

Definition :

Abnormal protrusion of an organ or tissue from its cavity through a defect in its surrounding walls.

→ Sabiston 19th

"Protrusion of a viscus or a part of the viscus through an abnormal opening in the walls of its containing cavity"

Bailey - 25th

Risk Factors :

Congenital

- ① Collagen vascular diseases
- ② Patent processus vaginalis

Acquired

⊕ ↑ intra abdominal pressure

- ① chronic cough
- ② Chronic constipation

③ Excessive straining during micturition

④ Obesity

⑤ Intra abdominal mass

⑥ Musculo skeletal disorders

⑦ Smoking

Chronic cough

→ Abdominal muscles → Accessory muscles of respiration

Micturition : m/c in males

Young age

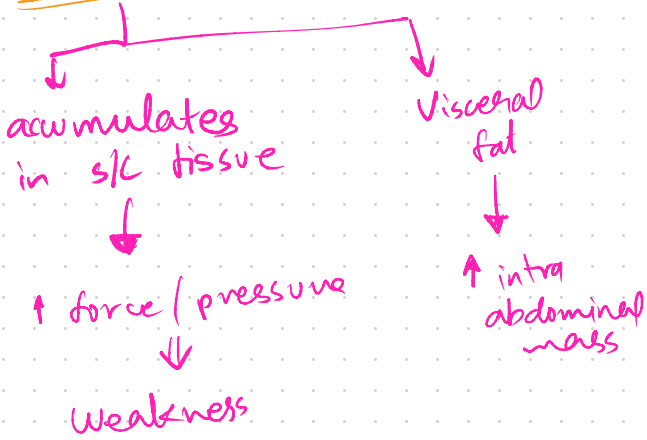
Stricture

↳ following : trauma
catheterization
Infection

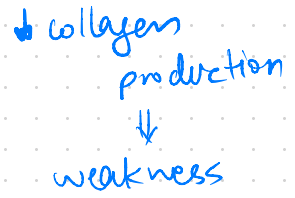
Old age

Benign Prostatic Hypertrophy

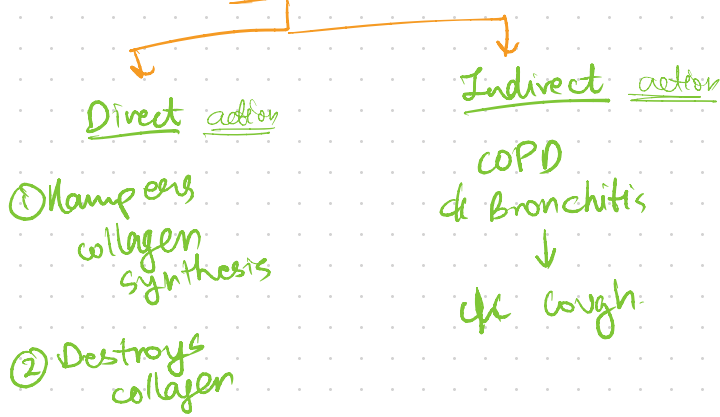
Obesity



Musculoskeletal disorders



Smoking



Classification :

External

- ① Groin : Inguinal hernia
Femoral hernia
- ② Ant. abd. wall :
Umbilical,
Epigastric,
Spigelian → through slit like defect in semilunar line.
- ③ Pelvis : Obturator,
Sciatic,
Perineal
- ④ Post. abd. wall :
Superior lumbar hernia
Inferior lumbar hernia

Internal

Hiatus hernia

↳ fundus herniates up through opening in diaphragm.

Diaphragmatic hernia

Paraduodenal hernia

↳ at starting of jejunum & ending of duodenum.

