"COMPARATIVE STUDY OF DESARDA'S REPAIR versus LICHTENSTEIN'S HERNIOPLASTY IN THE MANAGEMENT OF INGUINAL HERNIA"

By

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In partial fulfillment of the requirements for the degree of

MASTER OF SURGERY

IN

GENERAL SURGERY

Under the Guidance of

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SIGNATURE OF THE CANDIDATE

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LIST OF ABBREVIATIONS USED

ASIS	-	Anterior Superior Iliac Spine
CT	-	Computed Tomogram
EOA	-	External Oblique Aponeurosis
MPO	-	Myo pectineal orifice
TEP	-	Total Extraperitoneal approach
TAPP	-	Trans Abdominal Preperitoneal) approach
USG	-	Ultrasonography

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF IMAGES

ABSTRACT

BACKGROUND:

Hernia repair is one of the commonly performed surgical procedures in the world as well as in India. India a country whose large population demography consists of rural poor and urban poor is in need of a cost effective Hernia repair procedure. Hence the effectiveness and feasibility of newer, with similar to better outcome and cost effective techniques should be weighed against the now widely used surgical options for hernia repair.

Desarda's repair eliminates the problems associated with mesh based techniques such as Discomfort, Foreign body sensation, Mesh migration and rejection to name a few. It being a no mesh technique reduces the cost burden on the patient without compromising the effectiveness of the treatment with equal to better outcome. In this contrast a comparison of Desarda's repair with Lichtenstein's technique was done to compare operating time, postoperative pain, recovery time, post operative complications and cost effectiveness between two procedures.

MATERIAL AND METHODS: A Comparative study was done among patients in the age group 19-60 years with uncomplicated inguinal hernia admitted to RLJH during the study period. Patients who are immunocompromised, having metabolic diseases and chronic infective diseases and Patients with recurrent inguinal hernia were excluded from the study. A complete detailed history was taken; physical examination was done and relevant investigations were advised after obtaining an informed consent. Patients were divided into two groups using even-odd method to include similar type of cases with respect to age and sex in both groups. Patients willing for the study after completely understanding the two treatment options were

divided into two groups. Even group will undergo Desarda's repair and Odd group will undergo Lichtenstein's hernioplasty.

Ethical clearance was obtained from Institutional ethical committee prior to the start of the study and Informed consent was obtained from all the study subjects prior to the inclusion.

Statistical analysis: Data was entered into Microsoft excel data sheet and will be analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Chi-square was the test of significance. Continuous data will be represented as mean and standard deviation. Independent t test was the test of significance to identify the mean difference between two groups. p value <0.05 will be considered as statistically significant.

RESULTS:

Mean age of subjects in Even group was 41.70 ± 13.48 years and in Odd group was 45.60 ± 14.10 years. In Even group, majority of them had Right indirect hernia (45%) and in Odd group, majority of subjects had Right direct and indirect hernia. Mean operating time in even group was 87.15 ± 3.86 min and in odd group was 100.00 ± 5.39 min. Mean post op pain on day 1 in even group was 2.95 ± 0.69 and in odd group was 4.75 ± 0.79. Mean post op pain on day 3 in even group was 1.15 ± 0.37 and in odd group was 2.10 ± 0.31. There was significant difference in operating time, post op pain day 1 and day 3 between two groups. In Even group, 0% had complications and in odd group, 5% had Seroma and 10% had urinary retention. Mean day of Fit for discharge in even group was 2.00 ± 0.0 days and in odd group was 3.15 ± 0.48 days. There was significant difference in day of discharge between two groups. Mean Total

cost in the even group was 6600 ± 1313.89 Rs and in odd group was 12400 ± 1957.44. There was significant difference in cost of procedure between two groups.

CONCLUSION: Study concluded that Desarda repair was better with respect to reduced operating time, post op pain , complications and cost effectiveness compared to Lichtenstein repair.

KEY WORDS: Desarda repair, Lichtenstein repair, Inguinal hernia

INTRODUCTION

INTRODUCTION

Inguinal hernia is defined as a protrusion of the contents of the abdominal cavity or pre-peritoneal fat through a hernia defect in the inguinal area, irrespective of whether this is preformed.[1] About 75% of abdominal wall hernias are inguinal hernias, with a lifetime risk of 27% in men and 3% in women.[2]

Hernia repair is one of the commonly performed surgical procedures in the world as well as in India. India a country whose large population demography consists of rural poor and urban poor is in need of a cost effective Hernia repair procedure. Hence effectiveness and feasibility of newer, with similar to better outcome and cost effective techniques should be weighed against the now widely used surgical options for hernia repair.

The groin herniorrhaphies done worldwide every year exceeds 20 million,[3] which is one of the top three operations in most western countries.[4,5] In 1887, Edoardo Bassini first proposed repairing the inguinal canal with silk stitches suturing the conjoined transversus abdominis and internal oblique with the transversalis fascia to the inguinal ligament, which is the first sound technique for the repair of inguinal hernia.[6] Since that time, more than 70 derivations of tissue-based repairs are described in the literature.[7] In the 1970s, the Lichtenstein hernia repair was favoured and became the gold standard of open tension-free hernia repair.[8] However, the use of synthetic prostheses can result in new clinical problems, such as foreign body sensation, chronic groin pain, abdominal wall stiffness and pain related sexual dysfunction, which may affect the daily activities of the patient.[9,10] Besides, mesh rejection and migration have been reported.[11,12] In order to reduce the incidence of

complications and postoperative dysfunction, the tissue-based groin herniorrhaphies has re-attracted the attentions in recent years.

Current hernia repairs address the anatomic defect and do not restore the physiological factors that prevent hernia formation. Therefore, the surgical physiology of inguinal canal needs to be reconsidered.

Thus there is need for a technique, which addresses not only the anatomical repair but also the physiological aspect of the repair and it should be as efficient as Lichtenstein's repair. One such procedure is Desarda's no mesh repair.

In 2001, Desarda proposed a solution that using part of the external oblique aponeurosis (EOA) as a patch for repair, which may reduce the complications compared with meshes. Moreover, the technique requires no complicated dissection or suturing, and is easy to learn as its developer claimed.[13,14,15]

Desarda's repair eliminates the problems associated with mesh based techniques such as Discomfort, Foreign body sensation, Mesh migration and rejection to name a few. It being a no mesh technique reduces the cost burden on the patient without compromising the effectiveness of the treatment with equal to better outcome. In this context a comparison of Desarda's repair with Lichtenstein's technique has been done in the current study.

NEED FOR THE STUDY

- Since few decades Lichtenstein's mesh repair has been the standard of care in inguinal hernia surgery. Millions of people have undergone this procedure throughout the world.
- Though many alternative procedures are being proposed and practised mesh placement had the advantages of:

Being technically simple,

Easy to perform,

Tension free,

Less painful and has low recurrence rate compared to other older procedures.

- However Lichtenstein's repair has its own limitations.

- It was unphysiological as it involved placing a foreign body inside the inguinal canal
- Chronic inguinal pain (inguinodynia) [16,17,18] was common complication
- There was a likelihood of seroma formation[19,20]
- Patients complained of foreign body sensation[19,20]
- Risk of mesh infection, there may be risk of mesh migration or adhesion to bowel or formation of fistulas [18]
- Progressive decrease of blood flow in cord structures [21,22,23], testicular atrophy, [21,22,23]
- Use of this technique in cases of strangulated hernias is not recommended [19,20]
- The cost of the mesh is a burden on the patients pocket

Hence an alternate procedure for inguinal hernia surgery is to be evaluated to replace Lichtenstein's repair, which is physiological, low cost and with recurrence rates equal to or better than Lichtenstein's repair.

AIM AND OBJECTIVES

AIM

To compare the outcome between two methods of Hernia repair

OBJECTIVES:

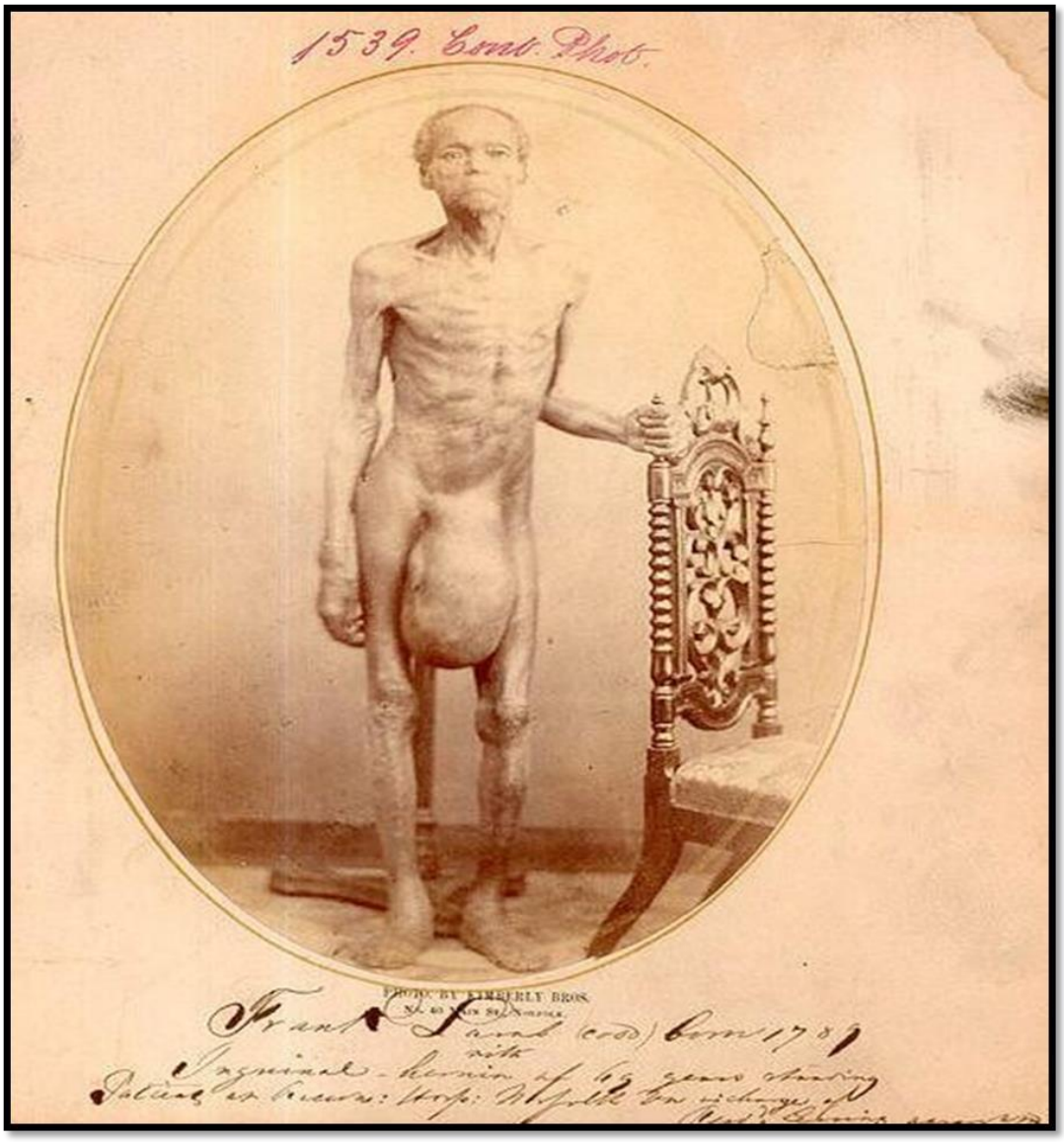
- To study outcome of inguinal hernia repair using Desarda's no mesh repair with regards to operating time, post-operative pain, recovery time, post operative complications and cost effectiveness.
- To study outcome of inguinal hernia repair using Lichtenstein's mesh repair with regards to operating time, postoperative pain, recovery time, post operative complications and cost effectiveness.
- To compare outcomes of hernia repair by Desarda's repair and Lichtenstein's hernioplasty with respect to operating time, postoperative pain, recovery time, post operative complications and cost effectiveness.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

HISTORY

The history of hernia is the history of Sir-Josef Patinoheliodorus surgeon who performed the first hernia operation. Aulus Cornelius Celsus first person to write a detailed description of hernia surgery in 50AD. In 18th century great anatomists and surgeons like Paston Cooper, Franz K Haselbach, Don Antonio De Gimbernat, Jean Lou Petit' described detailed anatomy which lead to modernization of hernia repair. Bassini's (1844-1924) described the posterior wall strengthening of the inguinal canal and high ligation of sac with anatomical reconstruction. Later his techniques were modified, therefore he is rightfully called as the Father of the modern Herniorrhaphy. Halstead(1852- 1922) developed a Bassini's technique modification. A canadian surgeon Shouldice(1960) described overlapping of layers with continuous sutures. Tension free repairs (lichtenstein) described strengthening of posterior wall with mesh with very low recurrence rate, and this mesh was introduced by üsher. Laparoscopically Ger did first repair, TAPP in 1991 by Arregui and TEP by Philips. The technique which has been accepted worldwide as the “Anatomical repair”; different from the usual techniques was introduced by our own Indian Surgeon Dr Mohan.P.Desarda.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Inguinal hernias remain an important surgical problem because of its frequency. Average Life time risk for inguinal hernia is 27% for men, 3% for women (Primatesta and Goldacre, 1996)[24]. Annual morbidity rates in various countries vary from 100 to 300 per 100,000 populations (Bay Nielsen et al, 2001).[25] Until 2009 there were no written surgical guidelines for hernia treatment, when the European hernia society (EHS) published its recommendations based on analysis of the literature and the results of clinical trials. In the EHS guidelines, mesh based techniques-the Lichtenstein technique in particular and endoscopic methods are recommended for treatment of primary inguinal hernia in adult men (strength of recommendation 1A). In a departure from this firm opinion presented by the EHS, the Shouldice method has been acknowledged to be acceptable (Simons et al., 2009)[1]. Some questions can be asked considering these facts; is the Shouldice technique the only non-mesh method that ensures good clinical results? Are any other tissue based techniques effective in inguinal hernia repair performed correctly? The synthetic prostheses most often used in the inguinal hernia can create new clinical problems, such as foreign body sensation in the groin, discomfort, and abdomimal wall stiffness, which may affect the everyday functioning of the patient (D'Amore et al., 2008)[26]. Surgical site infections often with clinical symptoms delayed for years are more frequent after hernia treatment using mesh (Genc et al., 2010; Scott et al., 2002)[27,28], migration of the mesh from the primary site of implantation in the abdominal cavity is one of the most dangerous complications (Jeans et al., 2007; Ott et al., 2005)[29,30] Intense chronic inflammatory process typically associated with foreign body reactions around the mesh may produce Meshoma or Ptumors, the treatment of which becomes a new surgical challenge (Mcroy 2010).[31] Procreation and sexual function are reportly seriously affected after surgical hernia treatment with mesh (Ott et al., 2005).[30]

The observed complication rates and postoperative dysfunction have influenced many investigations to look for new hernia repair techniques or modify old methods. An example of such efforts is the Desarda method, which was presented in 2001 and became a new surgical method for tension free tissue based inguinal hernia repair (Desarda, 2001a; Desarda 2001b).[32,33] The results of this prospective study involving comparison of two technique were promising and comparable to results presented by other authors (Mitura and Romanczuk, 2008; Szopinski et al., 2005).[34,35]

HERNIA DEFINITION

Hernia is a general term used to describe a bulge or protrusion of an organ through the structure or muscle that usually contains it.

TYPES OF HERNIA

1. Internal hernia
2. External hernia

INTERNAL HERNIA

Protrusion of the gut through the peritoneum, mesentery, or momentum into compartment of abdominal cavity, the hernia orifice is usually a pre existing foramen, recess, and fossa but can be caused by surgery, ischemia and trauma.

EXTERNAL HERNIA (abdominal hernia)

External or abdominal hernia is the bulging of part of the contents of the abdominal cavity through weakness in abdominal wall.

CAUSES OF HERNIA

- Basic design weakness
- Weakness due to structures entering and leaving abdomen Developmental failures
- Genetic weakness of collagen Sharp and blunt trauma
- Weakness due to ageing and pregnancy
- Primary neurological and muscle disease Excessive intra abdominal pressure

COMPOSITION OF HERNIA

Hernia consists of the three parts-

1.The sac

2.The coverings of sac

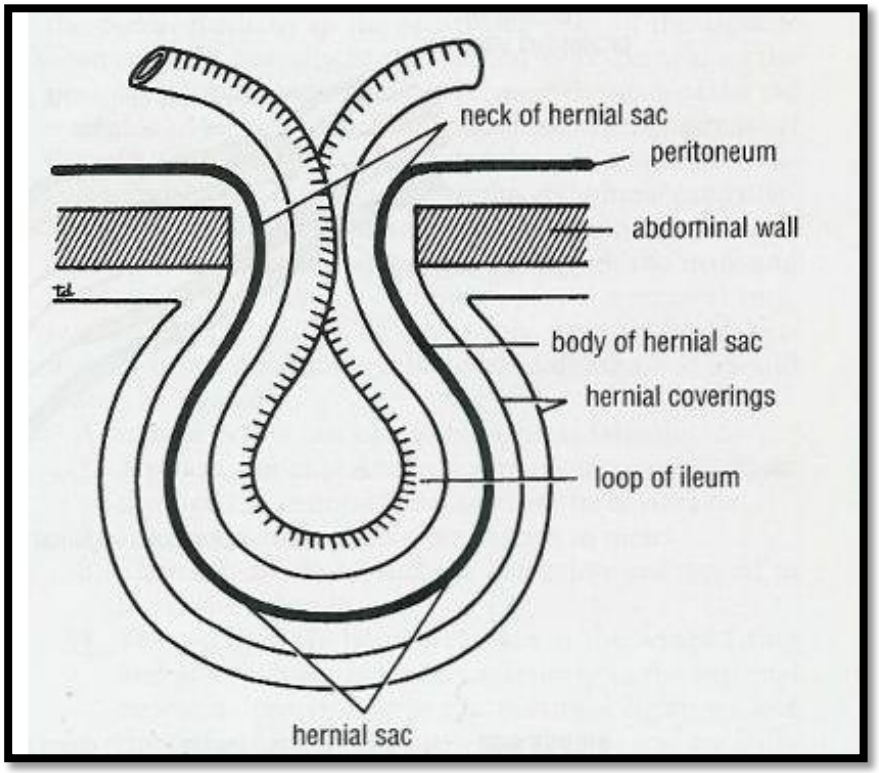
3.The contents of the sac

Sac: The sac is a diverticulum of peritoneum, consisting of Mouth

Neck Body and Fundus

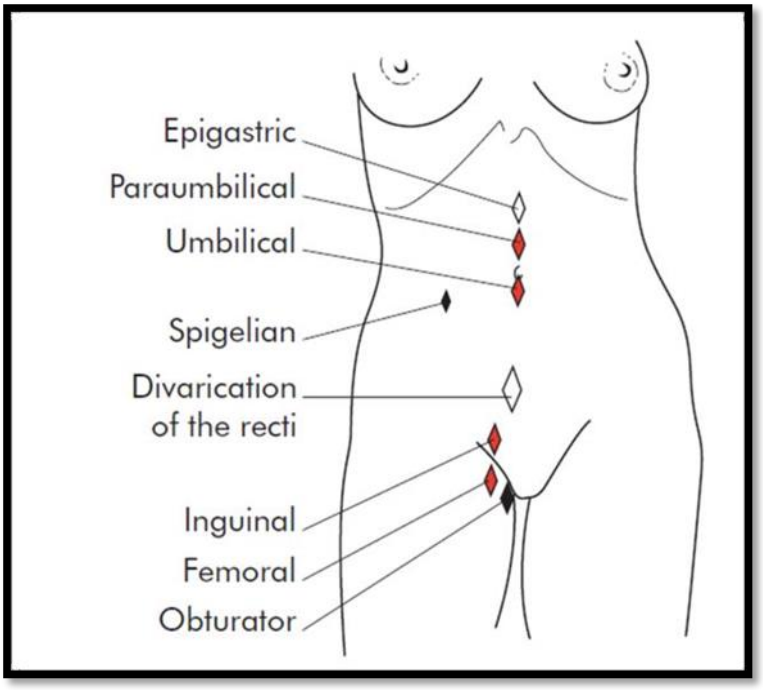
Coverings

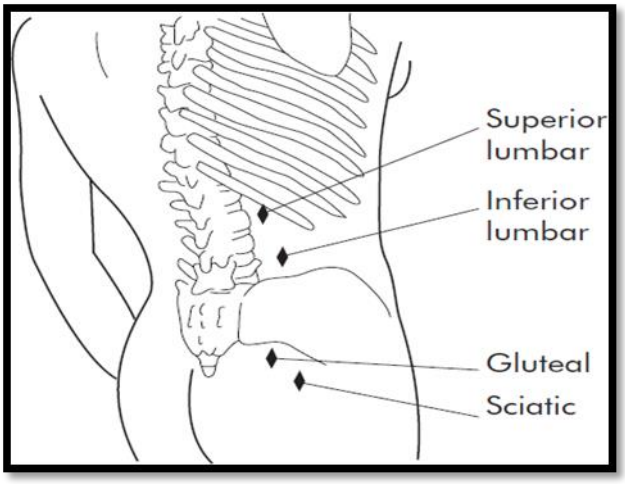
Coverings are derived from the layers of abdominal wall through which the sac passes



Parts of Hernia

HERNIA CLASSIFIED DEPEND ON SITE





INGUINAL HERNIA

Inguinal hernia means protrusion of abdominal contents through inguinal canal, it's often referred to as a "rupture" by patients, most common hernia in men & women but much more common in men.

