By the Name of ALLAH the Most Gracious the Most Merciful

Abdominal Wall, Hernias & Umbilicus
L3

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الأربعاء ٥ / ١٠ / ٢٠٢٢

Bailey & Love's Short Practice of Surgery, 27th Edition . CH 60 .
Browse's Introduction to The Symptoms and Signs of Surgical Disease , 4th Edition.

SPECIFIC HERNIA TYPES

- Inguinal hernia.
- Femoral hernia.

Inguinal hernia

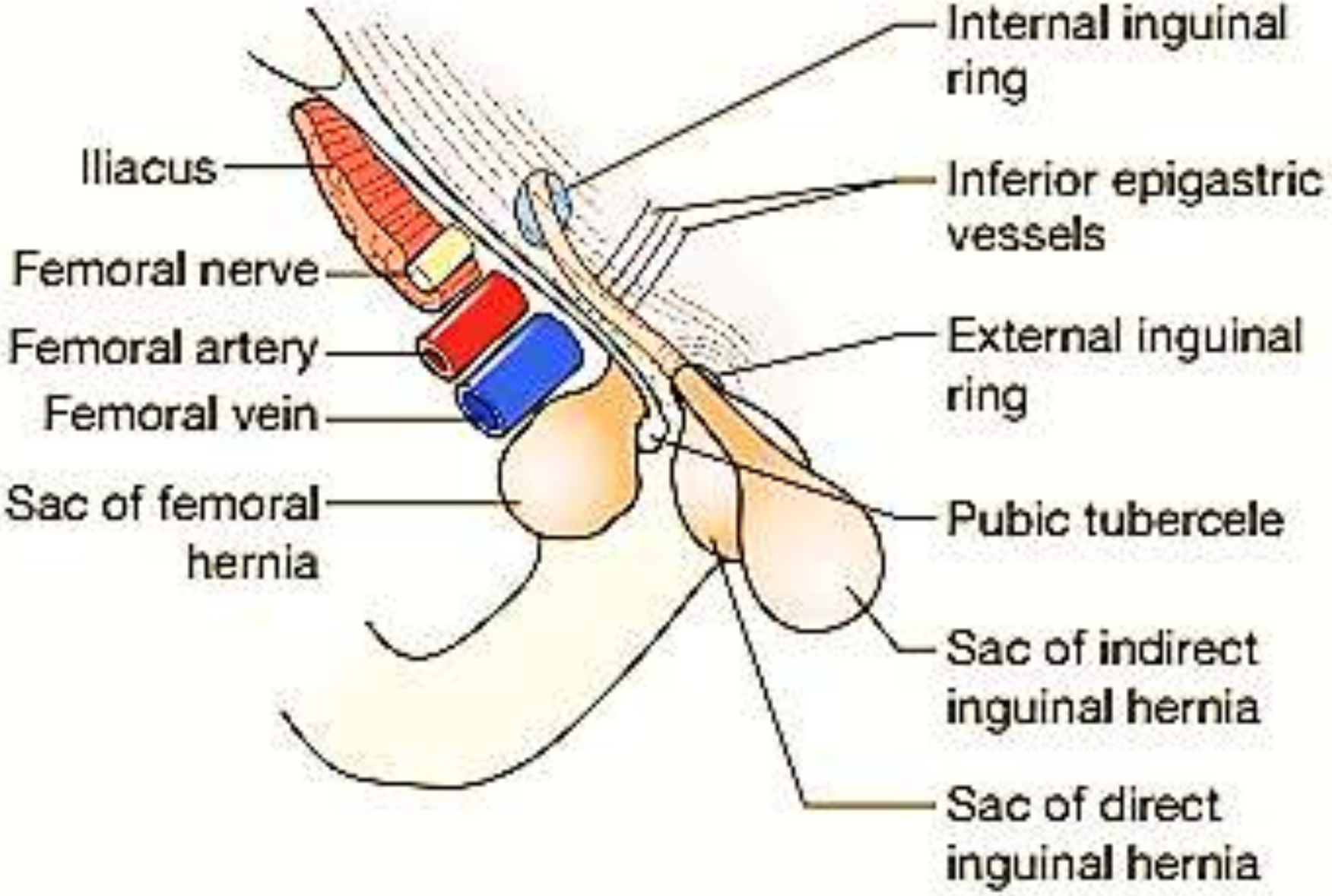
- Is the most common hernia in men and women but much more common in men.
- Congenial : (indirect, oblique or lateral).
- Acquired : (direct or medial) , (sliding or lateral).

Presentation :

Risk factors

‘rupture’ ,Swelling , reducible / irreducible , Pain .

Complication : (Intestinal obstruction +/- strangulation).

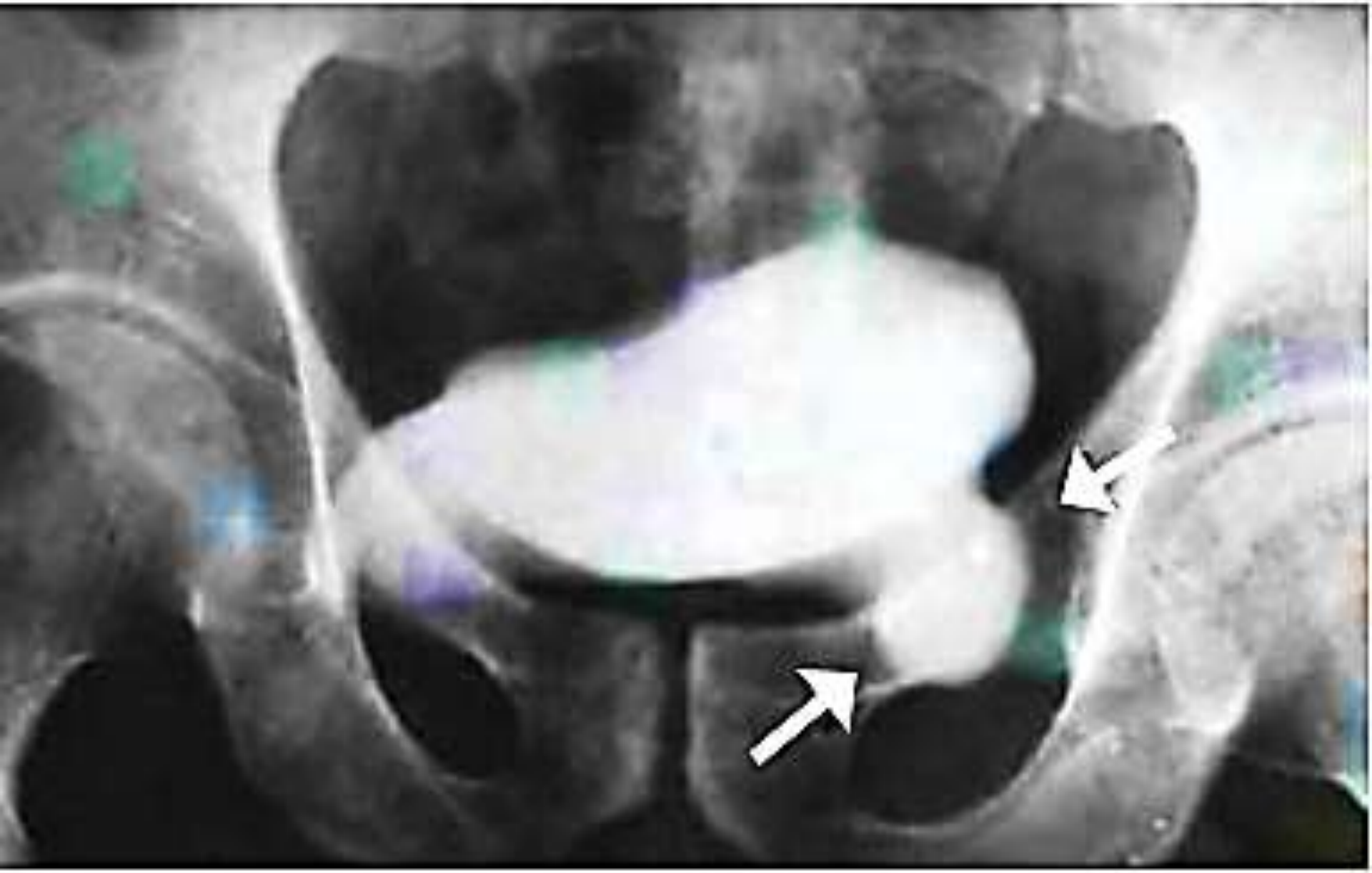

Internal inguinal ring
Iliacus
Inferior epigastric vessels
Femoral nerve
Femoral artery
External inguinal ring
Femoral vein
Sac of femoral hernia
Pubic tubercele
Sac of indirect inguinal hernia
Sac of direct inguinal hernia

Features of an Indirect inguinal hernia

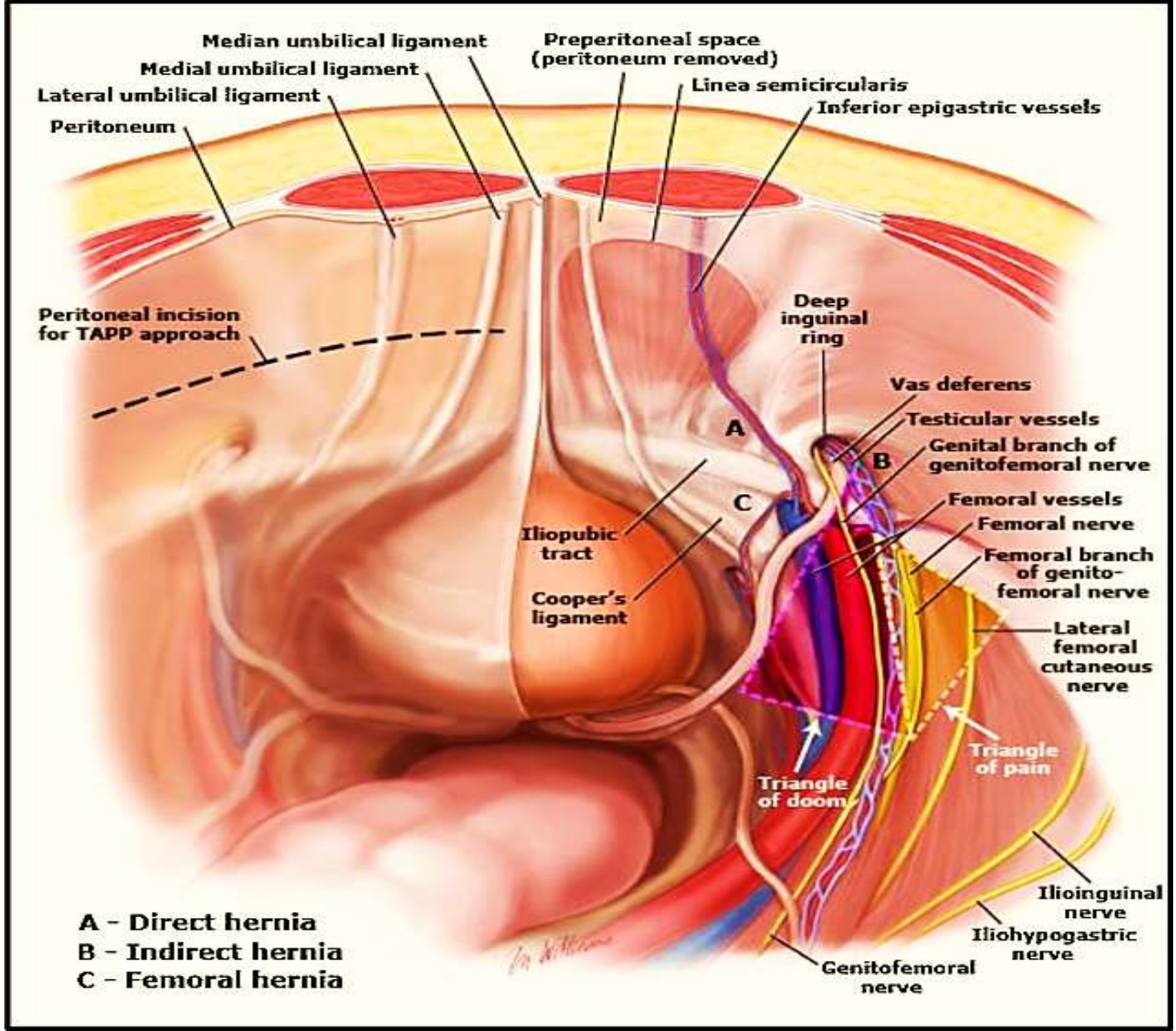
- Can (and often does) descend into the scrotum
- Reduces upwards, then laterally and backwards
- Controlled, after reduction, by pressure over the internal inguinal ring.
- The defect is not palpable, as it is behind the fibers of the external oblique muscle
- After reduction, the bulge reappears in the middle of the inguinal region and then flows medially before turning down to the neck of the scrotum (scrotal hernia).