Pericecal

Foramen of Winslow

⊕ Trans mesenteric

GROIN HERNIA

⊗ Inguinal hernia

⊗ Indirect (mk in both M & F)
* Direct

M > F, Indirect > Direct, Right > Left

⊗ Femoral hernia

F:M > 1

→ hernia that is more common in females compared to males
↳ also, umbilical hernia
obturator hernia

ANATOMY OF INGUINAL CANAL

Inside to outside anatomy of
ANT. ABD. WALL

Ist layer : transversalis fascia
→ with round defect → deep inguinal ring

→ Inf. epigastric artery
↓
medial to deep ring

IInd layer : transversus Abdominis muscle

IIIrd : Internal oblique muscle

Last layer : External oblique muscle

→ with triangular slit opening
superficial inguinal ring

Boundaries of Inguinal Canal:

Posterior : transversalis fascia

Anterior : Ext. oblique Aponeurosis

Roof : Conjoint tendon → derivative of Int. oblique.

Floor : Inguinal ligament → [reflection of ext. oblique aponeurosis]

Contents of Inguinal Canal

1. Spermatic cord (Key Box 34.1) →
2. Ilioinguinal nerve (Key Box 34.2)
3. Genital branch of genitofemoral nerve
4. Round ligament in females
5. Vestigial remnant of processus vaginalis sac.

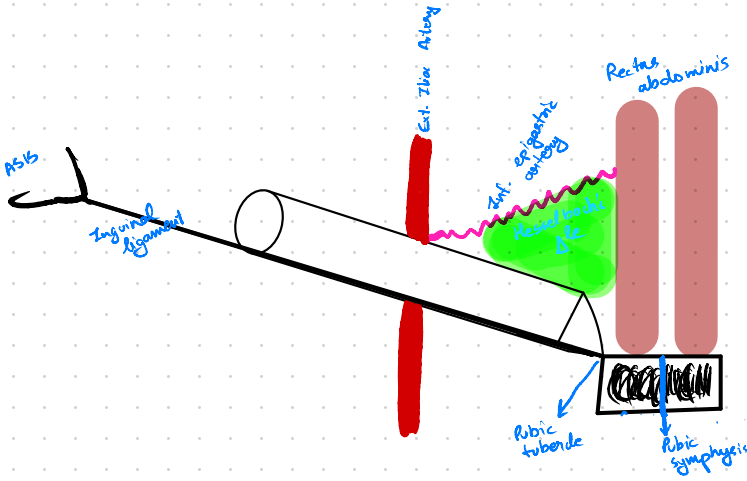
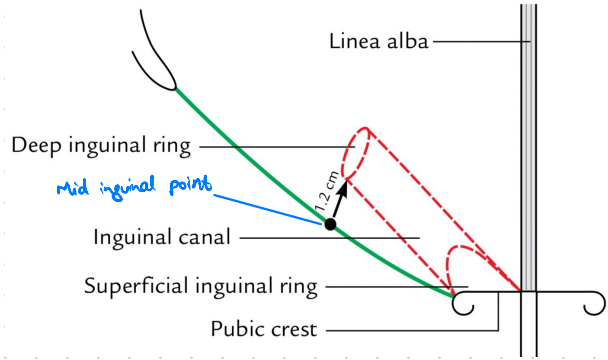
CONTENTS OF THE SPERMATIC CORD

- Vas deferens
- Testicular artery
- Artery to the vas
- Cremasteric artery
- Pampiniform plexus of veins
- Lymphatics
- Sympathetic nerves
- Genital branch of genitofemoral nerve
- Processus vaginalis

⊗ Inside the abdominal cavity the cord structures goes their separate ways.

vas deferens ⇒ medially
gonadal vessels ⇒ laterally

* cord is covered by cremasteric fascia



Boundaries of Hasselbach's Δ^le

Medially : Lateral border of RA muscle

Laterally : Inf. Epi artery

Inferior : Inguinal ligament.

⊗ Hernias through Hasselbach's Δ^le : DIRECT

⊗ Hernias through deep inguinal ring : INDIRECT

Protective Mechanisms:

1. Obliquity of the canal

- ⊛ Same principle is used while doing an aseptic tap $\Rightarrow$ "z-track technique"

2. Shutter mechanism

- ⊛ when conjoint tendon contracts, it acts like a shutter, by closing the canal.