ANATOMY OF INGUINAL CANAL

Inguinal canal in adults is an oblique rift in the lower part of the anterior abdominal wall. It measures approximately 4 cm length. It is located 2-4 cm above the inguinal ligament, between the opening of the external (superficial) and internal (deep) rings

BOUNDARIES:

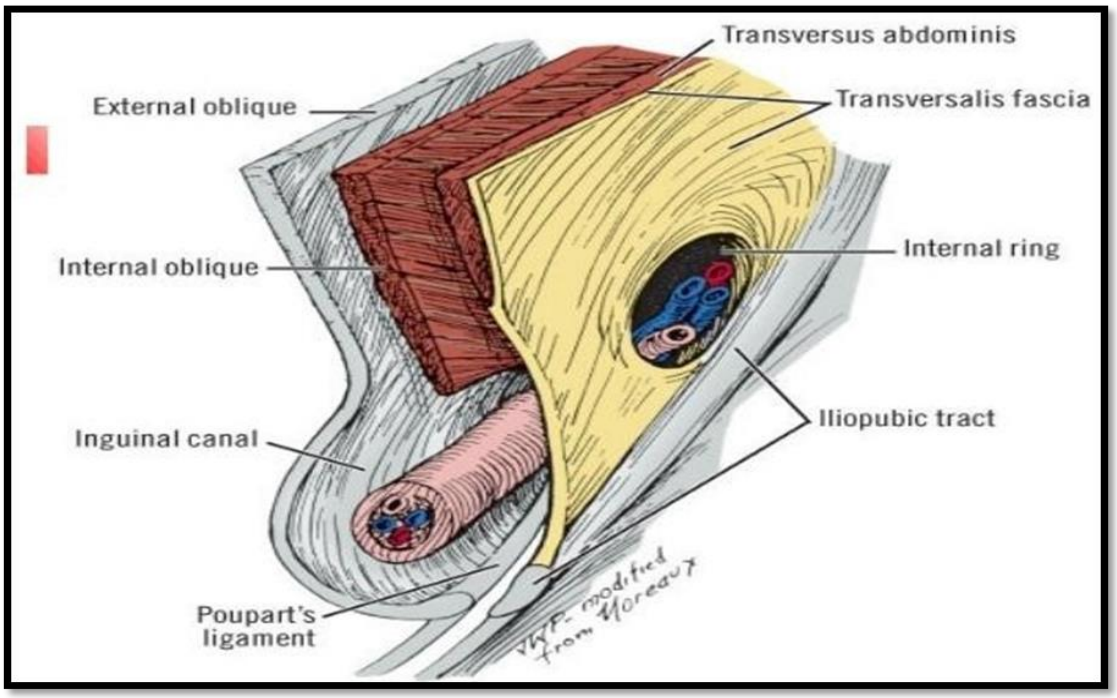
Anterior: aponeurosis of external oblique muscle, more laterally internal oblique muscles.

Posterior: posterior wall (floor) is formed laterally by aponeurosis of the transversus abdominis muscle & transversalis fascia, in 1/4 of the individual transversalis fascia alone is present. Medially posterior wall is reinforced by internal oblique aponeurosis.

Superior: roof of the canal is formed by the arched fibres of the lower edge (roof) of the internal oblique aponeurosis.

Inferior: wall of the canal is formed by the inguinal ligament (poupart's) & lacunar ligament (Gimbernat's).

Contents: spermatic cord in males, round ligament in females



SPERMATIC CORD

The spermatic cord consists of a matrix of connective tissue continuous proximally with extraperitoneal connective tissue. Following are the contents and coverings of spermatic card

Three fasciae:

External spermatic (from external oblique fascia)

Cremastric (from internal oblique muscle & fascia)

Internal spermtic (from transversalis fascia)

Three arteries:

Testicular artery

Cremastric artery

Deferential artery

Three veins:

Pampiniform plexus and testicular vein

Cremasteric vein

Deferential vein

Three nerves:

Genital branch of genitofemoral nerve

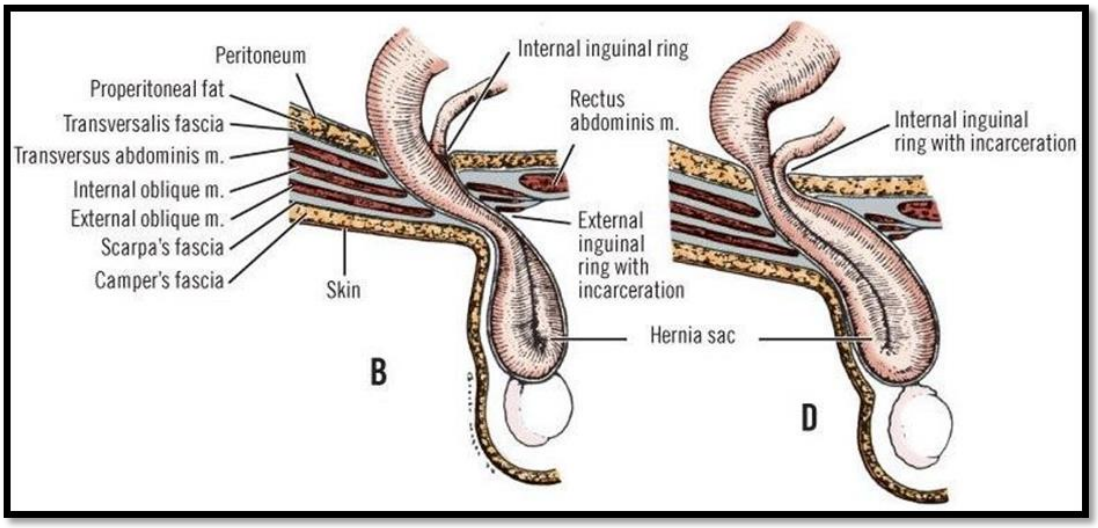
Ilioinguinal nerveS

Sympathetic nerves (testicular plexus) Lymphatics

LAYERS OF ABDOMINAL WALL IN THE INGUINAL REGION

1. Skin
2. Subcutaneous fasciae (camper and scarpa) contain fat (superficial fascia)
3. Innominate fascia (Gallaudet)
4. External oblique aponeurosis, including the inguinal, lacunar and reflected inguinal ligaments
5. Spermatic cord
6. Transversus abdominis muscle & aponeurosis, internal oblique muscle, falx inguinalis (Henle) conjoint tendon
7. Anterior lamina of transversalis fascia
8. Posterior lamina of transversalis fascia
9. Preperitoneal connective tissue with fat
10. Peritoneum

LAYERS OF ABDOMINAL WALL IN THE INGUINAL REGION



Scarpa's Fascia

Scarpa's fascia is a homogeneous membranous sheet of areolar tissue that forms a lamina in the depths of the subcutaneous tissues and usually is most prominent in the region of the groin. It is loosely connected to external oblique muscle, but in the midline it is more intimately adherent to the linea alba & to pubic symphysis, and is prolonged onto the dorsum of the penis, forming the fundi form ligament (suspensory ligament of the clitoris in females): below and laterally, it blends with the fascia lata of the thigh.

External Oblique Muscle & Aponeurosis

The external oblique muscle is the most superficial of the three flat musculo-aponeurotic layers that make up the anterolateral wall of abdomen. It is directed inferiorly and medially extending from the posterior aspects of the lower eight ribs to linea alba, the pubis, & iliac crest. Medially, the tendinous fibers pass anterior to the rectus abdominis muscle, forming the anterior layer of rectus sheath.

Inguinal Ligament

Inguinal ligament is the lower, thickened portion of the external oblique aponeurosis suspended between the anterior superior iliac spine and the pubic tubercle. The fibers of external oblique aponeurosis that form inguinal ligament present a rounded surface toward the thigh and a hollow surface toward inguinal canal functioning as supporting shelf for the spermatic cord

External Inguinal Ring

The superficial or external inguinal ring is located above superior border of pubis, immediately lateral to pubic tubercle. It is a triangular opening of the aponeurosis of external oblique, the base being part of the pubic crest with the margins formed by two crura, medial and lateral. The medial crus is formed by aponeurosis of external oblique itself, lateral crus is formed by inguinal ligament. To be more specific, the medial crus is attached to the lateral border of the rectus sheath and to the tendon of the rectus abdominis muscle. The lateral crus is attached to pubic tubercle

Internal Oblique Muscle and Aponeurosis

Internal oblique muscle & aponeurosis represent the middle layer of the three flat musculo-aponeurotic layers of the abdominal wall. Internal oblique muscle arises in part from thoracolumbar fascia & iliac crest splaying obliquely upward, forward, and medially to insert upon the inferior borders of the lower three or four ribs, the linea alba and the pubis

Transversus Abdominis Muscle & Aponeurosis

Transversus abdominis muscle & aponeurosis are the deepest of three flat anterior abdominal muscle layers. These layers arise from the fascia along the iliac crest, thoracolumbar fascia, iliopsoas fascia, and from the lower six costal cartilages and ribs. The muscle bundles of transversus abdominis course horizontally except inferior border of the transversus abdominis layer that forms a curved line, transversus abdominis arch an important landmark for surgeons because it represents the superior border of direct inguinal hernia space. The area beneath the arch & number of aponeurotic fibers and strength in this lower portion of transversus abdominis lamina varies, having a major influence in the development of direct inguinal hernia.

Conjoint Tendon

The conjoint tendon is, by definition, the fusion of lower fibers of internal oblique aponeurosis with similar fibers from aponeurosis of transversus abdominis where they insert on pubic tubercle and superior ramus of the pubis.

lliopubic Tract

Iliopubic tract, described by Alexander Thomson in 1836, is an aponeurotic band within transversus abdominis lamina that bridges across external femoral vessels that begin near anterior superior iliac spine & extend medially to attach to Cooper's ligament at the pubic tubercle. It forms the inferior margin of the deep musculo-aponeurotic layer consists of transversus abdominis muscle & aponeurosis & transversalis fascia.

Internal Inguinal Ring

Internal inguinal ring, formed mainly by aponeurotic fibres of transversus abdominis layer, is located halfway between pubic tubercle & anterior superior iliac spine. At the lateral half of the area between transversus abdominis arch above & the illopubic tract below, the fascia transversalis thickens and forms an incomplete ring in the shape of an inverted "V", with the open end pointing laterally and superiorly (transversalis fascia crura), that supports spermatic cord structures as they enter the inguinal canal. Inferior border is formed by ilio-pubic tract. Transversus abdominis arch along with superior crus of transversalis fascia forms the superior border of the deep inguinal ring

Myopectineal Orifice of Fruchaud

H. Fruchaud, a French surgeon, described in 1956 an oval-shaped area in the groin protected only by the combined lamina of aponeurosis of transversus abdominis and transversalis fascia, here all groin hernias originate named myopectinealorifice (MPO).

The MPO is bordered: Superiorly by arching fibers of the internal oblique and transversus abdominis muscles medially by lateral border of the rectus muscle, Inferiorly by Cooper's Ligament, Laterally by iliopsoas muscle

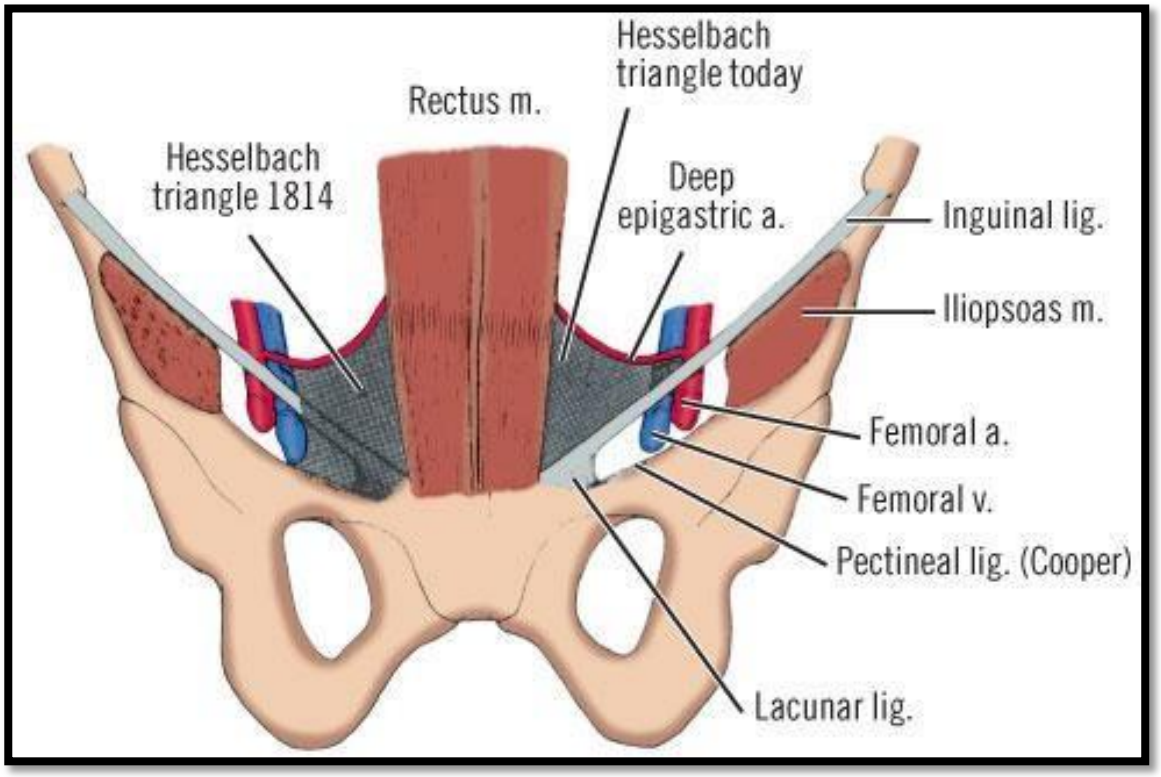
HESSELBACH'S TRIANGLE

Boundaries

Lateral (superior) border: inferior (deep) epigastric vessels.

Medial border: lateral margins of rectus abdominis muscle.

Base (infero lateral): inguinal ligament



TYPES OF INGUINAL HERNIA

1. Lateral (oblique, indirect)
2. Medial (direct)
3. Sliding

By origin

1. Congenital
2. Acquired

Types of hernia by complexity

1. Occult-not detectable clinically, only symptom sever pain
2. Reducible –a swelling which appears and disappears
3. Irreducible-a swelling which cannot be replaced in the abdomen, high risk of complications
4. Strangulated-painful swelling with vascular compromise, requires urgent surgery
5. Infarcted hernia- when contents of hernia have become gangrenous, high mortality

ACCORDING TO EXTENT

1. Bubonocele

   Hernia does not exit out of superficial inguinal ring.
2. Funicular

   Hernia crosses superficial inguinal ring and reaches only till the root of the scrotum.
3. Incomplete hernia

   Hernia comes out through external ring but fails to reach the bottom of the scrotum.
4. Complete hernia

   Hernia reaches the bottom of scrotum

ACCORDING TO CONTENTS

1. Enterocele

   When Intestine is the content it's called as enterocele

2. Omentocele (epiplocele)

   When omentum as content it's called omentocele

3. Cystocele

   Urinary bladder is content.

CLASSIFICATION

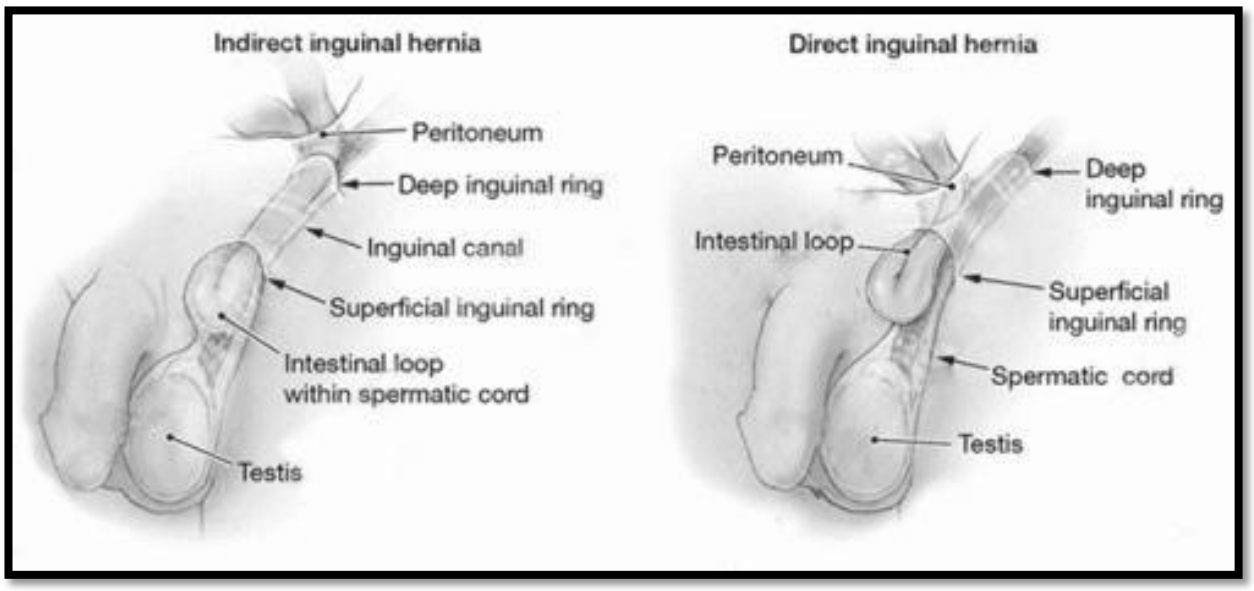
Many surgeons over the past hundred years have attempted to classify inguinal hernias, including Casten, Halverson and McVay, zollinger, ponka, Gilbert and Nyhus.

