

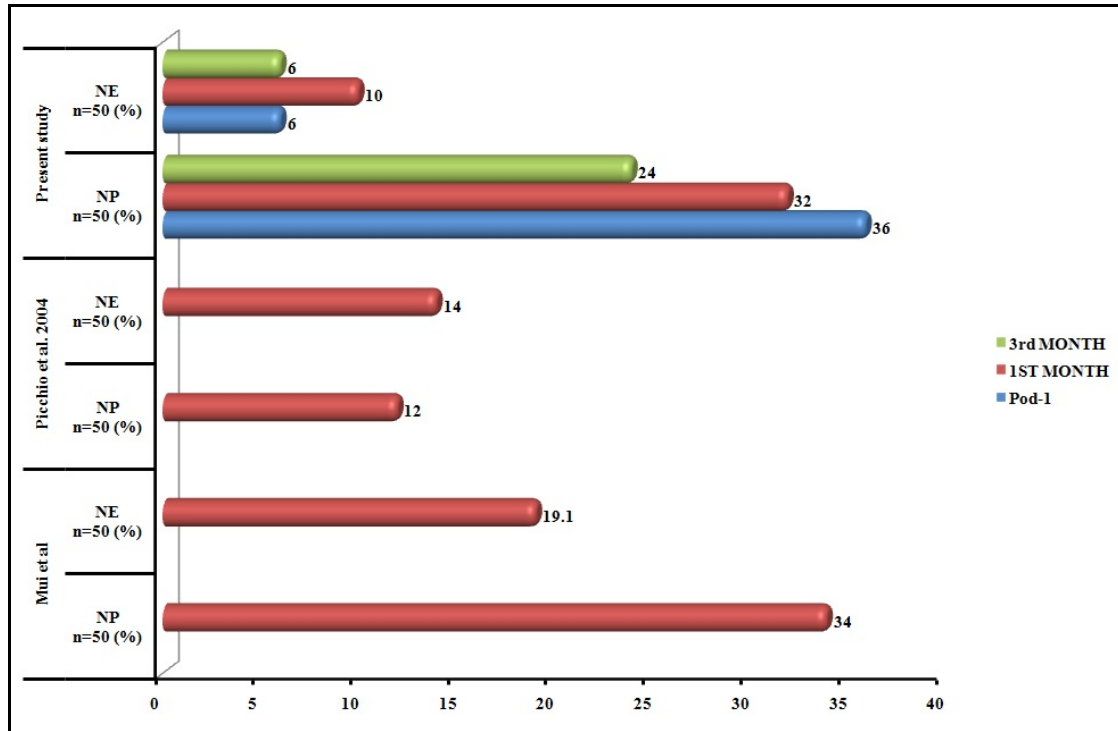


The above table shows the incidence of hypoesthesia in the present study compared with two other studies

In the present study the incidence of post operative hypoesthesia at groin between ilioinguinal nerve preservation and nerve excision during surgery , The results obtained are 10%vs36% at 1 month ; are compared with studies conducted by Fatemeh (Fatemeh M.D et al, 2008). and Mui (Mui M.B et al, 2006).

