Ultrasound of Herniae

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Anterior abdominal wall hernia

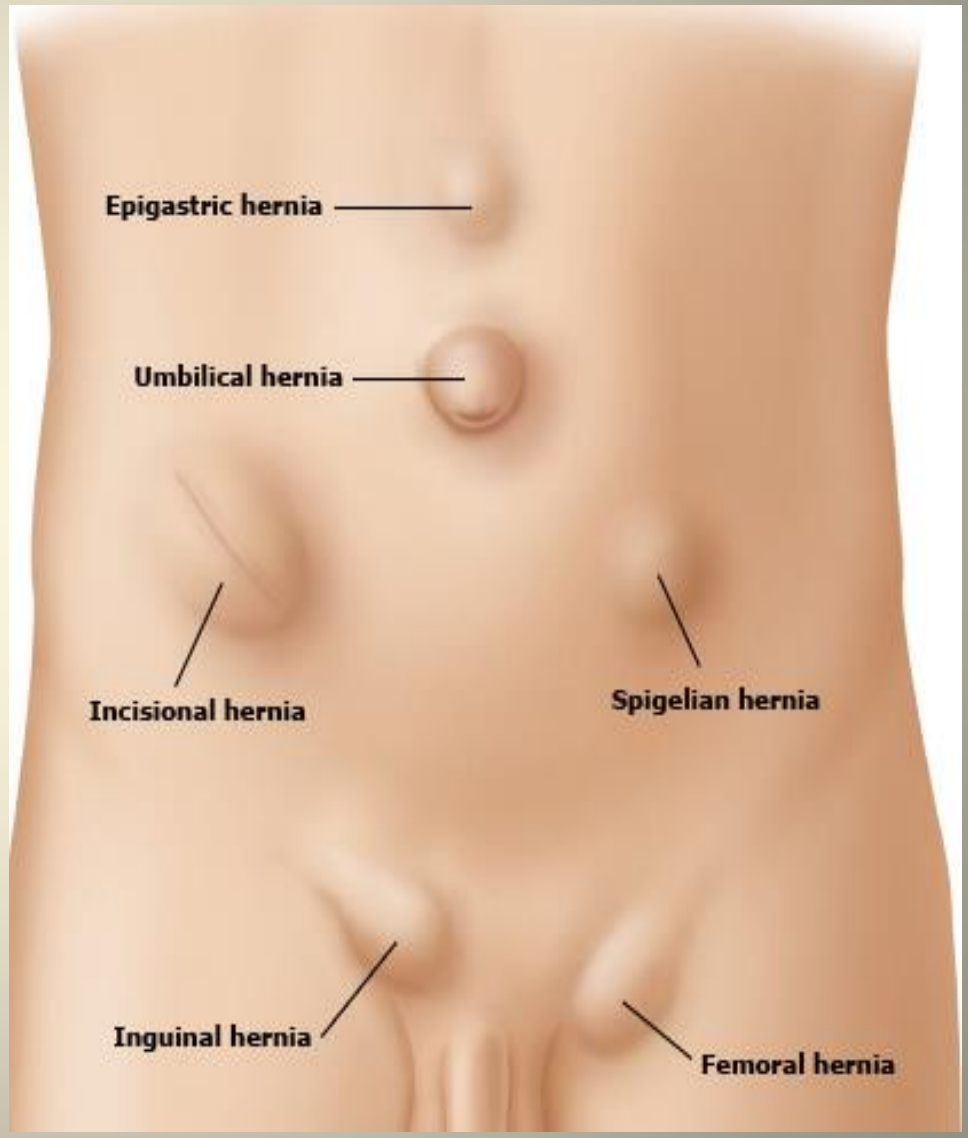
A hernia occurs when an internal part of the body pushes through a weakness in the muscle or surrounding tissue wall.

- Can occur at any site where there is weakness in a fascia
- Anywhere post surgical
- Most common inguinal
- Congenital predisposition
- Sex M>F
- Age
- BMI > 30
- Lifting
- Prolonged coughing
- Constipation
- Ascites
- Inter-peritoneal dialysis



Types of hernia

- Epigastric
- Umbilical / Paraumbilical
- Incisional –anywhere
- Spigelian –Semilunar line
- Inguinal –direct /indirect
- Femoral



Important to take history



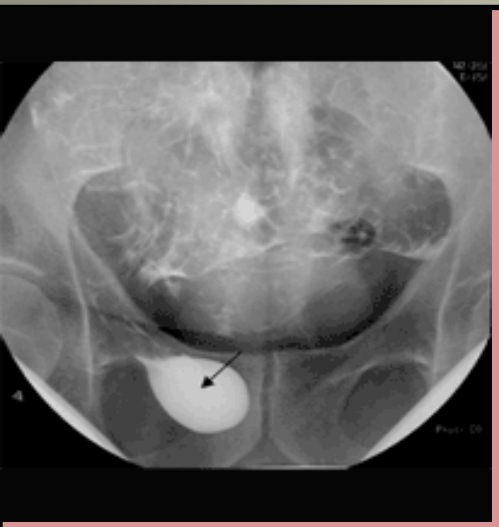
- Location, point to it
- Duration of symptoms
- Type of pain-dragging, sharp, fullness
- Constant/ intermittent
- Exacerbating conditions/movements
- Previous surgery –traumatic/ acquired hernia
- Scrotal swelling /pathology
- Any other ongoing illness, treatment – lymphadenopathy, radiotherapy
- Sports injury/ strain

Why image?

- To assist where there is clinical uncertainty
- The obvious hernia does not require imaging
- Location of hernia
- Contents –fat, bowel, fluid, lymphatics, vascularity, cystic lesions
- Size of neck opening and volume/size of sac
- Reducibility
- Differential diagnosis



Types of imaging



Water soluble contrast injected into the peritoneum
Maneuver patient & Valsalva to try and fill sac

Fluroscopic herniography

Good for
Large incisional herniae

Assess bowel
Confirm size of defect



Computer Tomography (CT)

Useful for less-specific groin pain

Particularly when hernia not expected



Magnetic Resonance Imaging (MRI)

PROS:
- Dynamic and interactive with patient
- Allows for wider diagnosis of differentials
- Can scan supine/erect
- Sensitivity: 86-100%
- Specificity : 82-97%

CONS:
- Habitus challenged
- Operator dependent
- Patient's inability to engage in Valsalva technique

Ultrasound

Technique

- Check previous
- Get good clinical history from patient
  - How long has the lump been there
  - Is painful? , getting bigger, any trauma
- Scan with the patient in different positions, lay , stood etc
- For suspected hernia, instruct patient to strain, raise head, raise legs, cough
- Use probe to vary pressure to assess hernia
- Colour Doppler for vascular localisation
- Contra-lateral side for comparison
- Always other imaging modalities, ask for help etc

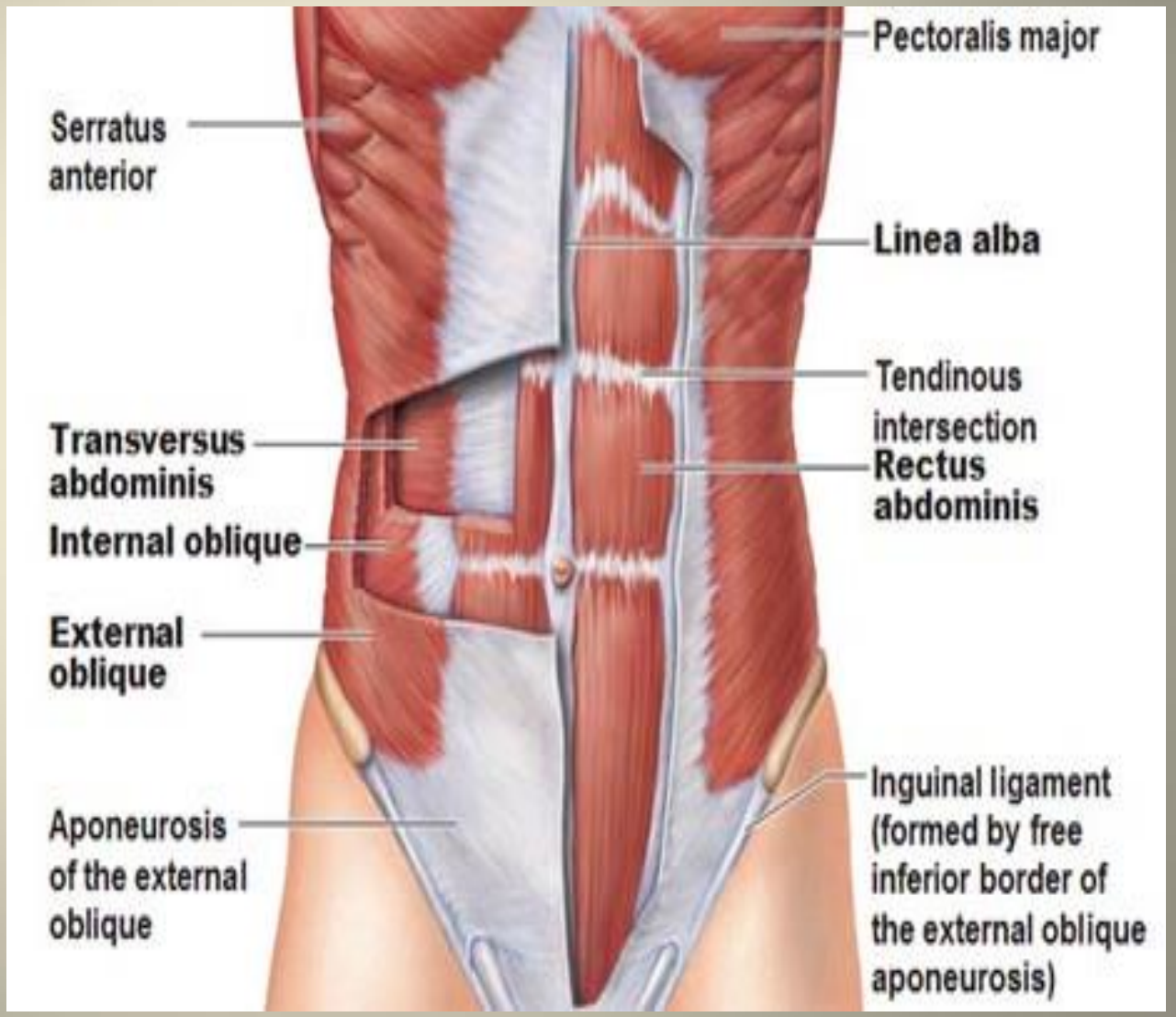
Anterior abdominal wall anatomy

2 groups of muscles

Flat muscles
- Lateral margin
 - External obliques
 - Internal obliques
-Tranversus abdominis

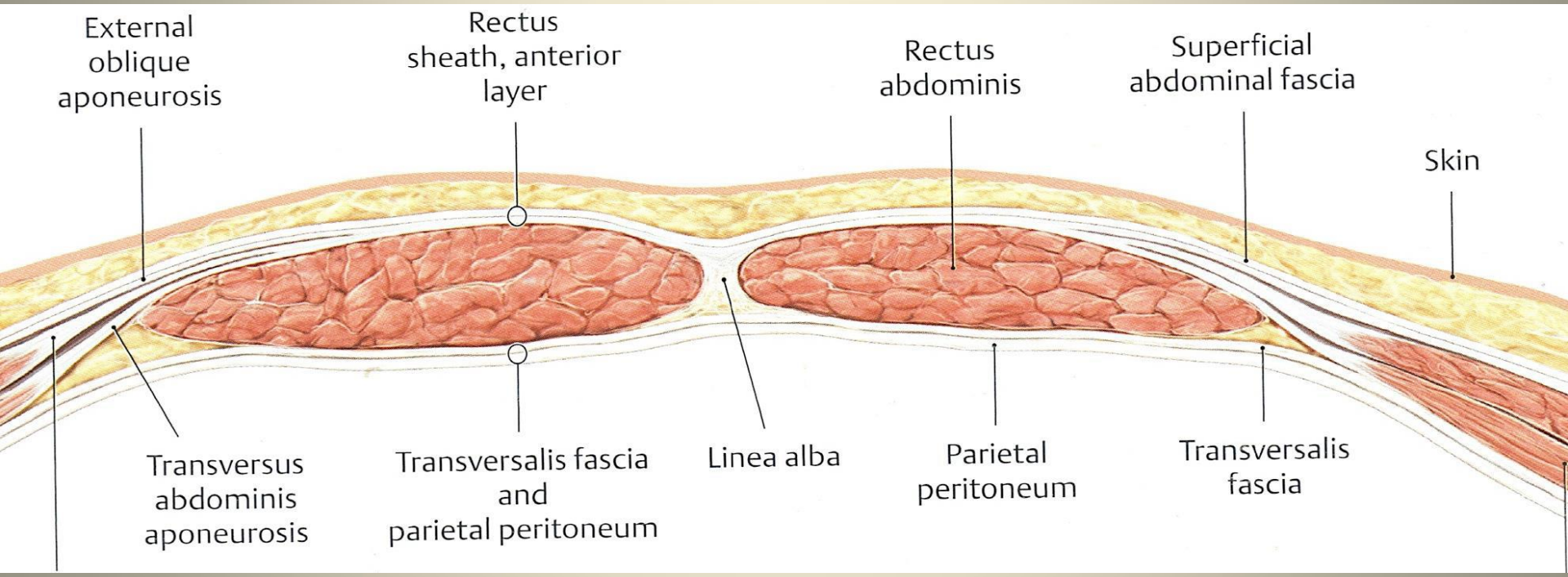
Ventral muscles:
- Central
- Rectus abdominis ("Six pack")