3. Sphincter mechanism

- ⊛ the external oblique aponeurosis fibres forms the triangular slit opening of the superficial inguinal ring.

When the external oblique contracts, the superficial inguinal ring also closes like a sphincter

4. Ball-valve mechanism

- ⊛ The cremasteric fascia covering the cord structures contract when there is a sudden increase in intra-abdo. pressure (like a cough),
 $\rightarrow$ This contraction leads to formation of a ball-valve in the inguinal canal

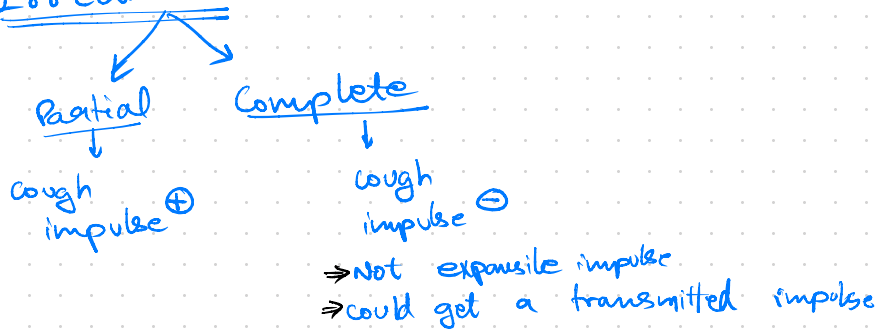
Classification of Indirect Hernia:

- In-complete {
- ① Bubonocoele → hernia within inguinal canal
 - ② Funicular → has come out through SIR but hasn't reached base of scrotum
 - ③ Complete → hernia has reached base of scrotum

Pathological Classification

- i) Reducible → Uncomplicated
 - ii) Irreducible
 - iii) Incarcerated
 - iv) Obstructed
 - v) Strangulated
- } Complication

Irreducible



abdomen, but it does not suggest any other complication whatsoever. Various causes of irreducibility are :- (i) adhesion of its contents to each other, (ii) adhesion of its contents with the sac, (iii) adhesion of one part of the sac to the other part, (iv) sliding hernia and (v) very large scrotal hernia (scrotal abdomen). Irreducible hernia is often confused

Obstructed :

Food is not able to go into the herniated bowel loop
i.e. intestine is obstructed.

Symptoms : Pain,
vomiting,
constipation,
obstipation (not able to pass flatus)

Strangulated : (3 Ts)

Irreducible + Obstructed + Arrest of blood supply
↓
NECROSIS

Symptoms : Pain,
vomiting,
constipation / obstipation

- ⊗ tenderness
- ⊗ local rise of temperature
- ⊗ tense

Incarcerated : irreducible + partial obstruction

Symptoms : Pain,
vomiting,
constipation,
No bowel compromise

H/O & EXAMINATION

H/OPI :

① Swelling :

Onset

Duration

② Progression → to differentiate the Direct v/s Indirect type of hernia.

Size, shape

Position,

Extent

② H/O aggravating & Relieving factors.

↓
defecation
urination
cough

↓
laying down
manual reduction

③ Symptoms suggestive of complications:

Pain, vomiting, Constipation...
Abdominal distension

④ H/O precipitating factors

↙ ↘ to avoid recurrence

↓
c/c cough, h/o smoking

difficulty in urination (poor urinary stream)

c/c constipation

h/o strenuous exercise

Nocturia ⇒ Lower Urinary Tract Symptoms ⇒ (FUR)
Frequency
Urgecy
Nocturia

} BPH

Causes of PAIN : (uncomplicated hernia)

- stretching of muscle ^(Dull aching pain) → Somatic pain → Groin region
- Drag on the mesentery ^(Dragging pain) → Autonomic → Umbilical region
- Colicky pain → d/t obstruction.
- Throbbing pain → d/t ischemia

Past H/O :

Comorbidities → for GA

Past Surgeries : Appendicectomy ?? ⇒ damage to Iliopsoas nerve ⇒ supplies Transverse Abdominis & Internal oblique muscles & Iliohypogastric nerve ⇒ Iliohypogastric nerve ⇒ damage predisposes to Right sided hernia.