Table & Graph -13: Comparison of incidence of numbness

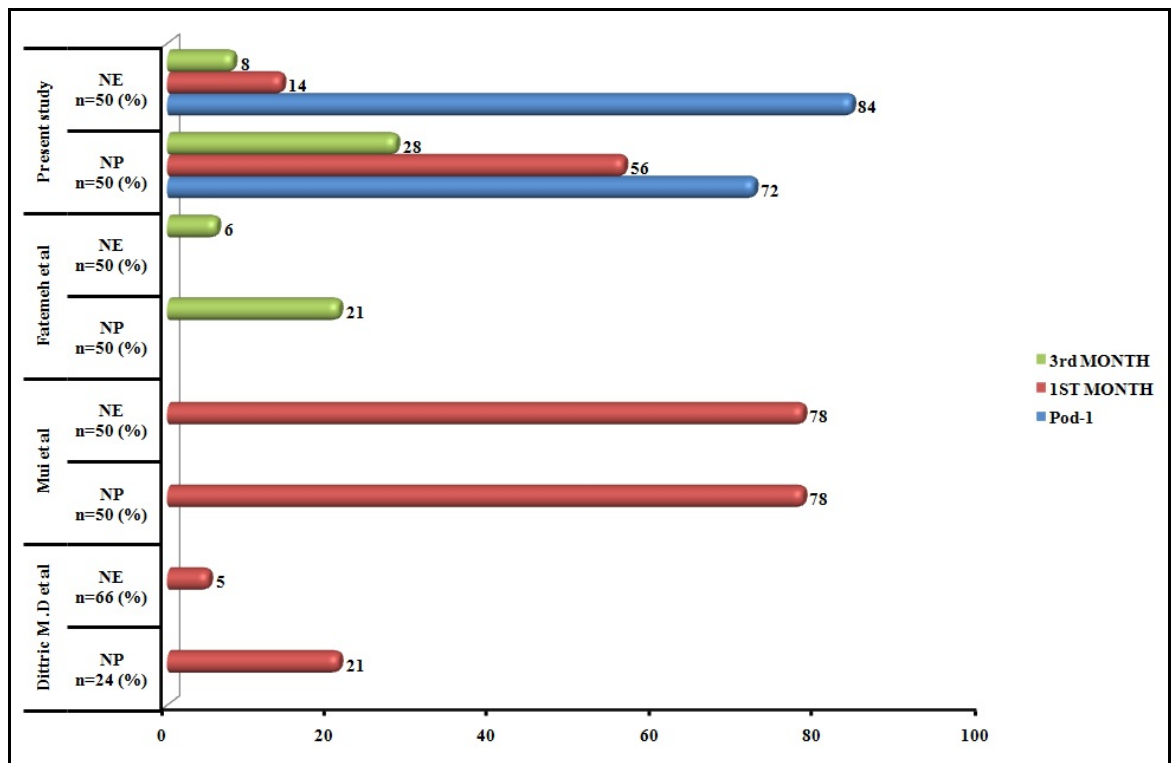
Studies	Mui et al		Picchio et al. 2004		Present study	
	NP n=50 (%)	NE n=50 (%)	NP n=50 (%)	NE n=50 (%)	NP n=50 (%)	NE n=50 (%)
Pod-1	–	–	–	–	18 (36)	3 (6)
1ST MONTH	16 (34)	9 (19.1)	46 (12)	54 (14)	16 (32)	5 (10)
3rd MONTH	–	–	–	–	12 (24)	3 (6)



In the present study the incidence of post operative numbness compared ilioinguinal nerve preservation versus nerve excision, results showing 32%vs10% at1 month, and are compared with results of studies conducted by Picchio (Picchio et al, 2004) and Mui (Mui M.B et al, 2006

Table & Graph -14: Comparison of incidence of groin pain with other studies

Studies	Dittric M .D et al		Mui et al		Fatemeh et al		Present study	
	NP n=24 (%)	NE n=66 (%)	NP n=50 (%)	NE n=50 (%)	NP n=50 (%)	NE n=50 (%)	NP n=50 (%)	NE n=50 (%)
Pod-1	–	–	–	–	–	–	36 (72)	42 (84)
1ST MONTH	5 (21)	3 (5)	37 (78)	37 (78)	–	–	28 (56)	7 (14)
3rd MONTH	–	–	–	–	10 (21)	3 (6)	14 (28)	4 (8)



The above table shows the number of patients and percentage of incidence of post operative chronic groin pain in three previous studies and the present study. The incidence of post operative groin pain in the present study compared ilioinguinal nerve preservation versus routine excision of ilioinguinal nerve showing the results 28% VS 8% at 3month comparable with study conducted by fatemeh et al.

(Mui M.B et al, 2006)⁶⁹ and Dittrick (Dittrick M.D et al,2004). Here the incidence of pain at POD-1 is not considered for post operative chronic groin pain.

DISCUSSION

Patients suffering from inguinodynia irrespective of the severity including the mild type affects the day to day activities of the Patients to a great extent.

Various recent studies though prove that the division of ilioinguinal nerve during the surgery decreases the risk of inguinodynia still there are controversies regarding the benefits of ilioinguinal nerve division during the surgery.