The European hernia society has recently suggested a simplified system of Primary or recurrent (P or R)

Lateral, medial or femoral (L, M or F)

Defect size in finger breadths assumed to be 1.5 cm

A primary, indirect, inguinal hernia with a 3 cm defect size would be PL2



RARE VARIETIES OF HERNIA

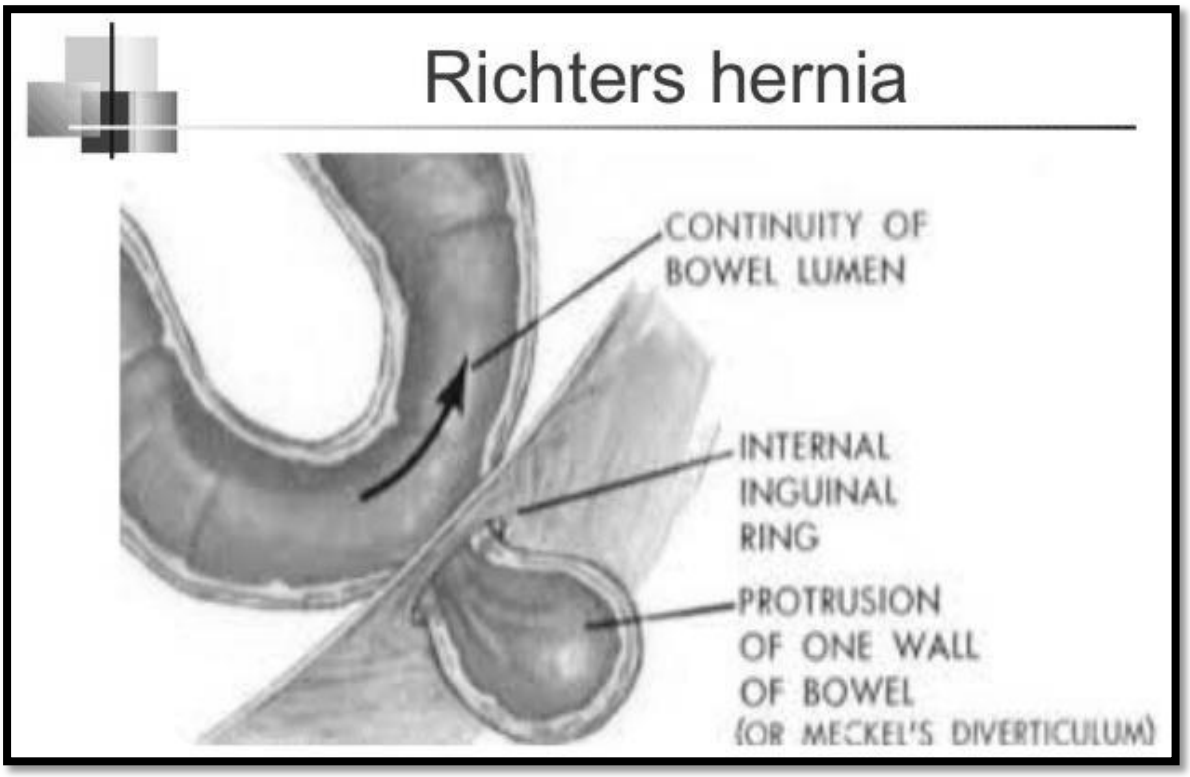
1. Sliding hernia or hernia –en- glissando

In this type a piece of extraperitoneal bowel, slides down the outside of hernial sac forming a part of its wall being covered by the peritoneum on the hernia aspect only. Usually, right side- caecum, left side- sigmoid colon and either side- Urinary bladder

A large globular hernia when descends well into the scrotum this condition is suspected.

2. Richter's hernia

In this type - portion of circumference of bowel becomes strangulated

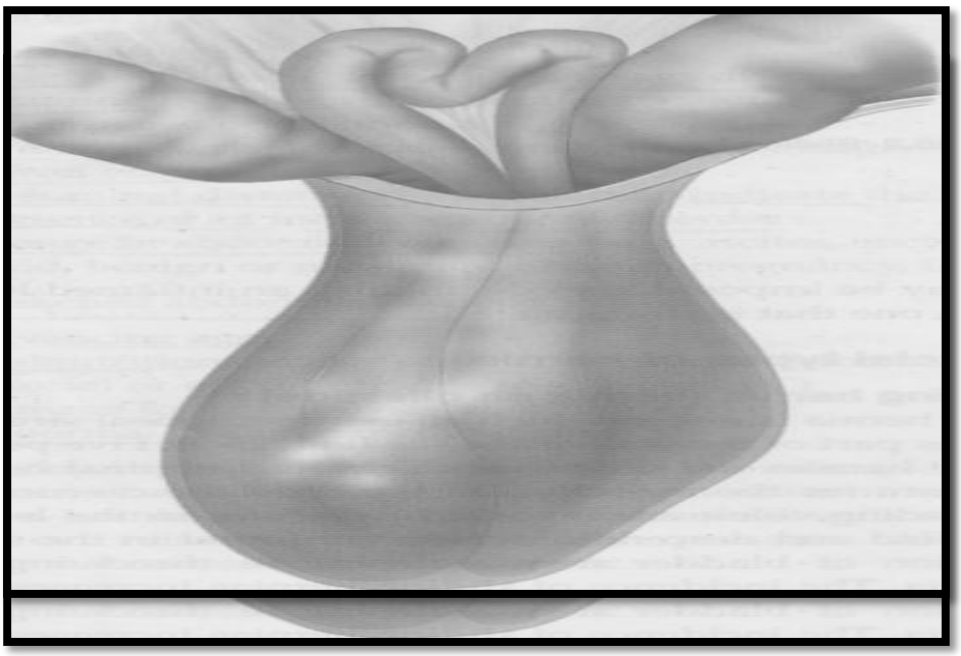


3. Litter's hernia

In this type meckel's diverticula as content is noted

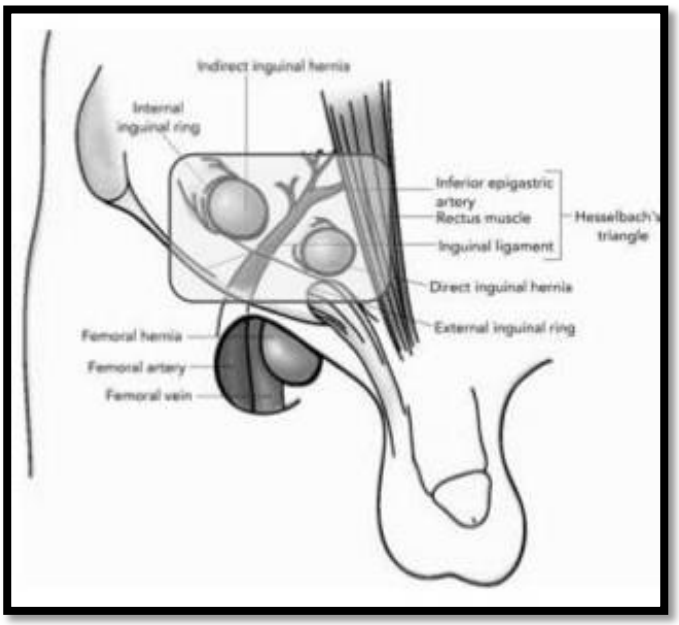
4 . .Maydl's hernia (Hernia –en-w) or retrograde strangulation

In this type two loops of bowels remain in the sac and the connecting loop remains within the abdomen and becomes strangulated, the loops of hernia look like W



5. Pantaloon hernia (double hernia, saddle hernia, Romberg hernia) It contains both direct & indirect inguinal hernia sacs

   Clinically present as direct hernia

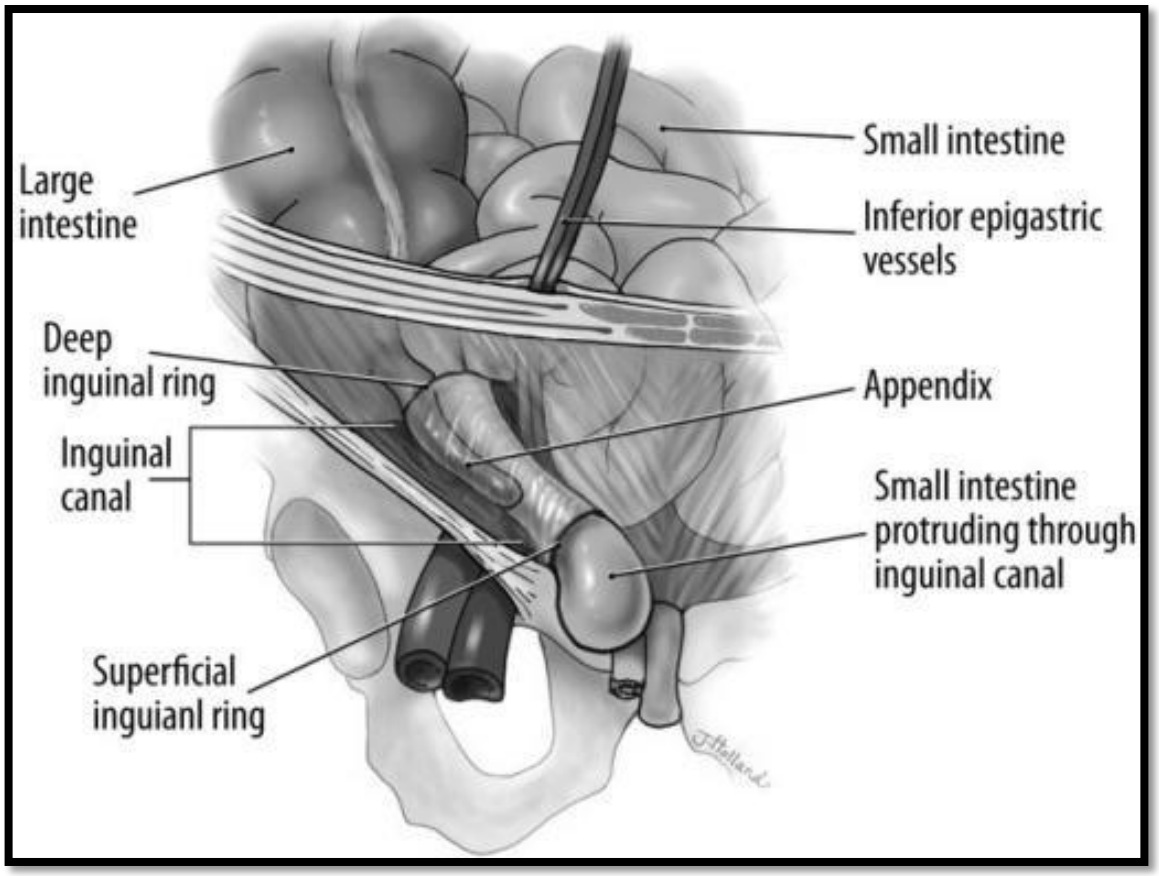


6. Infantile hernia

   Here processes vaginalis is closed at internal ring & hernia sac either invaginates processes vaginalis as inverted umbrella or comes behind the processus vaginalis.

7. Amyand hernia

It is a rare variety, less than 1% of inguinal hernia, here appendix as the contents of hernia sac



THEORIES FOR HERNIA FORMATION

1. Reid's metastatic emphysema theory due to smoking

2. Cloquet's lipoma theory

   due to the pile driver action of fat

3. Fruchaud's theory

   Due to larger opening in lower abdomen - in between the pubic bone and conjoint tendon. Divided into two halves by inguinal ligament. Through the upper half part passes the inguinal hernia, while through the lower half part passes the femoral hernia.

4. Denervation theory

   Ilioinguinal nerve injury after appendectomy.

5. Oblique pelvis

   Due to high arch of internal oblique, inefficient shutter mechanism, prone to inguinal hernia.

6. Wide female pelvis

Lower arched fibres of internal oblique muscle has more efficient shutter mechanism - usually indirect inguinal hernias are uncommon in females. Due to wider femoral ring - femoral hernias are more common in females

7. Uglavasky theory

Due to long term increase in Intra abdominal pressure

8. Peacock's theory

Because of defective collagen synthesis

9. Walk's theory

weakness in abdominal wall at exit of neurovascular bundle

10. Keith's theory

Degenerated connective tissue, especially in fascia transversalis- due to stress

11. Dr. Desarda's theory

a) Transversalis fascia will not give protection from herniation process as believed today or stated in the text books or various research articles.

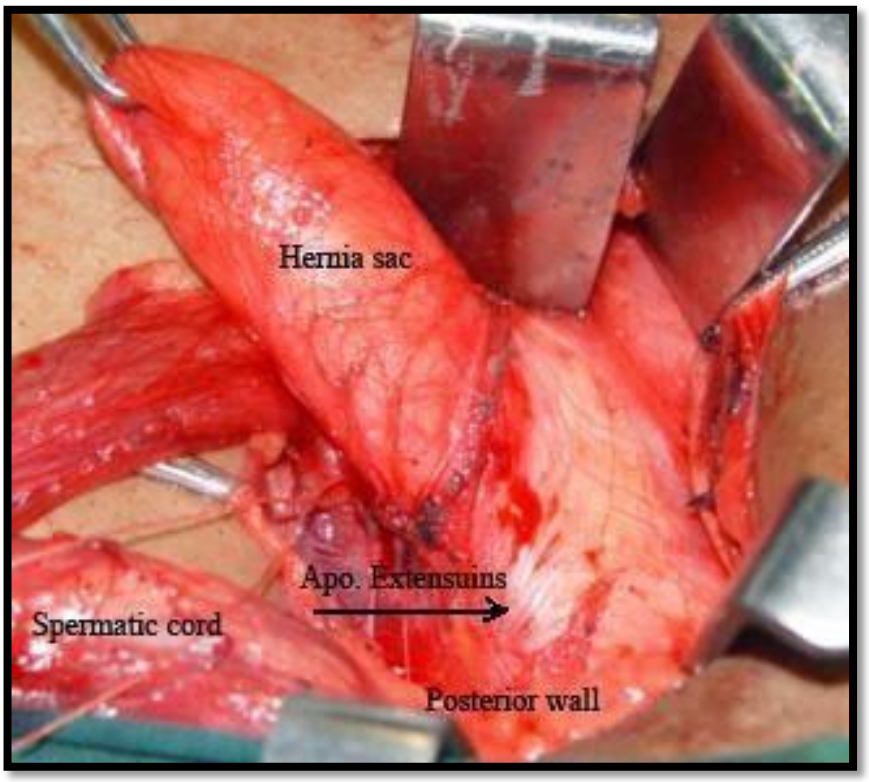
b) Transversalis fascia is very thin like paper and is an extension of endo-abdominal fascia

c) Posterior wall of inguinal canal is not only a single layer wall composed of the transversalis fascia as believed presently but it comprises of two layers. Transversalis fascia is a posterior layer & in front of it is another layer comprised of the aponeurotic extensions from Transversus Abdominis Aponeurotic Arch also known as the "Dessidious portion of the Transversus Abdominis Aponeurotic Arch". These aponeurotic extension in posterior wall of inguinal canal gives real protection from herniation process. Inguinal hernia formation can take place only if these aponeurotic extensions are absent/deficient. Loss in strength & physiologically a-dynamic nature of posterior wall of inguinal canal due to absent aponeurotic extensions in posterior wall and loss of strength in cremasteric fascia and musculo-aponeurotic structures in & around inguinal canal are the real factors & cause of hernia formation.

NATURAL DEFENCE MECHANISMS

1. Obliquity of inguinal canal
2. Arching of conjoint tendon
3. Shutter mechanism of internal oblique
4. Ball valve mechanism due to contraction of cremaster muscle which plugs the superficial ring
5. Slit valve mechanism- opposition of the intercrural fibres of superficial ring when external oblique contracts
6. Hormonal activity

Dessidious Part of Transversus Aponeurotic Arch



Complaints

Dull dragging pain referred to the testis - increases on work

If obstructed hernia having symptoms of constipation, vomiting and pain if strangulated hernia may have severe pain, shock and collapse.

Clinical Findings

Pyriform shaped swelling - in inguinal region

Cough impulse present

Reducibility present

Neck of hernia is supero-medial to pubic tubercle

Special tests

Deep ring occlusion test

After reducing the swelling deep ring will have been occluded by thumb

Indirect inguinal hernia-swelling does not appear

Direct inguinal hernia-swelling does appear

Finger Invagination test

Indirect hernia- impulse at tip of finger Direct hernia-impulse at pulp of finger

Three finger test-zieman'test

The examiner places his index finger on the deep ring, middle finger on the external ring, ring finger over the saphenous opening, patient asked to cough, if impulse felt on index finger –indirect hernia

Differential Diagnosis:

Males

1. Femoral hernia
2. Direct inguinal
3. Vaginal hydrocele
4. encysted hydrocele of cord
5. Undescended testis
6. Spermatocele
7. Varicocele
8. Diffuse lipoma of cord.

Females

9. Femoral hernia
10. Hydrocele of canal of Nuck

TREATMENT FOR HERNIA

Principles of treatment:

1. Restore the disrupted anatomy
2. Repair using fascia / aponeurosis NOT muscle
3. No tension
4. Suture material used should hold until natural support is formed over it. (i.e. monofilament nylon or polyethylene)

Management

1. Resuscitation - in case of strangulated hernia with gangrene with shock or with intestinal obstruction.
2. Reduction of hernia - includes taxis, & reduction under anesthesia.
3. Repair - of the defect - may be herniorrhaphy or hernioplasty.

<u>Strangulated hernia</u> -

- treat as emergency
- treat shock if any. Start IV antibiotics

- Incision over the most prominent part of swelling - sac carefully identified & dissected out. Sac opened.
- Aspirate all fluid (highly infectious)

- Resect any unviable intestine or omentum

- EO aponeurosis & external ring divided. Sac opened throughout the length upto deep ring & a little inside.

- Viable contents reduced. Definite repair carried out - any prosthetic repair is contra-indicated.

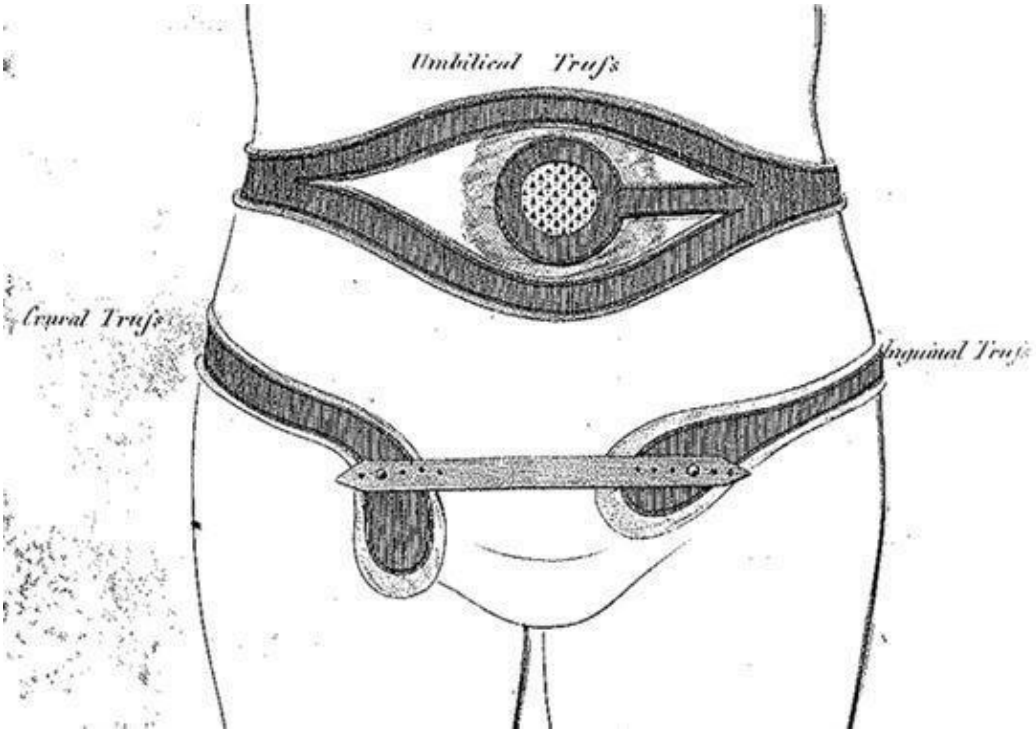
- **Non - Operative approach** - in elderly, unfit / unwilling for surgery.