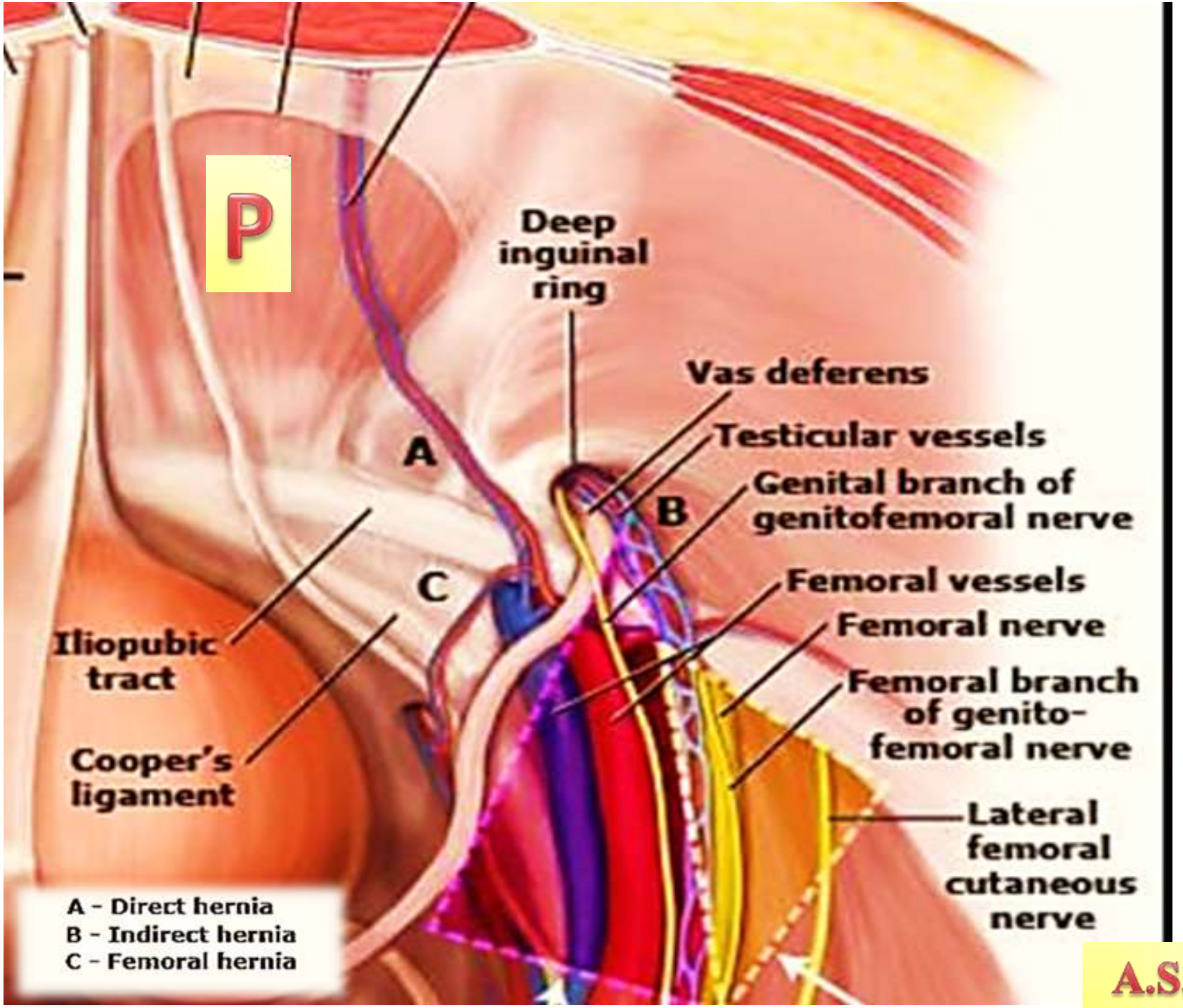
Features of a Direct inguinal hernia

- Elderly patients.
- Does not (hardly ever) go down into the scrotum
- Reduces upwards and then straight backwards
- Not controlled, after reduction, by pressure over the internal inguinal ring
- The defect may be felt in the abdominal wall above the pubic tubercle
- After reduction, the bulge reappears exactly where it was before
- Uncommon in children and young adults



This cystogram shows the urinary bladder, part of which has descended into a left direct inguinal hernia (arrows).


Median umbilical ligament
Medial umbilical ligament
Lateral umbilical ligament
Peritoneum
Preperitoneal space (peritoneum removed)
Linea semicircularis
Inferior epigastric vessels
Peritoneal incision for TAPP approach
Deep inguinal ring
Vas deferens
Testicular vessels
Genital branch of genitofemoral nerve
A
B
C
Iliopubic tract
Cooper's ligament
Femoral vessels
Femoral nerve
Femoral branch of genito-femoral nerve
Lateral femoral cutaneous nerve
Triangle of doom
Triangle of pain
Ilioinguinal nerve
Iliohypogastric nerve
Genitofemoral nerve
A - Direct hernia
B - Indirect hernia
C - Femoral hernia


P
Deep inguinal ring
Vas deferens
Testicular vessels
Genital branch of genitofemoral nerve
Femoral vessels
Femoral nerve
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Lateral femoral cutaneous nerve
A
B
C
Iliopubic tract
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A - Direct hernia
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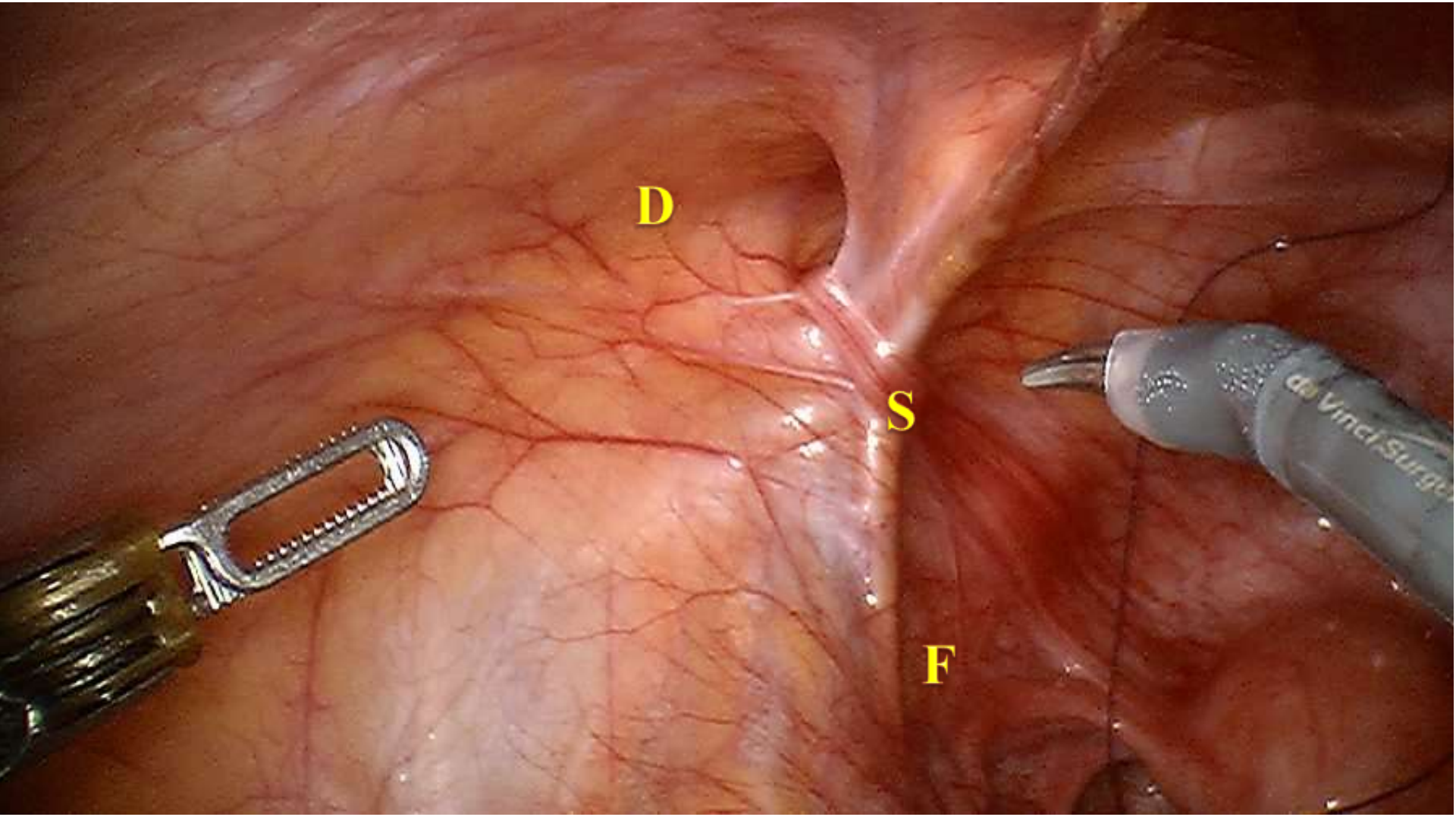
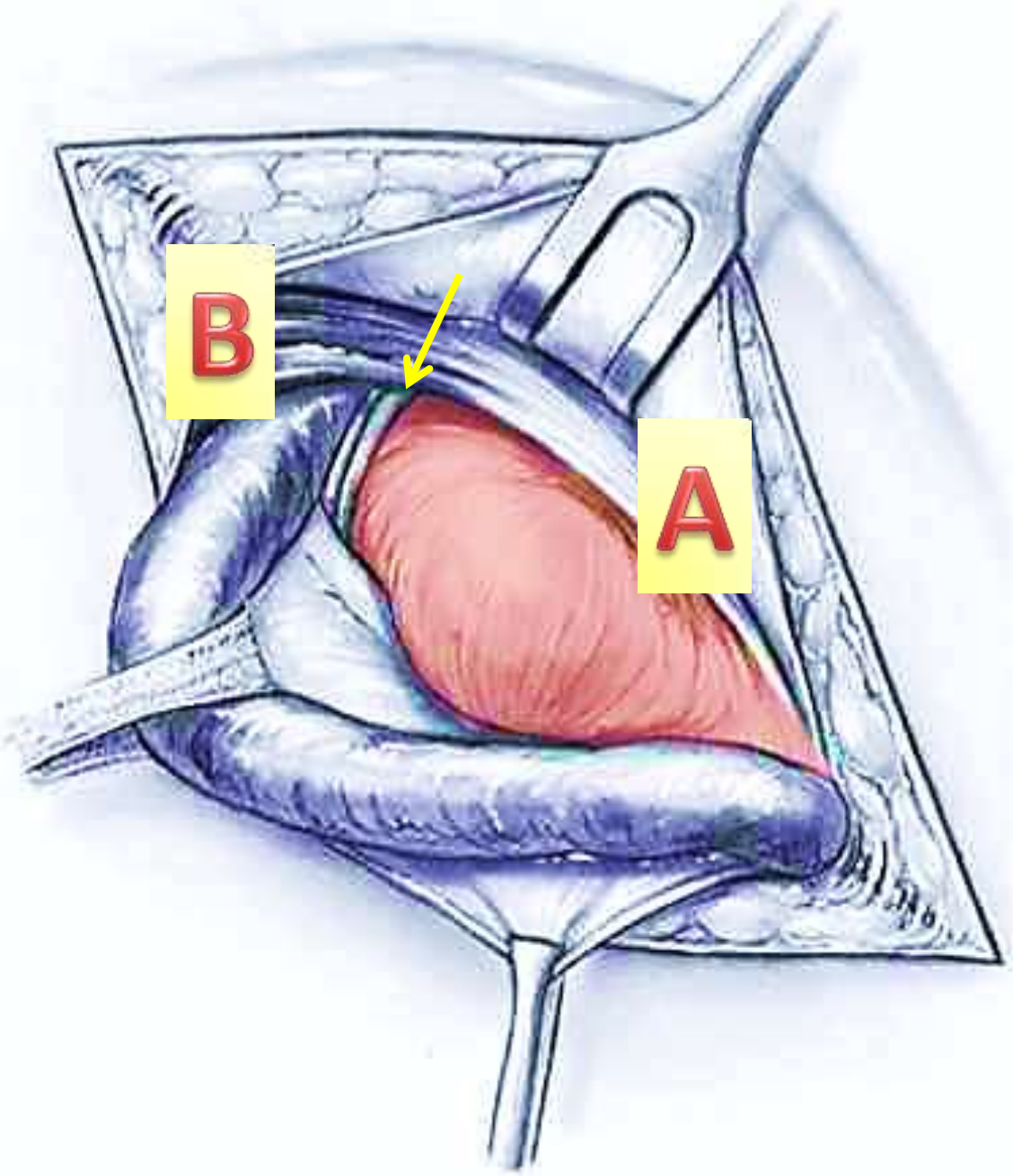
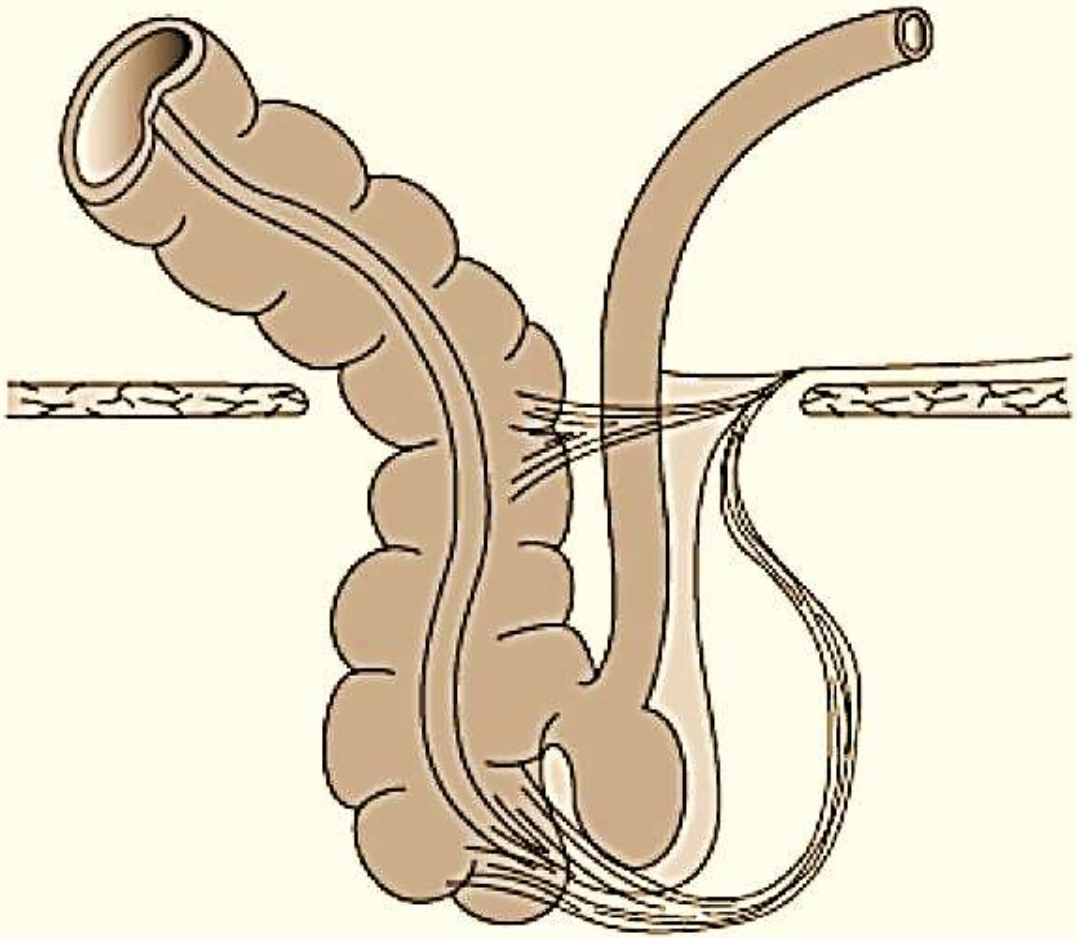