In the present study 100 patients were evaluated for pain, hypoesthesia, and numbness.

In the group of preservation of ilioinguinal nerve (Group A) the nerve is secured till the completion of surgery. .

In group B the ilioinguinal neurectomy is done and the proximal end is buried inside the internal oblique muscle lateral to the deep ring.

The patients were followed up for assessment of pain, hypoesthesia, and numbness at POD -1 , 1, 2&3 months after operation.

COMMENTS

After the results of various studies showing the incidence of incidence of inguinodynia as high as 62.9%, surgeons started finding out the protocols to prevent injury to the sensory nerves in the inguinal canal rather than preventing it. The commonest nerve involved in the injury due to entrapment is the ilioinguinal nerve & there are various studies supporting the evidence of ilioinguinal entrapment syndrome.

Since ilioinguinal nerve is the commonest nerve involved in inguinodynia ilioinguinal neurectomy significantly reduces the number of patients with inguinal hernia as supported by various studies.

Dittrick et al 2004

The result has showed that chronic groin pain is lesser in nerve division group compared with nerve preservation group (3% vs 26% $P < 0.001$) and even at 1 year period the difference is significant (3% vs 25% $p = 0.003$).

The incidence of parasthesia between nerve preservation and neurectomy group is statistically insignificant.

Mui M.D et al 2006

This double blinded and randomized study consisting of 100 patients concluded that the incidence of chronic groin pain at 6 months was significantly lower in the group A (50 patients) than group B (50 patients). (8% vs 28.6%) $p=0.008$.

No significant inter group differences in the neurosensory disturbances were found as compensated by cross innervations from the collateral cutaneous nerves.

Fatemeh malekpour et al 2008

Double blinded randomized controlled clinical trial was performed on 121 patients undergoing open anterior mesh repair of inguinal hernia.

Of the 121 patients, 61 were nerve excision group and 60 were nerve preserving group. The chronic post surgical inguinodynia was seen in 6% in nerve excision group and 21% in nerve preserved group ($p=0.033$). Results were concluded that the neurectomy decreases the post surgical pain after elective inguinal hernia repair.

In the present study –Results.

A prospective comparative study conducted at department of surgery at Rajiv Gandhi Govt General Hospital, Madras Medical College, Chennai with 50 patients in group A (ilioinguinal nerve preservation) and 50 patients in group B (ilioinguinal nerve divided). & all the 100 patients have completed the study.

The results showed the incidence of postoperative chronic groin pain months after surgery are 72% vs 84% ($p=0.384$) at POD-1; 56% vs 14% ($p<0.05$) at 1 month; 44% vs 12% ($p<0.05$) at 2 months; and 28% vs 8% ($p<0.05$) at 3 months in group A and B respectively by using Chi square test

The incidence of hypoesthesia was 12% vs 44% ($p<0.05$) at POD-1; 10% vs 36% ($p<0.05$) at 1 month; 8% vs 32% ($p<0.05$) at 2nd months; and 8% vs 20% ($p>0.05$) in group A & B respectively.

The results of the follow up visits are 36% vs 6% ($p<0.05$) at POD-1; 32% vs 10% ($p<0.05$) at 1 month; 20% vs 6% ($p<0.05$) at 2nd months; and 24% vs 6% ($p<0.05$) at 3 months. The difference was significant ($p\text{-value}<0.05$).

Thus showed the incidence of chronic groin pain is lower in ilioinguinal nerve excision (group B) compared to nerve

preservation (group A). & Statistically significant ($p < 0.05$). No significant difference noted in hypoesthesia in either group. There is significant difference in paresthesia with lower incidence of paresthesia at the 3 months in neurectomy group compared with nerve preservation group. $p < 0.05$.

SUMMARY

The summary of the study namely “ROLE OF ILIOINGUINAL NEURCTOMY IN ENTRAPMENT SYNDROME IN INGUINAL HERNIA REPAIR” conducted in the department of surgery at Rajiv Gandhi Govt General Hospital, Madras Medical College from may 2010 to November 2012 are as follows;

Datas are collected in the prescribed proforma ,analysed and evaluated for the incidence of post operative neuralgia,hypoesthesia and paresthesia at post operative day-1,1st month,2nd month,3rd month.