Aponeurosis (broad sheet like tendon)
 - Rectus sheath
 - Inguinal canal



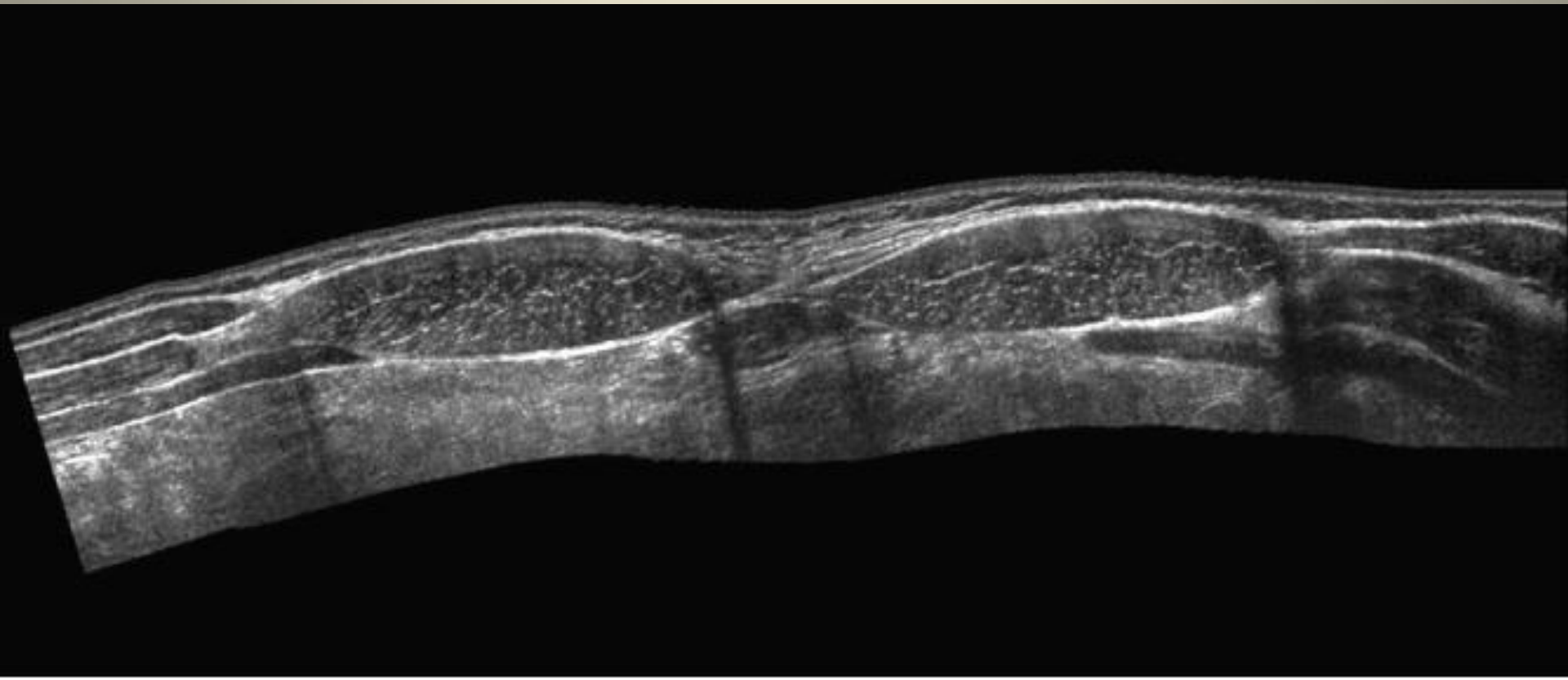
Anterior abdominal wall anatomy
Cross section