D
S
F

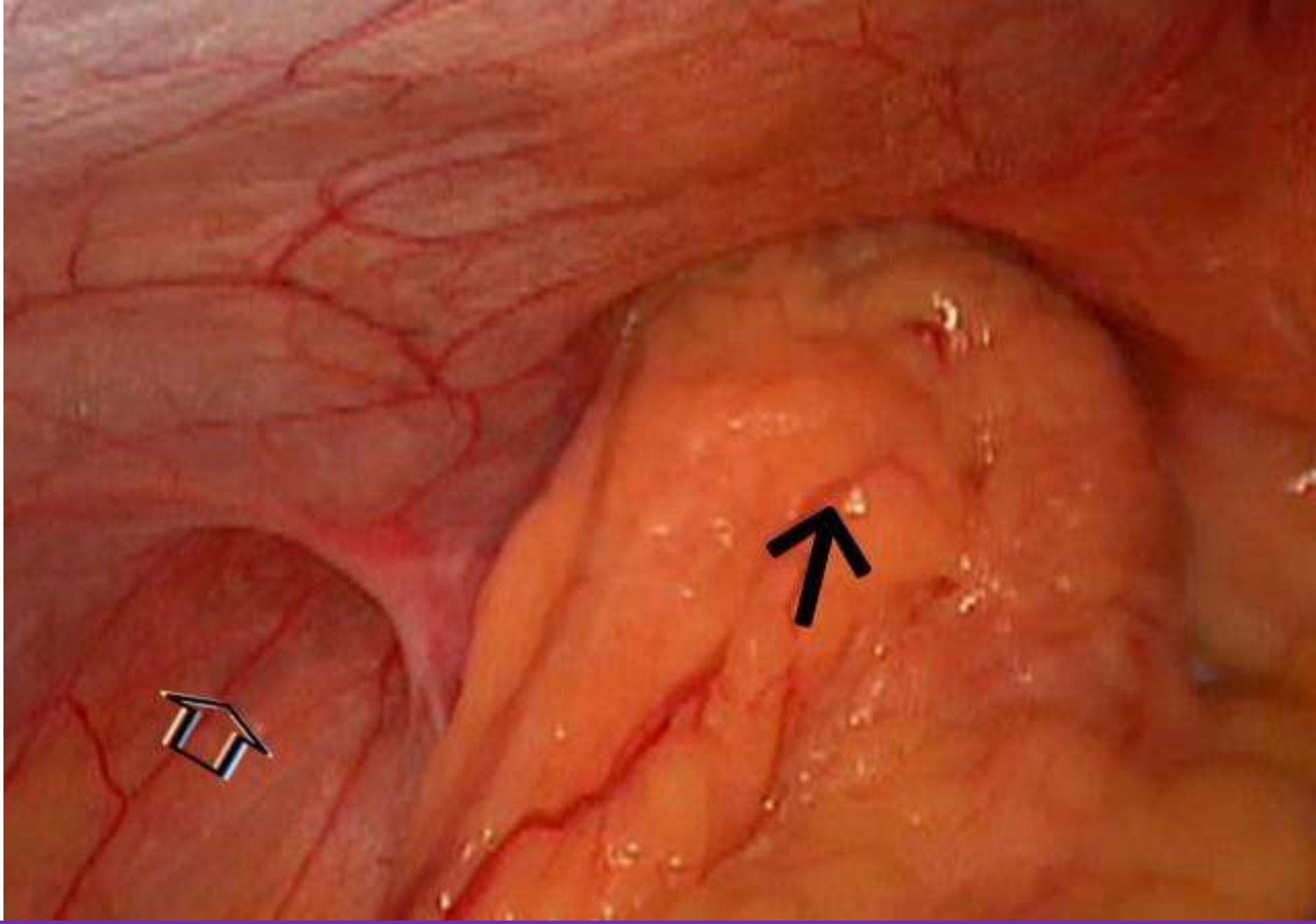

B
A

Features of a Sliding inguinal hernia

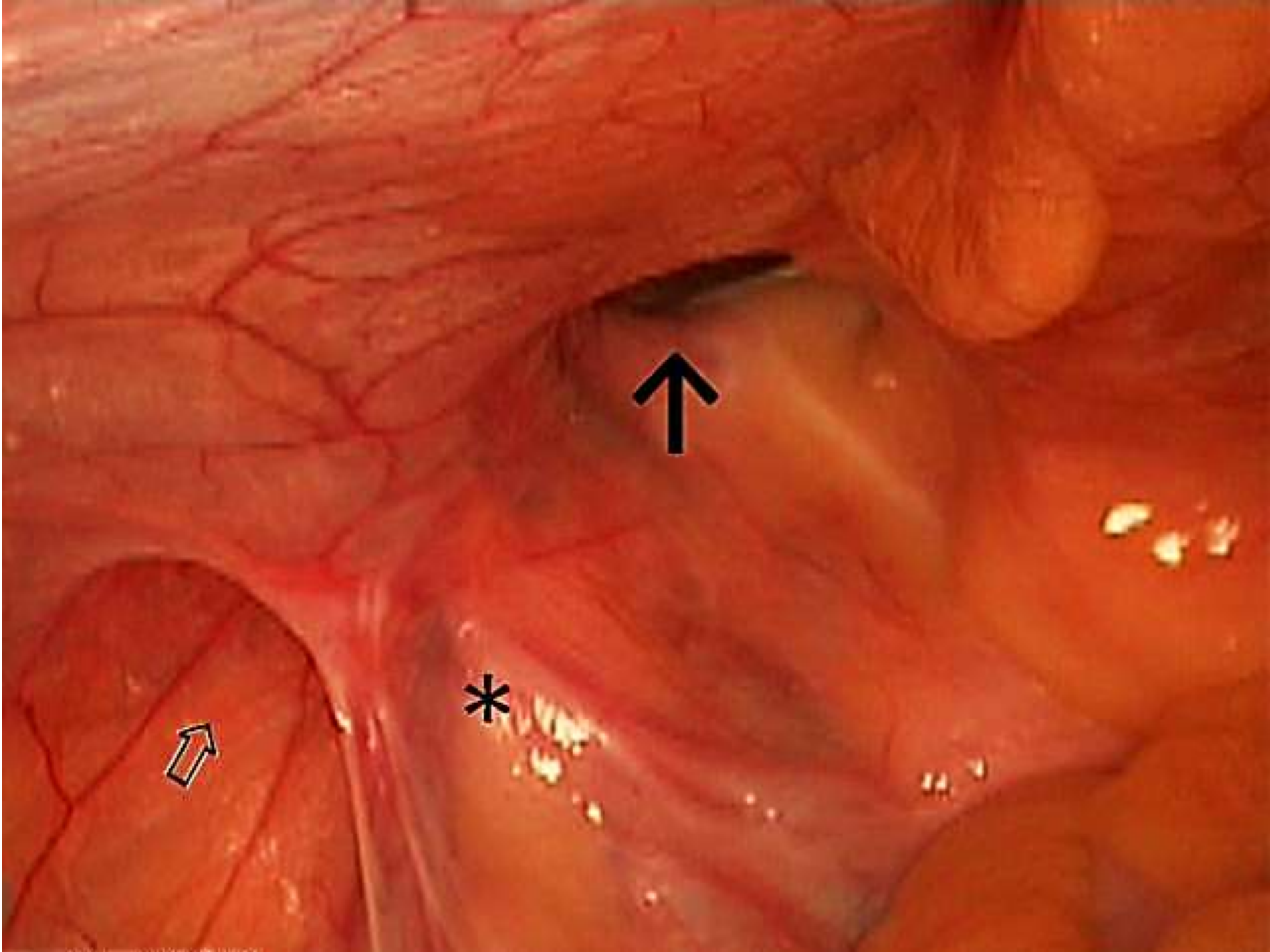
- This is also an acquired hernia due to weakening of the abdominal wall, but occurs at the deep inguinal ring lateral to the IE vessels. Retroperitoneal fatty tissue is pushed downwards along the inguinal canal. As more tissue enters the hernia, peritoneum is pulled with it, thus creating a sac.
- On the left side, sigmoid colon may be pulled into a sliding hernia and on the right side the caecum.
- If both lateral and medial hernias are present in the same patient (pantaloon hernia).

Sliding inguinal hernia





Left direct (black arrow) and indirect hernia (White arrow) in a man.



EHS Groin Hernia Classification		Primary	Recurrent		
	0	1	2	3	x
L					
M					
F					

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 fingerbreadths assumed to be 1.5 cm.

Examination

Inspection
Palpation
Percussion
Auscultation

- Identi|fy the bony landmarks of the anterosuperior iliac spine and pubic tubercle to landmark the deep inguinal ring at the mid-inguinal point.
- If an inguinal hernia becomes irreducible and tense there may be no cough impulse. Differential diagnosis would include a lymph node groin mass or an abdominal mass .
- Large scrotal hernias may be misdiagnosed as a hydrocele or other testicular swelling.

- Ask the patient to stand up.
- Look at the lump from in front.
- Feel from the side.
- You must now ascertain the following facts about the lump:
  - Position.
  - Cough implus.
  - Temperature
  - Tenderness
  - Shape
  - Size
  - Tension
  - Composition (solid, fluid, or gaseous)
  - Reducibility.
  - Feel the other side (Of all patients 10% will present with bilateral inguinal hernias and up to 20% more will have an occult contralateral hernia on laparoscopic evaluation).

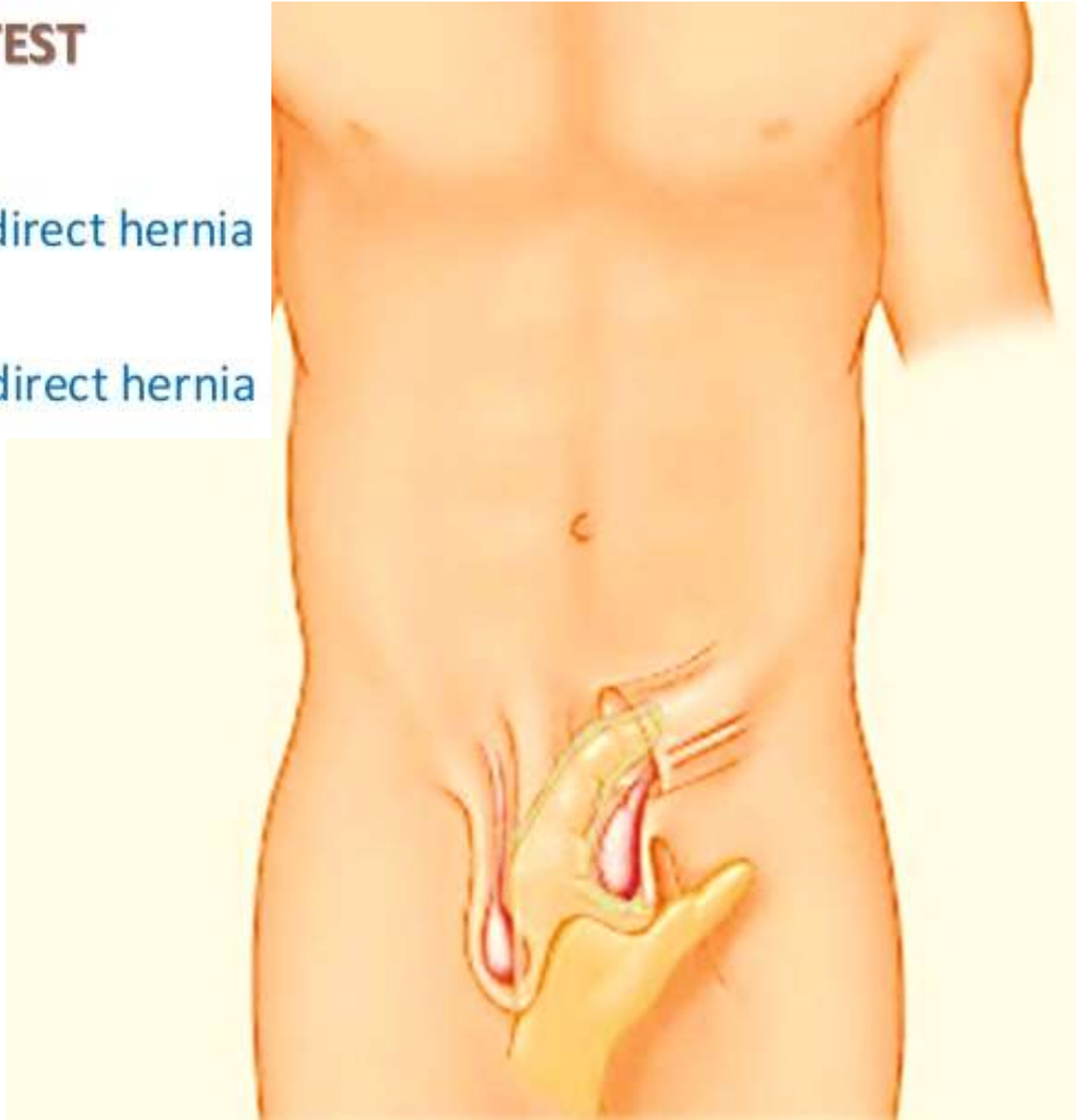
Examine the abdomen
Examine scrotum
Cardiovascular and respiratory assessment

COUGH IMPULSE

- Visible & Palpable cough impulse.
- Reappear on straining, standing or coughing