Family H/O :

No similar complaints in the family -

sign of musculoskeletal disorders or collagen vascular diseases

Personal h/o :

make it a sentence. (Smoking, ?
h/o bowel & bladder habits. ?)

General Physical Exam :

⊛ Built & nourishment.

thin	well built	obese
Hernia - well seen	We can see the hernia	Hernia - not seen
↓ Uncomplicated ↓ because he/she presents early		↓ could present late as complicated hernia

* Cyanosis & Clubbing

↳ Resp. system disease → COPD
Bronchitis → c/c cough.

LOCAL EXAMINATION

[Consent, Position, Exposure.]
↓
underlies to mid-thigh.

INSPECTION:

→ Done in both standing & supine position.

- * Site, size, shape, extent, borders & surfaces.
- * Expansile cough impulse
- * Reducibility

Shape: Indirect — Pear shaped
Direct — Spherical / Globular

Femoral hernia → Ratort shaped

→ holden's line,
(thick fascial lining)
prevents hernia
to go downwards.

Landmarks :

ASIS
 Pubic symphysis
 Pubic tubercle
 Deep ring
 Superficial ring

PALPATION :

- * Local rise of temperature, tenderness
- * Confirmation of inspectory findings → say in proper sentences.
- * Consistency
- * special tests:

① Getting above swelling

→ to differentiate it from
 pre-scrotal swelling
 → cords palpable in pre
 scrotal swelling

② Deep ring occlusion test

→ stand in front of patient.
 → for rt. side test, use left hand & vice versa

- Thumb
- Place horizontally
- $\frac{1}{2}$ inch above midpoint b/w ASIS & PS

③ Ziemen's Test
 stand behind pt.
 3 fingers

Consent → Expose → Supine
 ↓
 mark 3 points ← reduce
 [Deep ring
 Sup. ring
 softness opening]

Surface Markings :
 ASIS - Mark the lateral ends of the pubis.
 Pubic tubercle - Mark the point of union of the pubic bones.
 Mid inguinal point - point b/w ASIS & pubic tubercle.
 Deep Ring - $\frac{1}{2}$ inch above the mid-inguinal point.
 Superficial Ring - just above & medial to pubic tubercle.
 Midpoint of ASIS - Inferior & lateral ASIS.
 Midpoint of ASIS - Inferior & lateral ASIS.
 Midpoint of ASIS - Inferior & lateral ASIS.

Mid point of : Pubic symphysis
 Inguinal Ligament : 1.5 cm lateral to ASIS

inner → deep ring ⇒ Indirect
middle → superficial ring ⇒ Direct
ring → saphenous opening ⇒ Femoral

④ Finger invagination test
small finger.

- only use: assess quality of superficial ring
- doesn't provide any additional info that can't be obtained from other test
- painful to the patient. Difficult to interpret the results of exam

Also tells how big the superficial ring is.

PERCUSSION & AUSCULTATION:

Intestine → Resonant & Bowel sounds ⊕

Omentum → Dull & Bowel sounds ⊖

SYSTEMIC EXAMINATION:

P/A: any mass / ascites. Strength of rectus muscles.
Ask patient to raise head while lying on bed to appreciate Maigne's bulgings

P/R: Prostate gland (must & should for an elderly male)
(especially if urinary symptoms ⊕)

R/S: features suggestive of chronic bronchitis

DIAGNOSIS

- 1) Side - Right / Left ?
- 2) Inguinal / Femoral ?
- 3) If inguinal, Indirect / Direct ?
- 4) Complete / Incomplete ?
- 5) Complicated / uncomplicated ?
- 6) Contents $\begin{cases} \swarrow \text{Intestine} \\ \searrow \text{Omentum} \end{cases}$?