100 patients are included in the study and it was divided into two groups namely one group with the preservation of ilioinguinal nerve consisting of 50 patients named as group A and another group with ilioinguinal neurectomy done consisting of 50 patients named as groupB

The mean age of the patients in the group A is 45.86 ± 14.6

The mean age of the patient in the group B is 46.14 ± 15.8

In group A, 35 patients presented with the swelling only and 15 patients with swelling and the pain.

In group B, 37 patients presented with swelling only and 13 patients with the swelling and the pain.

In this study, 5 patients had bladder outlet obstruction, 14 patients had constipation, 6 patients had chronic cough and 38 patients are smokers.

58 patients doing heavy work, 14 patients doing moderate work and 28 patients doing light work are included in the study.

In group A, 20 patients had right sided inguinal hernia and 30 patients had left sided inguinal hernia. more over in this group 22 patients had direct inguinal hernia and 28 patients had indirect inguinal hernia.

In group B, 16 patients had right sided inguinal hernia and 34 patients had left sided inguinal hernia. in the same group 19 patients had direct inguinal hernia and 31 patients had indirect inguinal hernia

In comparing the incidence of post operative neuralgia between group A and the group B it is found to be 72% Vs 84% at POD-1, 56% Vs 14% at 1 month, 44% Vs 12% at 2nd month and 28% Vs 8% at 3rd month respectively and the P values are

0.384, 0.0, 0.001, and 0.013 at POD-1, 1 month, 2nd month and 3rd month respectively

.The interpretation of the study regarding the aspect of post operative neuralgia is that the patients belonging to the ilioinguinal neurectomy has decreased incidence of postoperative neuralgia compared to the nerve preservation group

In comparing the incidence of post operative hypoesthesia between Group A and Group B it is found to be 12% vs 44% at post operative day-1, 10% vs 36% at 1st month, 8% vs 32% at 2nd month, 8% vs 20% at 3rd month. And the P values are 0.001, 0.004, 0.005, 0.096 at post operative day-1, 1st month, 2nd month and 3rd month respectively.

The inference is that though the patients who had undergone ilioinguinal neurectomy at the time of surgery for inguinal hernia repair initially had hypoesthesia, the sensory impairment is gradually regained within few months and there is no statistical significance regarding the incidence of hypoesthesia within Group A and Group B at the 3rd month of follow up.

In the present study the incidence of post operative numbness was compared between Group A and Group B and the results of the

follow up study are as follows : 36% vs 6% at day-1 (P=0.001), 32% vs 10% at 1st month (P=0.011), 20% vs 6% at 2nd month (P=0.045), 24% vs 6% at 3rd month (P=0.016). The interpretation of the results are that there is statistical significant difference between Group A and Group B regarding the incidence of post operative numbness and patients with ilioinguinal nerve preservation (Group A) has more incidence of post operative paresthesia.

CONCLUSION

Prophylactic Ilioinguinal neurectomy significantly reduces the incidence of post operative neuralgia i.e; inguinodynia considering the ilioinguinal nerve entrapment syndrome as the predominant cause of inguinodynia in inguinal hernia repair(Lichenstein's tension free hernia repair).

The hypoesthesia after ilioinguinal neurectomy in lichenstein's hernia repair is regained within few months due to overlapping of adjoining dermatomes of the nerves or due to contralateral innervation of the nerve.

The incidence of paresthesia is more in the patients with ilioinguinal nerve preservation compared to ilioinguinal neurectomy in inguinal hernia repair.

So to conclude, the prophylactic ilioinguinal neurectomy is a reasonable option in inguinal hernia repair to decrease the incidence of inguinodynia.