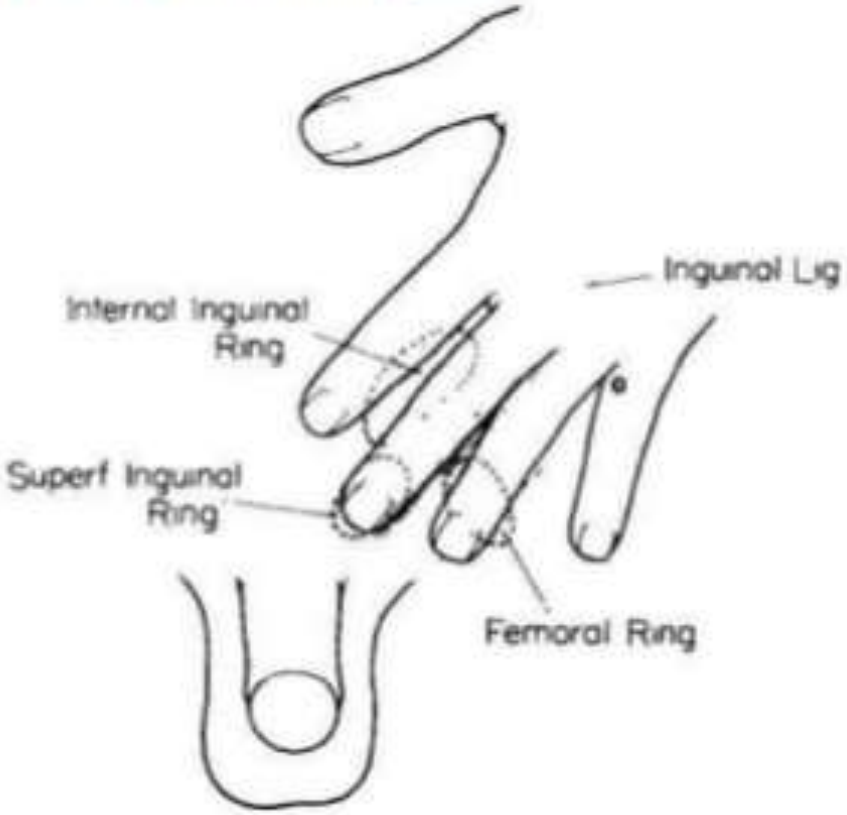
INVAGINATION TEST

- Felt on the pulp: direct hernia
- Felt on the tip: indirect hernia



THREE FINGER TEST / ZIEMAN'S TECHNIQUE

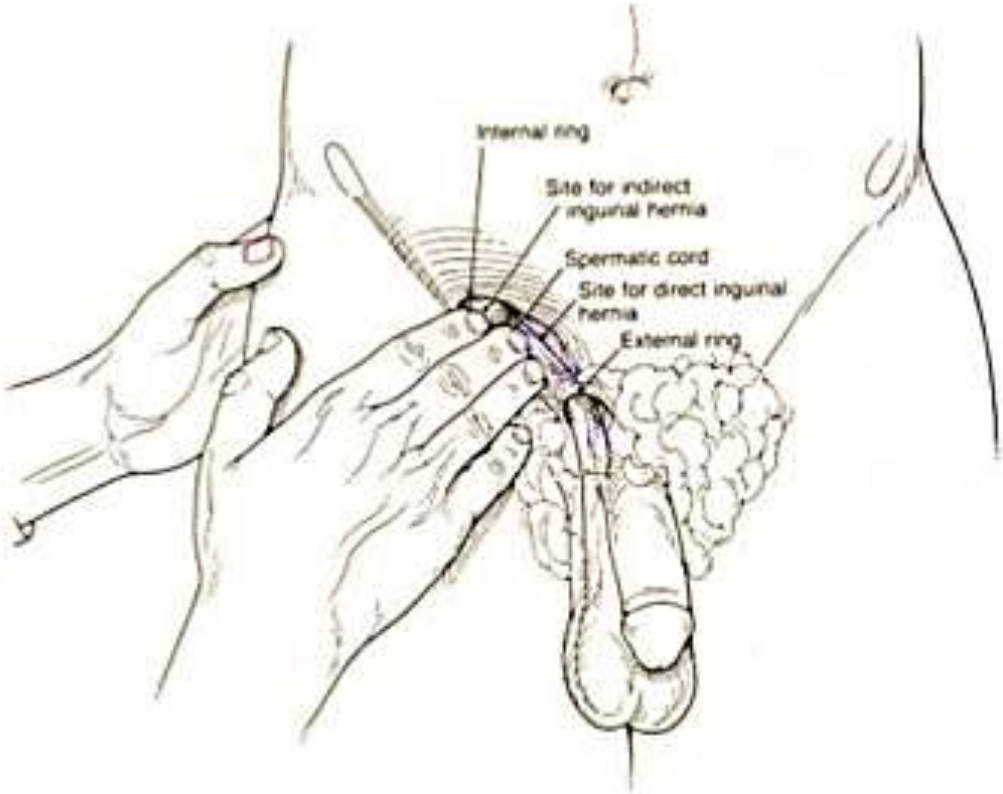
- Index finger: deep inguinal ring (indirect hernia)
- Middle finger: superficial ing. Ring (direct hernia)
- Ring finger: saphenous opening (femoral hernia)



RING OCCLUSION TEST

- (-) ring occlusion test: bulging of the hernia: **INDIRECT HERNIA**

- (+) ring occlusion test: no bulging of the hernia: **DIRECT HERNIA**



DDX hydrocele

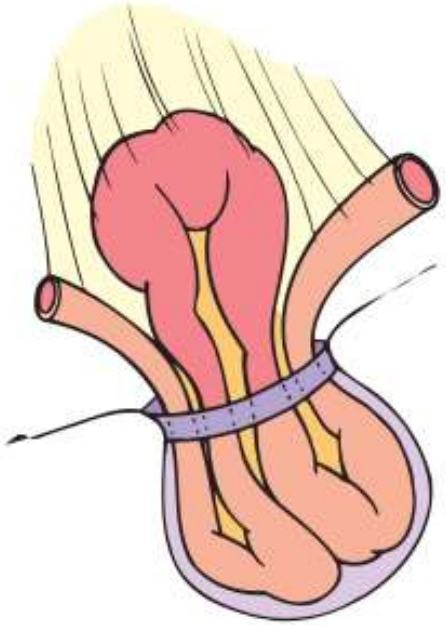
Inguinal hernia :

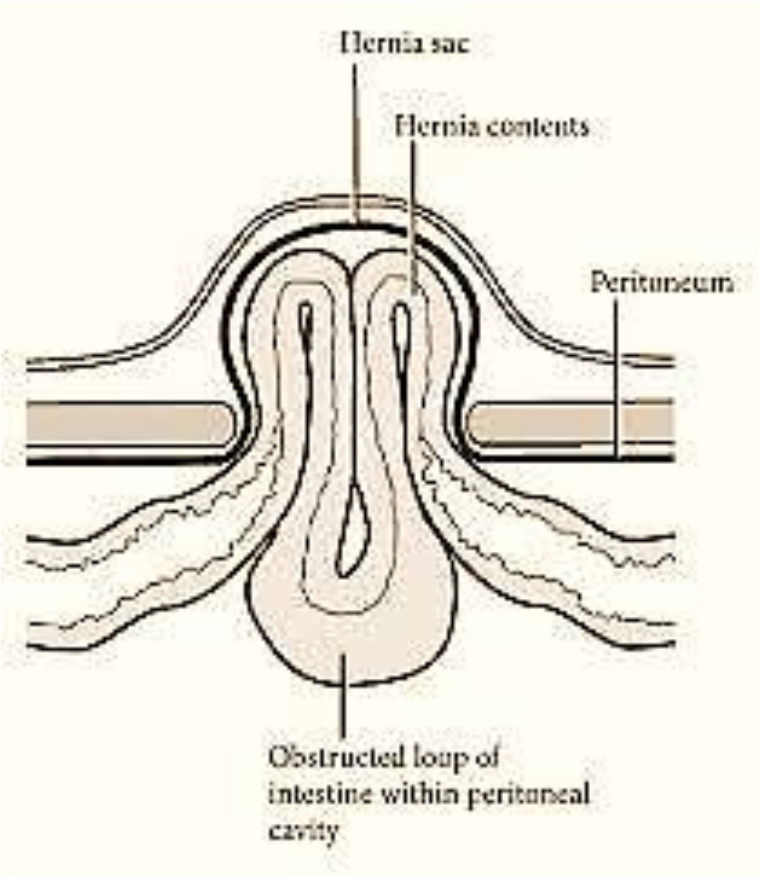
- Transillumination test. (-ve)
- Scrotal examination . (You can not get above it ?).
- Abdominal examination (Intestinal obstruction).

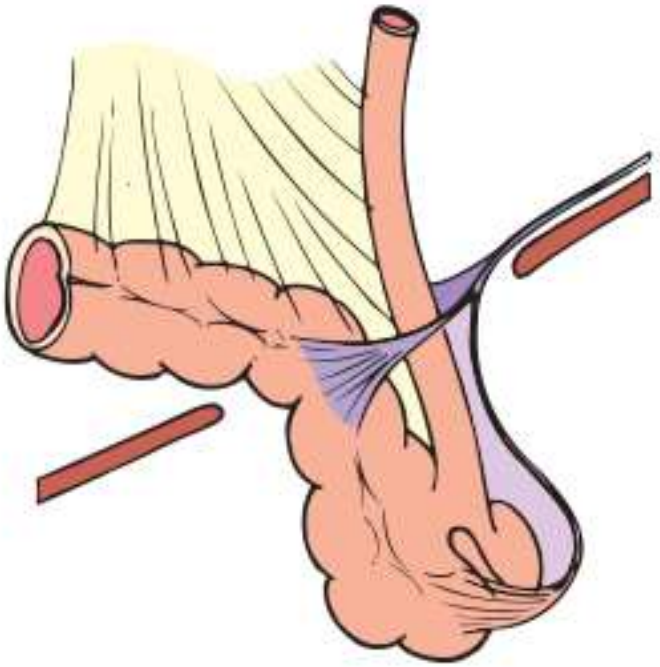
- Malgaigne’s bulge (Bulging of the inguinal regions with coughing is common; minor bulging of the inguinal canal is normal .

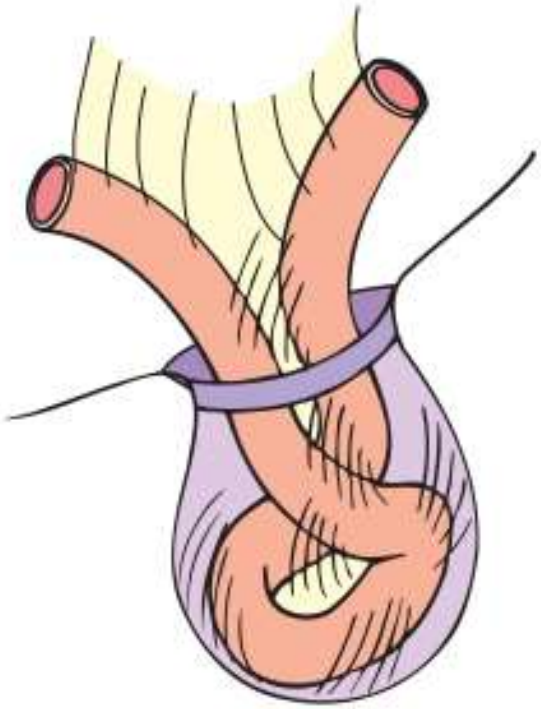
Maydl's hernia (hernia-en-W)

- Two loops of bowel in the sac, with strangulation of the loop of bowel in the abdomen which connects them. Diagnosis is made at operation.







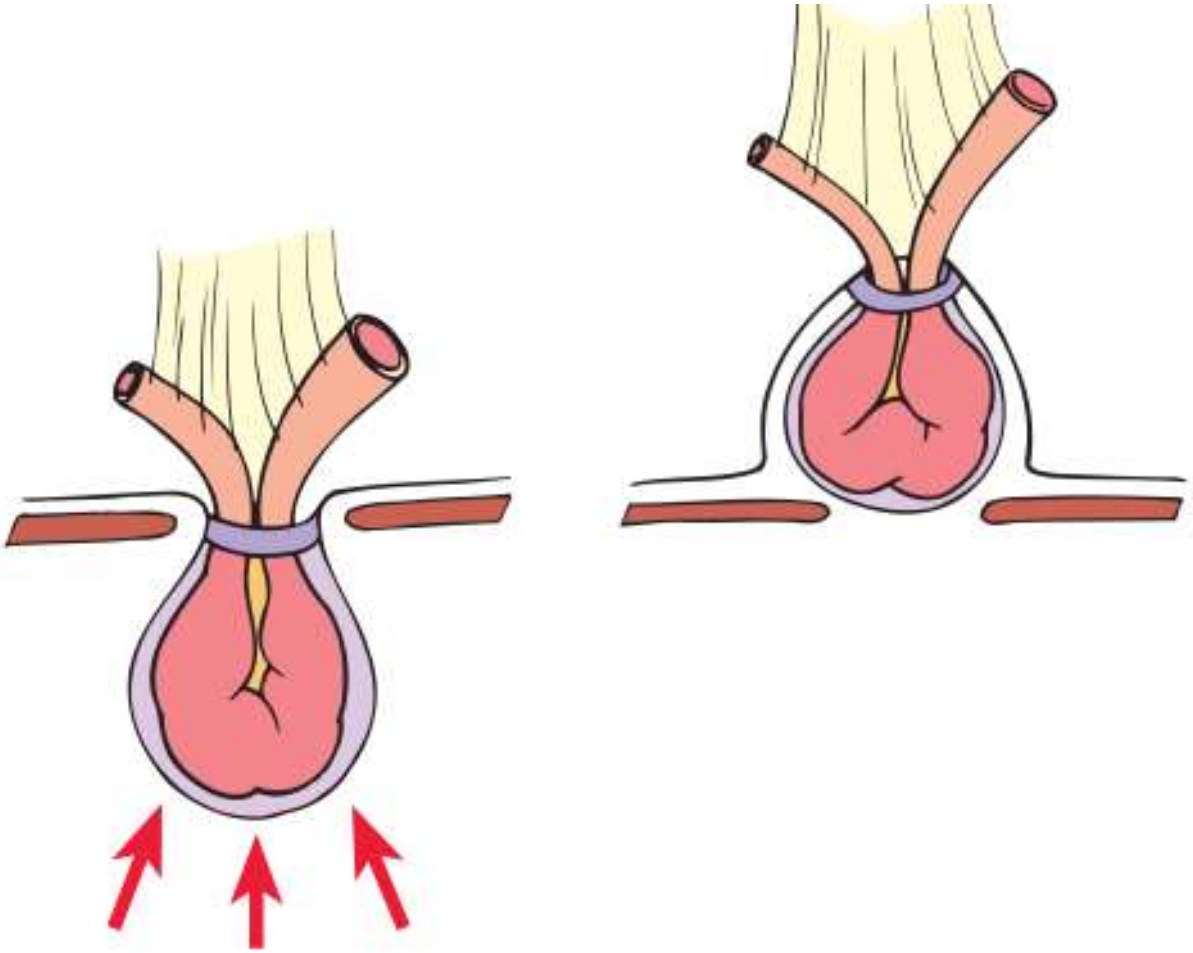


Sliding hernia

If bowel which is normally extraperitoneal forms one side of the sac, it is thought to have slid down the canal pulling peritoneum with it, hence the name hernia-en-glissade. The sac can contain other loops of bowel, and the gut forming the wall of the sac can be strangled by the external ring.