Enterocoele (Intestine)

* gas filled

$\therefore$ during reducing

$\Rightarrow$ initially it is difficult
but becomes easy
towards end of reducing

Omentocoele

$\Rightarrow$ initially
easy to reduce
but difficult
to reduce
towards end
(probably d/t
adhesions)

INVESTIGATIONS

for:-

- * Confirm the diagnosis → clinical diagnosis
- * Stage the disease
- * Treatment of disease

For confirmation

USG → medicolegal purpose.
diagnosis of hernia is confirmed.

- ⊗ Look for femoral hernia
- ⊗ Look for hernia on opposite side
- ⊗ Prostate size → BPH
→ Post void residue
- ⊗ Any abdominal mass

CT Abdomen

No role for staging → ∵ it is a benign disease

For treatment,

CBC, ESR, viral markers, LFT, C-XA, ECG.
RBS, Renal function Test
S. Cr,
S. Electrolytes → if vomiting was there
(when obstruction).

TREATMENT

No role for conservative management.

→ But in elderly pts (70s, 80s) & in those who are not fit for anaesthesia

reduction of hernia & follow-up would be enough.
Let's hope!

* Surgery → gold standard

open

↓
can be done under local, spinal or general anaesthesia

Laparoscopic

↓
can only be done under general anaesthesia

OPEN SURGERY

④ **Herniotomy** → Excision of sac.

In children, the rings superimpose causing hernia,
for this excision of sac is only needed.
As the child grows, the canal will become oblique

④ **Hernioraphy** → tissue repairs. [posterior wall strengthening.]

BASSINI'S
SHOULDICE'S
DASARDA'S

} tension
↓
↑ chance of failure

④ **Hernioplasty** → tension free

Excise sac
Put mesh

↓
Aseptic inflammation
↓ takes about 15-20 days
fibrosis ⇒ becomes a barrier

Lichtenstein's Tension Free Hernia Repair

done
under
LA, or
spinal
anesthesia

- mesh placed on posterior wall of inguinal canal
- mesh placed over transversalis fascia
- covered by external oblique

LAPAROSCOPIC SURGERY

Why is it done under GA?

→ for lap sx, we have to inflate the abd., this puts pressure on the chest making breathing difficult

→ So we put the patient in GA & provide tidal volume

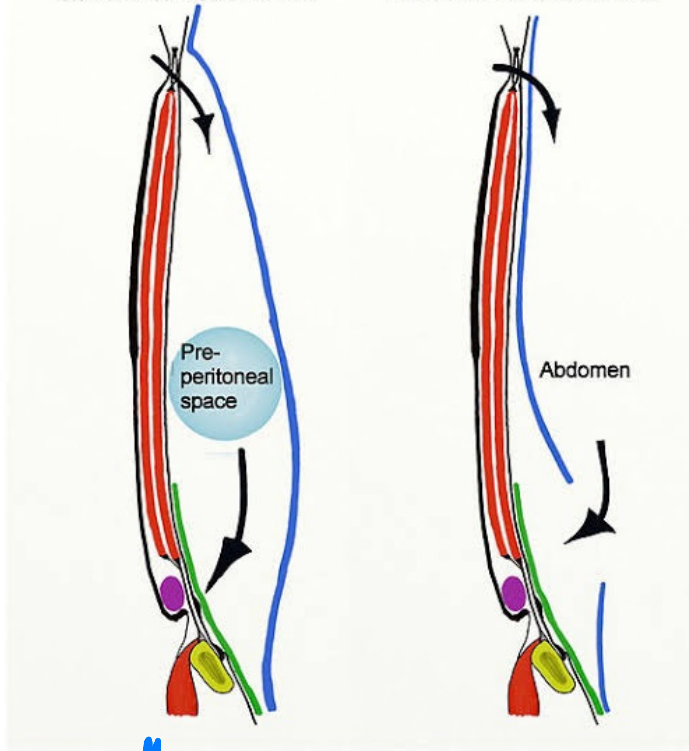
Two types of lap. Sx:

- ① TAPP : Trans abdominal Pre-Peritoneal Repair
- ② TEP : Totally Extra Peritoneal Repair

→ Mesh. is placed in pre-peritoneal plane.
i.e. b/w peritoneum & transversalis fascia

Laparoscopic operation TEP

Laparoscopic operation TAPP

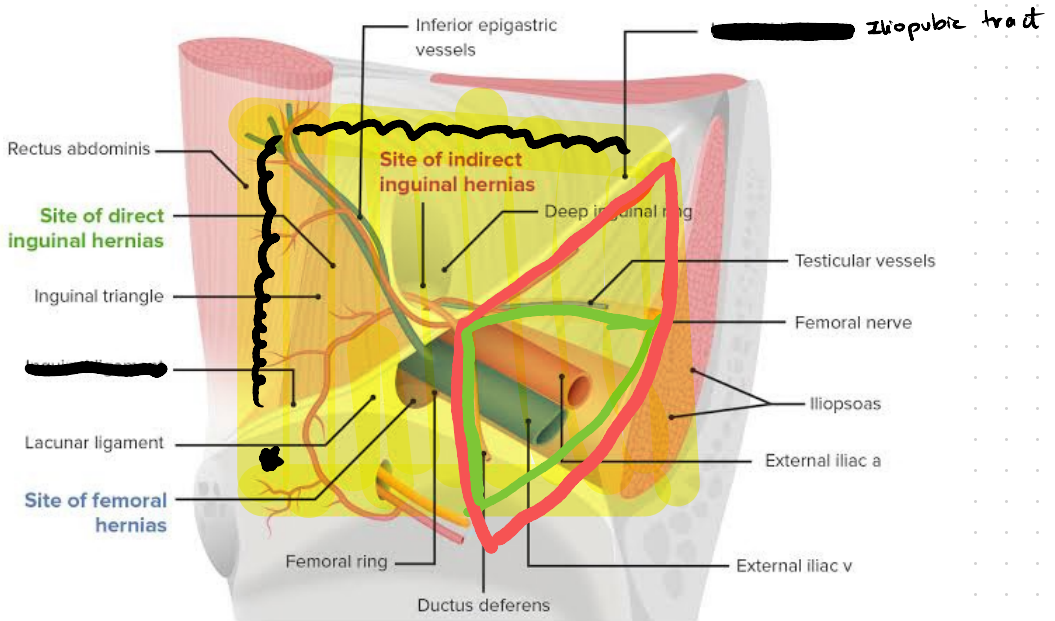
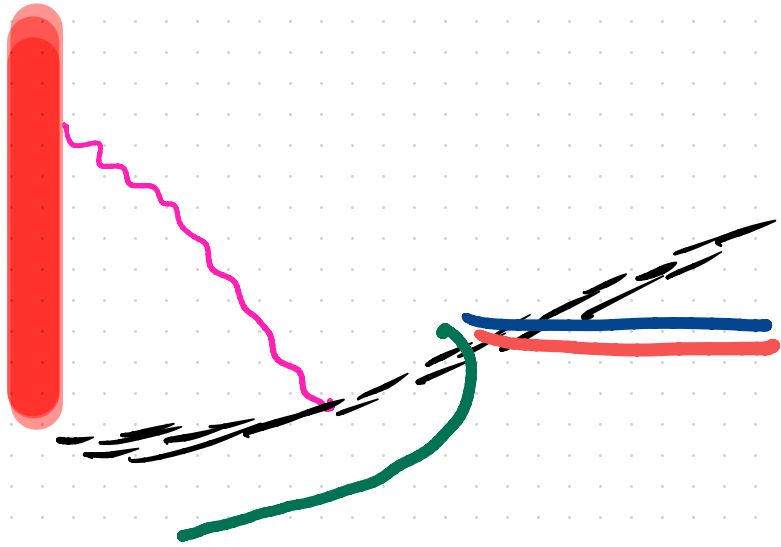