- Use of truss is advised in such cases- Truss must be applied with hernia reduced. Must prevent reappearance of hernia on straining.

- complications of truss include discomfort, ulceration, strangulation, inflammation, testicular atrophy, femoral and ilioinguinal neuritis.

- it may be used in elderly people when surgery is contraindicated.

TRUSS



Surgery-treatment of choice

Herniotomy

Herniorraphy (Open suture repair)

Bassini

Shouldice Desarda

Open flat mesh repair

Lichtenstein repair

Open complex mesh repair Plugs

Hernia systems

Open preperitoneal repair

Stoppa

Laparoscopic repair

TEP (Total Extraperitoneal) approach

TAPP (Trans Abdominal Preperitoneal) approach

LICHTENSTEIN REPAIR (Open flat mesh repair)

This is tension free, simple, flat, synthetic mesh repair described by Lichtenstein in 1980. Synthetic material is polypropylene.

Patient Preparation

This technique can be performed under local, regional, or general anesthesia. One cited advantage of performing this technique in awake patients is the opportunity to ask the patient to cough & assess repair for weakness. The arms may remain out stretched or can be tucked on the basis of the patient's body habitus and the surgeon's

preference. In routine cases, a urinary catheter is not necessary. Sufficient bladder decompression is achieved if patient is able to urinate immediately prior to procedure and a consensus is reached with anesthesia that minimal amounts of intravenous fluids will be administered intra operatively. Lower abdomen and groin are prepped consistent with the surgeon's preference. Many surgeons prefer use of a plastic barrier draped over the skin to prevent contact of the mesh with the skin. Unless patient has a large intra scrotal hernia, the scrotum does not need to be draped into the operative field. Use of the plastic barrier drape makes it possible to easily include umbilicus, anterior superior iliac spine (ASIS) & pubic tubercles into the operative field. A single dose of first generation cephalosporin is commonly administered for prophylaxis.

Procedure:

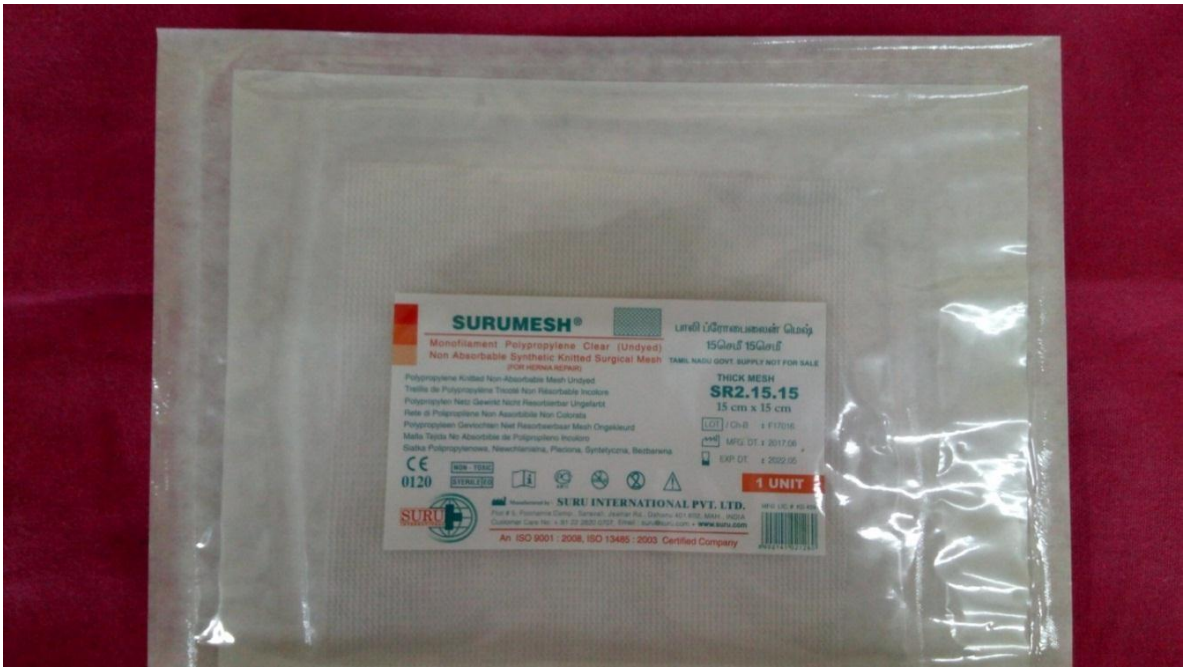
Under spinal anaesthesia patient in supine position, the oblique incision is essentially made over the distance from the internal to the external ring which in theory allows for the smallest length of incision needed. The oblique incision is prepared by marking a line from the *ASIS* to the pubic tubercle. A 5 to *7* cm incision is then made parallel 1 cm Cephalad to the previously marked line which begins medially 2 cm lateral to pubic tubercle in the anterior abdominal wall, after opening the layers of abdominal wall such as external oblique aponeurosis inguinal canal is opened. Spermatic cord is dissected, external spermatic fascia, Cremasteric fascia, internal spermatic fascia opened, sac identified, presence of lateral or medial is confirmed. The sac of medial hernia inverted & transversalis fascia is suture plicated, if sac is lateral, opened any contents reduced. Sac is then sutured closed at its neck and excess sac removed. Medial defect is closed, a piece of mesh, measuring 8x15 cm is placed over posterior wall, behind spermatic cord at the deep inguinal ring. loose

sutures hold mesh to the inguinal ligament & conjoint tendon, external oblique closed with 2-0 vicryl then subcutaneous and skin are closed.

POSTOPERATIVE MANAGEMENT

All Male patients should wear scrotal support for at least a weak. This reduces tension on the testicle and increases comfort in post operative period. Patients were given oral analgesic medication and non-steroidal anti- inflammatory agents for pain. Most patients can return to work depending on the physical requirements in 1 to 2 weeks, also there is a wide variation on the basis of patient motivation & extent of physical activity required. Patients are advised to avoid truly strenuous lifting for 6 weeks postoperatively.

Mesh



Lichtenstein repair

LIMITATIONS OF MESH

Presence of infection

Expensive

COMPLICATIONS

1) recurrence
2) chronic groin pain
3) sepsis & sinuses
4) testicular damage
5) migration
6) perforation
7) rejection

DESARDA REPAIR

Skin & fascia are incised through a regular oblique inguinal incision to expose external oblique aponeurosis. Thin, filmy fascial layer covering it is kept undisturbed as far as possible. The thinned out portion is usually seen at the top of the hernia swelling, extending and fanning out to the lower crux of the superficial ring.

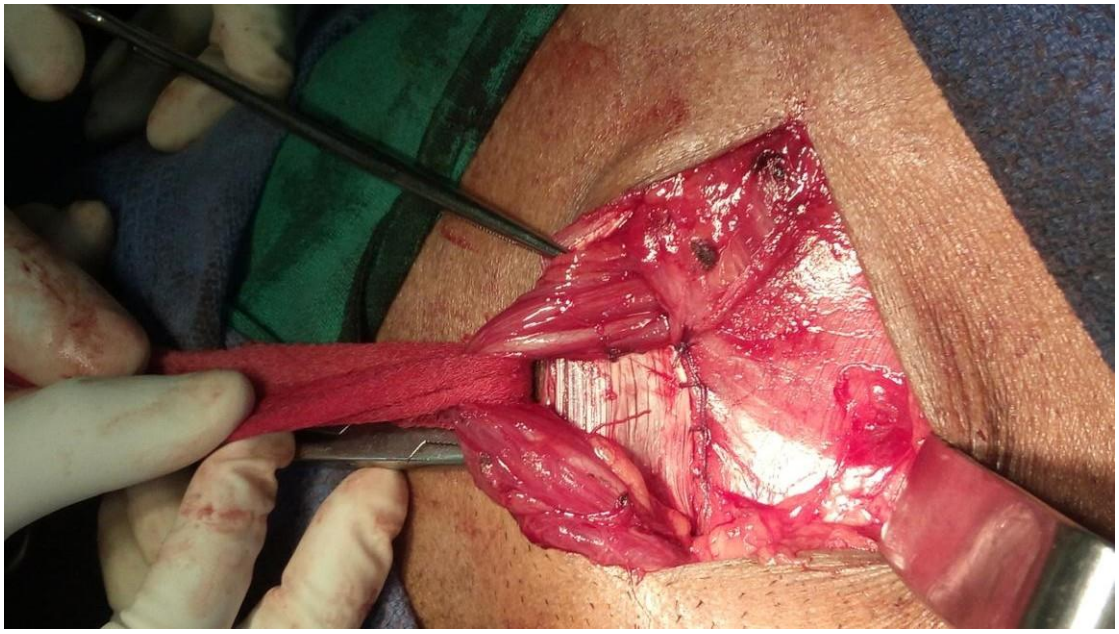
The external oblique is cut in line with the upper crux of the superficial ring, which leaves the thinned out portion in the lower leaf so a good strip can be taken from the upper leaf. The external oblique, which is thinned out as a

result of aging or long standing large hernias, can also be used for repair if it is able to hold the sutures. The Cremasteric muscle is incised for the Herniotomy and the spermatic cord together with the Cremasteric muscle is separated from the inguinal floor. The sac is excised in all cases except in direct hernias where it is inverted. The medial leaf of the external oblique Aponeurosis is sutured with the inguinal ligament from the pubic tubercle to the abdominal ring using Vicryl 2-0 continuous sutures. The first two sutures are taken in the anterior rectus sheath where it joins the external oblique aponeurosis. The last suture is taken so as to narrow the abdominal ring sufficiently without constricting the spermatic cord (In fact, here we are creating a new internal ring). Each suture is passed first through the inguinal ligament, then the transversalis fascia, and then the external oblique. The index finger of the left hand is used to protect the femoral vessels and retract the cord structures laterally while taking lateral sutures.

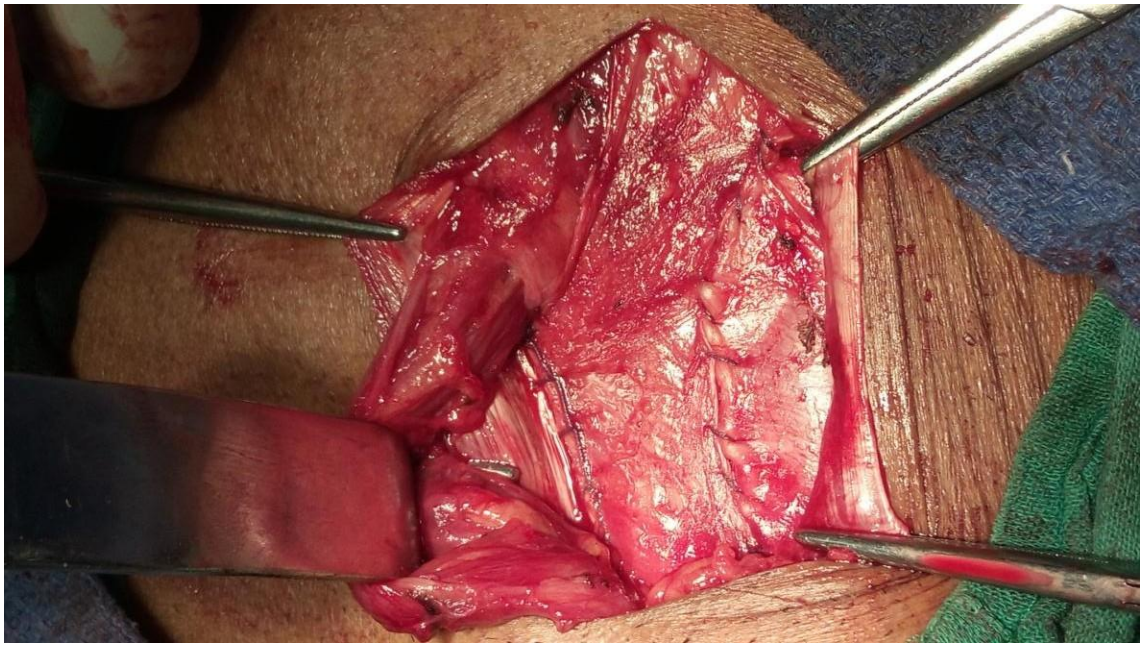
A splitting incision is made in this sutured medial leaf, partially separating a strip of 1-2 CMS WIDTH but NEVER more than 2 cms. This splitting incision is extended medially up to the pubic symphisis and laterally 1– 2 cms beyond the abdominal ring. The medial insertion and lateral continuation of this strip is kept intact. A strip of the external oblique, is now available, the lower border of which is already sutured to the inguinal ligament. The upper free border of the strip is now sutured to the internal oblique or conjoined muscle lying close to it with vicryl 2-0 continuous sutures throughout its length The aponeurotic portion of the internal oblique muscle is used for suturing to this strip wherever and whenever possible; otherwise, it is not a must for the success of the operation. This will result in the strip of the external oblique being placed behind the cord to form a new posterior wall of the inguinal canal.

At this stage the patient is asked to cough and the increased tension on the strip exerted by the external oblique to support the weakened internal oblique and transversus abdominis is clearly visible. The increased tension exerted by the external oblique muscle is the essence of this operation. The spermatic cord is placed in the inguinal canal and the lateral leaf of the external oblique is sutured to the newly formed medial leaf of the external oblique in front of the cord, as usual, again using vicryl 2-0 continuous sutures. Undermining of the newly formed medial leaf on both of its surfaces facilitate its approximation to the lateral leaf. The first stitch is taken between the lateral corner of the splitting incision and lateral leaf of the external oblique. This is followed by closure of the superficial fascia and the skin as usual.

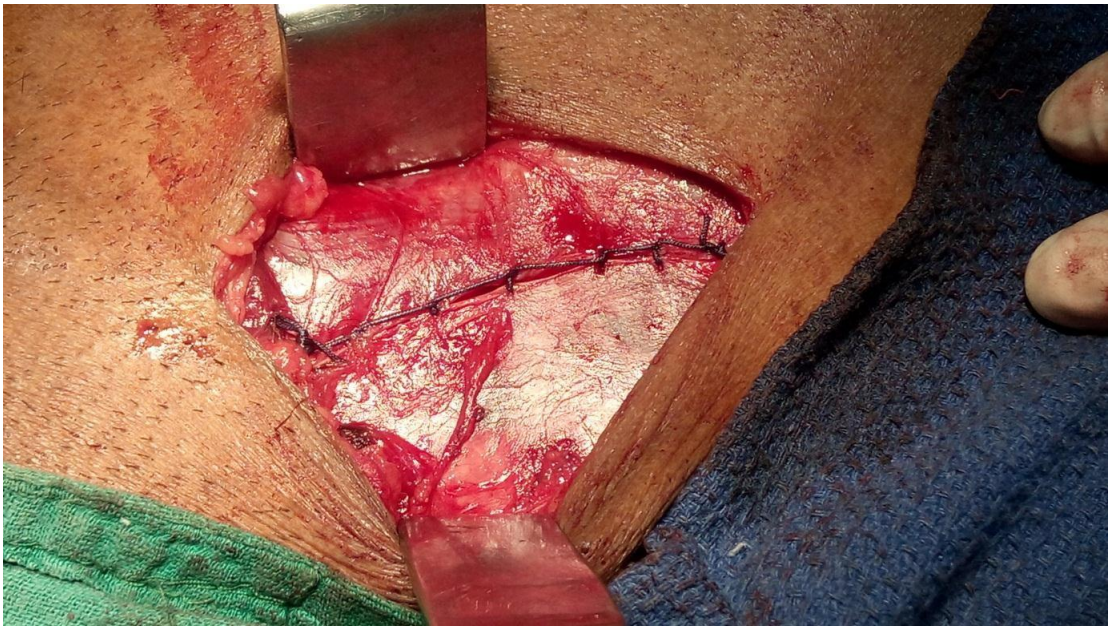
Strip of External Oblique – Lower Border is Sutured to Inguinal Ligament



Strip of External Oblique – Upper Border is Sutured to Internal Oblique or Conjoined Muscle

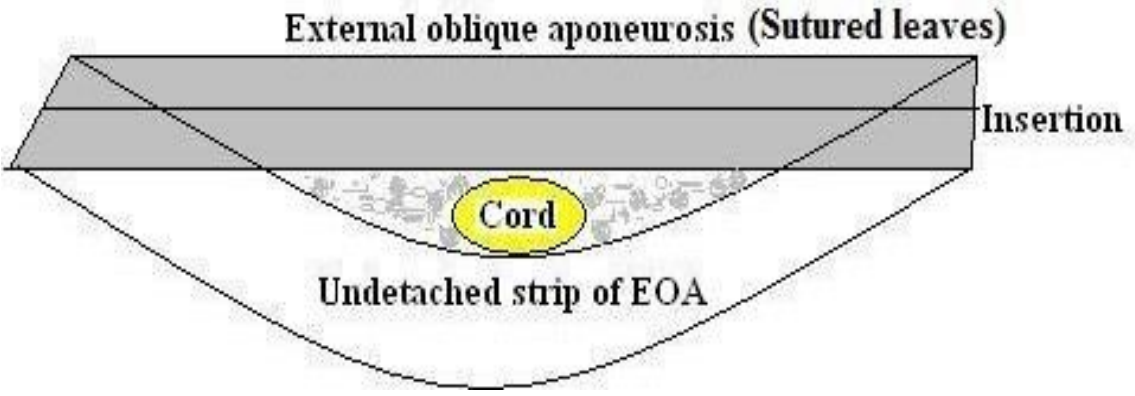


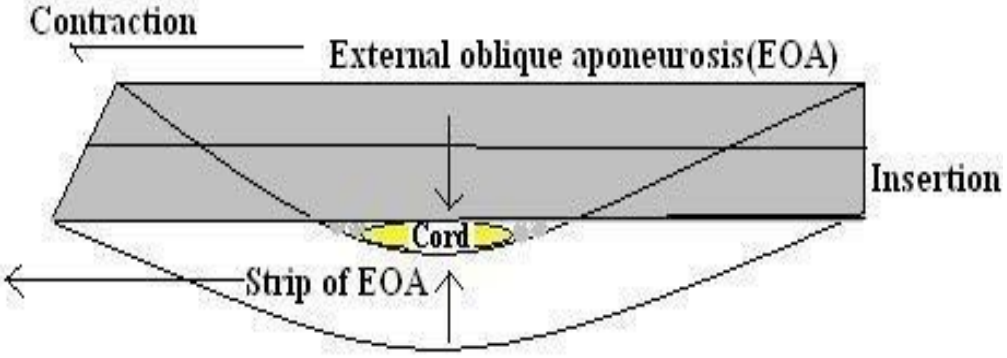
External Oblique Closure – New Formed



Mechanism of action:

Contractions of abdominal wall muscles pull external oblique strip upwards and laterally against fixed structures like inguinal ligament & pubic symphisis, creating tension above & laterally and turning the strip into a shield to prevent any herniation. This added strength given by external oblique muscle to the weakened muscle arch to create tension in strip and prevent re-herniation is the essence of this operation. Shielding action of strip of EOA can be elegantly demonstrated on operating table by asking patient to cough. Second factor that prevents hernia formation in the normal individuals is anterio-posterior compression of the inguinal canal caused by the external oblique aponeurosis compressing against posterior wall. This compression is lost if posterior wall is weak & flabby because of absent aponeurotic extension cover. Strip of EOA sutured in the operation gives aponeurotic cover to posterior wall transversalis fascia again and restores this anterior-posterior compression effect during the raised intra-abdominal pressures. Contraction of external oblique muscle pulls anterior aponeurosis & posteriorly placed strip also, naturally compressing the inguinal canal.