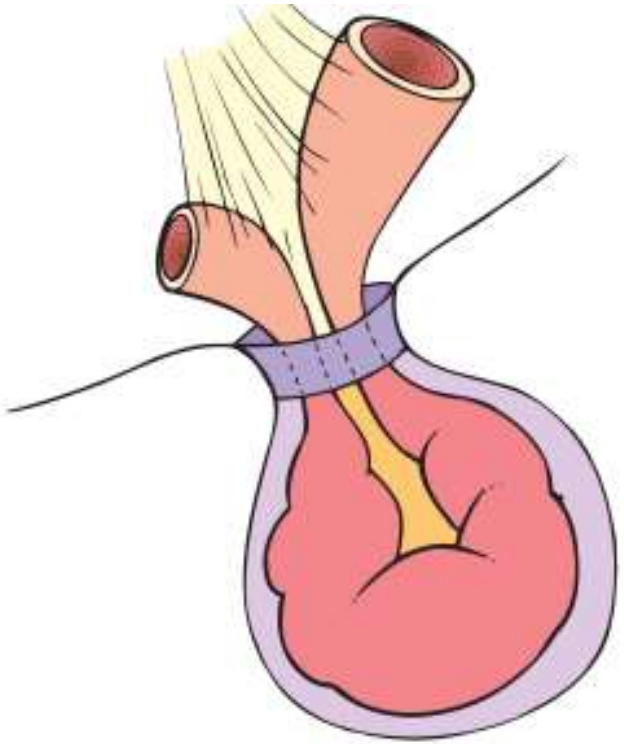
Incarceration

The contents are fixed in the sac because of their size and adhesions. The hernia is irreducible but the bowel is not strangulated or obstructed.

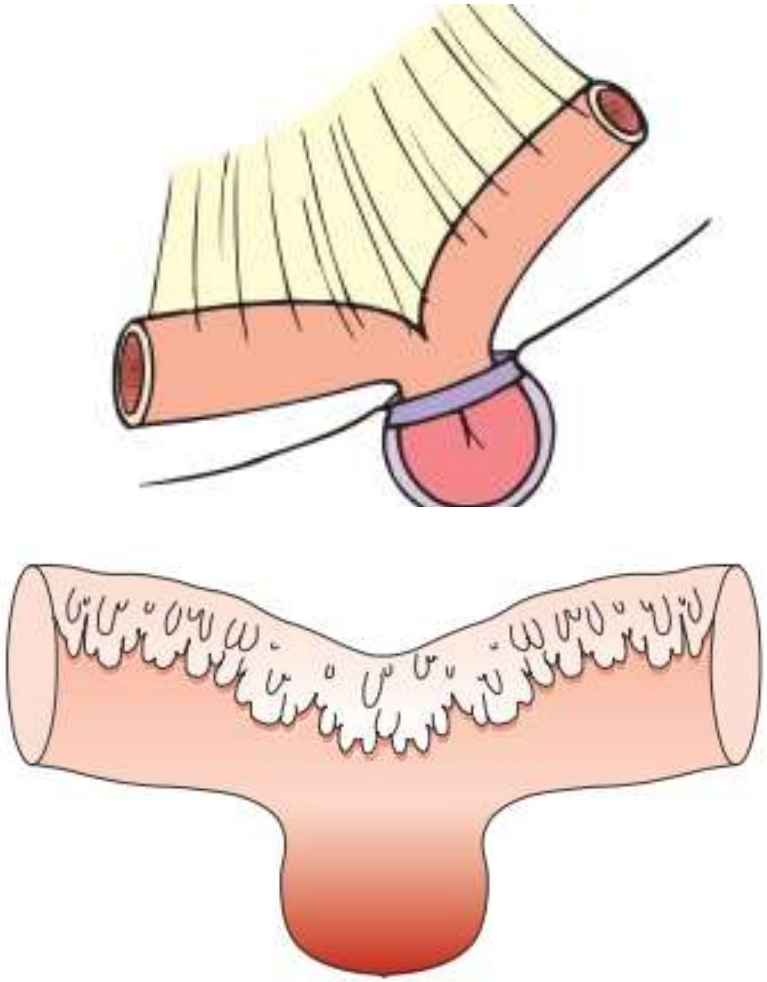


Reduction-en-masse

It is possible to push a hernia back through the abdominal wall, so apparently reducing it, without actually pushing the contents out of the sac. If they were strangulated in the first position they will still be strangulated in the second. *Never push hard* when trying to reduce a hernia.



A **strangulated hernia**
The blood supply of the contents of the hernia is cut off. When a loop of gut is strangulated there will also be intestinal obstruction.



A strangulated hernia
If the sac is small, a knuckle of bowel can be caught in the sac and strangled without causing intestinal obstruction. This is called a **Richter's hernia**.

The differential diagnosis of inguinal hernia

- Femoral hernia
- Vaginal hydrocele .
- Hydrocele of the cord or the canal of Nuck
- Undescended testis
- Lipoma of the cord.
- Sportsman’s hernia

- Inguinal hernia in women.
- Inguinal herniae in children (Pediatric Lectures).

Recurrent Hernia

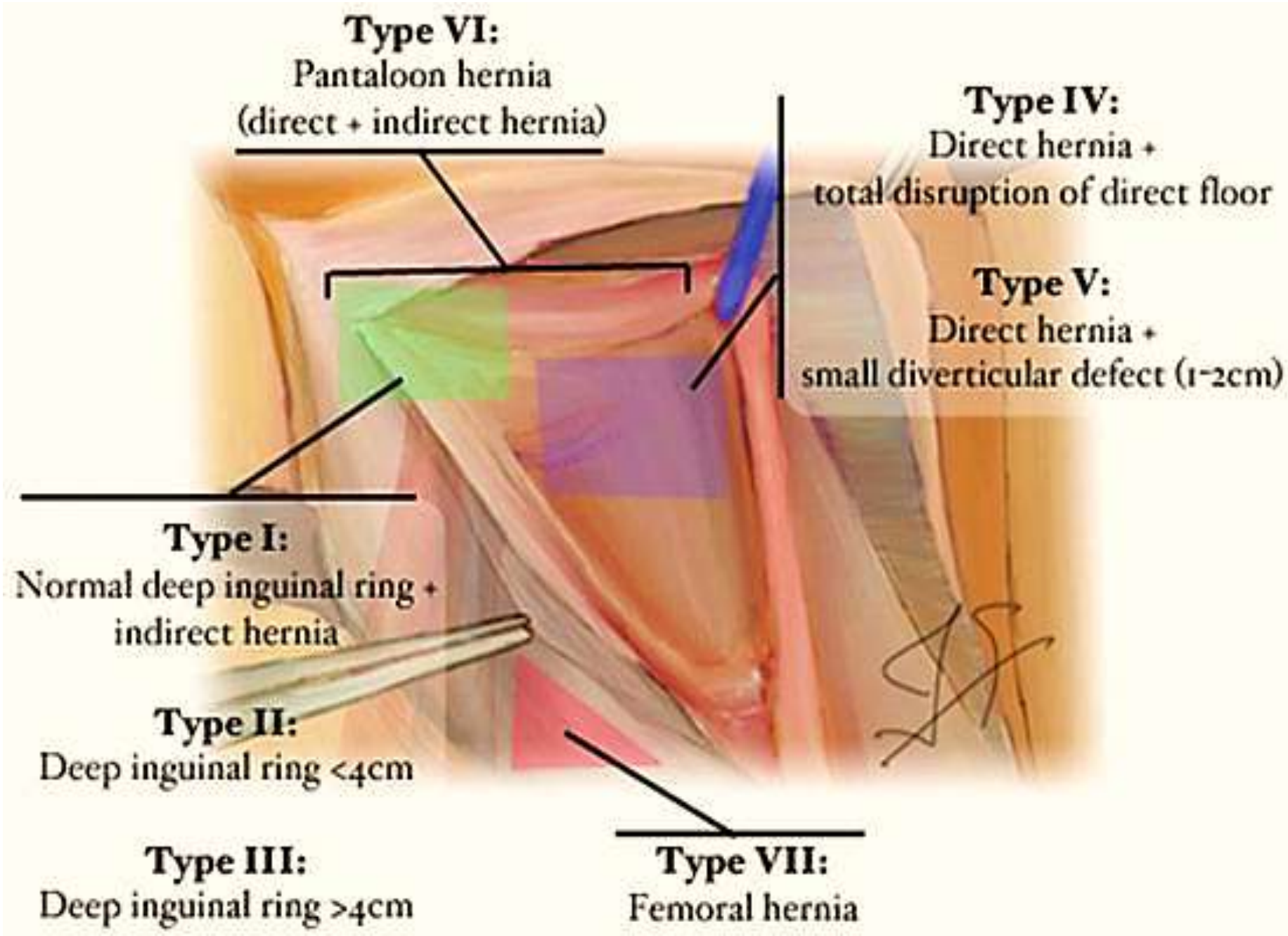
- Recognition is important because strangulation is more likely than with a new hernia.
- Duration.

Investigations for inguinal hernia

- Most cases require no diagnostic tests.
- But ultrasonography, CT and MRI are occasionally used.
- A herniogram involves the injection of contrast into the peritoneal cavity followed by screening which shows the presence of a sac or asymmetrical bulging of the inguinal anatomy.

Nyhus Classification of Inguinal Hernias

Hernia Type	Description
Type 1	Indirect hernia with internal inguinal ring of normal size
Type 2	Indirect hernia with dilated internal inguinal ring but intact posterior inguinal wall
Type 3	Posterior inguinal wall defect
Type 3A	Direct inguinal hernia
Type 3B	Indirect hernias with a large, dilated internal inguinal ring that encroaches on the posterior inguinal wall; includes pantaloon, scrotal, and sliding hernias
Type 3C	Femoral hernia
Type 4	Recurrent hernias
Type 4A	Direct
Type 4B	Indirect
Type 4C	Femoral
Type 4D	Combined

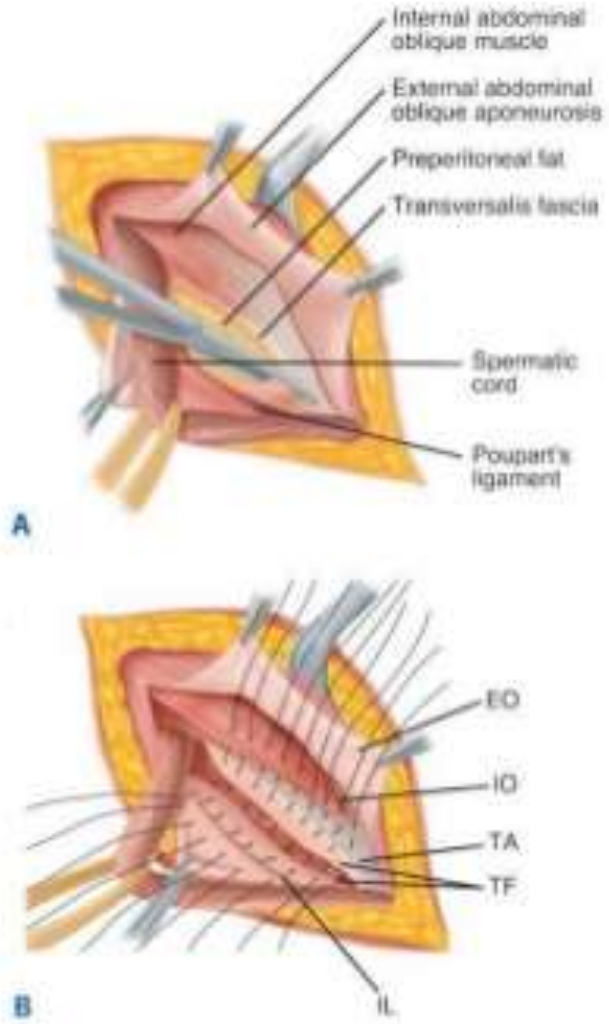

Type VI:
Pantaloon hernia
(direct + indirect hernia)
Type IV:
Direct hernia +
total disruption of direct floor
Type V:
Direct hernia +
small diverticular defect (1-2cm)
Type I:
Normal deep inguinal ring +
indirect hernia
Type II:
Deep inguinal ring <4cm
Type III:
Deep inguinal ring >4cm
Type VII:
Femoral hernia

Operations for inguinal hernia

- Emergency / Elective.
- Herniotomy (In children). In adult surgery, herniotomy alone has a high recurrence rate and some form of muscle strengthening is added (herniorrhaphy).
- Open suture repair (Bassini , Shouldice).
- Open flat mesh repair (Lichtenstein)
- Open complex mesh repair (Plugs , Hernia systems)
- Open preperitoneal repair (Stoppa)
- Laparoscopic repair (TEP , TAPP) The totally extraperitoneal (TEP) approach is more widely used than the transabdominal preperitoneal (TAPP) approach.