Anterior

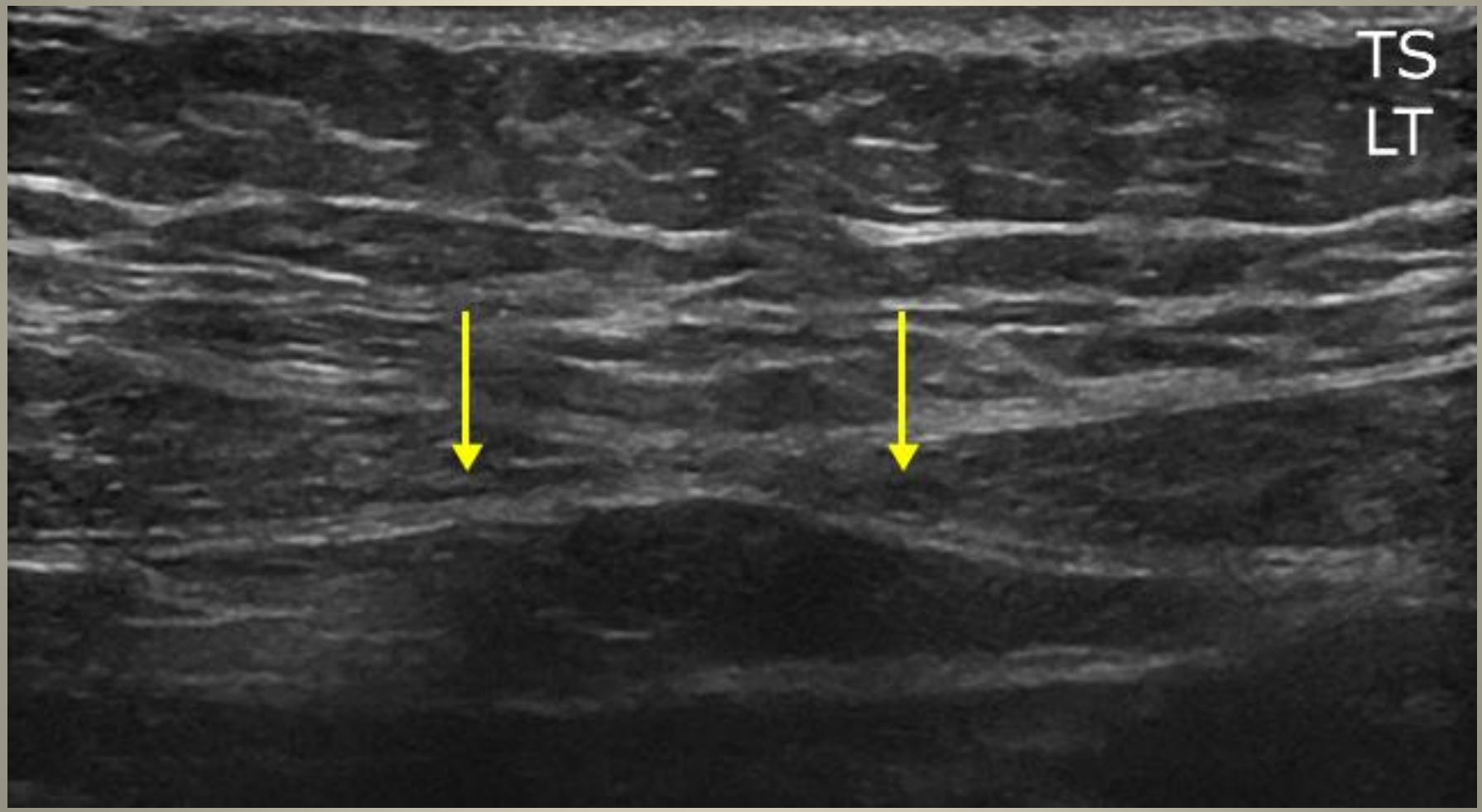


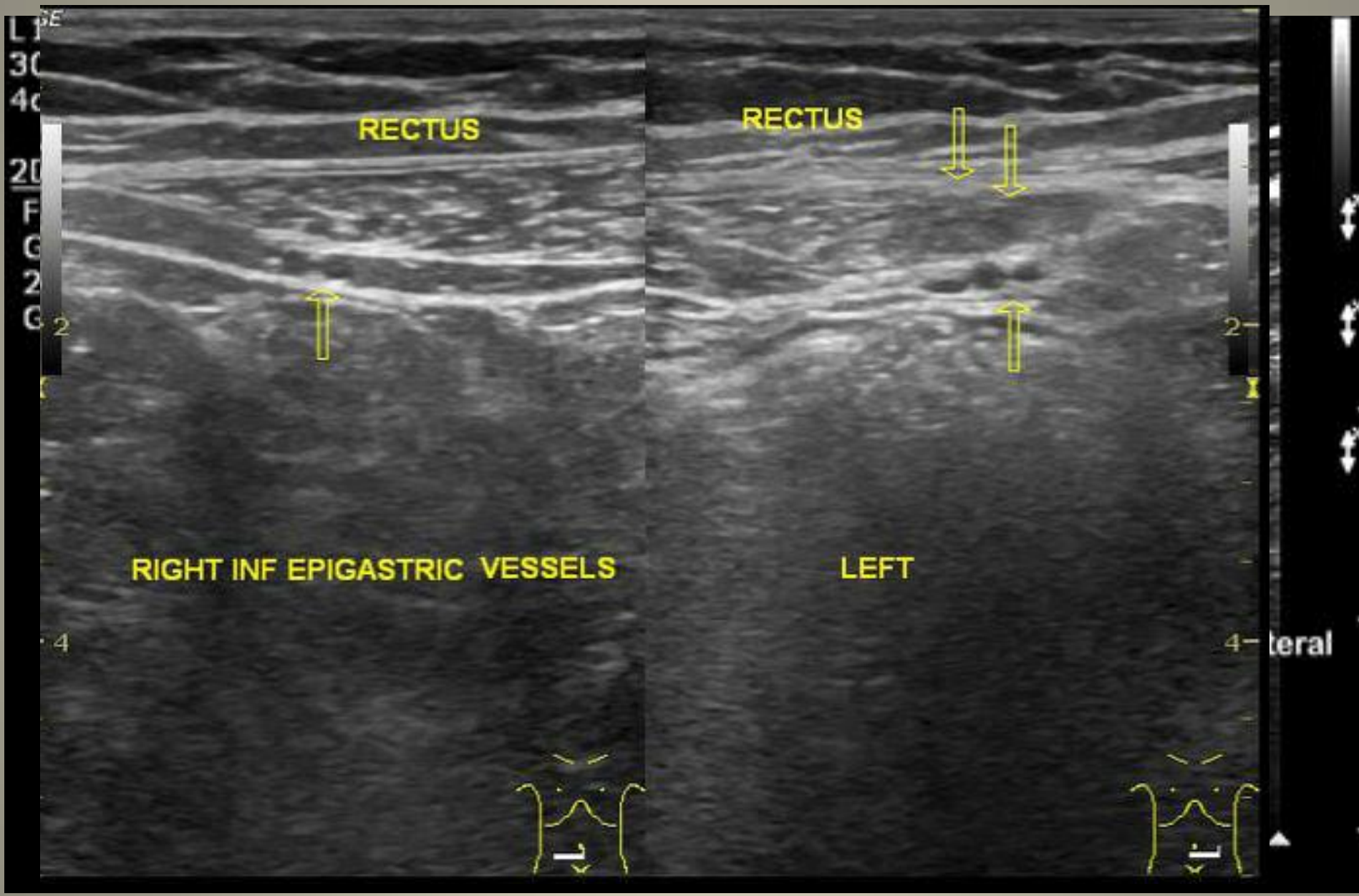
Posterior

Ultrasound anterior abdominal wall anatomy

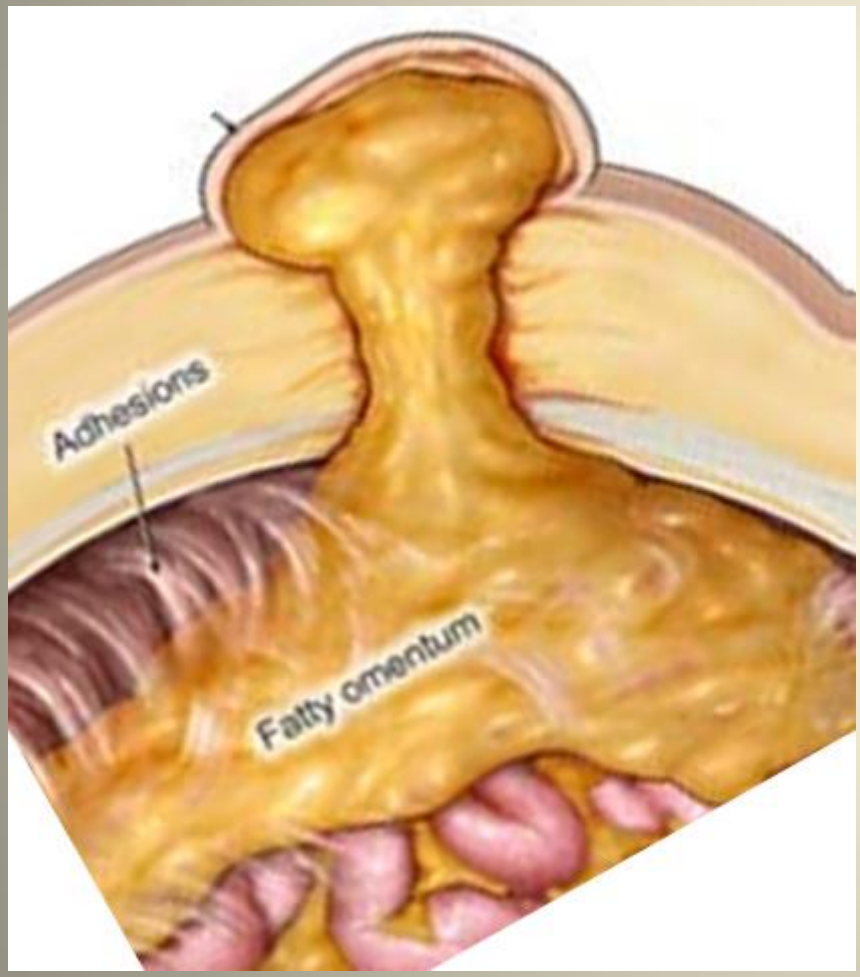


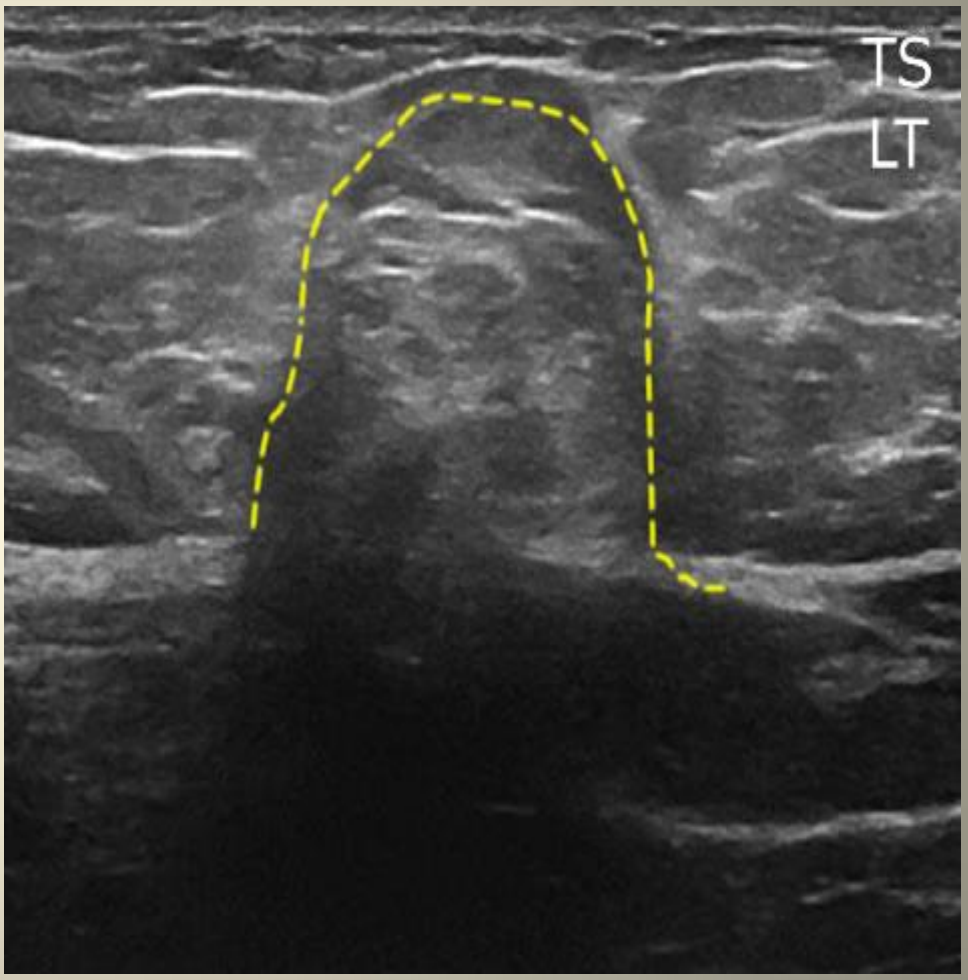
Rectus abdominis and linea alba



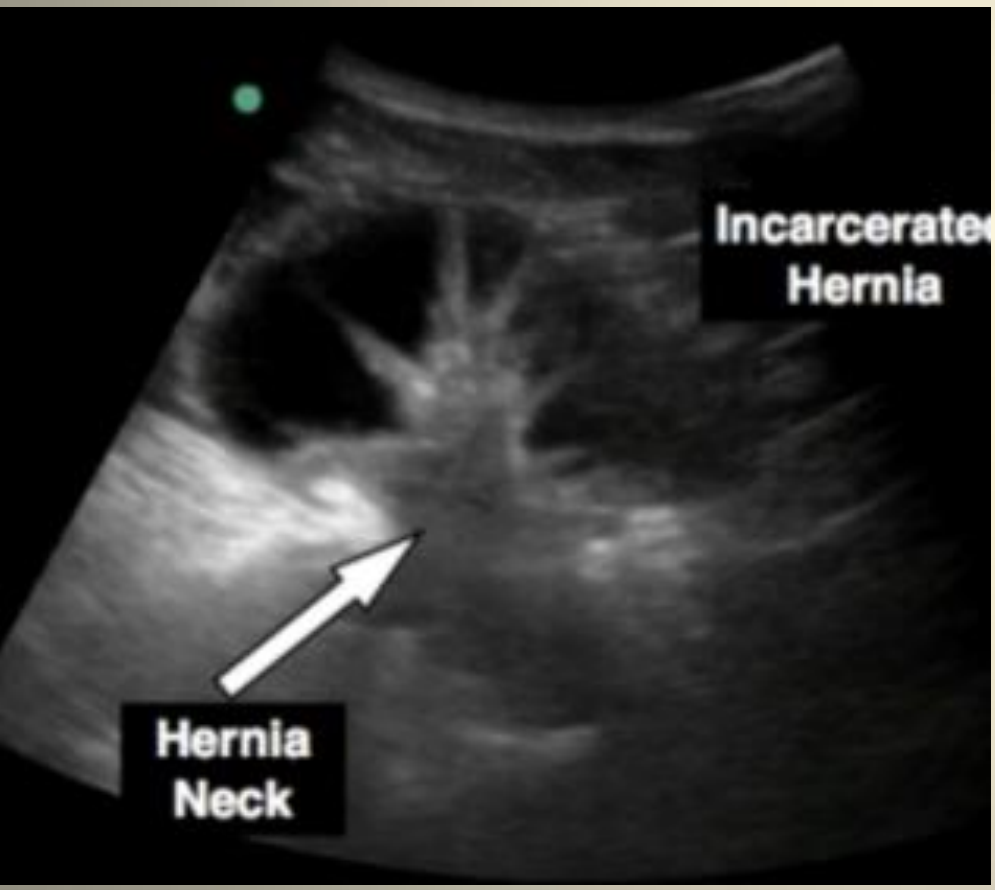

RECTUS
RECTUS
RIGHT INF EPIGASTRIC VESSELS
LEFT

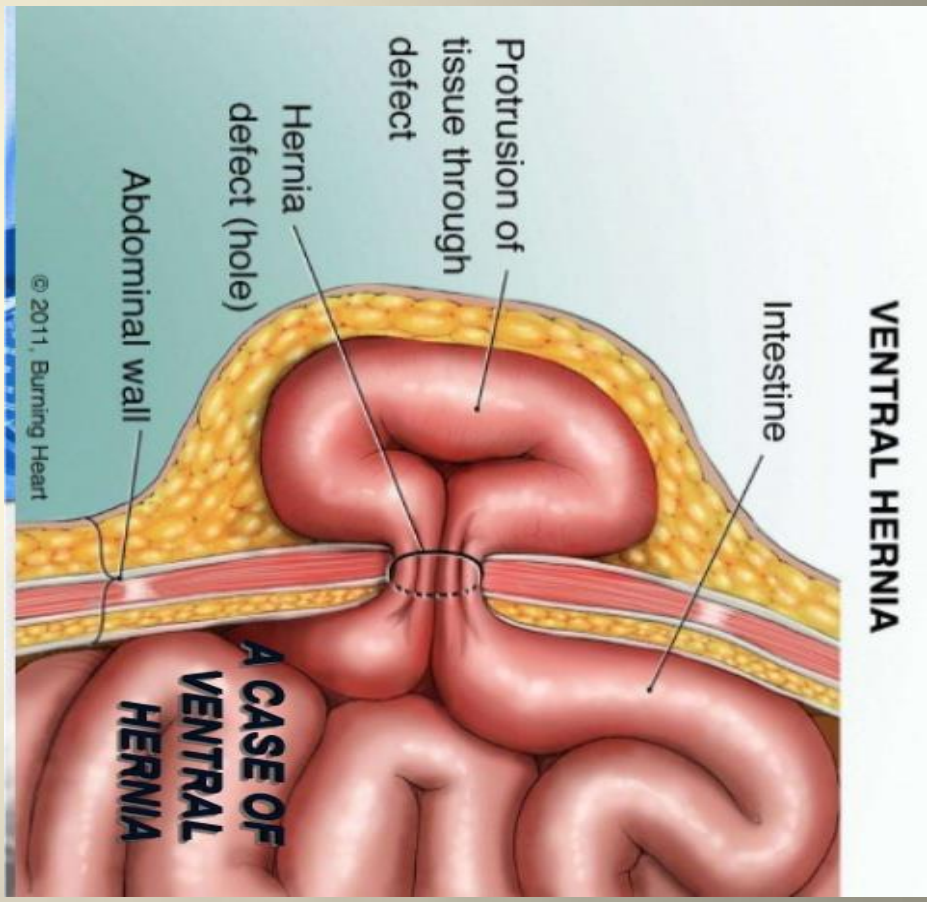