Anterio-posterior compression of EOA & post. wall (strip of EOA) forms a solid shield by compressing the cord structures that prevents the recurrence

MATERIALS AND METHODS

SOURCE OF DATA:

- All patients admitted with uncomplicated inguinal hernia in the Department of General Surgery, R.L.Jalappa Hospital and Research Centre, Tamaka, Kolar attached to Sri Devaraj Urs Medical College during the study period December-2017 to September-2019.

INCLUSION CRITERIA:

All patients with age 19-60 years with uncomplicated inguinal hernia admitted to RLJH during the study period

EXCLUSION CRITERIA:

- Patients who are immunocompromised, having metabolic diseases and chronic infective diseases.
- Patients with recurrent inguinal hernia.

TYPE OF STUDY: Comparative study

Sample Size:

Estimated by using the Meantime taken to resume to normal activities from the study[9]. Mean time taken to resume to normal activities in lichtenstein's was 10.7±2.7 and in Desarda's was 7.7±3.1.

- Using this values at 95% Confidence limit and 80% power and to obtain a mean difference of 3 days. sample size of 15 was obtained for each group from open epi software.

- With 30% loss in followup, the sample size of 15 + 4.5 ≈ 20 cases was included in each group

$$\text{Sample size} = \frac{2SD^2(Z_{\alpha/2}+Z_{\beta})^2}{d^2}$$

SD – Standard deviation = From previous studies or pilot study

$Z_{\alpha/2} = Z_{0.05/2} = Z_{0.025} = 1.96$ (From Z table) at type 1 error of 5%

$Z_{\beta} = Z_{0.20} = 0.842$ (From Z table) at 80% power

d = effect size = difference between mean values

So now formula will be

$$\text{Sample size} = \frac{2SD^2(1.96+0.84)^2}{d^2}$$

Sample Size For Comparing Two Means

Input Data

Confidence Interval (2-sided)	95%
Power	80%
Ratio of sample size (Group 2/Group 1)	1

	Group 1	**Group 2**	**Mean difference**
Mean	10.7	7.7	3
Standard deviation	2.7	3.1	
Variance	7.29	9.61	

Sample size of Group 1	20
Sample size of Group 2	20
Total sample size	40

Mean difference= (Group 1 mean) - (Group 2 mean)
30% loss in follow up has also been included in the sample size estimation.

METHOD OF COLLECTION OF DATA

A complete detailed history was taken; physical examination was done and relevant investigations was advised after obtaining an informed consent. Patients were divided into two groups using even-odd method to include similar type of cases with respect to age and sex in both groups. Patients willing for the study after completely understanding the two treatment options were divided into two groups. Even group underwent Desarda's repair and Odd group underwent Lichtenstein's hernioplasty. Patients not willing for the newer treatment modalities i.e. Desarda's repair were treated with the standard line of treatment i.e. Lichtenstein's hernioplasty and were excluded from the study. Patient preferences with regards to inclusion in study were accommodated.

All the data was entered in to a structured questionnaire.

Parameters studied:

- Operating time
- Duration of post- operative pain.
- Severity of pain: by visual analogue scale.
- Length of hospital stay.
- Post-operative complications: Seroma formation, Wound infection, urinary retension.
- Cost effectiveness.
- Recurrence over a 4 month period.

a) Routine investigations: -CBC, blood grouping and typing,bleeding time and clotting time, blood urea, serum creatinine, serum electrolytes ,HIV, HbSAg, visual analogue scale.

b) Special investigations –USG Abdomen-pelvis, Chest X-ray, Uroflowmetry.

STATISTICAL ANALYSIS [37,38,39,40]

Data was entered into Microsoft excel data sheet and will be analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Chi-square was the test of significance. Continuous data will be represented as mean and standard deviation. Independent t test was the test of significance to identify the mean difference between two groups. p value <0.05 will be considered as statistically significant.

Ethical Considerations:

1. Ethical clearance was obtained from Institutional ethical committee prior to the start of the study.
2. Informed consent was obtained from all study subjects prior to the inclusion.

RESULTS

Table 1: Age distribution comparison between two groups

		Group					
		Even		Odd		Total	
		Count	%	Count	%	Count	%
Age	<30 years	6	30.0%	5	25.0%	11	27.5%
	31 to 40 years	5	25.0%	3	15.0%	8	20.0%
	41 to 50 years	3	15.0%	3	15.0%	6	15.0%
	51 to 60 years	5	25.0%	9	45.0%	14	35.0%
	>60 years	1	5.0%	0	0.0%	1	2.5%

$\chi 2 = 2.734$, df =4, p =0.603

In Even group, majority of subjects were in age group <30 years (30%) & in Odd group, majority of subjects were in the age group 51 to 60 years (45%). There was no significant difference in age distribution between two groups.

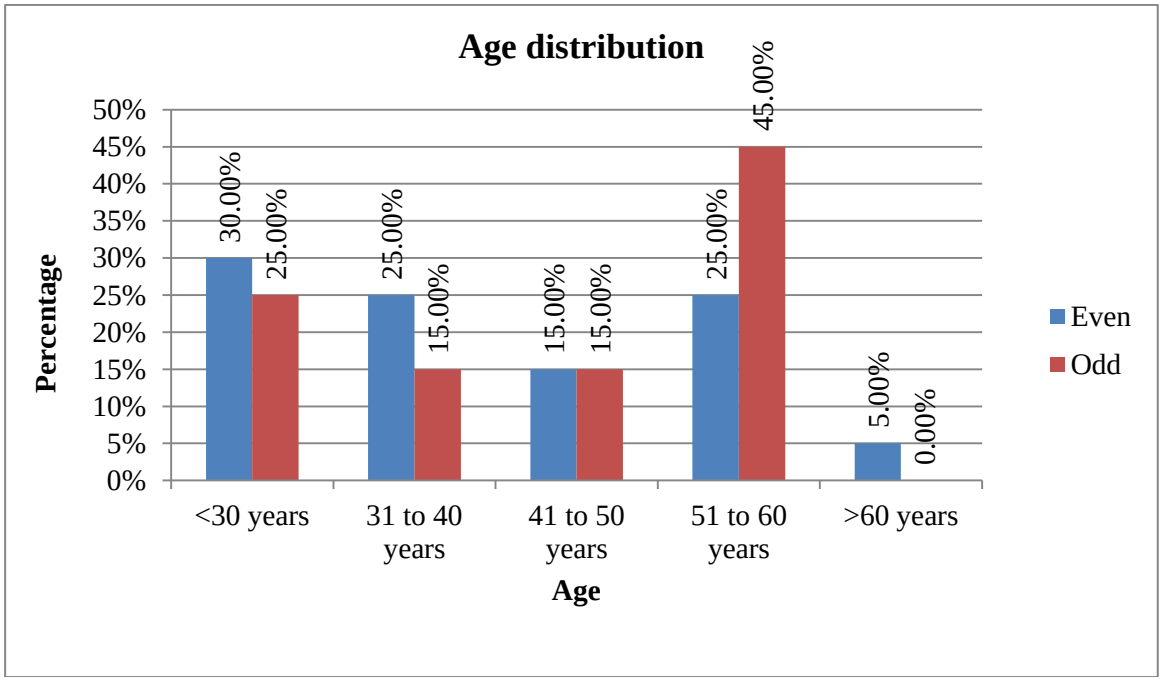


Figure 1: Bar diagram showing Age distribution comparison between two groups

Table 2: Mean age comparison between two groups

		Age		P value
		Mean	SD	
Group	Even	41.70	13.48	0.377
	Odd	45.60	14.10	
	Total	43.65	13.76	

Mean age of subjects in Even group was 41.70 ± 13.48 years and in Odd group was 45.60 ± 14.10. There was no significant difference in Age distribution between two groups.

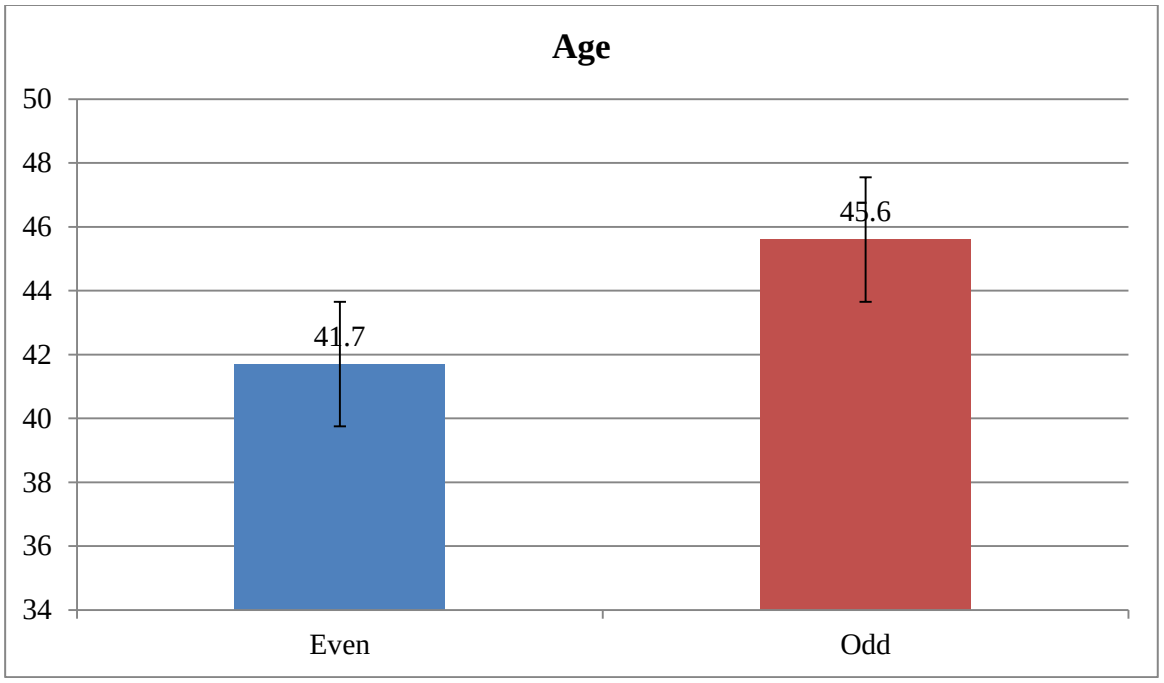


Figure 2: Bar diagram showing Mean age comparison between two groups

Table 3: Gender distribution comparison between two groups

		Group					
		Even		Odd		Total	
		Count	%	Count	%	Count	%
Gender	Male	20	100.0%	20	100.0%	40	100.0%

In the study all the subjects in both the groups were males.

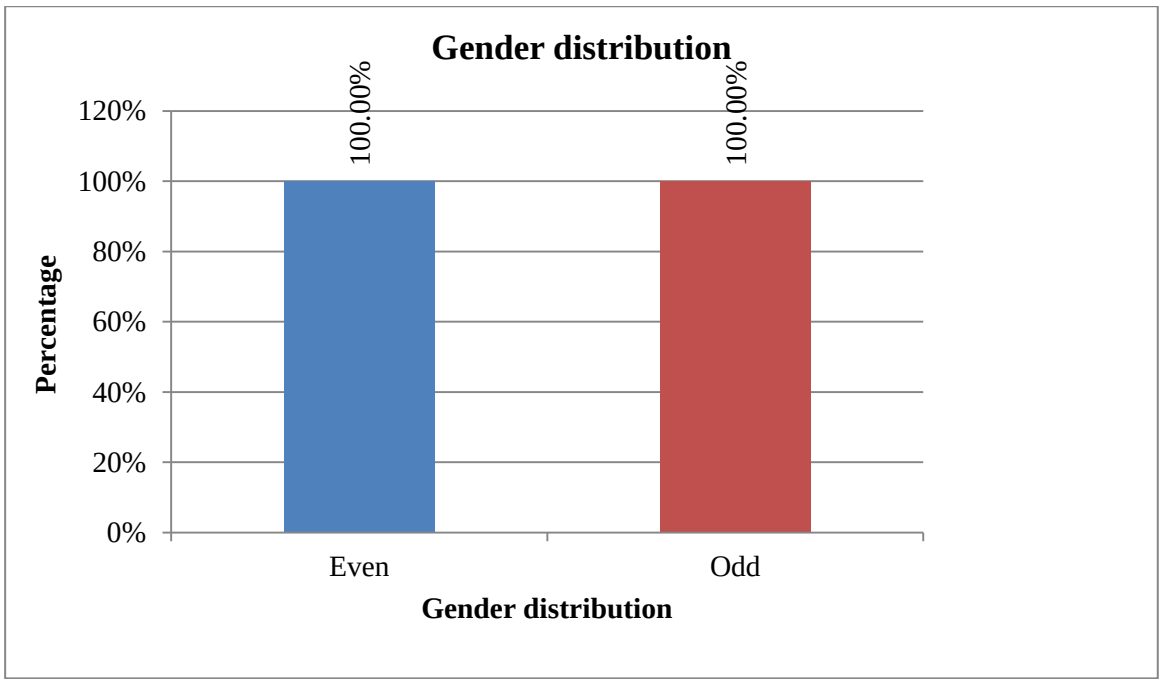


Figure 3: Bar diagram showing Gender distribution comparison between two groups

Table 4: Diagnosis comparison between two groups

		Group					
		Even		Odd		Total	
		Count	%	Count	%	Count	%
Diagnosis	Left Direct	0	0.0%	1	5.0%	1	2.5%
	Left Indirect	7	35.0%	5	25.0%	12	30.0%
	Right Direct	4	20.0%	7	35.0%	11	27.5%
	Right Indirect	9	45.0%	7	35.0%	16	40.0%

$\chi 2 = 2.402$, df =3, p =0.493

In Even group, majority of them had Right indirect hernia (45%) and in Odd group, majority of subjects had Right direct and indirect hernia. There was no significant difference in diagnosis between two groups.

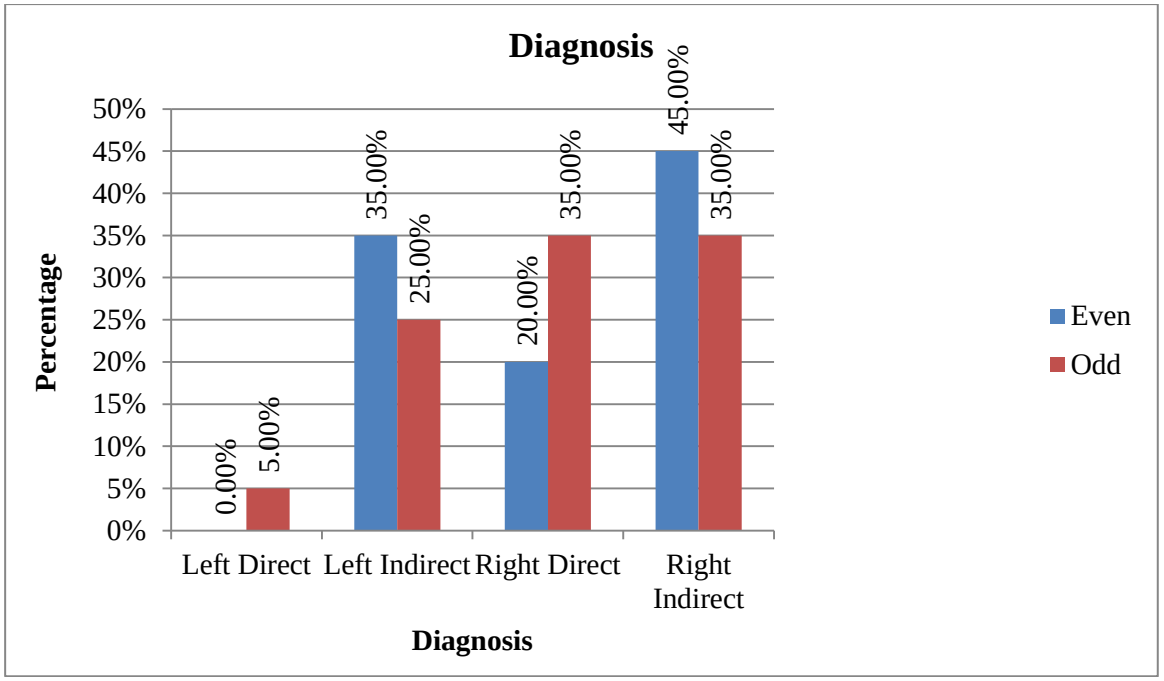


Figure 4: Bar diagram showing Diagnosis comparison between two groups

Table 5: Mean Operating time comparison between two groups

		Operating Time (min)		P value
		Mean	SD	
Group	Even	87.15	3.86	<0.001*
	Odd	100.00	5.39	
	Total	93.58	7.98	

Mean operating time in even group was 87.15 ± 3.86 min and in odd group was 100.00 ± 5.39 min. There was significant difference in operating time between two groups.

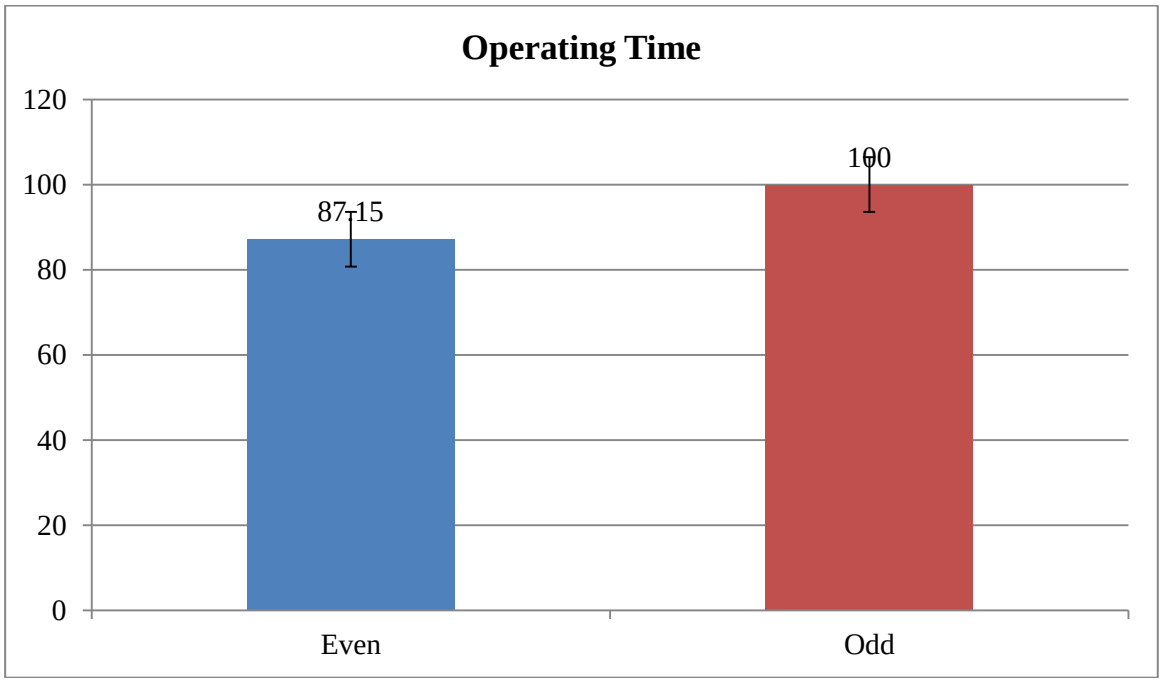


Figure 5: Bar diagram showing Mean Operating time comparison between two groups

Table 6: Mean Post op pain on day 1 and day 3 comparison between two groups

	Group						P value
	Even		Odd		Total		
	Mean	SD	Mean	SD	Mean	SD	
Post-Op Pain (Day 1)	2.95	0.69	4.75	0.79	3.85	1.17	<0.001*
Post-Op Pain (Day 3)	1.15	0.37	2.10	0.31	1.63	0.59	<0.001*

Mean post op pain on day 1 in even group was 2.95 ± 0.69 and in odd group was 4.75 ± 0.79. There was significant difference in post op pain on day 1 between two groups.