BIBLIOGRAPHY

- 1) Normans S. Williams, Bailey & Love's Short Practice of Surgery, 25th Edition
- 2) Gray's anatomy - anatomical basis of clinical practice - 14th Edition
- 3) Maingot's abdominal operations - 11th Edition
- 4) Fischer's mastery of surgery - 6th Edition.
- 5) Chummy S.Sinnatamby - Last's Anatomy - 12 th Edition
- 6) Amanual on clinical surgery-S.das - 9th edition
- 7) Schwartz's principles of surgery - 9th Edition
- 8) Courtney M. Townsend Sabiston's textbook of surgery -19th Edition Art of laparoscopic surgery-C.Palanivelu-2012
- 9) G.W Dittrick and K. Ridl et al, Routine Ilioinguinal Nerve excision in Inguinal Hernia Repair, Am J surg 2004 ;188 : 736-40
- 10) D. Ravichandran . B. G. Kalambe et al, Pilot Randomized controlled study of

- 11) Preservation or Division of Ilio-inguinal Nerve in open Mesh Repair of Hernia, Br J Surg 2007; 87: 1166 -6M
- 12) Picchio P. Marcello and D. Palimento et al, RCT of Preservation or Elective division of Ilio inguinal nerve on Open Mesh Repair , Arch Surg 2004 ;139 :755.
- 13) Nyhus and Condons Hernia, Robert T. Fitzabbons, 5th edition: “Historic aspects of groin hernia Repair” Page;29-42.
- 14) Skandalakis John et al. Embryologic and Anatomic basis of Inguinal Herniorrhaphy, Surgical clinics of North America, Philadelphia ,W B Saunders Co 1993; 73 :799 – 34.
- 15) Nienhuijs SW, Van Oort I, Keemers-Gel s M. Randomized trial comparing the Prolene Hernia System, mesh plug repair and Lichtenstein method for open inguinal hernia repair. Br J Surg 2005;92(1):33-38
- 16) Irving L Lichtenstein. Herniorrhaphy. A Personal Experience with 6,321 cases. The American Journal of Surgery 1987; 153:553-59.
- 17) Poobalan A ,Bruce J,Cairns W, et al Areview of Chronic Groin Pain after Inguinal Herniorrhaphy ,Clin J Pain

2003;19:48 -54.

- 18) Fatemeh Malekpour M.D.Kolahi et al, Ilioinguinal Nerve Excision in Open Repair of Inguinal Hernia. Am J Surg 2008;195 : 735 – 40.
- 19) C.P Heis and J .Starling ‘Mesh inguinodynia’ A New Clinical syndrome After Inguinal Heniorrhaphy, J Am Coll Surg 1998; 187 :514 - 18
- 20) Madura JA, Madura JA II, Copper CM et al. Inguinal Neurectomy for Nerve Entrapment: An experience with 100 patients. Am J surg 2005 ; 189 : 283 – 7.
- 21) Lee CH, Dellon AL. Surgical Management of Groin Pain of Neural Origin.J Am Coll Surg 2000 ; 19 (2) : 137-42.
- 22) Mui, MB Calvin S .H et al, Prophylactic Ilioinguinal Neurectomy in Open Inguinal Hernia Repair. Ann Surg. 2006; 244: 27-33.
- 23) Amanda Johner et al,, Planned ilioinguinal nerve excision for prevention of chronic pain after inguinal hernia repair: A meta-analysis JOURNAL OF SURGERY 2011
- 24) M. Sachs et al, Surgical History Historical Evolution of

Inguinal Hernia Repair World J. Surg. 21, 218-223, 1997

- 25) Abdul Hakeem et al Inguinodynia following Lichtenstein tension-free hernia repair: A review World J Gastroenterol 2011 April 14; 17(14): 1791-1796
- 26) Wilfred Lik-Man Mui et al Prophylactic Ilioinguinal Neurectomy in Open Inguinal Hernia Repair A Double-Blind Randomized Controlled Trial Annals of Surgery • Volume 244, Number 1, July 2006
- 27) R. Van Hee HISTORY OF INGUINAL HERNIA REPAIR Jurnalul de Chirurgie, Iași, 2011, Vol. 7, Nr. 3 [ISSN 1584 – 9341
- 28) Bay-Nielsen M, Perkins FM, Kehlet H. Pain and functional impairment 1 year after inguinal herniorrhaphy: a nationwide questionnaire study. Ann Surg. 2001;233:1–
- 29) Cunningham J, Temple WJ, Mitchell P, et al. Cooperative hernia study: pain in the postrepair patient. Ann Surg. 1996;224:598–602.
- 30) Callesen T, Bech K, Kehlet H. Prospective study of chronic pain after groin hernia repair. Br J Surg. 1999;86:1528–