Anterior abdominal wall



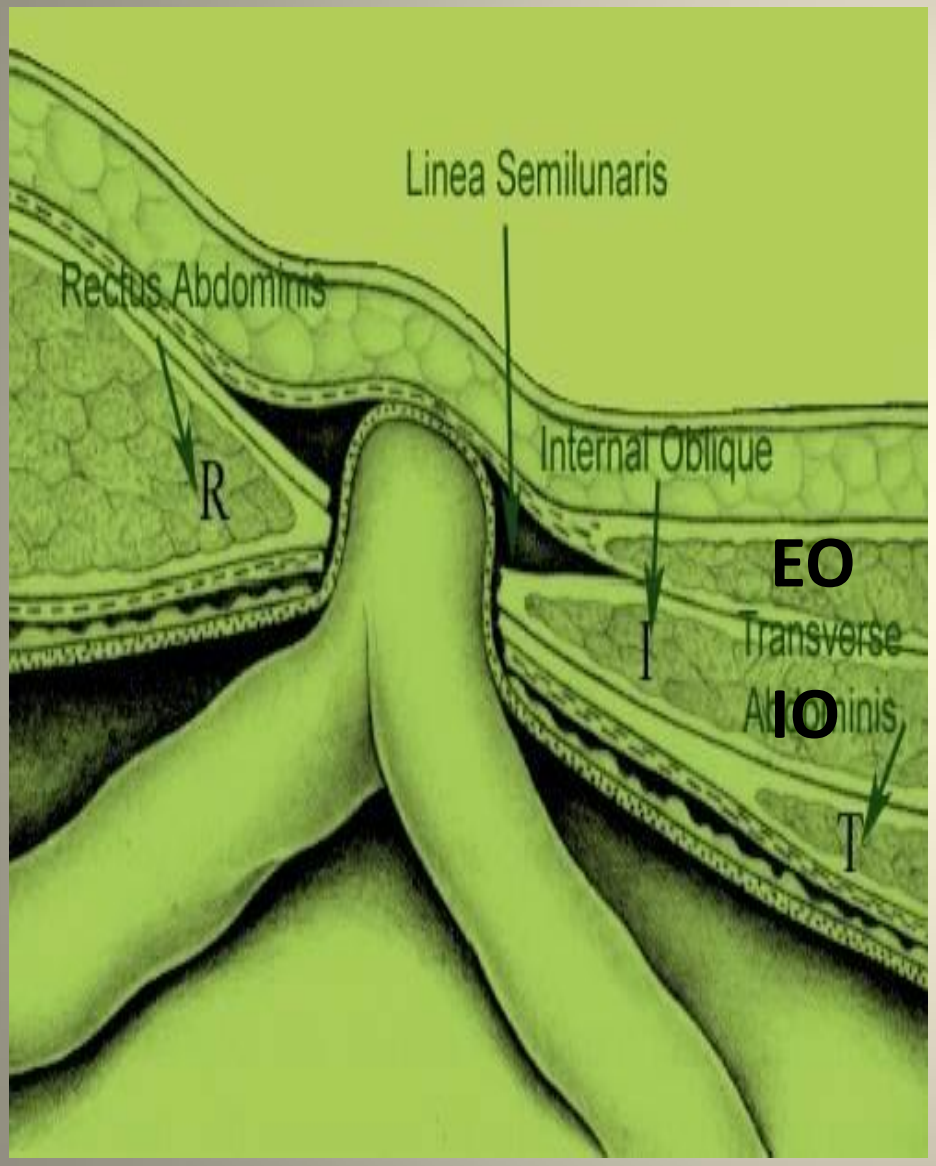


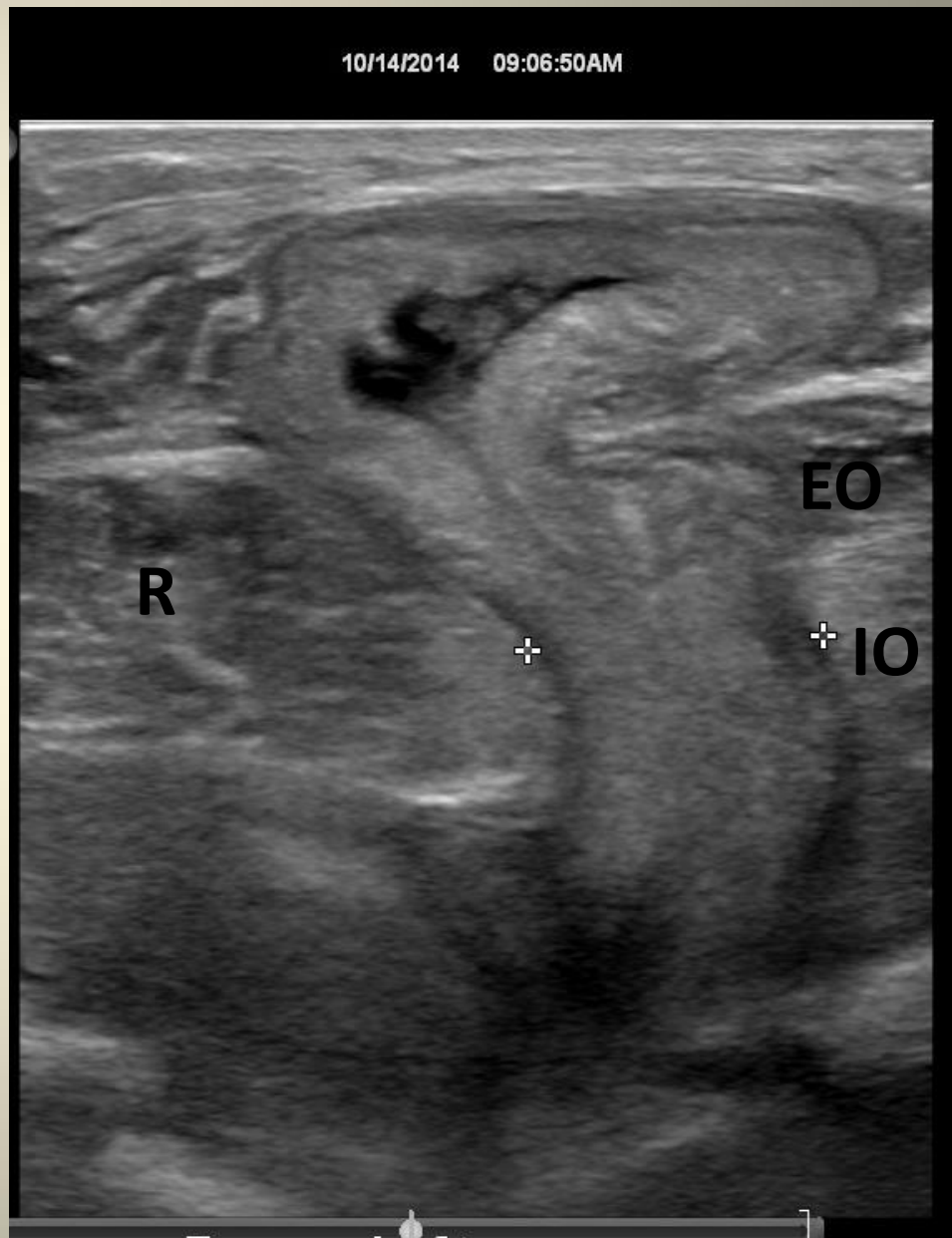
Anterior abdominal wall





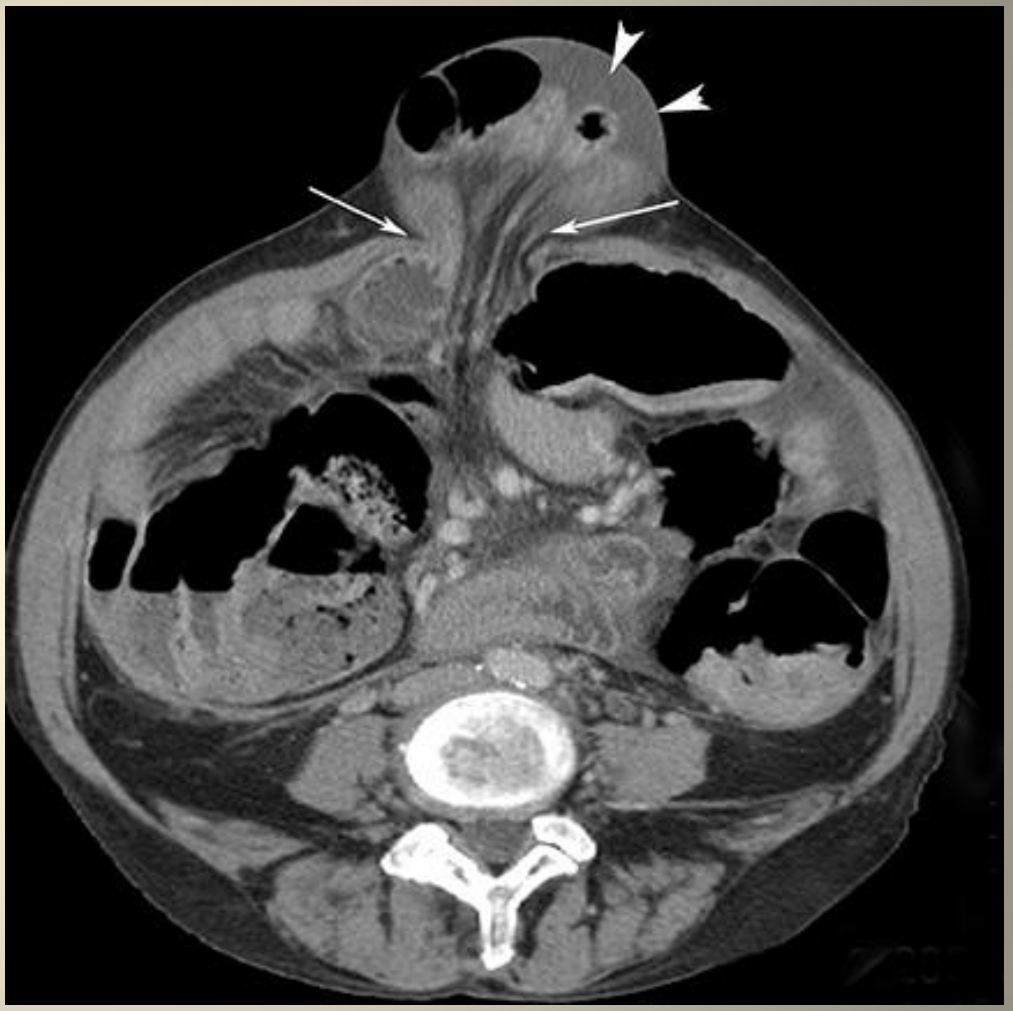
Spigelian hernia





Incisional type hernia

Incisional hernia
- Through scar or defect
- Risk increased with age > poor healing
- Obesity
- Post op complications –infection, haematoma
- Steroid therapy
- Radiotherapy