Mean post op pain on day 3 in even group was 1.15 ± 0.37 and in odd group was 2.10 ± 0.31. There was significant difference in post op pain on day 3 between two groups.

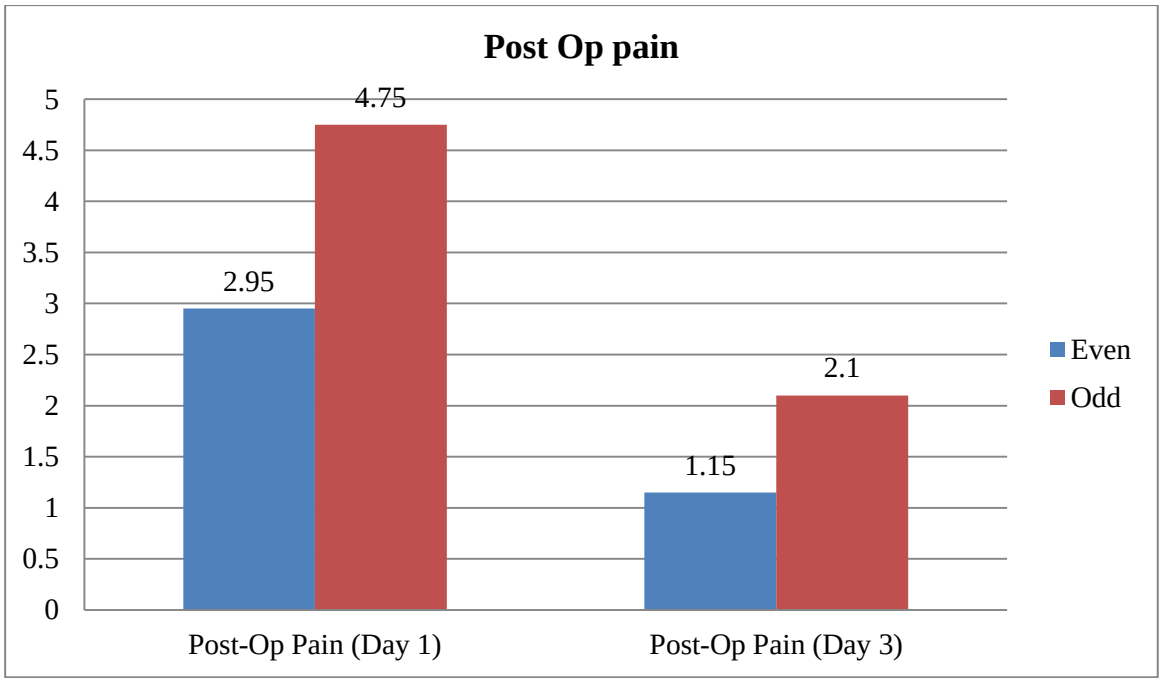


Figure 6: Bar diagram showing Mean Post op pain on day 1 and day 3 comparison between two groups

Table 7: Post op pain on day 1 and day 3 comparison between two groups

		Group						P value
		Even		Odd		Total		
		Count	%	Count	%	Count	%	
POST-OP PAIN (DAY 1)	2	5	25.0%	0	0.0%	5	12.5%	<0.001*
	3	11	55.0%	1	5.0%	12	30.0%	
	4	4	20.0%	6	30.0%	10	25.0%	
	5	0	0.0%	10	50.0%	10	25.0%	
	6	0	0.0%	3	15.0%	3	7.5%	
POST-OP PAIN (DAY 3)	1	17	85.0%	0	0.0%	17	42.5%	<0.001*
	2	3	15.0%	18	90.0%	21	52.5%	
	3	0	0.0%	2	10.0%	2	5.0%	

In Even group, majority of them had pain score of 3 (55%) on day 1 and in odd group, majority of them had pain score of 5 on day 1 (50%). There was significant difference in post op pain between two groups on day 1.

On day 3, in even group, majority of them had pain score of 1 (85%) and in odd group, majority of them had pain score of 2 (90%). There was significant difference in post op pain on day 3 between two groups.

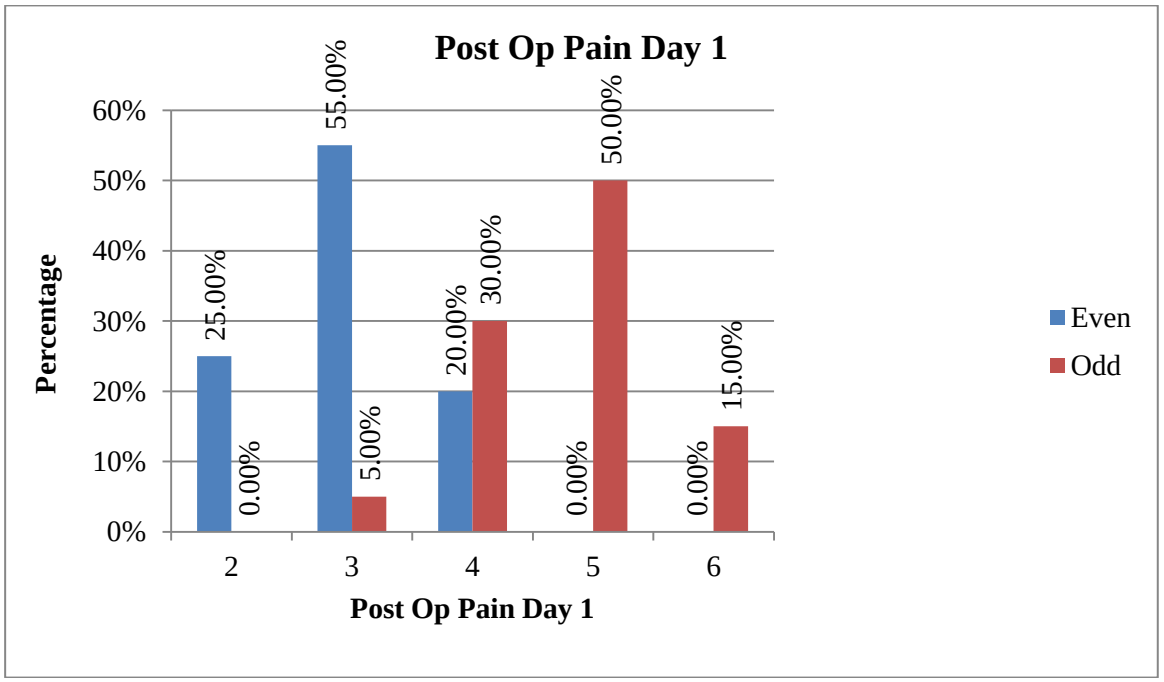


Figure 7: Bar diagram showing Post op pain on day 1 comparison between two groups

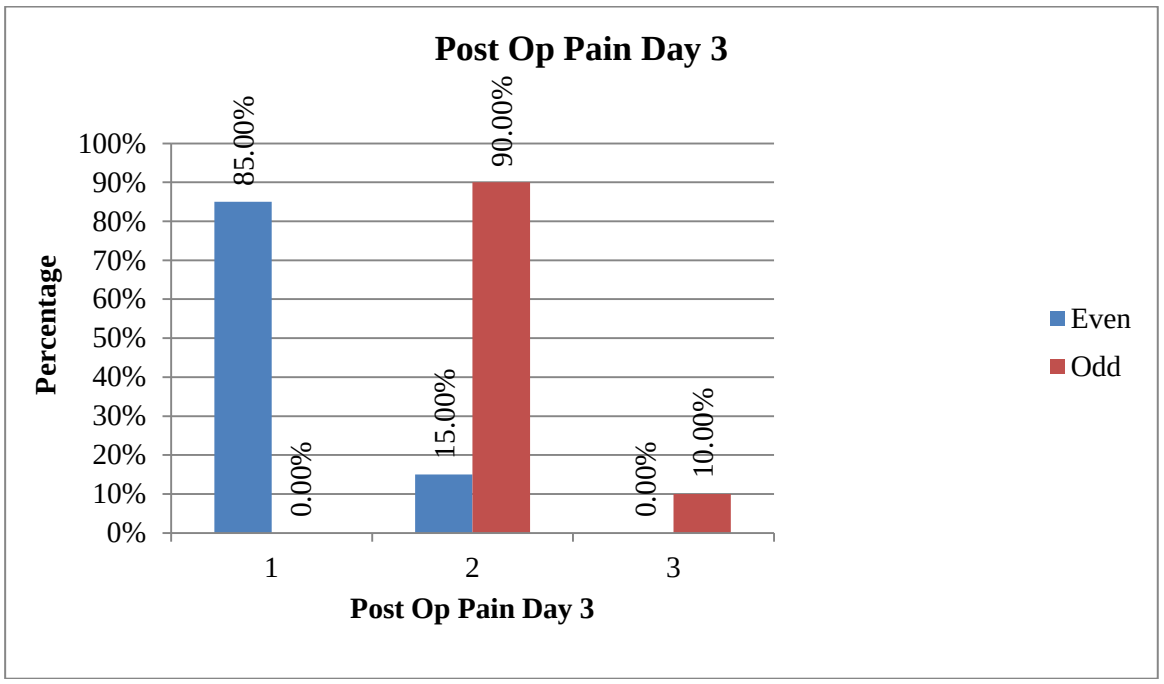


Figure 8: Bar diagram showing Post op pain on day 3 comparison between two groups

Table 8: Complications comparison between two groups

		Group					
		Even		Odd		Total	
		Count	%	Count	%	Count	%
Complications	Nil	20	100.0%	17	85.0%	37	92.5%
	Seroma	0	0.0%	1	5.0%	1	2.5%
	Urinary Retention	0	0.0%	2	10.0%	2	5.0%

$\chi 2 = 3.243$, df $= 2$, $p = 0.198$

In Even group, 0% had complications and in odd group, 5% had Seroma and 10% had urinary retention. There was no significant difference in complications between two groups.

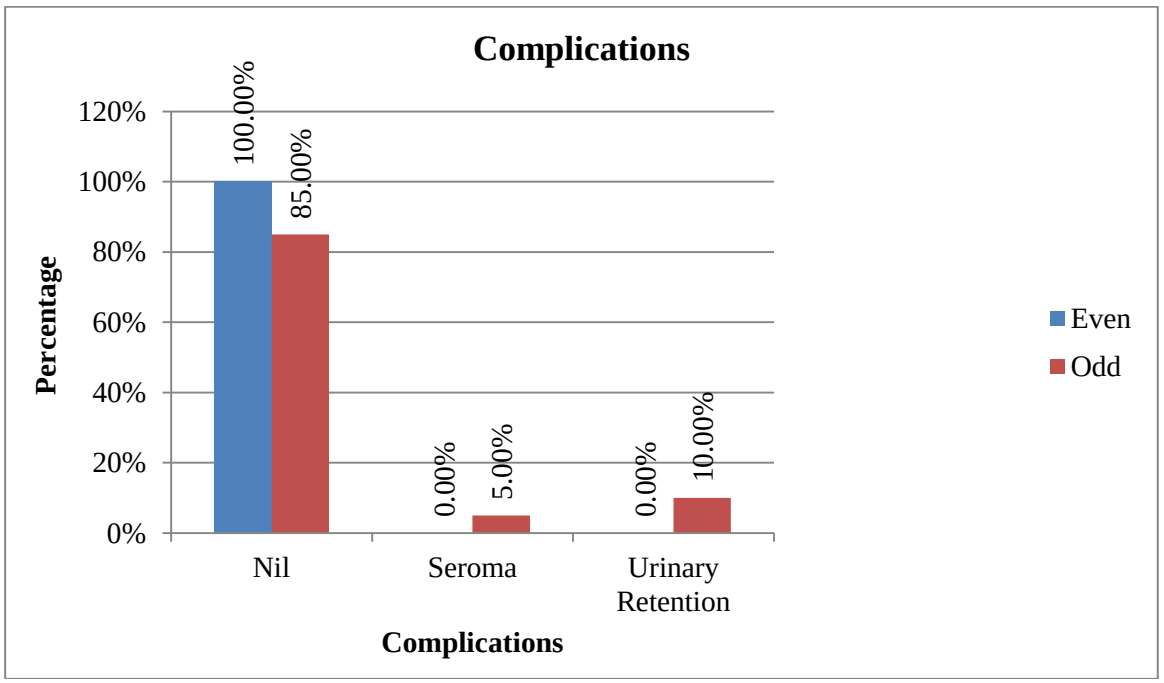


Figure 9: Bar diagram showing Complications comparison between two groups

Table 9: Day on which patient fit for Discharge comparison between two groups

		Group					
		Even		Odd		Total	
		Count	%	Count	%	Count	%
Patient fit for discharge on	DAY 2	20	100.0%	0	0.0%	20	50.0%
	DAY 3	0	0.0%	18	90.0%	18	45.0%
	DAY 4	0	0.0%	1	5.0%	1	2.5%
	DAY 5	0	0.0%	1	5.0%	1	2.5%

$\chi 2 = 40$, df $= 3$, $p < 0.001$*

In Even group, 100% of patients were discharged on day 2 and in odd group, 90% were discharged on day 3, 5% on day 4 and day 5. There was significant difference in day of discharge between two groups.

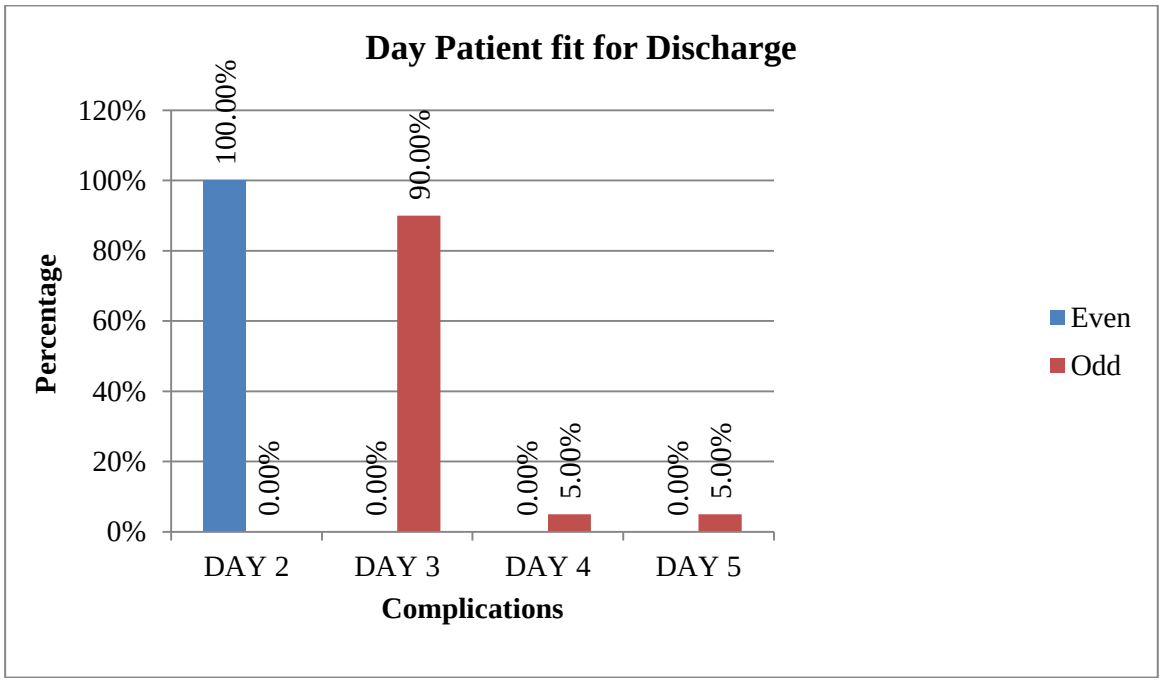


Figure 10: Bar diagram showing Day Patient fit for Discharge comparison between two groups

Table 10: Mean day of Fit for Discharge comparison between two groups

	Group	N	Mean	SD	P value
Day of Discharge	Even	20	2.00	0.0	<0.001*
	Odd	20	3.15	0.48	

Mean day of Fit for discharge in even group was 2.00 ± 0.0 days and in odd group was 3.15 ± 0.48 days. There was significant difference in day of discharge between two groups.

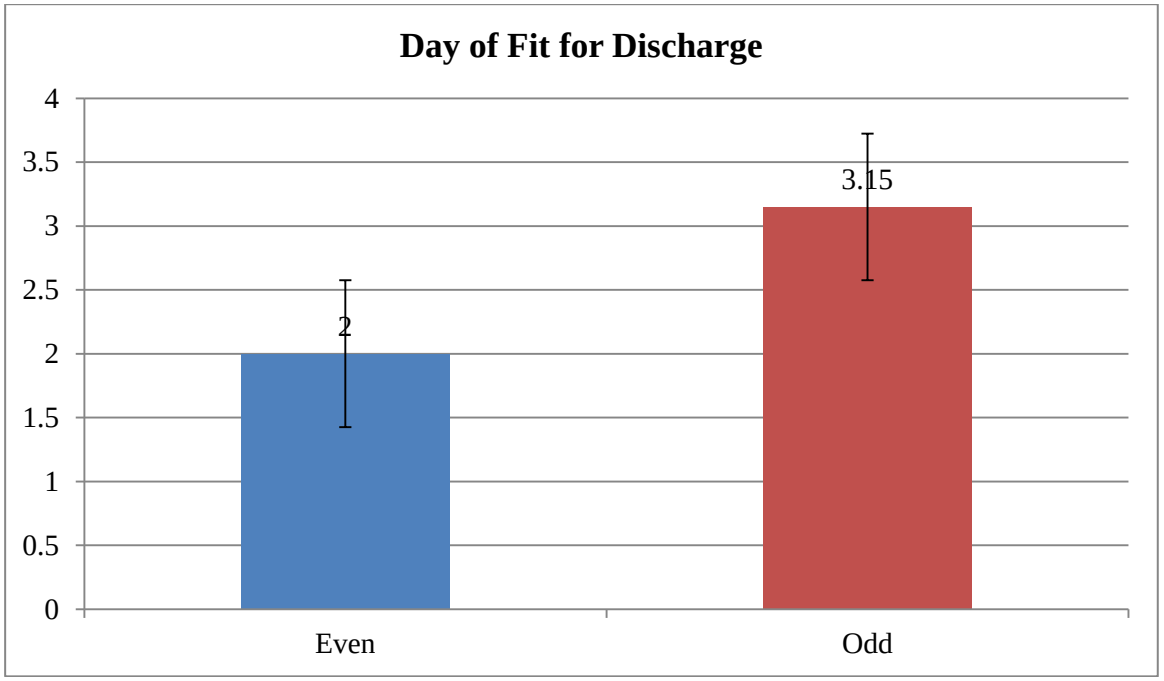


Figure 11: Bar diagram showing Mean day of Fit for Discharge comparison between two groups

Table 11: Cost effectiveness comparison between two groups

	Group	N	Mean	SD	P value
Cost of the Procedure	Even	20	6600	1313.89	<0.001*
	Odd	20	12400	1957.44	

Mean Total cost in the even group was 6600 ± 1313.89 Rs and in odd group was 12400 ± 1957.44. There was significant difference in cost of procedure between two groups. The cost of procedure for subjects under odd group i.e. Lichtenstein's repair group was higher, probably due to the cost of mesh itself.