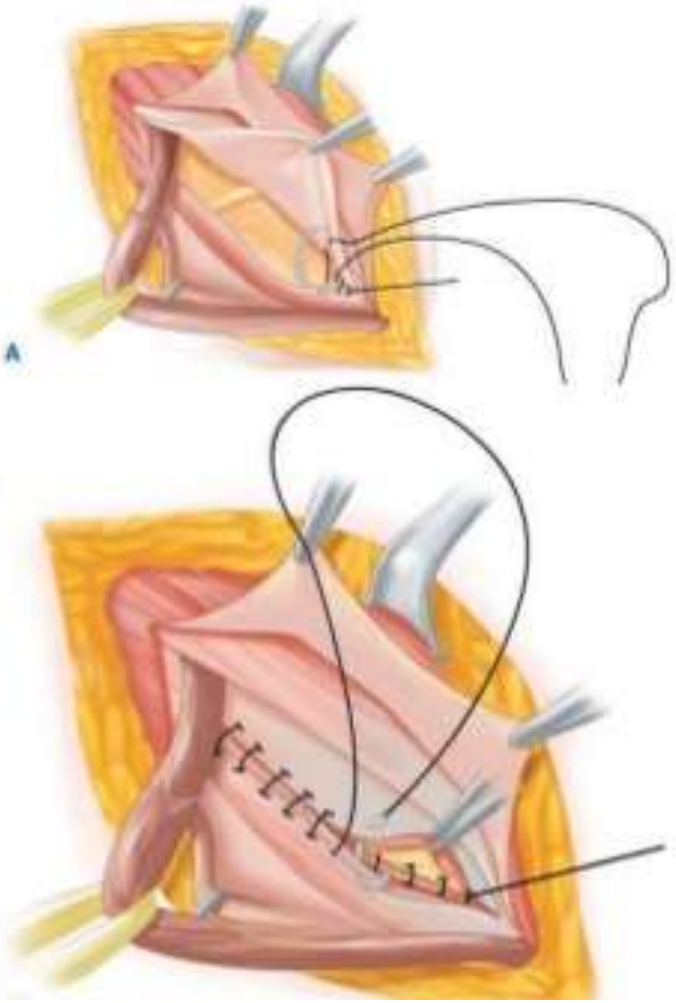
BASSINI REPAIR

- Sutures approximate reflection of inguinal ligament (Poupart's) to the transversus abdominis aponeurosis/conjoint tendon
- Major Components:
  - Division of the external oblique aponeurosis
  - Division of the cremaster muscle
  - Division of the floor or posterior wall of the inguinal canal
  - High ligation of an indirect sac
  - Reconstruction of the posterior wall



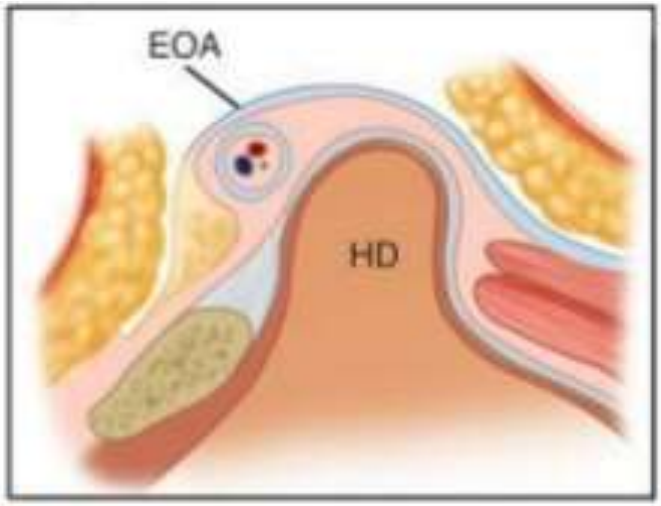
Shouldice

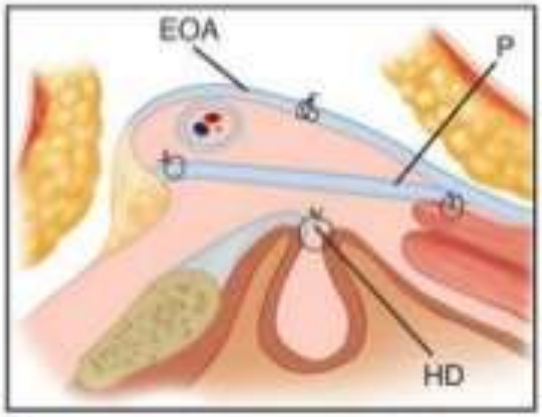
- The transversalis fascia is opened by a central incision from the deep inguinal ring to the pubic tubercle and then closed to create a double-thick, two-layered posterior wall (double breasting).



- The external oblique is closed in similar fashion.

LICHTENSTEIN TENSION-FREE HERNIOPLASTY





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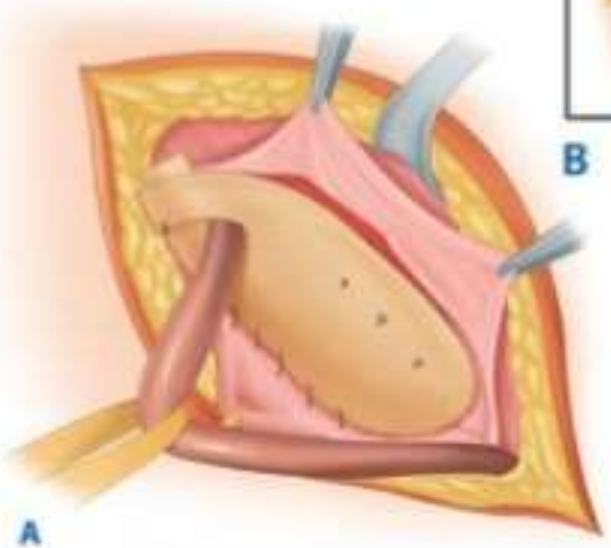

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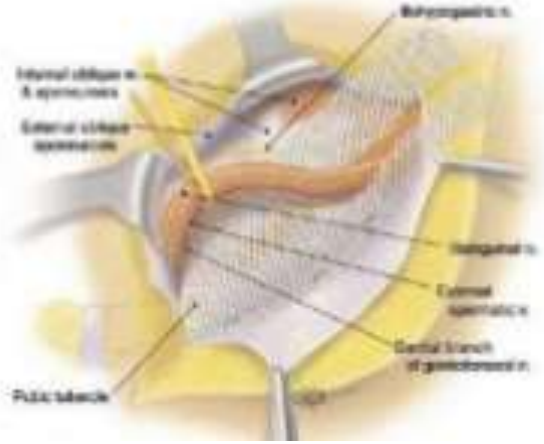
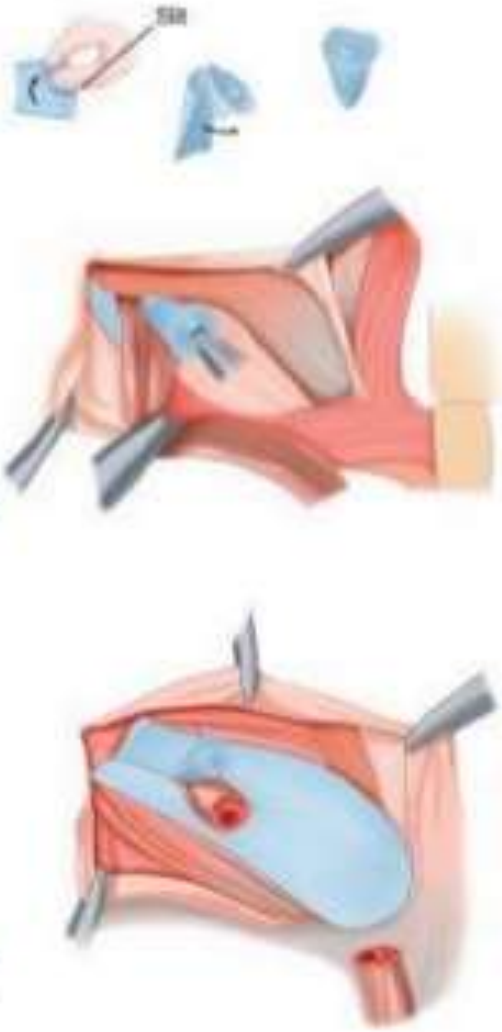


Expands the domain of the inguinal canal by reinforcing the inguinal floor with a prosthetic mesh

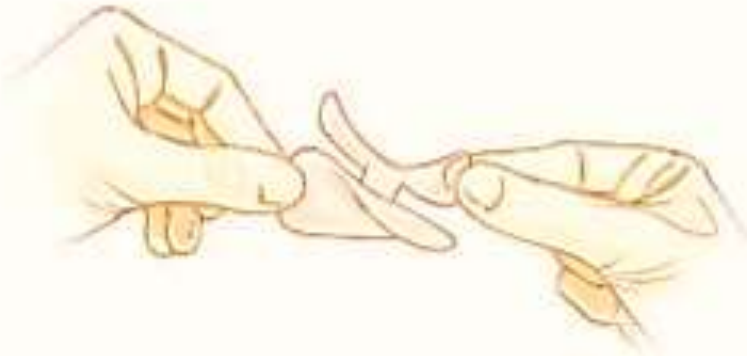


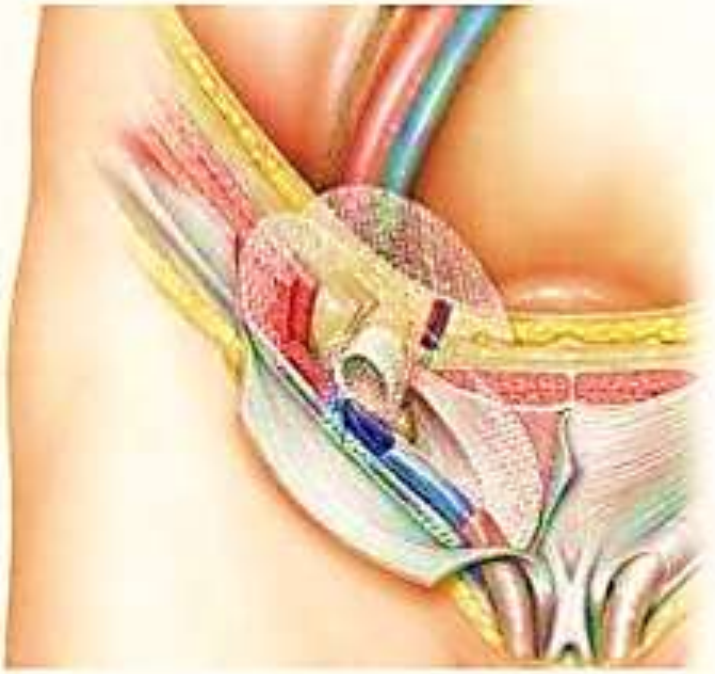
PLUG AND PATCH TECHNIQUE

- Modification of the Lichtenstein repair; developed by Gilbert and later popularized by Rutkow and Robbins
- **Indirect:** plug is placed alongside the spermatic cord through the internal ring
- **Direct:** sac is reduced, and the plug is sutured to Cooper's ligament, the inguinal ligament, and the internal oblique aponeurosis

PROLENE HERNIA SYSTEM

- provides reinforcement to the anterior and posterior aspects of the abdominal wall
- The advantage of the preperitoneal mesh position:
  - increased intra-abdominal pressure pushes the mesh into closer apposition to the abdominal wall.
- The overlay flap reinforces the inguinal floor similar to a tension-free repair.

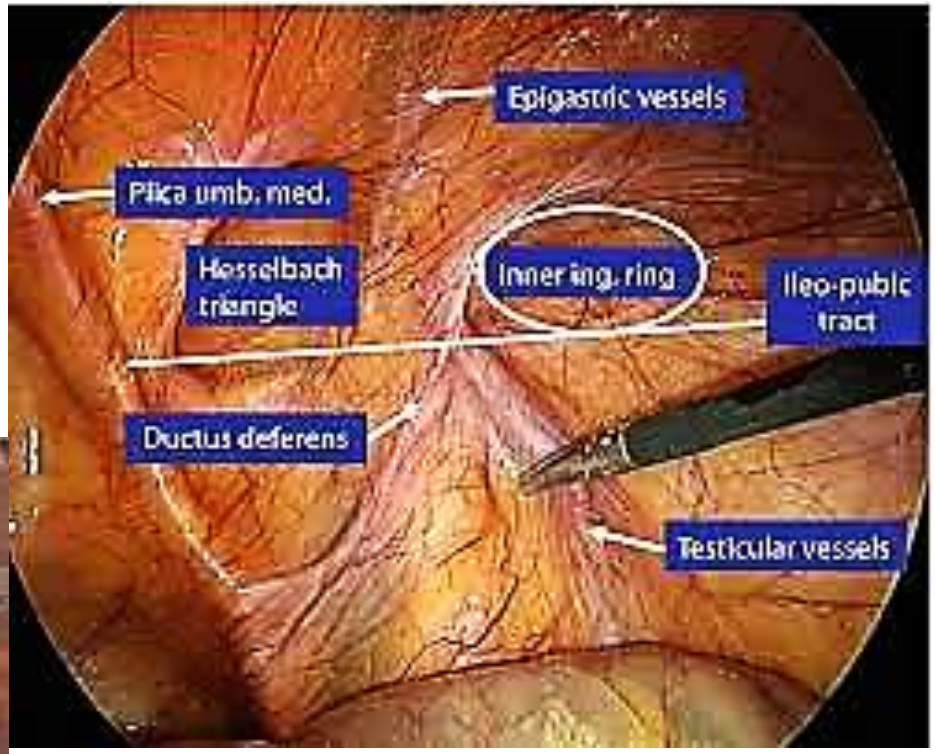




LAPAROSCOPIC APPROACH

Transabdominal Preperitoneal Procedure

- Useful for bilateral hernias, large hernia defects, and scarring from previous lower abdominal surgery