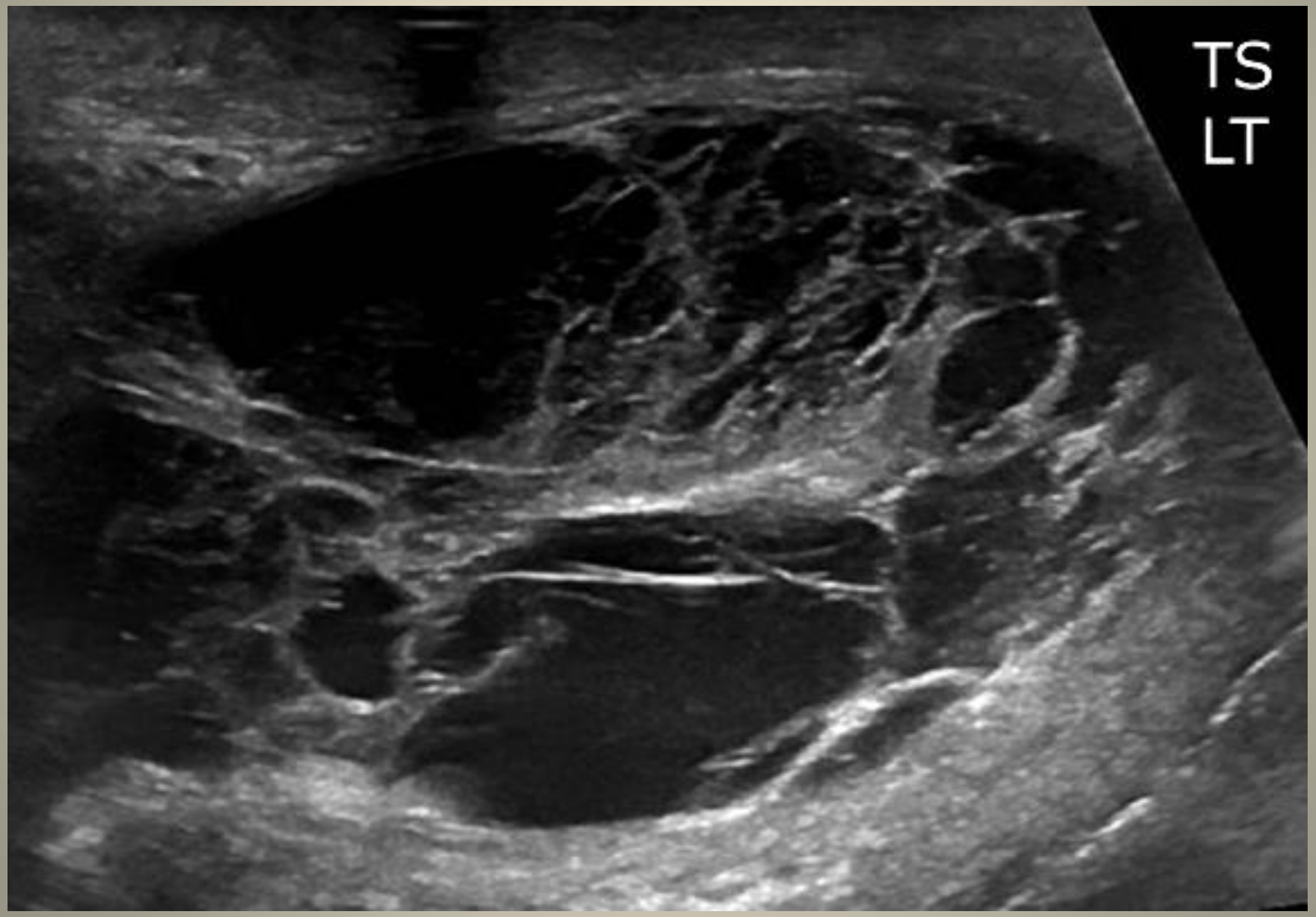




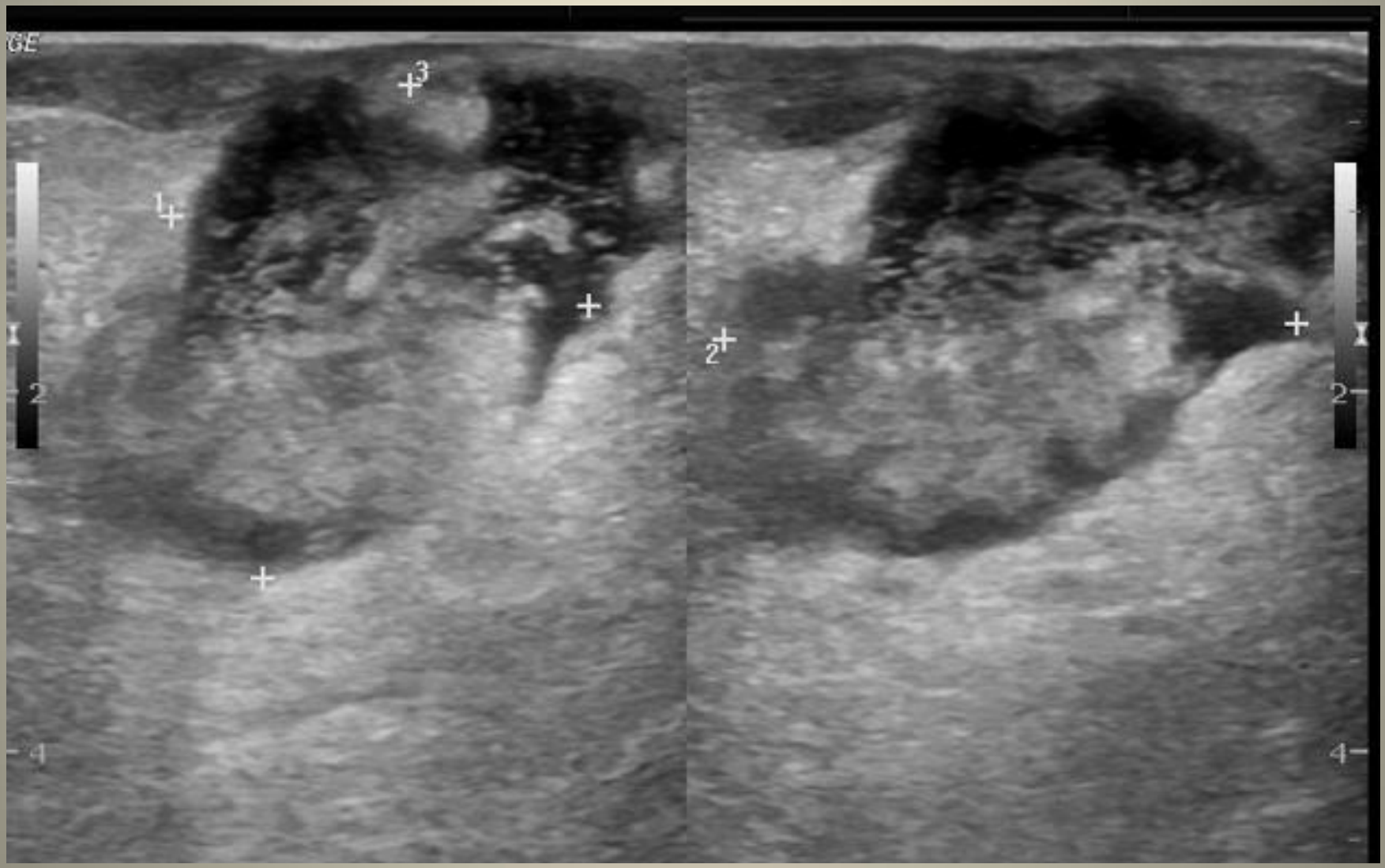
Divarication of the rectus abdominis muscles



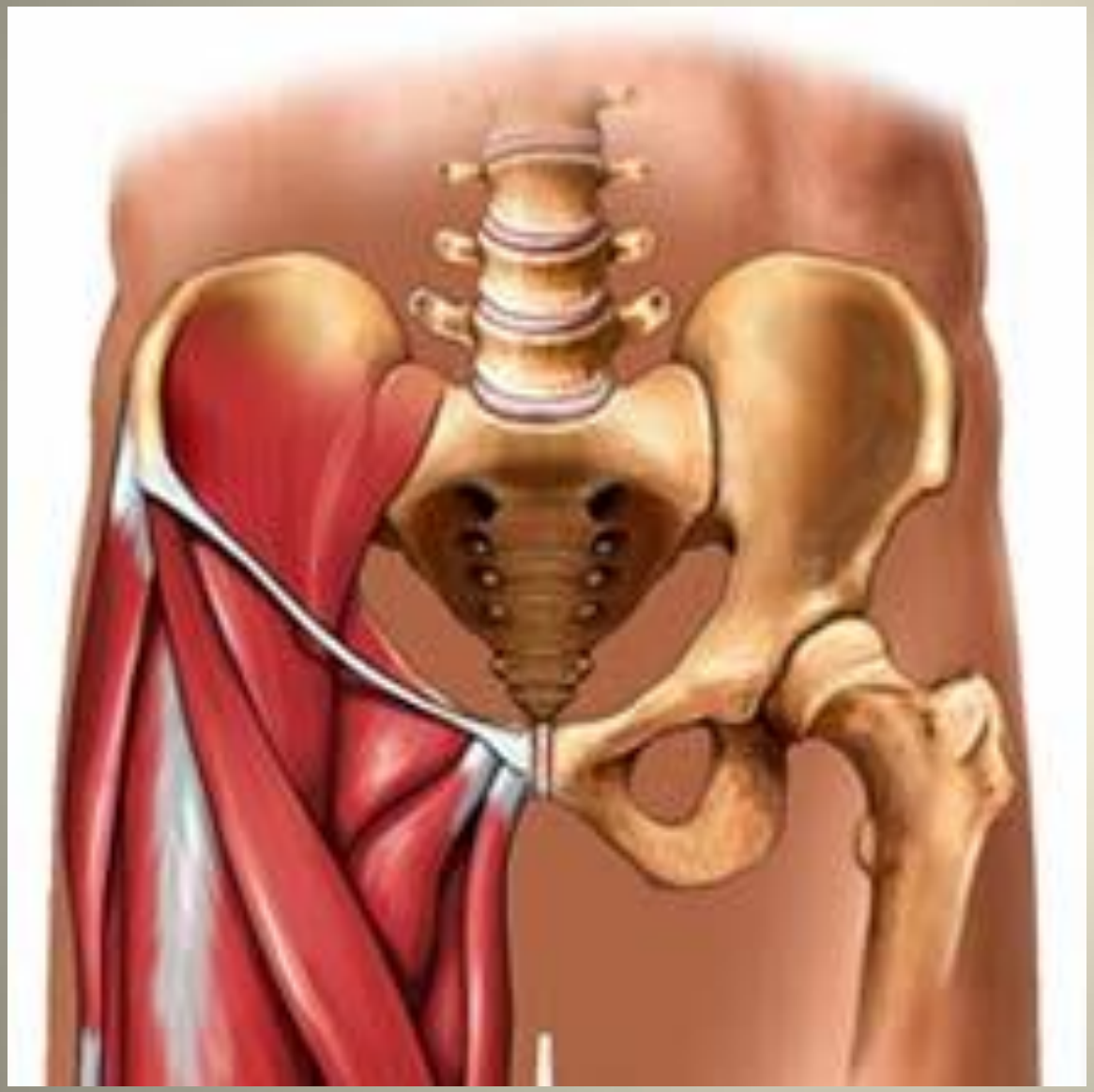
Seroma



Abscess



Groin anatomy



Groin contains the soft tissues of the inguinofemoral region between the ASIS and the symphsis pubis

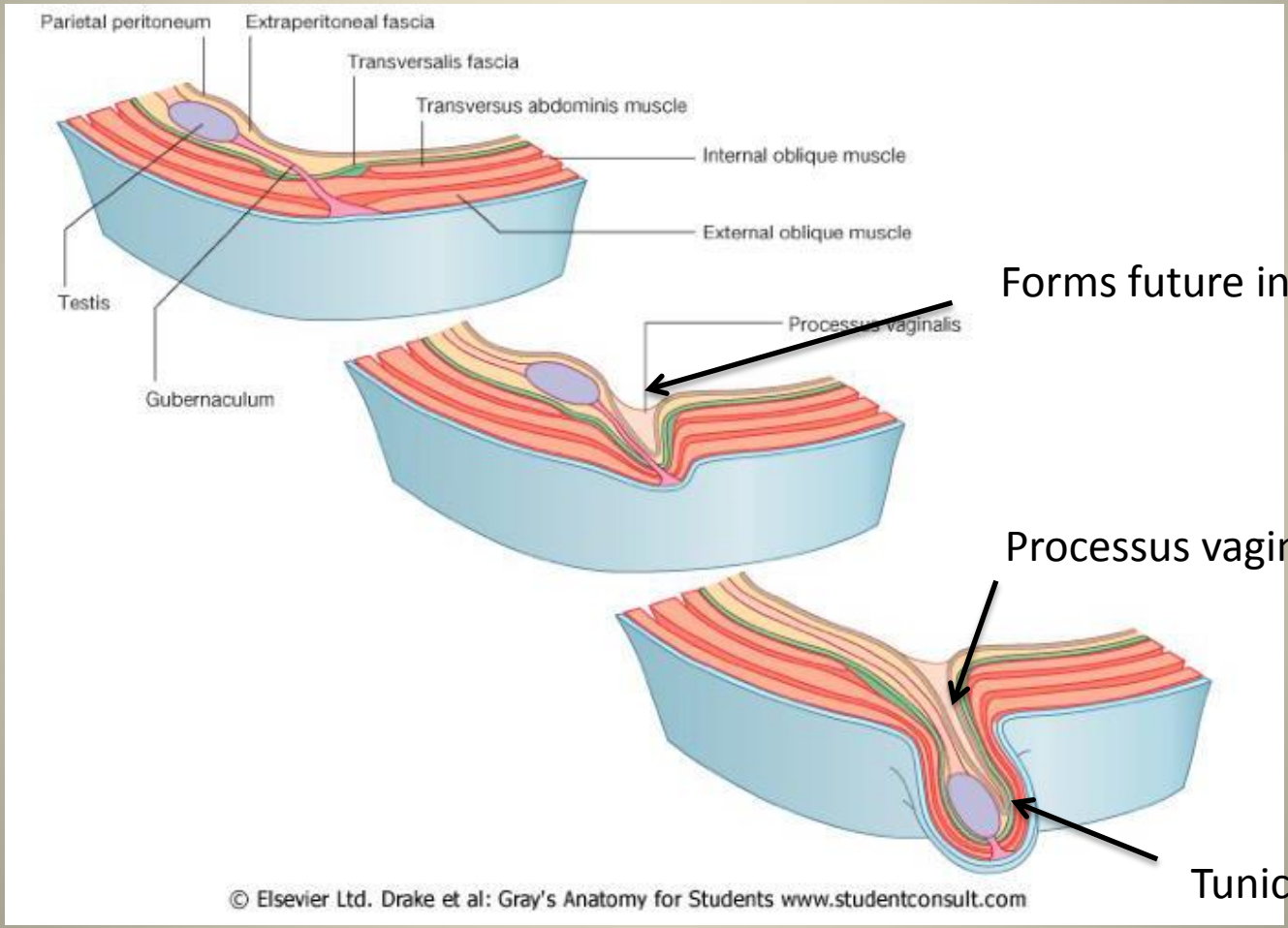
Femoral vessels

Lymph nodes

Inguinal ligament

Inguinal canal located deep and medial to the inguinal ligament.