- 31) Poobalan AS, Bruce J, King PM, et al. Chronic pain and quality of life following open inguinal hernia repair. *Br J Surg.* 2001;88:1122–1126.
- 32) Courtney CA, Duffy K, Serpell MG, et al. outcome of patients with severe chronic pain following repair of groin hernia. *Br J Surg.* 2002;89:1310–1314
- 33) Pappalardo G, Guadalaxara A, Illomei G, et al. Prevention of postherniorrhaphy persistent pain: results of a prospective study. *Int Surg.* 1999;84:350–3538.
- 34) Amid PK. Causes, prevention, and surgical treatment of post herniorrhaphy neuropathic inguinodynia: triple neurectomy with proximal end
- 35) Starling JR, Harms BA. Diagnosis and treatment of genitofemoral and ilioinguinal neurectomy. *World J Surg.* 1989; 13: 586–591.
- 36) Madura JA, Madura JA 2nd, Copper CM, et al. Inguinal neurectomy for inguinal nerve entrapment: an experience with 100 patients. *Am J Surg.* 2005;189:283–287.
- 37) Tsakayannis DE, Kiriakopoulos AC, Linos DA. Elective

neurectomy during open, 'tension free' inguinal hernia repair. *Hernia*. 2004;8:67–69

- 38) Lam CL, Gandek B, Ren XS, et al. Tests of scaling assumption and construct validity of the Chinese (HK) version of the SF-36 Health Survey. *J Clin Epidemiol*. 1998;51:1139–1147
- 39) Lichtenstein IL, Shulman AG, Amid PK, et al. The tension-free hernioplasty. *Am J Surg*. 1989;157:188–193.
- 40) Bell JA. Semmes-Weinstein monofilament testing for determining cutaneous light touch/deep pressure sensation. *Star*. 1984;44(2).
- 41) Heise CP, Starling JR. Mesh inguinodynia: a new clinical syndrome after inguinal herniorrhaphy? *J Am Coll Surg*. 1998;187:514–518.
- 42) Nienhuijs SW, Van Oort I, Keemers-Gels M. Randomized trial comparing the Prolene Hernia System, mesh plug repair and Lichtenstein method for open inguinal hernia repair. *Br J Surg* 2005;92(1):33-38.
- 43) Skandalakis JE, Gray SW, Skandalakis LJ. Surgical anatomy

of the inguinal

- 44) Skandalakis MC, Skandalakis JE. The personal and professional life of John Hunter. *J Med Assoc Ga* 1991;80:445.
- 45) Gilbert AI. Sutureless repair of inguinal hernia. *Am J Surg* 1992;163:331
- 46) Arregui ME. Laparoscopic preperitoneal herniorrhaphy. Paper presented at: Annual meeting of the society of American Endoscopic Surgeons; 1991.
- 47) Aasvang EK, Bay-Nielsen M, Kehlet H. Pain and functional impairment 6 years after inguinal herniorrhaphy. *Hernia* 2006;10(4):316-321
- 48) Ferzli GS, Edwards ED, Khoury GE. Chronic pain after inguinal herniorrhaphy. *J Am Coll Surg* 2007;205(2):333–341.
- 49) Kalliomaki ML, Meyerson J, Gunnarsson U. Long-term pain after inguinal hernia repair in a population-based cohort: risk factors and interference with daily activities. *Eur J Pain* 2008;12(2):214–225.

- 50) Dennis R, O’Riordan D. Risk factors for chronic pain after inguinal hernia repair. *Ann R Coll Surg Engl* 2007;89(3):218–220.
- 51) Amid PK. Causes, prevention and surgical treatment of postherniorrhaphy neuropathic inguinodynia: Triple neurectomy with proximal end implantation. *Hernia* 2004; 8: 343–349.
- 52) Patrick J. O-Dwyer, Ahmed Alani, Alex McConnachie. Groin Hernia Repair: Postherniorrhaphy Pain. *World J Surg* 2005; 29: 1062–1065.