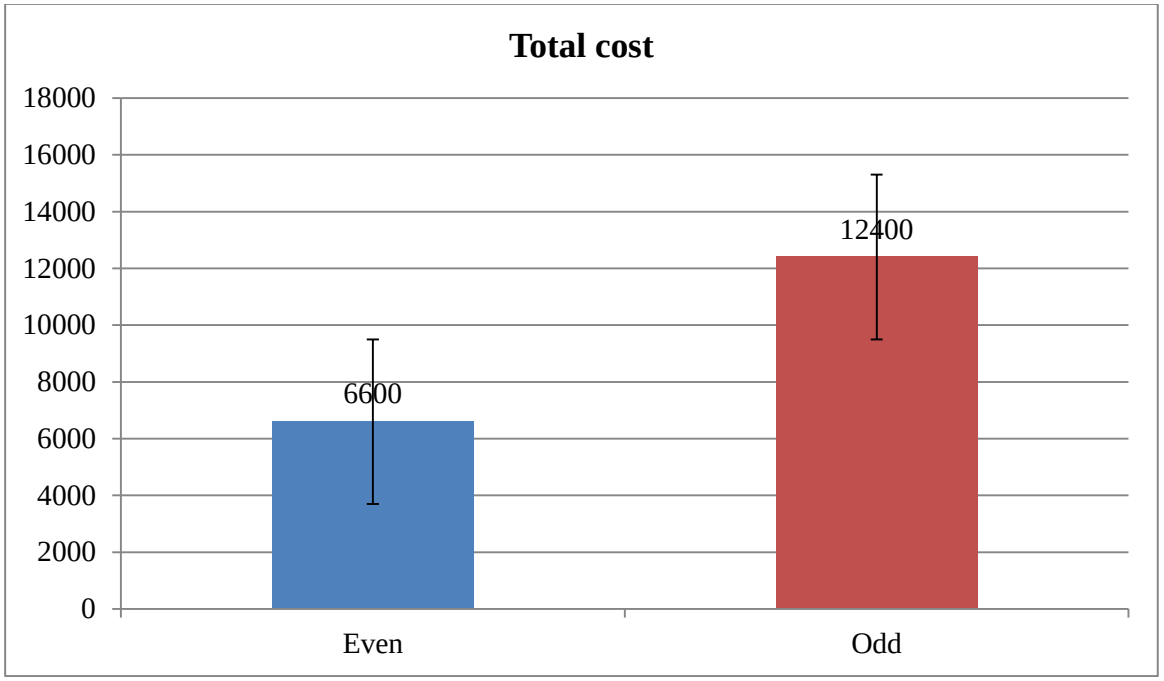


Figure 12: Bar diagram showing Cost effectiveness comparison between two groups

DISCUSSION

DISCUSSION

Lichtenstein Mesh repair is now widely used, and is often referred to as the gold standard despite a relative paucity of clinical trial comparing mesh with suture repair. Cost of surgery and post-operative morbidity affecting the quality of life are important consideration in inguinal hernia surgery.

There are advantages and disadvantages associated with all types of open inguinal hernia surgery. Existing non prosthesis repair (Bassini/Shuldice) are blamed for causing tissue tension and mesh repair is blamed for causing complication of foreign body. In Desarda's repair an undetached strip of external oblique aponeurosis was sutured between muscle arch & inguinal ligament to give a strong & physiologically dynamic posterior wall[41]. The posterior wall of inguinal canal was weak & without dynamic movement in all patients. Strong aponeurotic extensions were absent in posterior wall. Muscle arch movement was lost or diminished in all patients. Movement of the muscle arch improved after it was sutured to upper border of a strip of external oblique aponeurosis (EOA). Newly formed posterior wall is kept physiologically dynamic by additional muscle strength provided by external oblique muscle to the weakened muscles of arch. A physiologically dynamic & strong posterior inguinal wall, shielding & compression action of muscles & aponeurosis around inguinal canal are important factors that helps prevent hernia formation/hernia recurrence post repair. In addition, squeezing & plugging action of cremastric muscle & binding effect of the strong cremastric fascia, also play a vital role in preventing hernia.[14] Desarda's repair result in a tension free repair without the use of any foreign body, it is also rather simple to perform.

Profile of subjects:

In this present study in Desarda's group, majority of subjects were in the age group <30 years (30%) and in Lichtenstein group, majority of subjects were in the age group 51 to 60 years (45%). Mean age of subjects in Desarda's group was 41.70 ± 13.48 years and in Lichtenstein group was 45.60 ± 14.10.

Table 12: Comparison of Age and sex distribution between various studies

Author	Year	Country	Group	No.	Total	Median age	Gender (M:F)
Present study	2019	India	Desarda	20	40	41.70 ± 13.48	20:0
			Lichtenstein	20		45.60 ± 14.10	20:0
Ahmed[42]	2018	Egypt	Desarda	65	130	38. ±11.55	61:4
			Lichtenstein	65		40±11.69	65:0
Abbas[43]	2015	India	Desarda	50	100	39.84±10.97	NA
			Lichtenstein	50		39.26±10.58	NA
Bhatti[44]	2015	Pakistan	Desarda	100	200	NA	NA
			Lichtenstein	100		NA	NA
Gedam[45]	2017	India	Desarda	92	187	49.75±18.02	91:1
			Lichtenstein	95		47.32±14.06	95:0
Manyilirah[46]	2012	Uganda	Desarda	50	101	40	46:4
			Lichtenstein	51		28.5	42:9
Sowmya[36]	2015	India	Desarda	20	40	46.6±16.2	NA
			Lichtenstein	20		44.1±12.9	NA
Szopinski[47]	2012	Poland	Desarda	105	208	50.2±17.5	NA
			Lichtenstein	103		54.1±15.3	NA
Youssef[48]	2015	Egypt	Desarda	71	143	45.97±10.69	69:2
			Lichtenstein	72		43.89±10.27	69:3
Zulu[49]	2016	South Africa	Desarda	12	35	34	NA
			Lichtenstein	23		52	NA

From the above table it can be observed that Inguinal hernia is more common in Middle age group and among males. The present study findings were almost similar to the findings in other studies as mentioned above.

Diagnosis:

In Desarda group, majority of them had Right indirect hernia (45%) and in Lichtenstein group, majority of subjects had Right direct and indirect hernia (35% respectively).

In the study by Prakash et al.,[50] of the 30 patients who underwent Desarda's repair, 33.3% patients with direct hernia & 66.7% patients with indirect hernia. Of the 30 patients who underwent Lichenstein's mesh repair, 36.7% patients had direct hernia and 63.3% patients had indirect hernia.

Hence indirect inguinal hernia is most common hernia among adults.

Operating time

Mean operating time in present study of Desarda's group was 87.15 ± 3.86 min and in Lichtenstein group was 100.00 ± 5.39 min. There was significant difference in operating time between two groups.

In the study by **Prakash et al.,[50]** the average duration for Desarda No mesh repair was 45 minutes. The average duration for Lichtenstein's mesh repair was 50 minutes. The difference was statistically significant.

In the study by **Ahmed et al,[42]** mean operative time for Desarda No mesh repair was 29 min and for Lichtenstein's mesh repair was 40 min. There was significant difference in operating time between two procedures.

Youssef et al[48] report that Desarda repair had shorter operating time, early return to normal gait compared to Lichtenstein repair.

In the study by Abhishek Gupta et al.,[51] Mean Operative time in Desarda group was 28.24 minutes. The average duration for Lichtenstein's mesh repair was 30.88 minutes. The difference was statistically significant.

In the study by **Neogi P, et al**.,[52] Mean Operative time in Desarda group was 14.75 minutes. The average duration for Lichtenstein's mesh repair was 21.32 minutes. The difference was statistically significant.

From the review it can be observed that operative time were significantly shorter in Desarda group compared to Lichtenstein's mesh repair.

Post Op Pain:

In present study mean post op pain on day 1 in Desarda group was 2.95 ± 0.69 and in Lichtenstein group was 4.75 ± 0.79. There was significant difference in post op pain on day 1 between two groups.

Mean post op pain on day 3 in Desarda group was 1.15 ± 0.37 and in Lichtenstein group was 2.10 ± 0.31. There was significant difference in post op pain on day 3 between two groups.

In the study by Prakash et al[50] post op pain at 24 hrs was 5 in Desarda group and 6 in Lichtenstein group. At 7 days was 2 and 3 respectively. There was significant difference in Pain score between two groups on Day 1 and Day 7.

Other studies reported lower early post-operative pain in Desarda group however, it not reach significant level.[47,53] In contrast to Szopinski et al who reported higher early post-operative pain in Desarda group however in another publication by them they reported no significant difference.[54]

In the study by Prakash et al,[50] patients were classified into those who had groin pain for <3 days, 3-7 days, >7 days. 70% of the patients in the Desarda group experienced pain only for less than 3 days whereas 46.7% and 33.3% of the patients in Lichtenstein's method had pain for 3-7 days and more than 7 days respectively.
In the study by **Abhishek Gupta et al.,**[51] Mean VAS in Desarda group on 2nd POD was 3.12 while Lichtenstein had 3.73 which was significant ($p<0.05$), on 1 week mean VAS in Desarda group 1.28 and Lichtenstein group was 2.07 was significant ($p<0.05$) and mean VAS at 1 month in Desarda was 0.12 and Lichtenstein was 0.346 which was also significant ($p<0.05$). 3 patients in Desarda group and 8 patients in Lichtenstein group had pain at the end of 1 month and was statistically significant ($p<0.05$).

In the study by Neogi P et al,[52] patients in Desarda group complained of less pain on 2nd day and pain at 1 week. In Lichtenstein group, post-operative pain on 2nd day was between 2 and 5 on visual analog scale (average VAS score = 3.51). It was between 1 and 3 on 1st week (average VAS = 1.91). In Desarda group, pain on 2nd day was between 2 and 5 (average VAS = 2.90). On 1st week, it was between 1 and 3 (VAS 1.37). It was found statistically significant. However, difference in average pain at 1 month was not significant. Also, the number of patients who complained of pain was also found insignificant. At 1 month, 9 patients complained of continuous pain (VAS between 1 and 2) obviating to take analgesics in Lichtenstein arm and 5 patients complained of pain (VAS between1to 2) in Desarda arm. This observation of less intensity of pain score possibly confirms that the Desarda repair, as acclaimed by its inventor and others, is indeed a tension-free tissue repair.

Groin pain has been found to be due to fibrous reaction to foreign body in case of mesh repair, leading to spermatic cord and nerve enmeshment, which affects the quality of life of the patient. Desarda's technique being a pure tissue repair, and hence no fibrous reaction to produce groin pain.

Post Op Complications:

In Desarda group, 0% had complications and in Lichtenstein group, 5% had Seroma and 10% had urinary retention. There was no significant difference in complications between two groups.

In the study by Prakash et al., [50] none of the patients in the Desarda's repair group had seroma/hematoma. 1 patient (3.3%) in the Lichtenstein mesh repair had hematoma, whereas 4 patients (13.3%) had seroma. However, there was no significant difference in complications between two groups.

In the study by Abhisek Gupta et al.,[51] no seroma and wound infection was observed in Desarda group but Lichtenstein group 4 seroma and 1 wound infection was observed, which was significant ($p<0.05$). Abbas et al, also reported similar results, seroma formation rate 0% in Desarda and 1.4% in Lichtenstein repair.[43]

In the study by Neogi P et al.,[53] less incidence of seroma formation in Desarda group (8.33% in Desarda compared to 25.53% in Lichtenstein group) which was found statistically significant. Abbas Z et al, reported rate of seroma formation rate 0% in Desarda and 1.4% in Lichtenstein repair.[43]

Day of Fit for Discharge:

In Desarda group, 100% of patients were fit for discharge on day 2 and in Lichtenstein group, 90% were fit for discharge on day 3, 5% on day 4 and day 5. There was significant difference in day of discharge between two groups.

Mean day of fit for discharge in Desarda group was 2.00 ± 0.0 days and in Lichtenstein group was 3.15 ± 0.48 days. There was significant difference in day of fit for discharge between two groups.

In the study by Ahmed et al,[42] time for return to basic activity was 1.15 days in Desarda group and 1.5 days in Liechtenstein group. There was significant difference between two groups. Return to work was 11 days in Desarda group and 15 days in Lichtenstein group.

Similarly, in the study by Prakash et al.,[50] the average duration of hospital stay was 4 days in case of Desarda's repair and 6 days in Lichtenstein's hernioplasty with a P value of 0.000 (highly significant).

Various studies show that Desarda's technique is associated with lesser duration of surgery, and lesser post op complications like groin pain, abdominal wall stiffness, duration of hospital stay and time to return to normal activity.[32, 55, 56]

According to Desarda et al, average duration that was needed for the patients to return to work in the Desarda group was 8.26 days whereas it was 12.58 days in the Lichtenstein group. In the study by Prakash et al,[50] most of the people (63.3%) in the Desarda's group returned to normal activity within 7 days, when compared to Lichtenstein's group where the patients (60%) returned to normal activity within 7-15 days. Hence Desarda technique had faster recovery compared to Lichtenstein repair.

Cost of Procedure:

Mean Total cost in the Desarda group was 6600 ± 1313.89 Rs and in Lichtenstein group was 12400 ± 1957.44. There was significant difference in cost of procedure between two groups.

In the study by Abhishek Gupta et al.,[51] Operative cost in Desarda group was 7700 Rs and in Lichtenstein group was 14780 Rs. There was significant difference in cost of procedure between two groups.

In the study by Neogi P et al.,[52] Operative cost in Desarda group was 990 Rs and in Lichtenstein group was 4424 Rs. There was significant difference in cost of procedure between two groups.

Hence Desarda procedure was more economical procedure compared to Lichtenstein repair.

External oblique muscle technique satisfies all criteria of modern hernia surgery. Desarda's technique is simple & easy to do. It does not require risky or complicated dissection. There is no tension in suture line. It does not require any foreign material and does not use weak muscle or fascia transversalis for repair. It does not use mesh prosthesis so it is more economical and also avoid morbidity associated with foreign body like rejection, infection, chronic groin pain. Szopinski et al.,[47] stated in their Randomized controlled trial that the Desarda's technique has the potential to increase the number of tissue based method available to treat groin hernias. The most evident indication for use is the financial constraints or if a patient disagrees with the use of mesh.

CONCLUSION

CONCLUSION

This study is designed to compare the outcome of Lichtenstein tension free mesh repair and Desarda's repair. Though it requires studying a larger number of patients and a longer follow up, based on results of our study the following conclusions are drawn:-

1. The Desarda procedure required lesser operative time compared to Lichtenstein repair.
2. Post Operative pain on Day 1 and Day 3 was significantly lower in Desarda procedure compared to Lichtenstein repair.
3. No complications were seen in Desarda group, where as 15% of subjects undergoing Lichtenstein repair reported complications.
4. Patient was fit for discharge much earlier in Desarda group compared to Lichtenstein repair.
5. Desarda's technique is cost effective when compared with Lichtenstein method, so can be useful in rural setup where financial constraint is a major concern.

RECOMMENDATIONS:

Based on the observations and review of available literature following recommendations can be made, Desarda repair is a physiological, simple, cost effective procedure with lesser operative time and lower complication rates as compared to Lichtenstein's hernioplasty. The need for this procedure is much warranted in crisis where resources are limited and for subjects of rural background with financial contraints.

LIMITATIONS:

1. Duration of Follow up was shorter hence long term complications and recurrence could not be assessed in the present study.
2. The results and conclusions drawn are from a single centre with a small sample size.

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ANNEXURE

STANDARD_PROFORMA

COMPARATIVE STUDY OF DESARDA'S REPAIR versus LICHTENSTEIN'S HERNIOPLASTY IN THE MANAGEMENT OF INGUINAL HERNIA

Name: **DOA:**

Age: **DOD:**

Sex: **IP/OP NO:**

Religion: **Unit No:**

Education: **Date of surgery:**

Occupation:

Address:

1. **CHIEF COMPLAINTS:**
2. **HISTORY OF PRESENTING ILLNESS**
3. **PAST HISTORY:**
4. **PERSONAL HISTORY:**
5. **MENSTRUAL HISTORY:**
6. **FAMILY HISTORY:**
7. **GENERAL PHYSICAL EXAMINATION**

Built and nourishment:
Level of Consciousness:

Vitals Data
Temperature:
Pulse:
BP:
RR:
Pallor: YES, OR NO
Icterus: YES, OR NO
Clubbing: YES, OR NO
Cyanosis: YES, OR NO
Lymphadenopathy: YES, OR NO
Edema: YES, OR NO

8. SYSTEMIC EXAMINATION

Per Abdomen:

A. Inspection:

B. Palpation:

C. Percussion:

D. Auscultation:

Respiratory System:

Cardiovascular System:

Central Nervous system:

9. INVESTIGATIONS:

A. BLOOD
Hb %:
TC:
RBS:
Blood Urea:
Serum Creatinine:
HIV and HbSAg:
Bleeding time and Clotting time:

10. Diagnosis:

MANAGEMENT:

PREOPERATIVE ORDERS:

SURGERY PERFORMED:

POSTOPERATIVE ORDERS AND PROGRESS:

Operating time
Duration of post- operative pain.

PARAMETERS:

- Severity of pain: by visual analogue scale.
- Length of hospital stay.
- Post-operative complications: bleeding, urinary retention, and wound infection
- Recurrence over a 4 month period

OTHERS:

FOLLOW UP:

Foreign body sensation: YES/NO

Recurrence Noted: YES/NO

PATIENT INFORMATION SHEET

Study title: **"COMPARATIVE STUDY OF DESARDA'S REPAIR versus LICHTENSTEIN'S HERNIOPLASTY IN THE MANAGEMENT OF INGUINAL HERNIA"**

GUIDE: DR KRISHNAPRASAD K
STUDY CONDUCTED BY DR MUKTESH B S

Study location: R L Jalappa Hospital and Research Centre attached to Sri Devaraj Urs Medical College, Tamaka, Kolar.

METHOD AND PROCEDURE:
Group 1: will be undergoing Desarda's Repair, which is a No Mesh technique based on physiological repair.
Group 2: will be undergoing Lichtenstein's Hernioplasty, which is a Mesh based technique.

Subject selection:
You have been selected in this study since you are in the age group of 19 to 60 and have the underlying condition 'Inguinal Hernia'.
You would have been excluded from this study if you were Immunocompromised, having metabolic conditions or was a case of Recurrent Inguinal Hernia.