Formation of inguinal canal

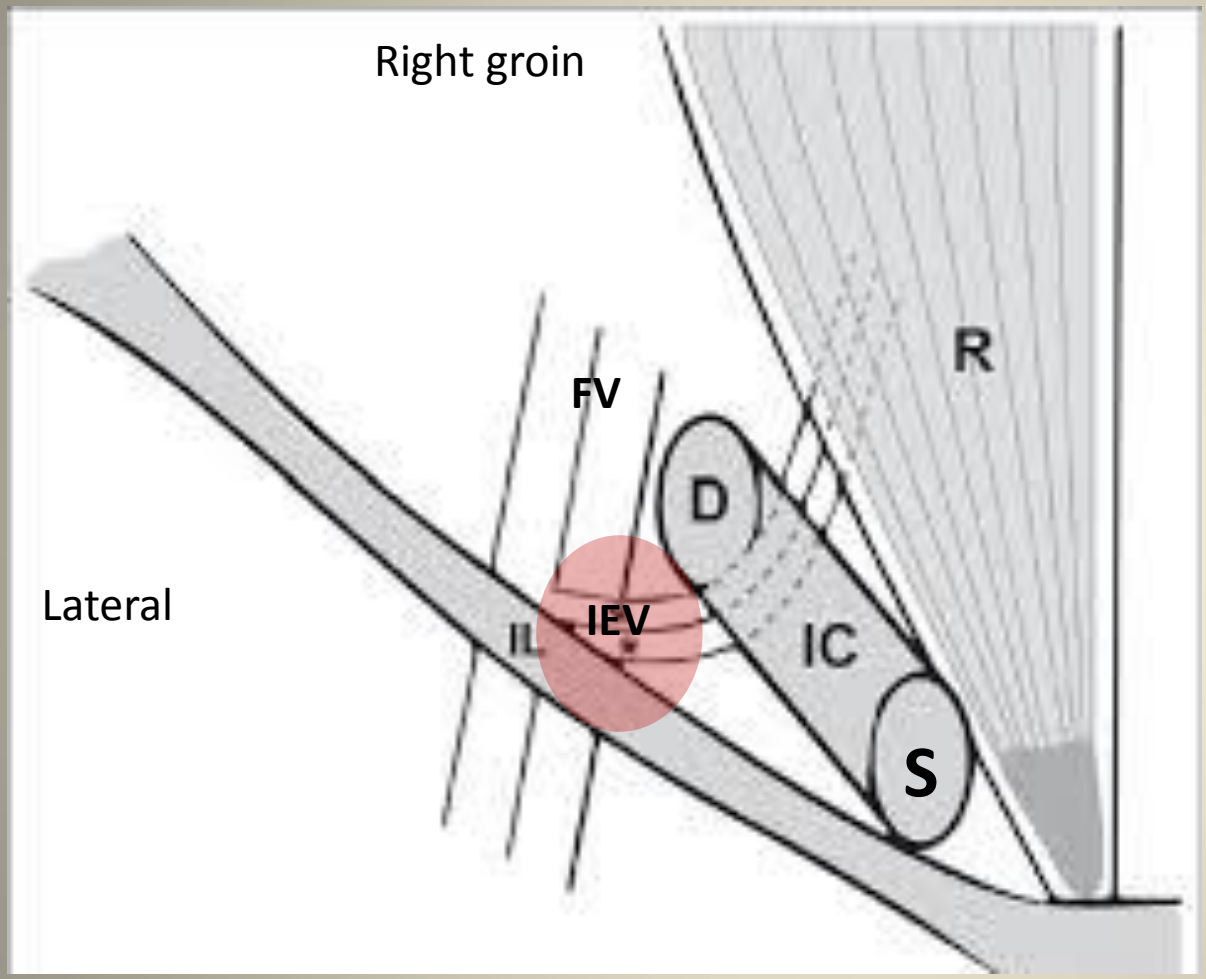


Forms future inguinal canal

Processus vaginalis closes off

Tunicavaginalis

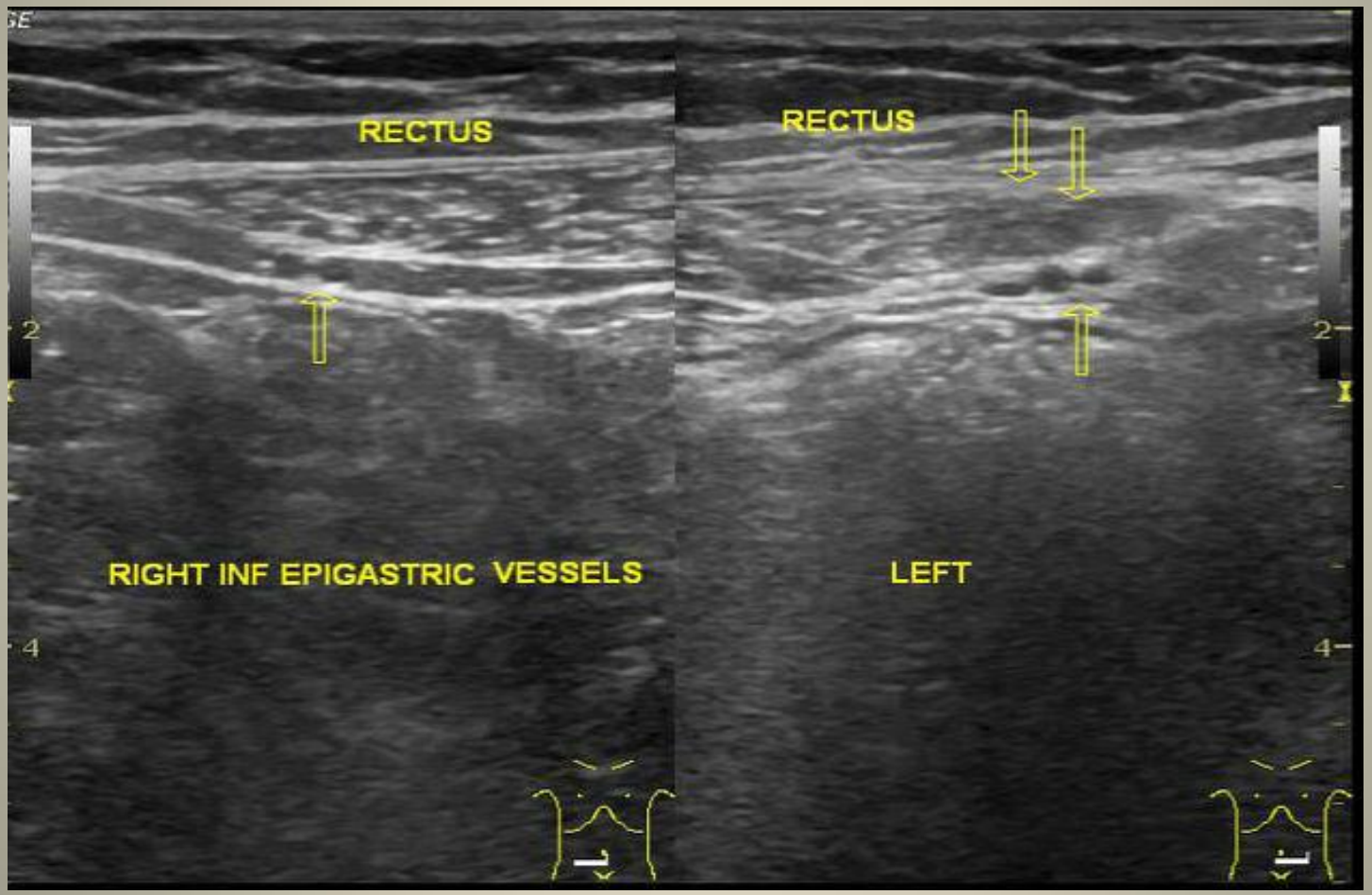
Inguinal canal anatomy



Deep ring located just medial at the point the inferior epigastric vessels meet the femoral vessels

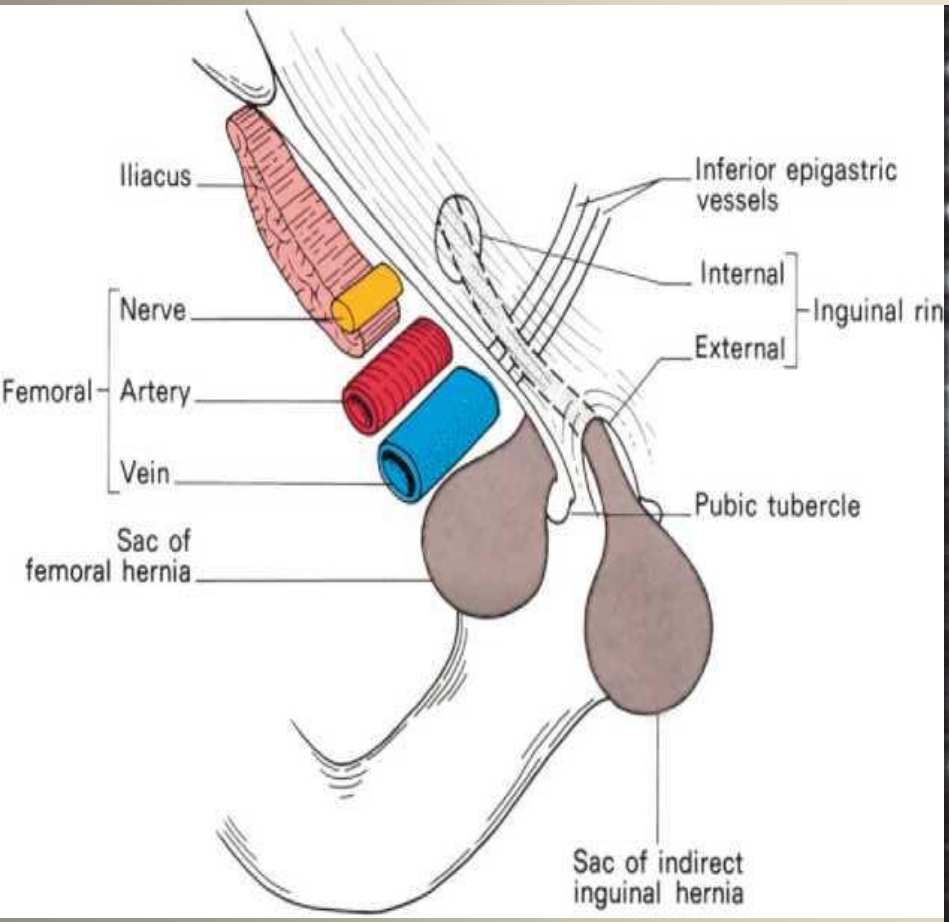
D - deep ring, S – superficial ring, IC – inguinal canal,
IL – Inguinal ligament , R – rectus abdominis,

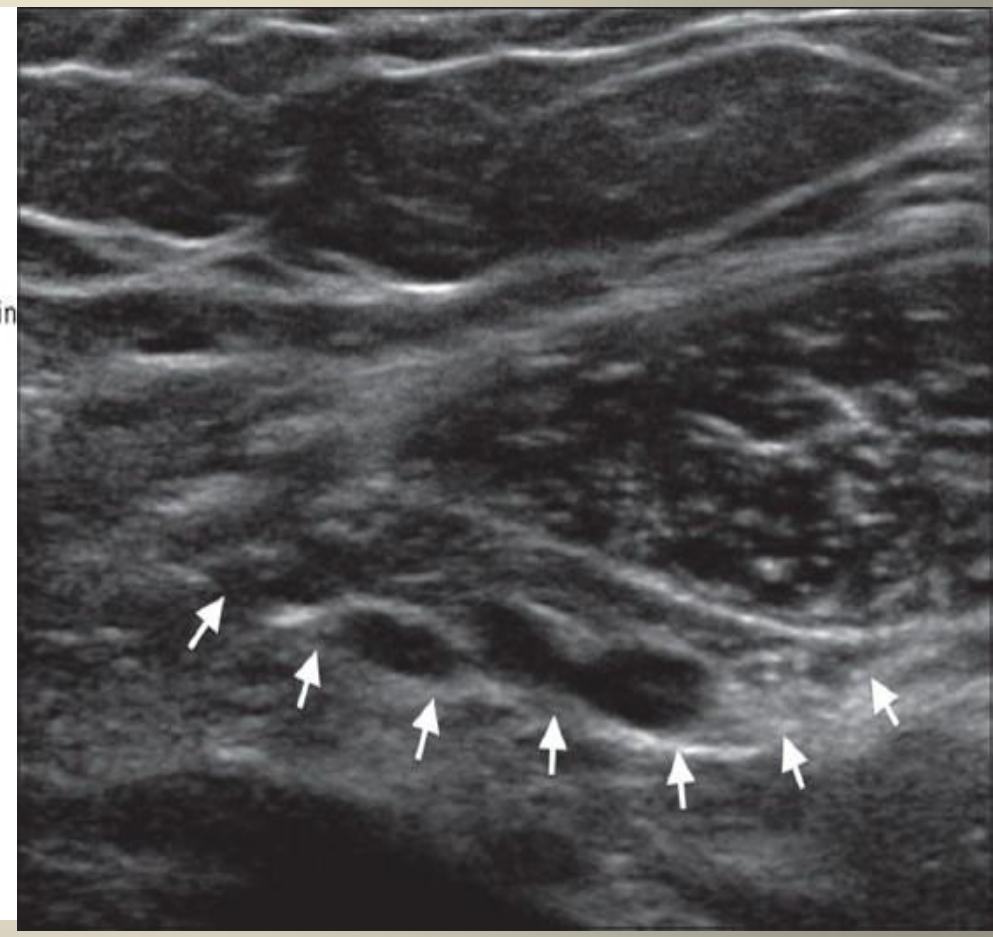
Ultrasound Anatomy- finding the inguinal canal