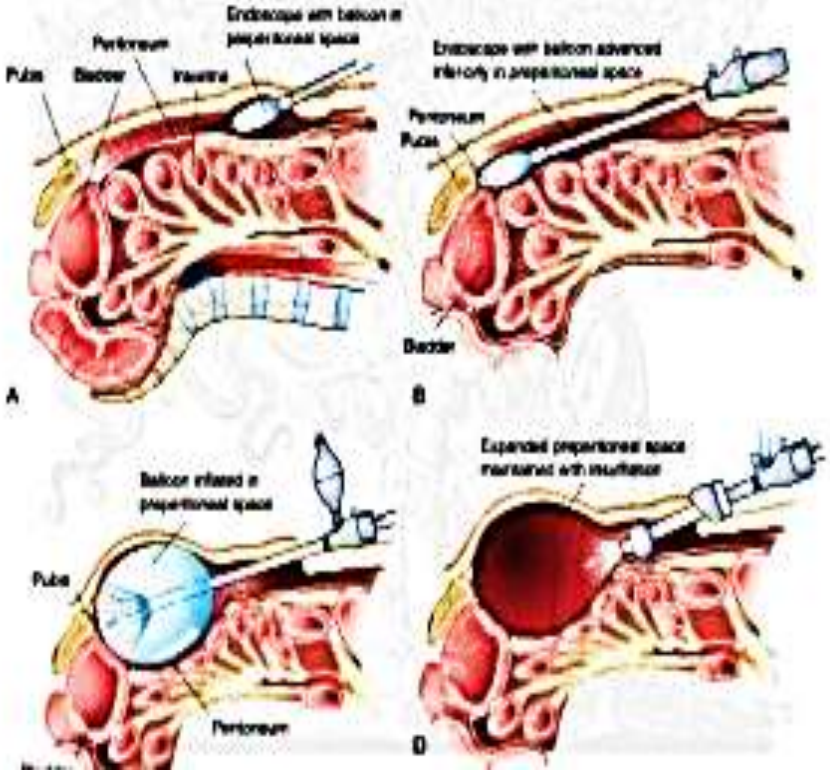


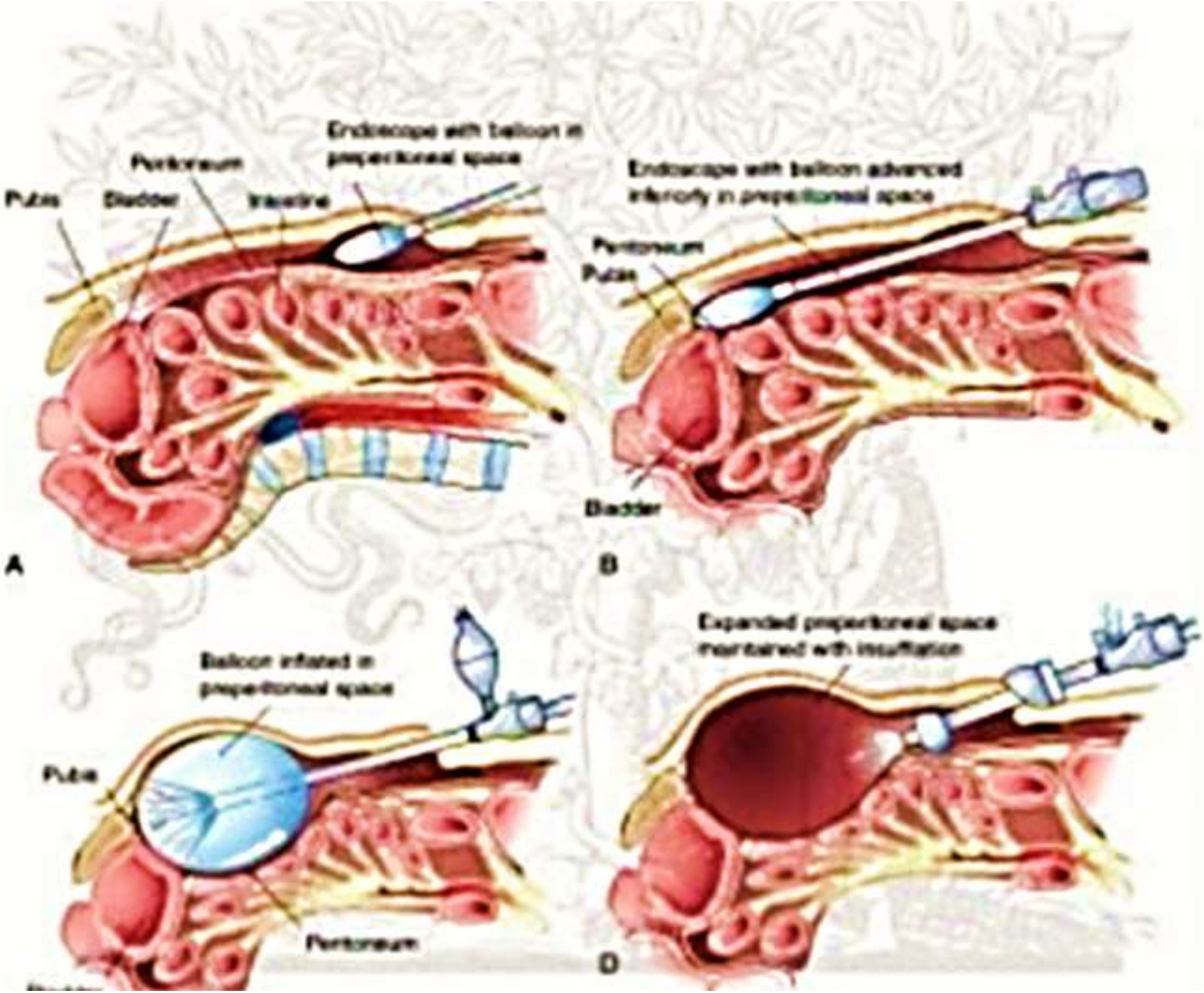
LAPAROSCOPIC APPROACH

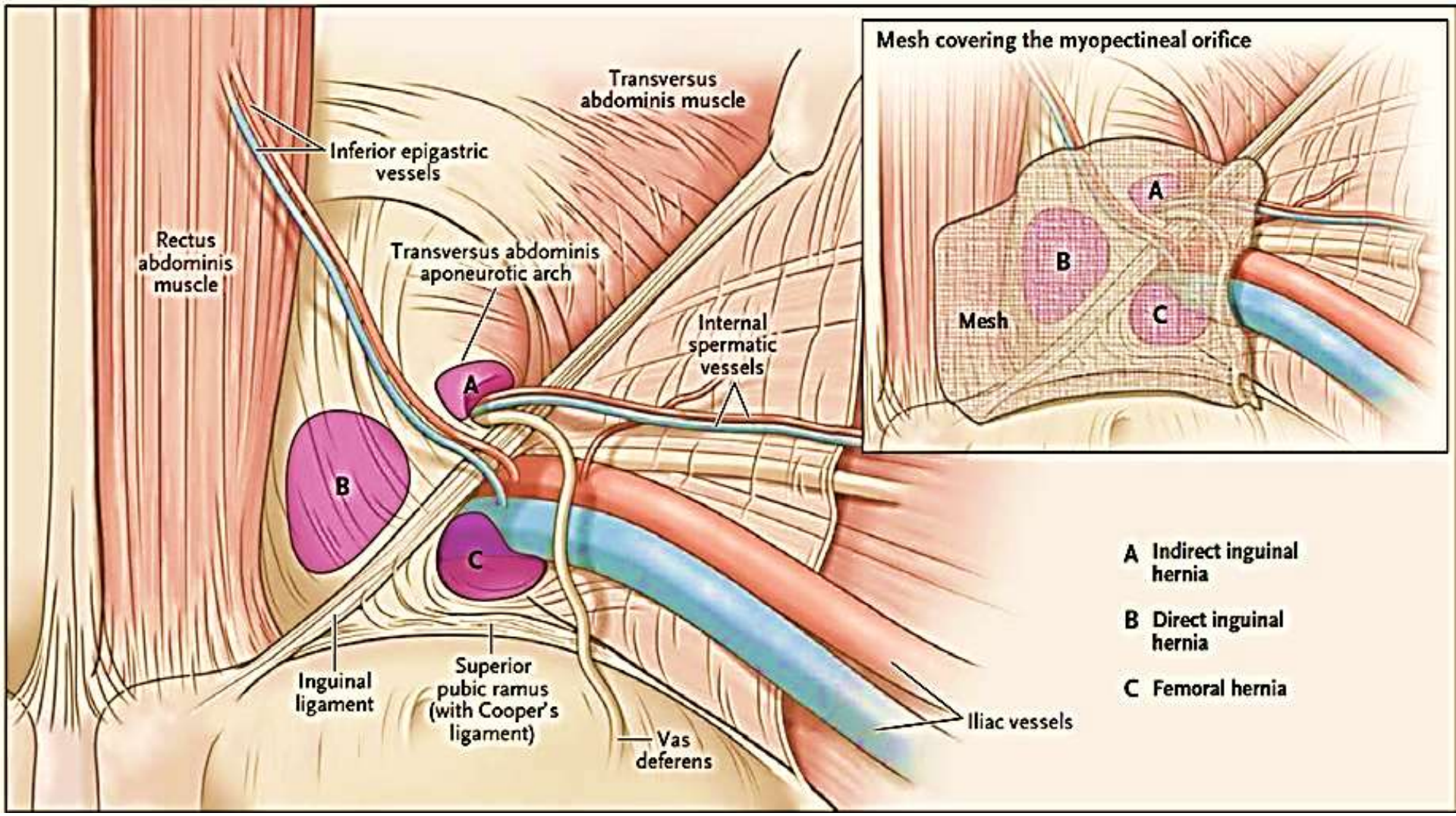
Totally Extraperitoneal Procedure

- Advantage: access to the preperitoneal space without intraperitoneal infiltration

- minimizes the risk of injury to intra-abdominal organs and port site herniation through an iatrogenic defect in the abdominal wall




Endoscope with balloon in preperitoneal space
Peritoneum
Pubis
Bladder
Intestine
A
Endoscope with balloon advanced inferiorly in preperitoneal space
Peritoneum
Pubis
Bladder
B
Balloon inflated in preperitoneal space
Pubis
Peritoneum
C
Expanded preperitoneal space maintained with insufflation
D

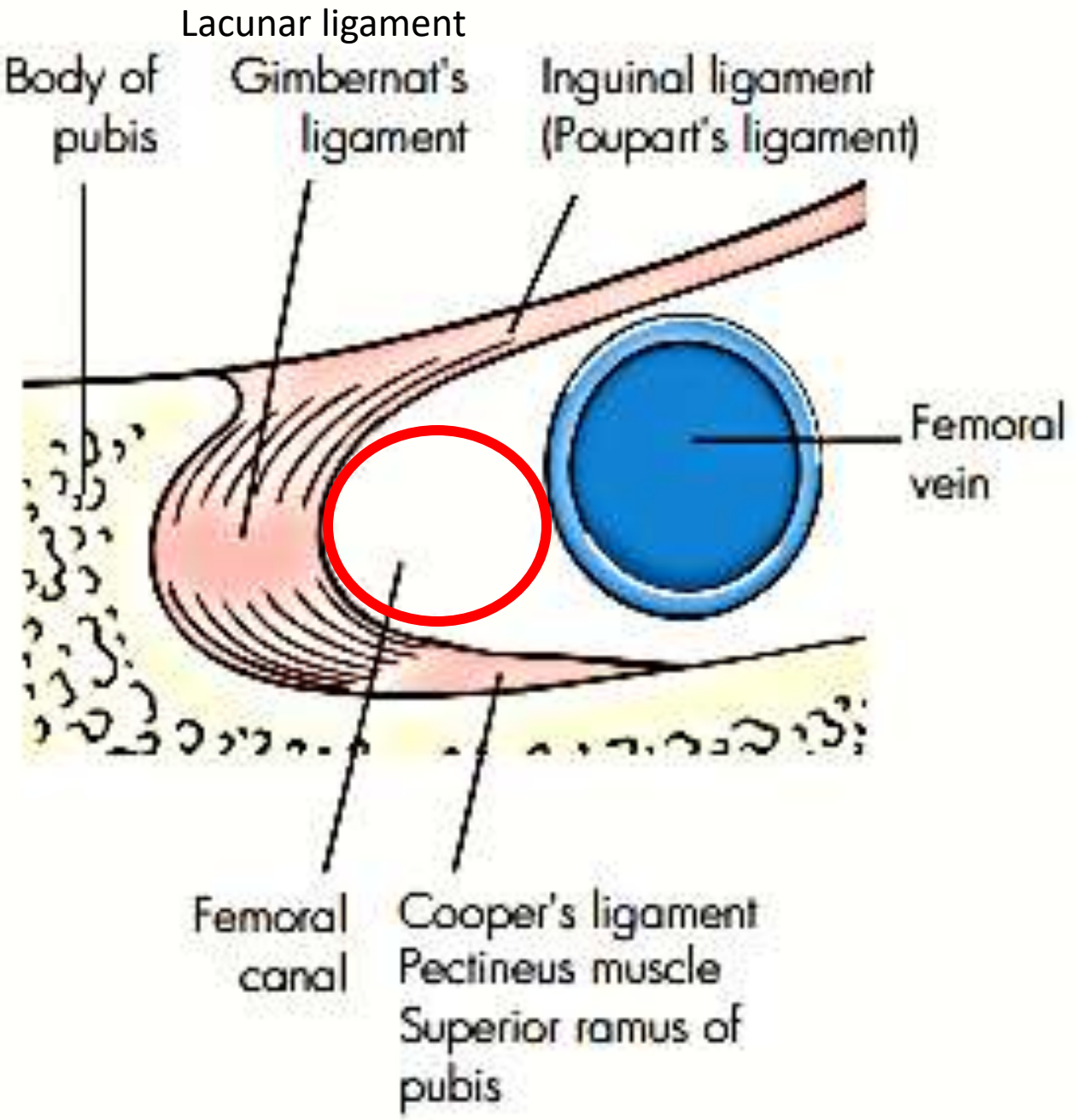

Mesh covering the myopectineal orifice
A
B
C
Mesh
Transversus abdominis muscle
Inferior epigastric vessels
Rectus abdominis muscle
Transversus abdominis aponeurotic arch
Internal spermatic vessels
A
B
C
Inguinal ligament
Superior pubic ramus (with Cooper's ligament)
Vas deferens
Iliac vessels
A Indirect inguinal hernia
B Direct inguinal hernia
C Femoral hernia

COMPLICATIONS OF INGUINAL HERNIA SURGERY

- Immediate complications (bleeding, urinary retention
- Over the next week :seroma formation and wound infection may occur.
- Recurrence.
- Chronic pain, defined as pain present 3 months after surgery, is common after all forms of surgery. It is less common and less severe after laparoscopic surgery. neuralgic pain due to nerve irritation. may be due to the mesh.(LESS IN LAPROSCOPY.
- Rarely, damage to the testicular artery can lead to testicular infarction,

Femoral hernia.