You in this study will have to undergo CBC,BT CT, Blood Grouping.Random blood sugar, blood urea, serum creatinine, serum electrolytes, HIV, HbsAg, chest xray. ECG and USG Abdomen.
Complications: wound infection, seroma formation, recurrence.
Please read the following information and discuss with your family members. You can ask any question regarding the study. If you agree to participate in the study we will collect information (as per proforma) from you or a person responsible for you or both. Relevant history will be taken. This information collected will be used only for dissertation and publication.
All information collected from you will be kept confidential and will not be disclosed to any outsider. Your identity will not be revealed. This study has been reviewed by the Institutional Ethics Committee and you are free to contact the member of the Institutional Ethics Committee. There is no compulsion to agree to this study. The care you will get will not change if you do not wish to participate. You are required to sign/ provide thumb impression only if you voluntarily agree to participate in this study.

After complete deliberation I choose to be included in this study and consent to the division into Even and Odd groups

Desarda's no mesh repair	
Lichtenstein's Hernioplasty	

For further information contact
Dr. Muktesh B S (Post graduate)
Phone No:9663560564
Department of General Surgery
SDUMC, Kolar

Left thumb impression/Signature of the patient:

Left thumb impression/Signature of the witness:

ರೋಗಿಯ ಮಾಹಿತಿ ಪತ್ರ

ಸ್ಪಡಿ ಶೀರ್ಷಿಕೆ: "ಅಂಡವಾಯು ನಿರ್ವಹಣೆಯಲ್ಲಿ ಲಿಚ್ಟೆನ್ಸ್ಟೈನ್ನ ಹಾರ್ನಿಯೋಪ್ಲ್ಯಾಸ್ಟಿ ವಿರುದ್ಧದ ಡೆಸರ್ಡಾದ ದುರಸ್ತಿ ಕುರಿತು ತುಲನಾತ್ಮಕ ಅಧ್ಯಯನ"

ಗೈಡ್: ಡಾ. ಕೃಷ್ಣ ಪ್ರಸಾದ್ ಕೆ
ಡಾ. ಮುಕ್ತೇಶ್ ಬಿ ಎಸ್ ನಡೆಸಿದ ಅಧ್ಯಯನ

ಅಧ್ಯಯನ ಸ್ಥಳ: ಆರ್ ಎಲ್ ಜಲಪ್ಪ ಆಸ್ಪತ್ರೆ ಮತ್ತು ಸಂಶೋಧನಾ ಕೇಂದ್ರ
ಶ್ರೀ ದೇವರಾಜ್ ಉರ್ಸ್ ಮೆಡಿಕಲ್ ಕಾಲೇಜಿನಲ್ಲಿ
ತಮಾಕ

ಅಧ್ಯಯನ ವಿನ್ಯಾಸ: ತುಲನಾತ್ಮಕ ಅಧ್ಯಯನ
ವಿಧಾನ ಮತ್ತು ಕಾರ್ಯವಿಧಾನ:
ಗುಂಪು 1: ದೇಸಾರ್ದ ರಿಪೇರಿಗೆ ಒಳಗಾಗುತ್ತದೆ, ಇದು ಶಾರೀರಿಕ ದುರಸ್ತಿಗಳ ಆಧಾರದ ಮೇಲೆ ಯಾವುದೇ ಮೆಶ್ ತಂತ್ರವಲ್ಲ.
ಗುಂಪು 2: ಲಿಚ್ಟೆನ್ಸ್ಟೈನ್ನ ಹೆರ್ನಿಯೊಪ್ಲ್ಯಾಸ್ಟಿಗೆ ಒಳಗಾಗುತ್ತದೆ, ಇದು ಮೆಶ್ ಆಧಾರಿತ ತಂತ್ರಜ್ಞಾನವಾಗಿದೆ.

ವಿಷಯ ಆಯ್ಕೆ:
ನೀವು 19 ರಿಂದ 60 ರ ವಯಸ್ಸಿನಲ್ಲಿರುವ ಕಾರಣದಿಂದಾಗಿ ಈ ರೋಗಿಯನ್ನು ಆಯ್ಕೆ ಮಾಡಲಾಗಿದೆ ಮತ್ತು ಆಂತರಿಕ ಸ್ಥಿತಿಯನ್ನು 'ತೊಡೆಸಂದಿಯ ಅಂಡವಾಯು' ಹೊಂದಿರುತ್ತಾರೆ.

ನೀವು ಇಮ್ಯೂನೊಕಾಂಪ್ರೊಮೈಸ್ಡ್ ಆಗಿದ್ದರೆ, ತೀವ್ರವಾಗಿ ಸಹ-ಅಸ್ವಸ್ಥವಾಗಿರುವ ಅಥವಾ ಮರುಕಳಿಸುವ ಅಂಡಾಶಯದ ಅಂಡವಾಯುಗಳ ಸಂದರ್ಭದಲ್ಲಿ ಈ ಅಧ್ಯಯನದಿಂದ ಹೊರಗಿಡಬಹುದು.

ಈ ಅಧ್ಯಯನದ ರೋಗಿಗಳು ಸಿಬಿಸಿ, ಬಿಟಿ ಸಿಟಿ, ಬ್ಲಡ್ ಗ್ರೂಪಿಂಗ್ಗೆ ಒಳಗಾಗಬೇಕಾಗುತ್ತದೆ. ಯಾದೃಚ್ಛಿಕ ರಕ್ತದ ಸಕ್ಕರೆ, ರಕ್ತದ ಯೂರಿಯಾ, ಸೀರಮ್ ಕ್ರಿಯಾಟಿನ್, ಸೀರಮ್ ಎಲೆಕ್ಟ್ರೋಲೈಟ್ಸ್, ಎಚ್ಐವಿ, ಎಚ್ಬಿಎಸ್ಎಗ್, ಎದೆಯ xray. ಇಸಿಜಿ ಮತ್ತು ಯುಎಸ್ಜಿ ಹೊಟ್ಟೆ.
ತೊಡಕುಗಳು: ಗಾಯದ ಸೋಂಕು, ಸೆರೋಮಾ ರಚನೆ, ಪುನರಾವರ್ತನೆ.

ಕೆಳಗಿನ ಮಾಹಿತಿಯನ್ನು ಓದಿ ಮತ್ತು ನಿಮ್ಮ ಕುಟುಂಬ ಸದಸ್ಯರೊಂದಿಗೆ ಚರ್ಚಿಸಿ. ಅಧ್ಯಯನದ ಬಗ್ಗೆ ನೀವು ಯಾವುದೇ ಪ್ರಶ್ನೆಯನ್ನು ಕೇಳಬಹುದು. ನೀವು ಅಧ್ಯಯನದಲ್ಲಿ ಪಾಲ್ಗೊಳ್ಳಲು ಒಪ್ಪಿಕೊಂಡರೆ ನಾವು ನಿಮ್ಮಿಂದ (ಮಾಹಿತಿ ಪ್ರಕಾರ) ಮಾಹಿತಿಯನ್ನು ಅಥವಾ ನಿಮ್ಮ ಅಥವಾ ಎರಡಕ್ಕೂ ಜವಾಬ್ದಾರರಾಗಿರುವ ವ್ಯಕ್ತಿಗಳನ್ನು ಸಂಗ್ರಹಿಸುತ್ತೇವೆ. ಸಂಬಂಧಿತ ಇತಿಹಾಸವನ್ನು ತೆಗೆದುಕೊಳ್ಳಲಾಗುವುದು. ಸಂಗ್ರಹಿಸಿದ ಈ ಮಾಹಿತಿಯನ್ನು ಪ್ರೌಢಪ್ರಬಂಧ ಮತ್ತು ಪ್ರಕಟಣೆಗಾಗಿ ಮಾತ್ರ ಬಳಸಲಾಗುತ್ತದೆ.

ನಿಮ್ಮಿಂದ ಸಂಗ್ರಹಿಸಿದ ಎಲ್ಲಾ ಮಾಹಿತಿಯನ್ನು ಗೌಪ್ಯವಾಗಿರಿಸಲಾಗುವುದು ಮತ್ತು ಯಾವುದೇ ಹೊರಗಿನವರಿಗೆ ಬಹಿರಂಗಪಡಿಸಲಾಗುವುದಿಲ್ಲ. ನಿಮ್ಮ ಗುರುತನ್ನು ಬಹಿರಂಗಪಡಿಸಲಾಗುವುದಿಲ್ಲ. ಈ ಅಧ್ಯಯನವು ಸಾಂಸ್ಥಿಕ ನೀತಿಶಾಸ್ತ್ರ ಸಮಿತಿಯಿಂದ ಪರಿಶೀಲಿಸಲ್ಪಟ್ಟಿದೆ ಮತ್ತು ನೀವು ಸಂಸ್ಥೆಯ ಎಥಿಕ್ಸ್ ಸಮಿತಿಯ ಸದಸ್ಯರನ್ನು ಸಂಪರ್ಕಿಸಲು ಮುಕ್ತವಾಗಿರುತ್ತೀರಿ. ಈ ಅಧ್ಯಯನಕ್ಕೆ ಒಪ್ಪಿಗೆ ನೀಡಲು ಯಾವುದೇ ಕಡ್ಡಾಯವಿಲ್ಲ. ನೀವು ಭಾಗವಹಿಸಲು ಬಯಸದಿದ್ದರೆ ನೀವು ಪಡೆಯುವ ಕಾಳಜಿ ಬದಲಾಗುವುದಿಲ್ಲ. ಈ ಅಧ್ಯಯನದಲ್ಲಿ ನೀವು ಸ್ವಯಂಪ್ರೇರಣೆಯಿಂದ ಒಪ್ಪಿಕೊಳ್ಳುವುದಾದರೆ ಮಾತ್ರ ಹೆಬ್ಬೆರಳು ಅನಿಸಿಕೆಗೆ ನೀವು ಸಹಿ / ನೀಡಬೇಕಾಗಿದೆ.

ಹೆಚ್ಚಿನ ಮಾಹಿತಿಗಾಗಿ ರೋಗಿಯ ಸಹಿ:
ಡಾ. ಮುಕ್ತೇಶ್ ಬಿ ಎಸ್ (ಪೋಸ್ಟ್ ಪದವೀಧರ)
ದೂರವಾಣಿ ಸಂಖ್ಯೆ: 9663560564
ಸಾಮಾನ್ಯ ಸರ್ಜರಿ ಇಲಾಖೆ
SDUMC, ಕೋಲಾರ್

INFORMED CONSENT FORM

I Mr./Mrs.have …… been explained in my own understandable language, that I will be included in a study which is DESARDA'S REPAIR versus LICHTENSTEIN'S HERNIOPLASTY–A COMPARATIVE STUDY, being conducted in RL JALAPPA HOSPITAL.

I have been explained that my clinical findings, investigations, intraoperative findings, post-operative course, will be assessed and documented for study purpose.

I have been explained my participation in this study is entirely voluntary, and I can withdraw from the study any time and this will not affect my relation with my doctor or the treatment for my ailment.

I have been explained about the follow up details and possible benefits and adversities due to interventions, in my own understandable language.

I have understood that all my details found during the study are kept confidential and while publishing or sharing of the findings, my details will be masked.

I have principal investigator mobile no for enquiries.

I in my sound mind give full consent after complete deliberation I choose to be included in this study and consent to the division into Even and Odd groups

Left thumb impression/Signature of the patient: Investigator: Dr Muktesh.B.S

Ph No: 9663560564

Name: Signature:

Left thumb impression/Signature of the witness:

Name:

Relation to patient:

Date:

Place:

ಮಾಹಿತಿಯುಕ್ತಸಮ್ಮತಿಪತ್ರ

ನಾನುಶ್ರೀ / ಶ್ರೀಮತಿ ..... ನಾನು DESARDA'S REPAIR versus LICHTENSTEIN'S HERNIOPLASTY ಒಂದು ತುಲನಾತ್ಮಕ ಅಧ್ಯಯನ ಆರ್ ಎಲ್ ಜಲಪ್ಪ ಆಸ್ಪತ್ರೆಯಲ್ಲಿ ನಡೆಸಲಾಗುತ್ತಿದೆ ಅಧ್ಯಯನ ಸೇರಿಸಲಾಗುವುದು ಎಂದು, ನನ್ನ ಸ್ವಂತ ಅರ್ಥವಾಗುವ ಭಾಷೆಯಲ್ಲಿ ವಿವರಿಸಲಾಗಿದೆ.

ನನ್ನ ವೈದ್ಯಕೀಯಸಂಶೋಧನೆಗಳ ತನಿಖೆ, intraoperative findings, ನಂತರದ operative course, ಮೌಲ್ಯಮಾಪನ ನಡೆಯಲಿದೆ ಮತ್ತುಅಧ್ಯಯನ ಉದ್ದೇಶಕ್ಕಾಗಿ ದಾಖಲಿಸಲಾಗಿದೆ ಎಂದು ವಿವರಿಸಲಾಗಿದೆ.

ನಾನು ವಿವರಿಸಿದರು ಮಾಡಲಾಗಿದೆ ಈ ಅಧ್ಯಯನದಲ್ಲಿ ನನ್ನ ಭಾಗವಹಿಸುವಿಕೆ ಸಂಪೂರ್ಣವಾಗಿ ವೈಯಕ್ತಿಕವಾಗಿದ್ದು, ಮತ್ತು ನಾನು ಅಧ್ಯಯನದಿಂದ ಯಾವುದೇ ಸಮಯದಲ್ಲಿ ಹಿಂದಕ್ಕೆ ಮತ್ತು ಈ ನನ್ನ ವೈದ್ಯರು ಅಥವಾ ನನ್ನ ಖಾಯಿಲೆಗಾಗಿ ಚಿಕಿತ್ಸೆ ನನ್ನ ಸಂಬಂಧಿಸಿದಂತೆ ಪರಿಣಾಮ ಸಾಧ್ಯವಿಲ್ಲ.

ನನ್ನ ಸ್ವಂತ ಅರ್ಥವಾಗುವಭಾಷೆಯಲ್ಲಿ, ವಿವರಗಳು ಮತ್ತು ಸಂಭಾವ್ಯ ಪ್ರಯೋಜನಗಳನ್ನು ಮತ್ತು adversities ಮುನ್ನಡೆ ಬಗ್ಗೆ ವಿವರಿಸಲಾಗಿದೆ.

ನಾನು ನನ್ನ ವಿವರಗಳನ್ನು ಅಧ್ಯಯನ ಕಂಡು ಬಂದ ಖಾಸಗಿ ಇರಿಸಲಾಗುತ್ತದೆ ಮತ್ತು ಪ್ರಕಾಶನ ಅಥವಾ ಸಂಶೋಧನೆಗಳ ಹಂಚಿಕೆ ಮಾಡುವಾಗ, ನನ್ನ ವಿವರಗಳನ್ನು ತಡೆಯುತ್ತವೆ ಅರ್ಥಮಾಡಿಕೊಂಡಿದ್ದೇನೆ.

ನಾನು ವಿಚಾರಣೆಯಲ್ಲಿ ಪ್ರಮುಖ ಸಂಶೋಧಕ ಮೊಬೈಲ್.

ನನ್ನ ಧ್ವನಿ ಮನಸ್ಸಿನಲ್ಲಿ ನೀಡಲು ಪೂರ್ಣ ಒಪ್ಪಿಗೆ ಈ ಅಧ್ಯಯನದ ಭಾಗವಾಗಿ ಸೇರಿಸಲಾಗುವುದು.

ರೋಗಿಯಸಹಿ:

ಹೆಸರು:

ಸಾಕ್ಷಿಯಸಹಿ:
ಹೆಸರು:
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MASTERCHART

Sl no	UHID NO	Age	Gender	Diagnosis	Group	Operating Time (min)	Post Op Pain Day 1	Post Op Pain Day 3	Complications	Pt Fit for Discharge	Total Cost	Recurrence
1	532990	60	M	Right Indirect	Odd	110	6	2	Nil	3	14000	Nil
2	522392	28	M	Right Indirect	Even	90	4	1	Nil	2	3000	Nil
3	533068	60	M	Left Indirect	Odd	100	5	2	Nil	3	12000	Nil
4	522392	54	M	Right Indirect	Even	94	4	1	Nil	2	5000	Nil
5	533434	50	M	Right Direct	Odd	94	6	3	Nil	3	10000	Nil
6	536719	38	M	Right Indirect	Even	85	3	1	Nil	2	8000	Nil
7	543610	55	M	Right Direct	Odd	100	5	2	Urinary Retension	3	15000	Nil
8	552256	65	M	Right Indirect	Even	90	3	1	Nil	2	6000	Nil
9	557648	26	M	Right Indirect	Odd	105	4	2	Nil	3	14000	Nil
10	433132	54	M	Right Direct	Even	85	4	2	Nil	2	7000	Nil
11	557305	54	M	Right Indirect	Odd	96	5	2	Nil	3	12000	Nil
12	574425	27	M	Left Indirect	Even	87	3	1	Nil	2	5000	Nil
13	573552	25	M	Right Indirect	Odd	110	5	2	Nil	3	10000	Nil
14	577317	19	M	Left Indirect	Even	86	2	1	Nil	2	8000	Nil
15	589766	34	M	Left Indirect	Odd	100	4	2	Nil	3	15000	Nil
16	570686	35	M	Right Indirect	Even	80	2	2	Nil	2	6000	Nil
17	606411	58	M	Right Indirect	Odd	95	4	2	Nil	3	12000	Nil
18	701940	23	M	Right Indire	Even	87	3	2	Nil	2	7000	Nil
1	702	3	M	Left	O	95	5	2	Nil	3	100	Nil

9	669	5		Indirect	dd						00	
20	707829	48	M	Right Indirect	Even	88	3	1	Nil	2	8000	Nil
21	715293	48	M	Left Indirect	Odd	100	6	3	Nil	4	15000	Nil

Sl no	UHID NO	Age	Gender	Diagnosis	Group	Operating Time (min)	Post Op Pain Day 1	Post Op Pain Day 3	Complications	Pt Fit for Discharge	Total Cost	Recurrence
22	715519	50	M	Right Direct	Even	95	3	1	Nil	2	6000	Nil
23	717843	40	M	Right Indirect	Odd	100	5	2	Urinary Retension	3	12000	Nil
24	722633	29	M	Left Indirect	Even	90	2	1	Nil	2	7000	Nil
25	722316	60	M	Right Direct	Odd	110	4	2	Seroma	5	10000	Nil
26	726720	42	M	Right Indirect	Even	85	4	1	Nil	2	8000	Nil
27	606709	58	M	Left Direct	Odd	100	5	2	Nil	3	15000	Nil
28	732960	28	M	Right Direct	Even	85	3	1	Nil	2	6000	Nil
29	738387	28	M	Right Direct	Odd	90	5	2	Nil	3	14000	Nil
30	743120	55	M	Right Direct	Even	80	3	1	Nil	2	7000	Nil
31	746389	60	M	Right Direct	Odd	100	3	2	Nil	3	12000	Nil
32	748729	40	M	Left Indirect	Even	85	3	1	Nil	2	8000	Nil
33	584146	60	M	Right Direct	Odd	100	5	2	Nil	3	10000	Nil
34	746351	59	M	Right Indirect	Even	86	3	1	Nil	2	6000	Nil
35	754540	22	M	Right Indirect	Odd	95	5	2	Nil	3	14000	Nil
36	756397	60	M	Left Indirect	Even	90	2	1	Nil	2	7000	Nil
37	756404	50	M	Right Direct	Odd	100	4	2	Nil	3	12000	Nil
38	756557	40	M	Left Indirect	Even	90	2	1	Nil	2	8000	Nil
39	759305	29	M	Left Indirect	Odd	100	4	2	Nil	3	10000	Nil
40	767871	40	M	Left Indirect	Even	85	3	1	Nil	2	6000	Nil