Step 1 – find the inferior epigastric vessels

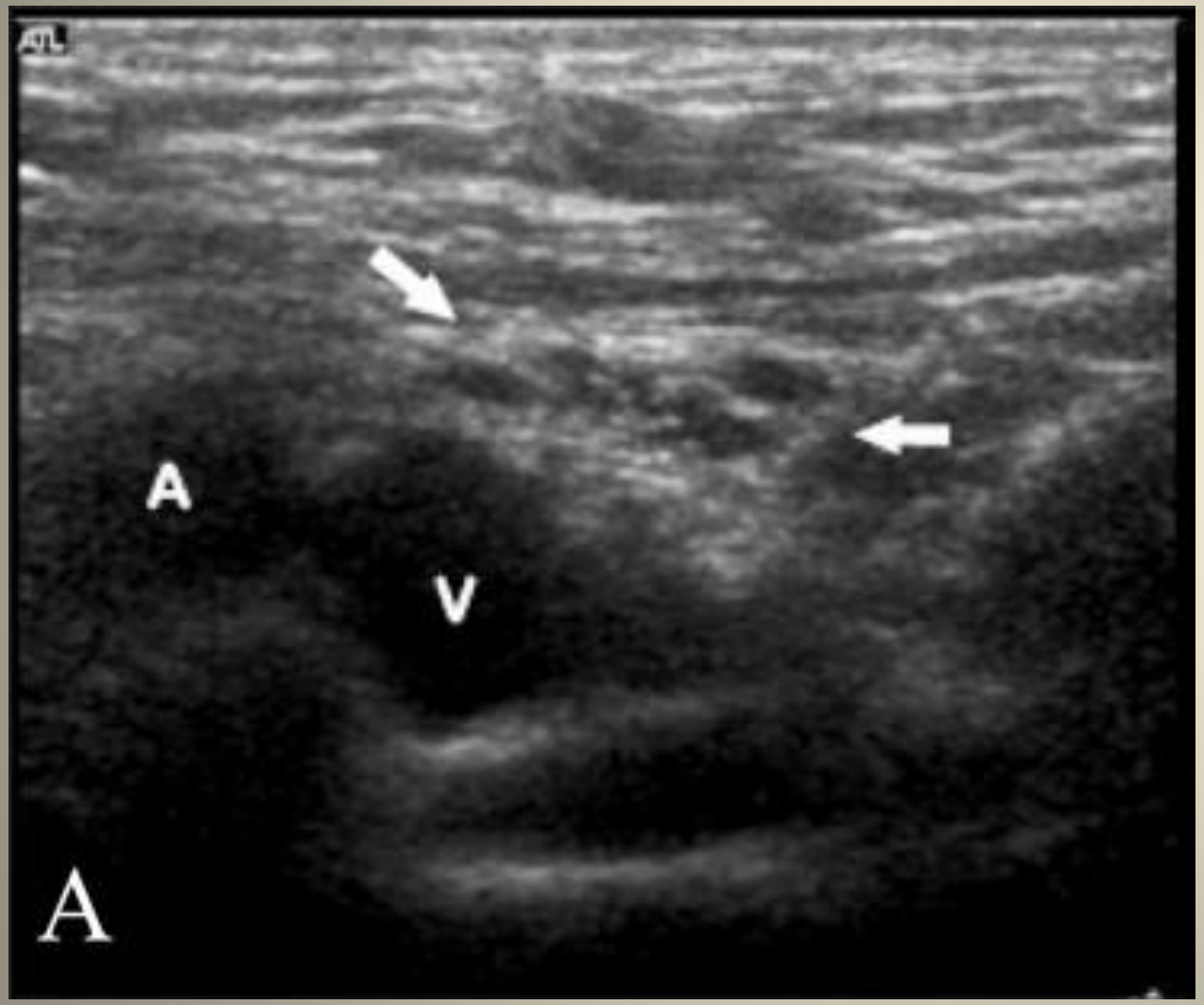
Ultrasound Anatomy- finding the inguinal canal





Step 2 – track the inferior epigastric vessels inferiorly and lateral to the point they joint the femoral vessels.

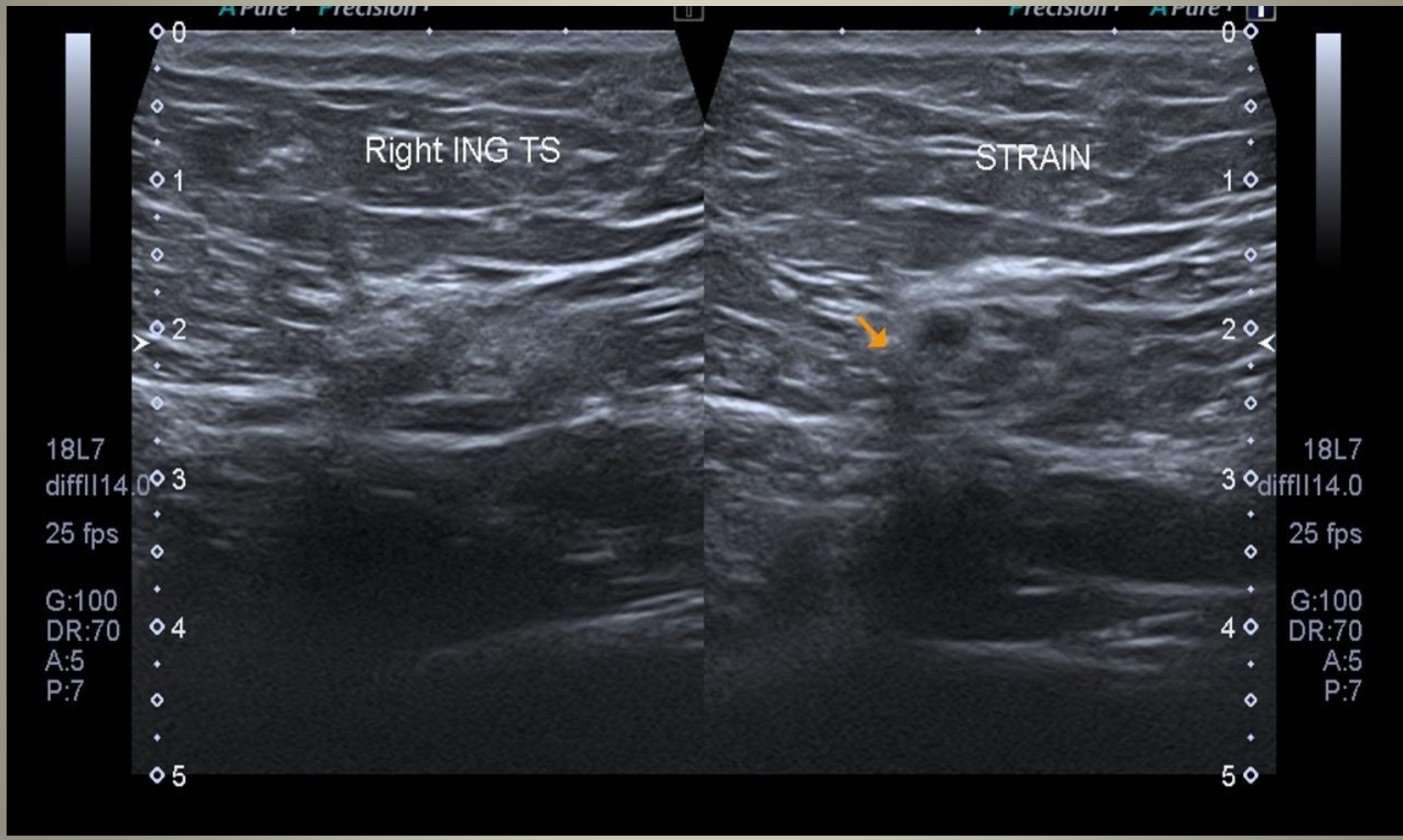
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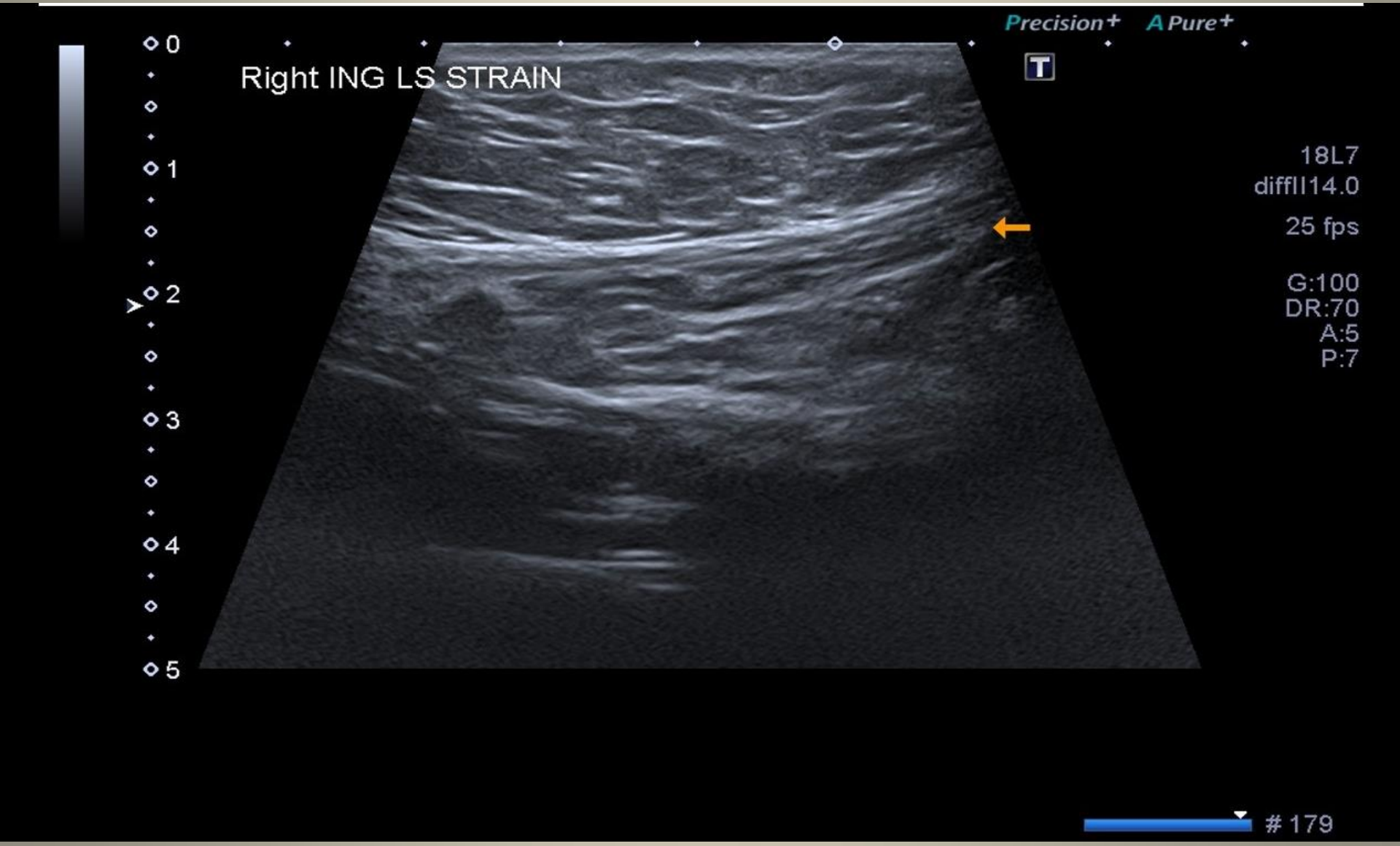
Step 3 –

At the point the inferior epigastric vessels meet the femoral vessels, the deep ring of the inguinal canal can be found.

Inguinal canal transverse section



Inguinal canal longitudinal



Inguinal hernia

- Accounts for 3 out of 4 hernia cases
- Male life incidence of 1 in 4
- Female life incidence of 3 in 100
- Adult male -65% are INDIRECT
- 55% are right sided
- Bilateral in 12%
- In UK, 2011-12, 60,000 inguinal hernia repairs

Indirect inguinal hernia - transverse section



Inguinal hernia – indirect: Contents enter the inguinal canal through the deep /internal ring