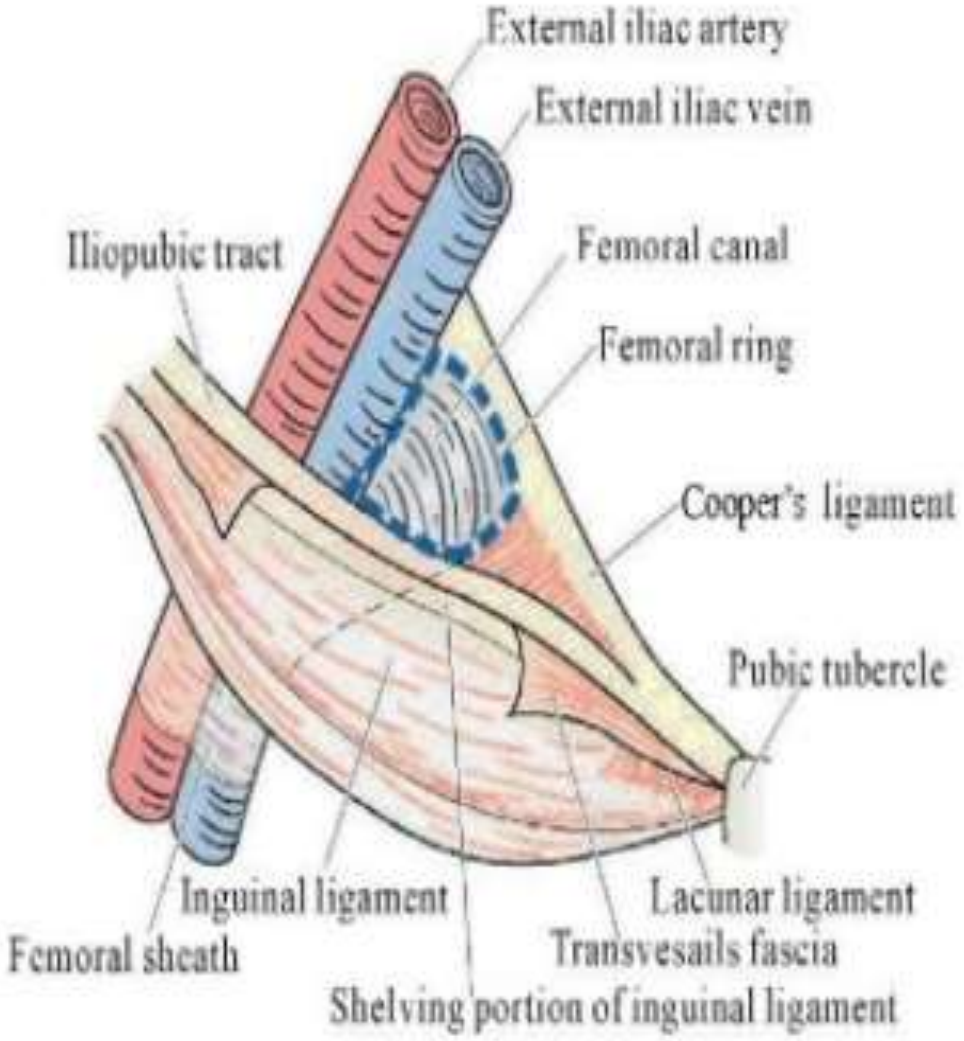
- Less common than inguinal hernia
- It is more common in women than in men
- Easily missed on examination
- 50% of cases present as an emergency with very high risk of strangulation


Lacunar ligament
Body of pubis
Gimbernat's ligament
Inguinal ligament (Poupart's ligament)
Femoral vein
Femoral canal
Cooper's ligament
Pectineus muscle
Superior ramus of pubis

Femoral hernia.

Boundaries of femoral ring

- Anterior: Inguinal ligament
- Posterior: Ligament of Cooper (pectineal ligament).
- Medial: Lacunar ligament (Gimbemat's ligament)
- Lateral: Thin septum which separates the femoral canal from femoral vein (silver fascia).



- Female > Male (wide neck with relative small size femoral vessels, wide pelvis)

Femoral hernia

-Inferior

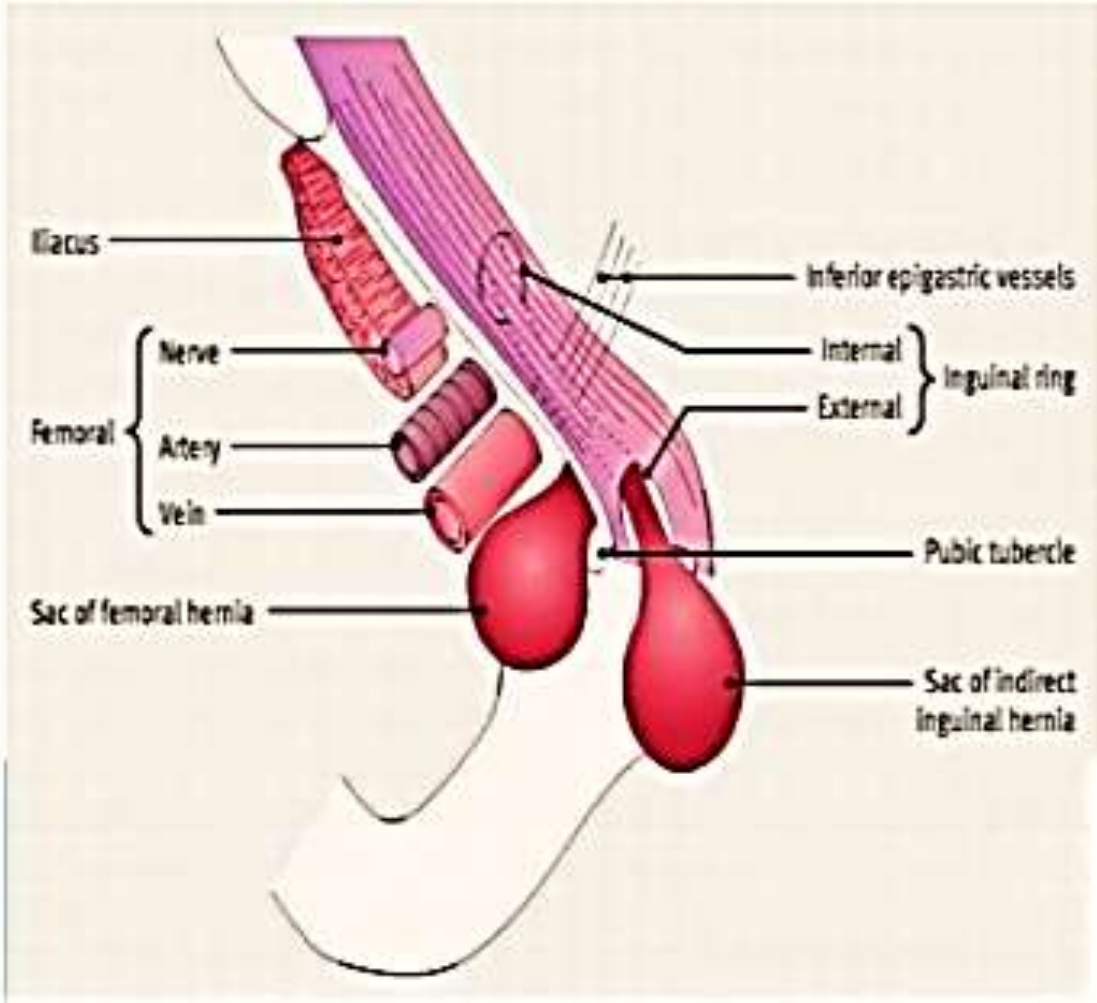
-Lateral

Inguinal hernia

-Superior

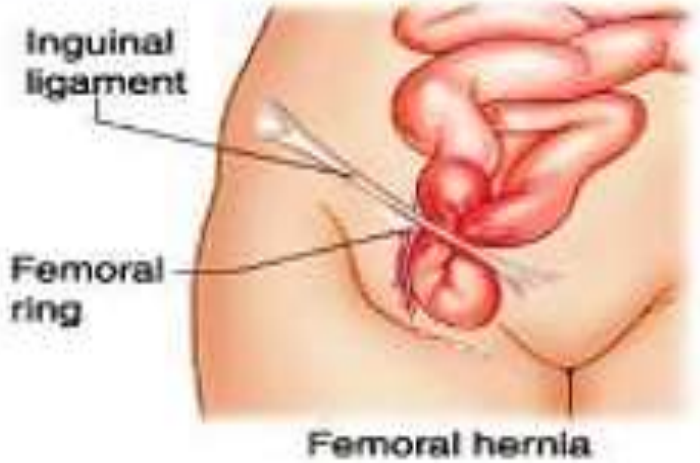
-Medial

To Pubic Tubercle



INGUINAL	FEMORAL
Above and medial to the pubic tubercle	**Below and lateral** to the pubic tubercle
Above the crease of the groin	**Below the crease** of the groin
Can be reduced completely	**Cannot** be reduced completely
Cough impulse **usually present**	Many do **not** have cough impulse

Inguinal hernia



Femoral hernia

- Pain
- Tense and Tenderness.
- Swelling.
- Gaur’s sign :
- Mostly is irreducible.
- Intestinal obstruction
- Strangulation.

- The hernia (saphenous foramen) appears below and lateral to the pubic tubercle and lies in the upper leg rather than in the lower abdomen.
- The hernia often rapidly becomes irreducible and loses any cough impulse due to the tightness of the neck.
- It may only be 1–2 cm in size and can easily be mistaken for a lymph node.
- A direct inguinal hernia leaves the abdominal cavity just above the inguinal ligament and a femoral hernia just below.

Differential diagnosis

- Inguinal hernia
- Lymph node
- Saphena varix
- Femoral artery aneurysm
- Psoas abscess / Bursa.
- Rupture of adductor longus with haematoma.
- Lipoma.

Investigations

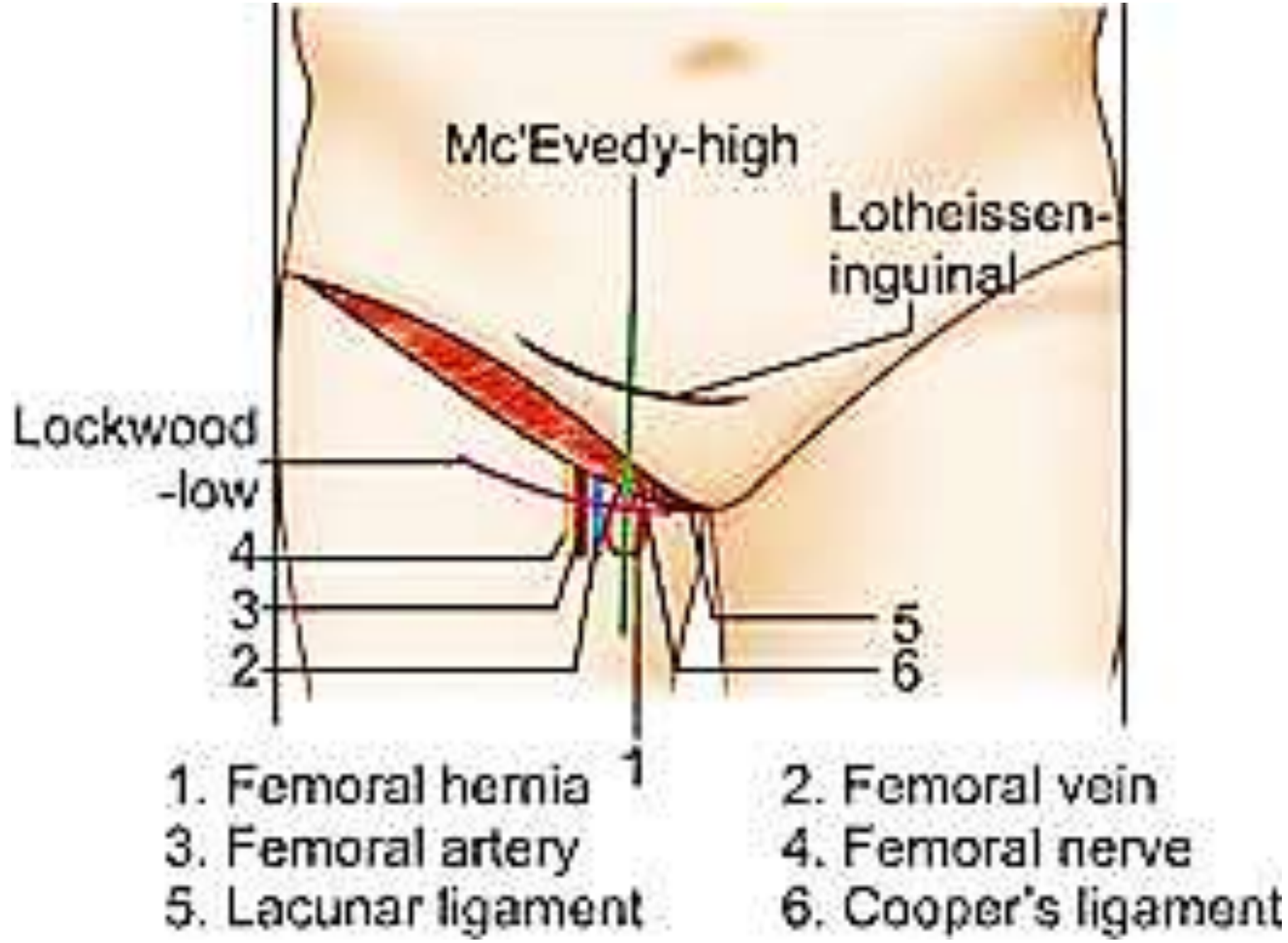
- All patients with unexplained small bowel obstruction should undergo careful examination for a femoral hernia.
- Plain X ray of abdomen.
- Ultrasonography.
- CT scan . it can identify an obstructing femoral hernia missed by clinicians.

Surgery for femoral hernia

Open approach with sutures or a mesh plug.

- LOW APPROACH (LOCKWOOD) suitable only when there is no risk of bowel resection.(A transverse incision . The sac of the hernia is opened and its contents reduced. The sac is also reduced and non-absorbable sutures are placed between the inguinal ligament above and the fascia overlying the bone below.
- THE INGUINAL APPROACH (LOTHEISSEN) The spermatic cord (or round ligament) is mobilised , the transversalis fascia is opened. A femoral hernia lcan be reduced by a combination of pulling from above and pushing from below. The neck of the hernia is closed with sutures or a mesh plug.
- HIGH APPROACH (McEVEDY) is ideal in the emergency situation where the risk of bowel strangulation is high. A horizontal incision is made in the lower lateral edge of the rectus muscle. Preperitoneal space. The femoral hernia is reduced and the sac opened , inspection of the bowel 5 minutes and then re-examined. The defect is then closed with sutures, mesh or plug.

LAPAROSCOPIC APPROACH (Both the TEP and TAPP approaches can be used for a femoral hernia and a standard mesh inserted.



1. Femoral hernia
2. Femoral vein
3. Femoral artery
4. Femoral nerve
5. Lacunar ligament
6. Cooper's ligament

تم بتوفيق الله