PROFORMA

Name : IP No :

Age / Sex : Date of Admission :

Occupation : Date of Operation :

Address : Date of Discharge :

CHIEF COMPLAINTS

HISTORY OF PRESENT ILLNESS

1. Swelling in the groin

a) Duration :

b) Site : Right / Left / Bilateral

c) Mode of onset : Sudden / Insidious

d) Swelling appears Spontaneously / Following straining

e) Progress : Slow / Rapid / Constant

f) Extension : Inguinal canal / into the scrotum / Upto the bottom of the
scrotum

g) Size on lying down : Disappears spontaneously / By manipulation /
Not disappears

2. Pain : Present / Absent

- a) Site : Groin / Scrotum / Abdomen / Inguino-scrotal
- b) Mode of onset : Sudden / Insidious
- c) Radiating pain : Yes / No
- d) Character : Dragging / Dull aching / Pricking / Colicky / Throbbing
/ Twisting
- e) Severity : Mild / Moderate / Severe
- f) Pain on standing : Increases / Decreases / No change
- g) Pain on lying : Increases / Decreases / No change

3. Vomiting: Present / Absent

Nature of vomitus :

No of bouts :

4. Distension of abdomen: Present / Absent

5. Other straining factors

- a) Cough / Breathlessness / Chronic asthma : Present / Absent
- b) Constipation / Straining at stools : Present / Absent
- c) Urgency / Frequency / Hesitancy : Present / Absent

6. Any treatment before admitting to the hospital : Yes / No

If Yes:

PAST HISTORY

H/ o Similar Complaints : Yes / No

History of any co-morbid illness

TREATMENT HISTORY:

Medical :

Surgical :

FAMILY HISTORY:

PERSONAL HISTORY:

Diet :

Substance abuse:

MENSTRUAL HISTORY (if female) :

GENERAL PHYSICAL EXAMINATION

Built : Poor / Moderate / Well

Nourishment : Poor / Moderate / Well

Mental state : Conscious oriented / Drowsy / Irritable

Pallor : Clubbing :

Icterus : Edema :

Cyanosis: Lymphadenopathy:

VITALS

Pulse : Respiratory rate:

Blood pressure : Temperature :

LOCAL EXAMINATION

A . Inspection :

- a) Site : Rt groin / Left groin / Bilateral
- b) Extent : Inguinal / Inguino-scrotal / Upto the bottom of scrotum
- c) Size : Measuring about
- d) Shape : Pyriform / Globular
- e) Surface : Smooth / Irregular
- f) Margin : Well defined / Ill defined
- g) Skin over the swelling : Stretched / Inflamed / Normal
- h) Expansile impulse on cough : Present / Absent
- i) Visible peristalsis over swelling : Present / Absent
- j) Position of penis : Normal / Pushed to Rt / Lt

B. Palpation

- a) Temperature over the swelling : Normal / Raised / Decreased
- b) Tenderness over the swelling : Present / Absent
- c) To get above the swelling : Possible / Not possible
- d) Position and extent : Rt groin / Lt groin / Bilateral
- e) Size :

- f) Shape : Pyriform / Globular
- g) Surface : Smooth / Irregular
- h) Consistency : Soft & elastic / Doughy& Granular
- i) Reducibility : Spontaneous / by Manipulation
- j) Deep ring occlusion test : Positive / Negative
- k) Invagination test
- l) Zieman`s test :
- l) Can testis felt separately from the swelling : Yes / No

C. Percussion

Over the swelling : Resonant / Dull note

D. Auscultation

Bowel sounds heard over the swelling? : Yes / No

E. Examination of abdominal muscle tone

On head raising test malgaigne`s bulgings : Present / Absent

SYSTEMIC EXAMINATION

A. Per Abdomen :

- a) Shape :
- b) Umbilicus :
- c) Tenderness :
- d) Organomegaly :
- e) Other findings :

Per Rectal examination:

Per vaginal examination (If female):

B. Respiratory system :

C. Cardiovascular system :

D. Nervous system :

CLINICAL DIAGNOSIS

INVESTIGATIONS

A. Baseline investigations

Complete blood count

Liver Function Test

Renal Function Test

Blood sugar

Blood grouping

CXR

ECG

USG Abdomen

Echo and Pulmonary Function Test if needed

TREATMENT

Type of Anaesthesia:

Type of operation :

Findings:

Contents of the sac : Intestine / Omentum / Others

Ilio-inguinal nerve : Identified and **Preserved** / **Neurectomy**

FOLLOW- UP

POST OPERATIVE

Pain - (Using visual analogue scale)

DAY-1

Pain : None / Mild / Moderate / Severe

Hypoesthesia : Present / Absent

Paresthesia : Present / Absent

AT ONE MONTH

Pain : None / Mild / Moderate / Severe

Hypoesthesia : Present / Absent

Paresthesia : Present / Absent

AT TWO MONTHS

Pain : None / Mild / Moderate / Severe

Hypoesthesia : Present / Absent

Paresthesia : Present / Absent

AT THREE MONTHS

Pain : None / Mild / Moderate / Severe

Hypoesthesia : Present / Absent

Paresthesia : Present / Absent

KEY TO MASTER CHART

SL No: Serial Number

I P No: Inpatient Number

Age : In Years

Sex : M :Male

Occupation:

F : Farmers, T : Teacher , B : Business,

S : Student , Ck : Cook, Cw- Construction worker

E; Employee , M : Manual Labour, O : Others

Duration:

Yr : Year

Side:

Rt : Right , Lt : Left.

Mode of presentation:

S : Swelling only ,

S/P : Swelling with pain ,

Straining Factors: S F

CC : Chronic cough,

SS : Straining at stools ,

Bladder outlet obstruction : Boo. + : Present . - : Absent.

Clinical Presentation: C P

C : Complete , I : Incomplete,

Reducibility:

R : Reducible , I : Irreducible ,

Type:

DIRECT – Direct Inguinal Hernia, INDIRECT - Indirect Inguinal Hernia,

Surgery:

L : Lichtenstein`s mesh hernioplasty ,

Study Group :

A : Nerve preservation , B : neurectomy

Follow-Up :

0 : No pain , 1 : Mild pain,

2: Moderate pain , 3 : Severe Pain

H : Hypoesthesia, N : Numbness, ,

+ : Present . - : Absent.

PoD-1 : Post operative day one , 1m : At one Month,

2m : At Second Months , 3m : At Third Months .

INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE, CHENNAI -3

Telephone No : 044 25305301
Fax : 044 25363970

CERTIFICATE OF APPROVAL

To
Dr.P. Mahesh Kumar
PG in MS General Surgery
Madras Medical College, Chennai -3

Dear Dr.P. Mahesh Kumar

The Institutional Ethics committee of Madras Medical College, reviewed and discussed your application for approval of the proposal entitled "Role of Ilioinguinal neurectomy in entrapment syndrome in inguinal hernia repair" No.18082012.

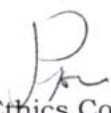
The following members of Ethics Committee were present in the meeting held on 10/08/2012 conducted at Madras Medical College, Chennai -3.

- | | |
|--|---------------------|
| 1. Dr. S.K. Rajan. M.D.,FRCP.,DSc | -- Chairperson |
| 2. Prof. Pregna B. Dolia MD
Vice Principal, Madras Medical College, Chennai -3
Director , Institute of Biochemistry, MMC, Ch-3 | -- Member Secretary |
| 3. Prof. B. Vasanthi MD
Prof of Pharmacology ,MMC, Ch-3 | -- Member |
| 4. Prof. C. Rajendiran, MD
Director , Inst. Of Internal Medicine, MMC, Ch-3 | -- Member |
| 5. Prof. S. Deivanayagam MS
Prof of Surgery, MMC, Ch-3 | -- Member |
| 6. Thiru. S. Govindsamy. BABL | -- Lawyer |
| 7. Tmt. Arnold Soulina MA MSW | -- Social Scientist |

We approve the proposal to be conducted in its presented form.

Sd/ Chairman & Other Members

The Institutional Ethics Committee expects to be informed about the progress of the study, and SAE occurring in the course of the study, any changes in the protocol and patients information / informed consent and asks to be provided a copy of the final report.


Member Secretary, Ethics Committee



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In partial fulfillment of the requirement for the degree
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