requires expertise
more or duration

In TEP
not entering peritoneum $\rightarrow$ $\therefore$ injury to intra abdominal organs
are less.
 $\therefore$ No chance of infections.

Success & recurrence rates are equal for both

Anatomy from inside :



mesh.
tackers

placed only above
iliohypubic tract &
on Cooper's ligament

Triangle of Doom → damage → torrential bleeding
It contains External Iliac vessels

Medially → Vas deferens

Laterally → testicular vessels

Inferiorly → Peritoneal reflection.

Triangle of Pain → femoral branch of genito femoral nerve,
lateral cutaneous nerve of thigh,
anterior cutaneous nerve of thigh,
femoral nerve

Medially → Testicular vessels

Laterally → Peritoneal reflection

Superiorly → Iliopubic tract

Corona Mortis

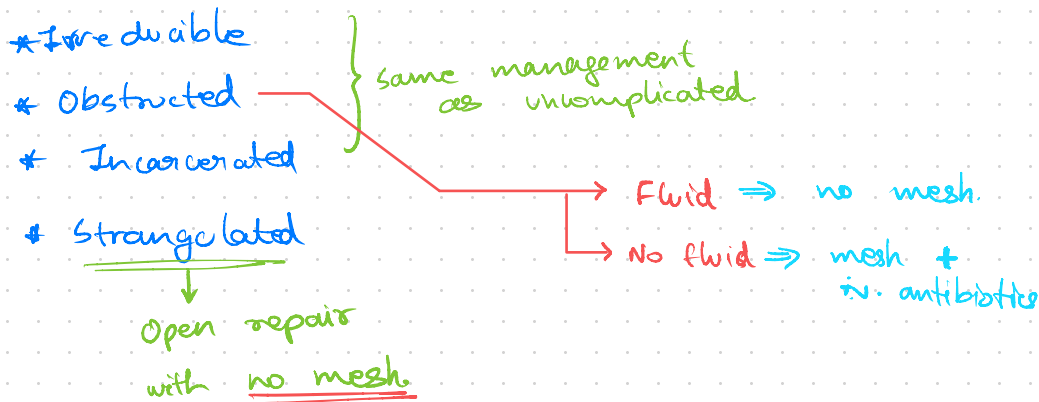
Abserrant obturator artery in this area
could lead to fatal bleeding
→ near pubic symphysis / obturator fossa

Myopectineal Plane of Fruchard's :

→ gives rise to all groin hernias

Indirect
Direct
femoral

COMPLICATED HERNIAS



Taxis : → reduction of hernias.

i) with sedation

ii) patient position

↙ Hip flexion
↘ thigh adduction
↘ Internal rotation

iii) surgeon :

aply. In the remaining cases the patient is asked to flex the thigh of the affected side and to adduct and rotate it internally. This will not only relax the pillars of the superficial ring but also will relax the oblique muscles of the abdomen. The fundus of the sac is gently held with one hand and even pressure is applied to it to squeeze the contents towards and abdomen while the other hand will guide the contents through the superficial inguinal ring (Fig. 38.12). This is known as 'Taxis'. Taxis must be carried out very

Reduction en masse : Rare complication following reduction.
Hernial sac goes into the pre-peritoneal space with a loop of bowel remaining incarcerated at the neck of the sac ⇒ Early strangulation

NAMED HERNIAS

① Sliding → wall of hernia is by the content either, bladder or colon



Fig. 38.26. — Hernia-en-glisssade or sliding hernia. The thick line represents the peritoneum, Note that the colon forms the wall of the sac.

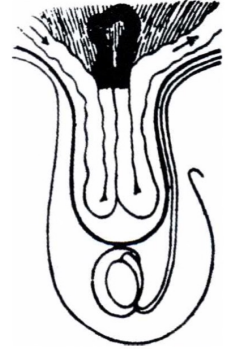
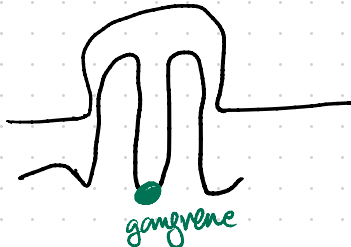


Fig. 38.27. — Maydl's hernia. The loop in the abdomen is always found at a more advanced stage of strangulation than the loops in the sac.

② Richter's → part of circumference of intestine is stuck
 ↓
 excessive peristalsis
 ↓
 Diarrhea

③ Maydl's → 

So, pull out all the content & then make sure it is a C-shaped loop before repair

④ Pantaloon's → Direct + Indirect hernia

⑤ Amyand's → Incarcerated appendix

⑥ Littre's → incarcerated Meckel's diverticulum

⑦ Gibbon's → inguinal hernia + hydrocele
Fluid collects in the hernial sac → mimics hydrocele.

FEMORAL HERNIA

* Most chance of strangulation

∴ → narrow neck of saphenous opening
→ missed diagnosis ⇒ complication

* Females > Males. Gren in female m/c
hernia is indirect inguinal
hernia.

→ femoral canal stretch (child birth)

→ lesser built ⇒ narrower veins

↓
more space in saphenous
opening

for herniation

* Below & lateral to pubic tubercle

* Below groin crease

TREATMENT:

① Open

② Laparoscopic

Mc Gredy's → high

Lothessan's → inguinal

Lockwood → low

OPEN

Anesthesia - Local,
Spinal,
General

Common procedure
well versed

Pain → more

Requires post-op scrotal
support

Two separate incisions
required if bilateral hernia

∴ preferred for u/l hernias

v/s

LAP.

Only GA

needs expertise

less pain

Occult / small femoral
hernia
can be diagnosed &
treated on table

Damage to major vessels

- Int. epigastric a.
- Ext. iliac artery

Can easily perform
b/l repair
preferred for b/l

LICHENSTEIN'S

TENSION FREE

REPAIR

① Skin incision

→ Groin crease

$\frac{1}{2}$ inch above & parallel to
medial $\frac{2}{3}$ rd of inguinal ligament

② Subcutaneous

→ Camper's (fat)

→ Scarpa's (membranous)

⇒ Ligate superficial epigastric & superficial external pudendal vessels.

③ External oblique aponeurosis

- incise parallel & above from the
inguinal ligament

- extend medially to SR
& laterally just beyond DR

④ Cord structures

Indirect



other cord structures

+

Ilioinguinal nerve

+

Hernial Sac [within the cord.]

∴ open the cord, open the sac,

reduce,

ligate,

cut excess sac

Identified &
preserved.

Direct

Cord

+

Ilioinguinal nerve only

push bulge/
muscle
back inside

↓
Plicate the
posterior wall

⑤ Put Mesh (Polypropylene)

(over the transversalis fascia)

↓
Anchoring → (i) onto fascia covering pubic tubercle
4 points of fixation.

If bite is put directly over PT, ⇒ Osteitis pubis

(ii) reflected part of inguinal ligament

(iii) fish tailing → cut the mesh horizontally to bring the cord structures forward.

(iv) Fix superiorly & medially to rectus muscle.

"DON'T STRANGULATE" ⇒ could impinge nerves
↓
ilio-inguinal
genital B (GF) nerve.
↓
ck pain
↓
Inguinodynia

(6) Close the external oblique aponeurosis

(7) Close scarpia's fascia

(8) Close skin