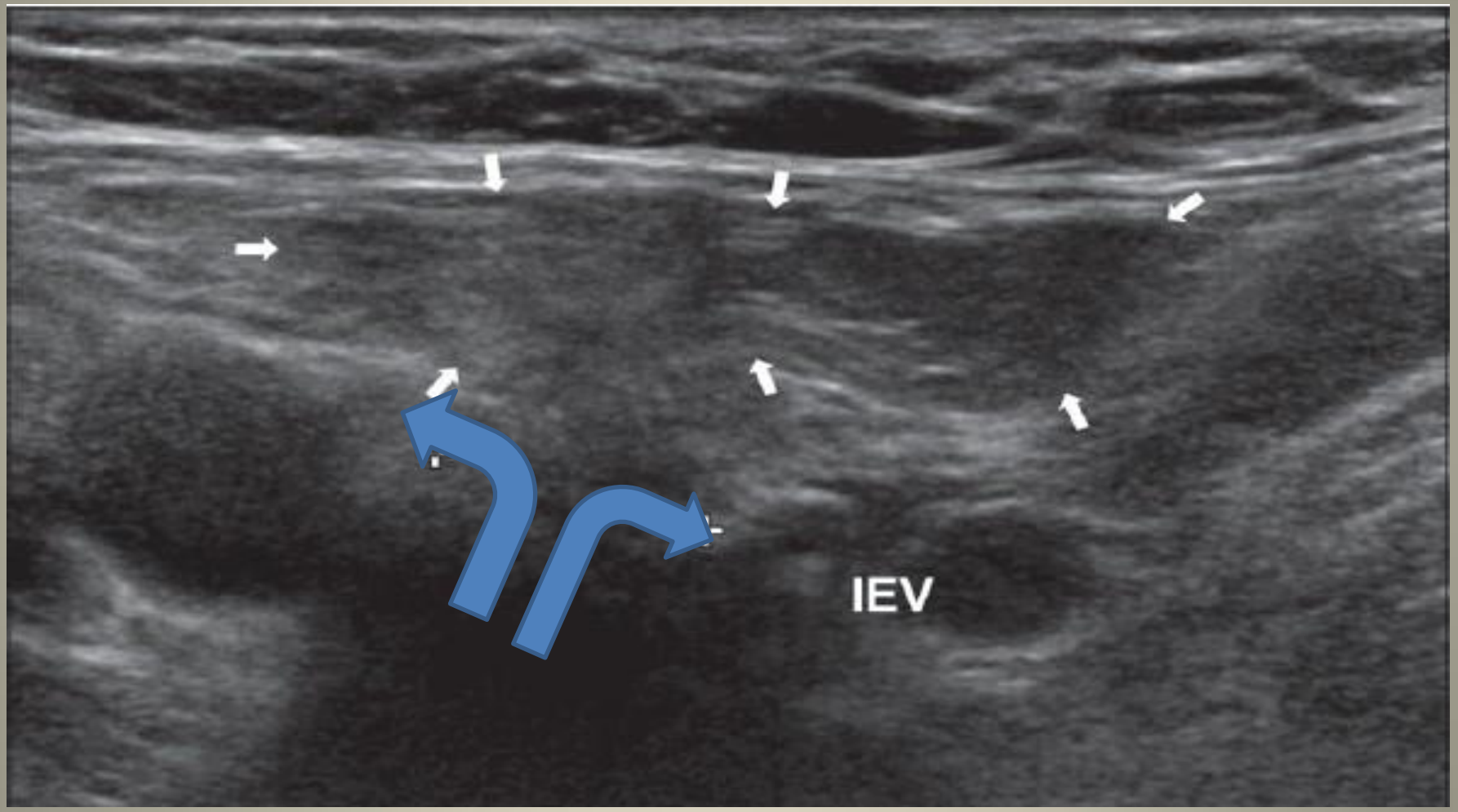
Indirect inguinal hernia - longitudinal



Direct inguinal hernia

- Not ALONG inguinal canal
- Contents protrude anteriorly through weakness in transversalis fascia within Hesselbach's triangle, MEDIAL of inferior epigastric vessels
- Contents retroperitoneal fat
- Less common retroperitoneal fat and bowel

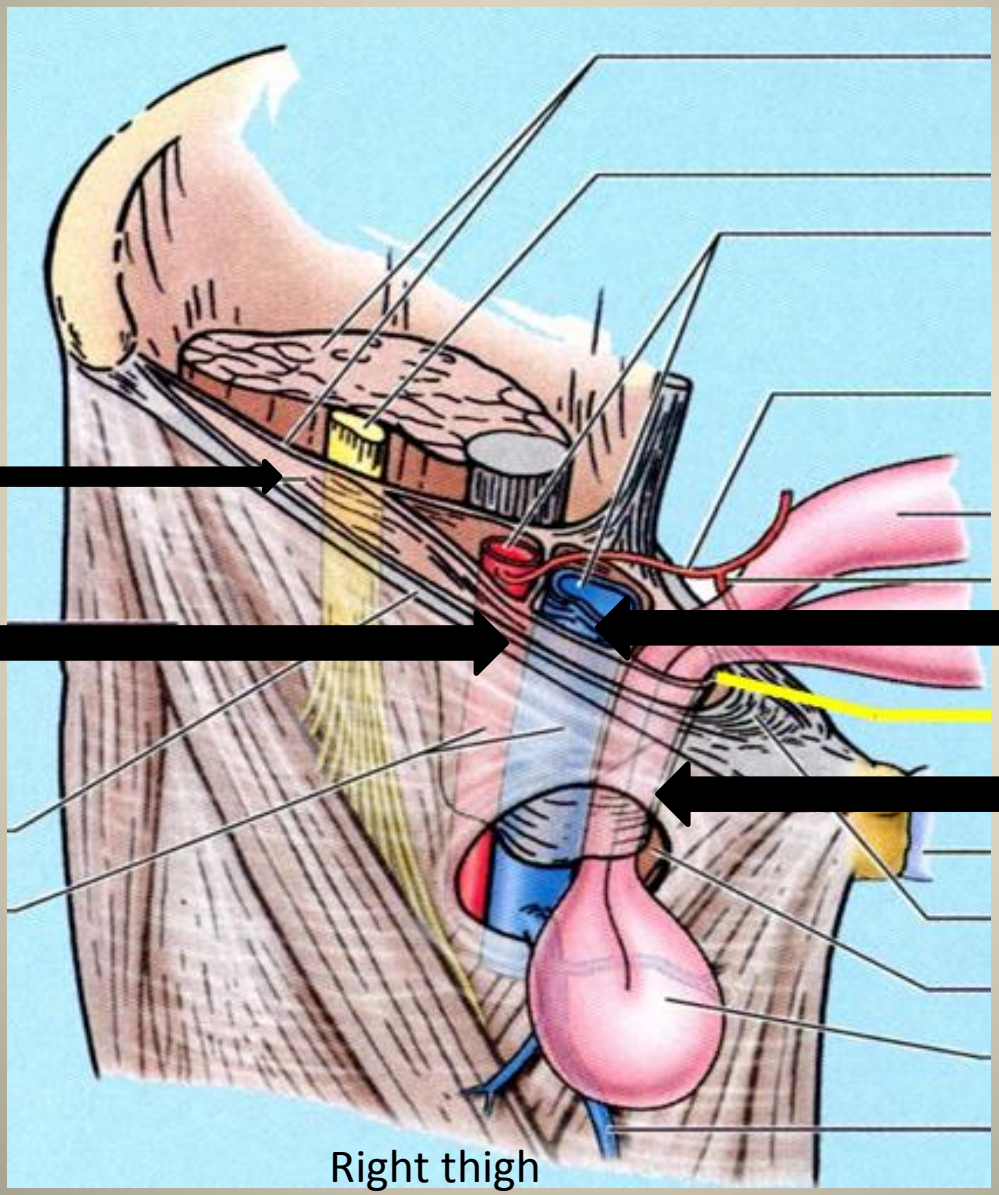
Direct inguinal hernia



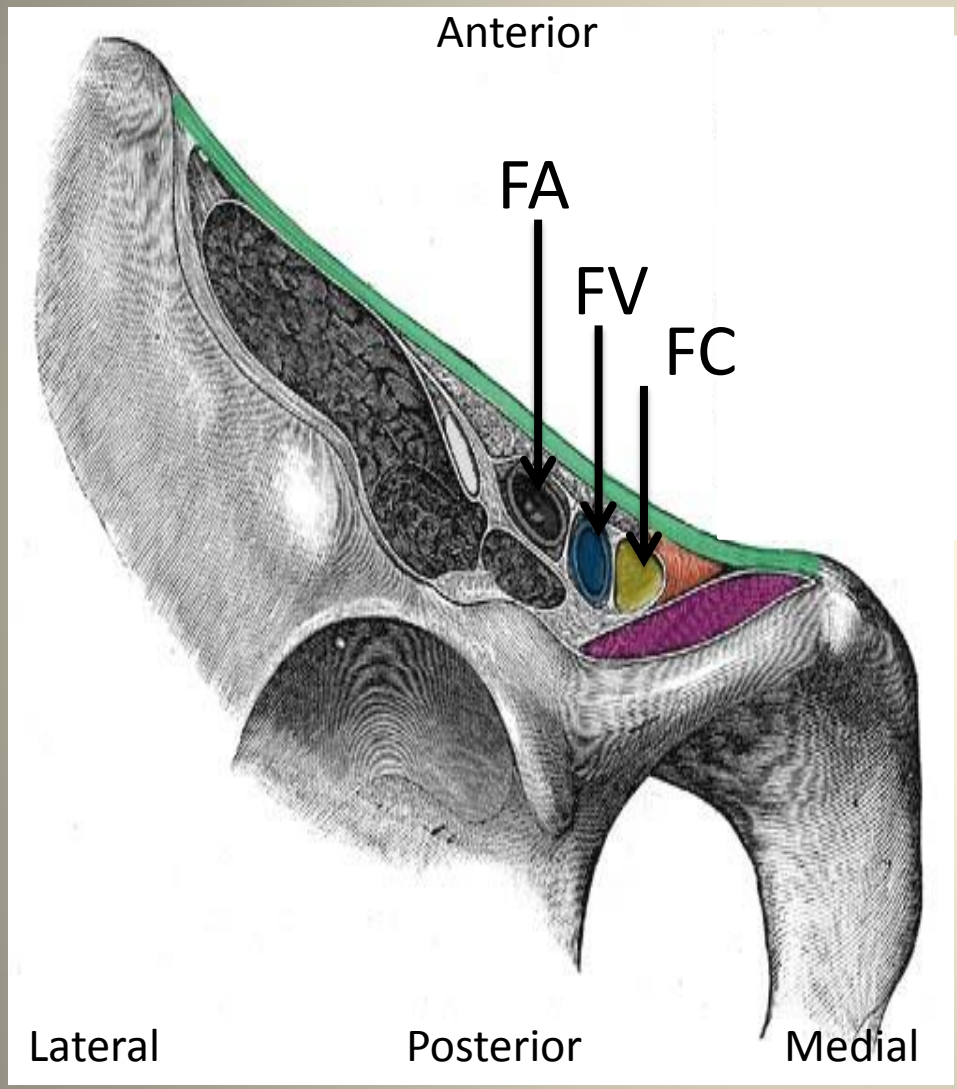
Inguinal hernia - direct

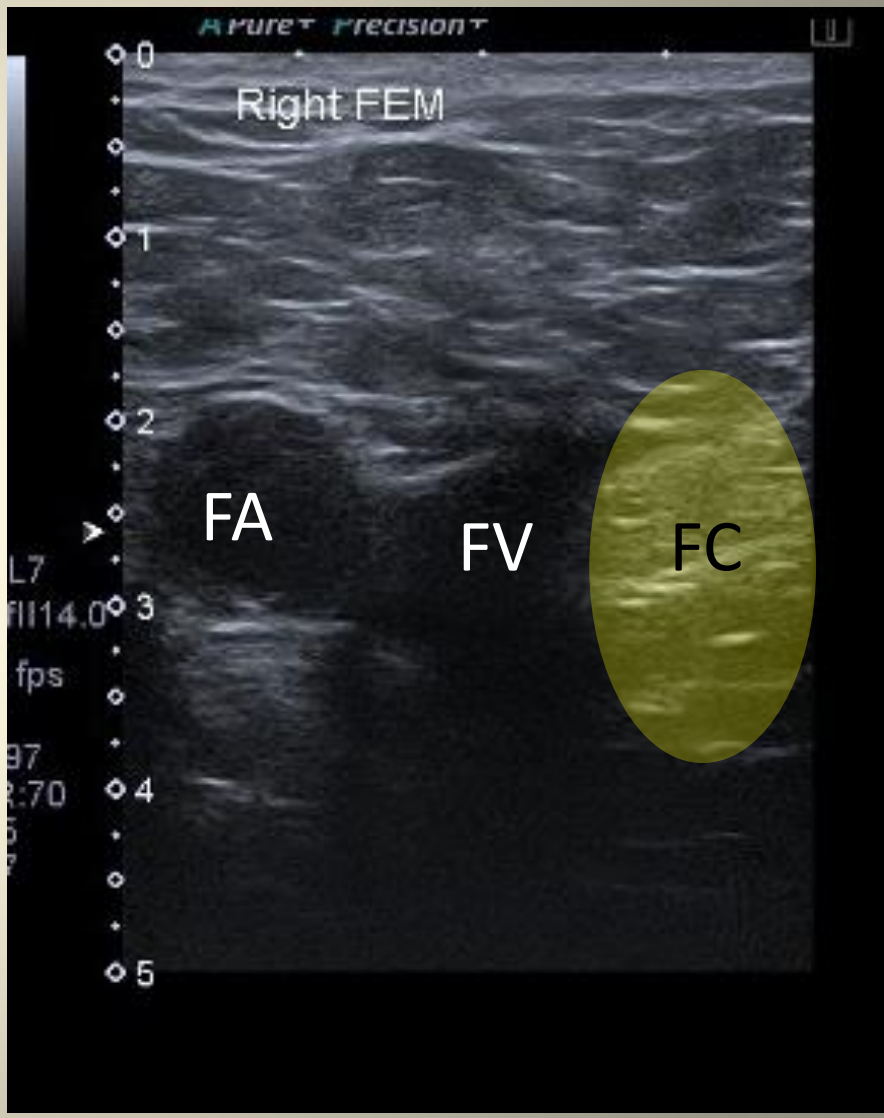
Contents arise medial to the inferior epigastric vessels and through a defect in the posterior inguinal canal wall

Femoral canal



Femoral Canal – Transverse section

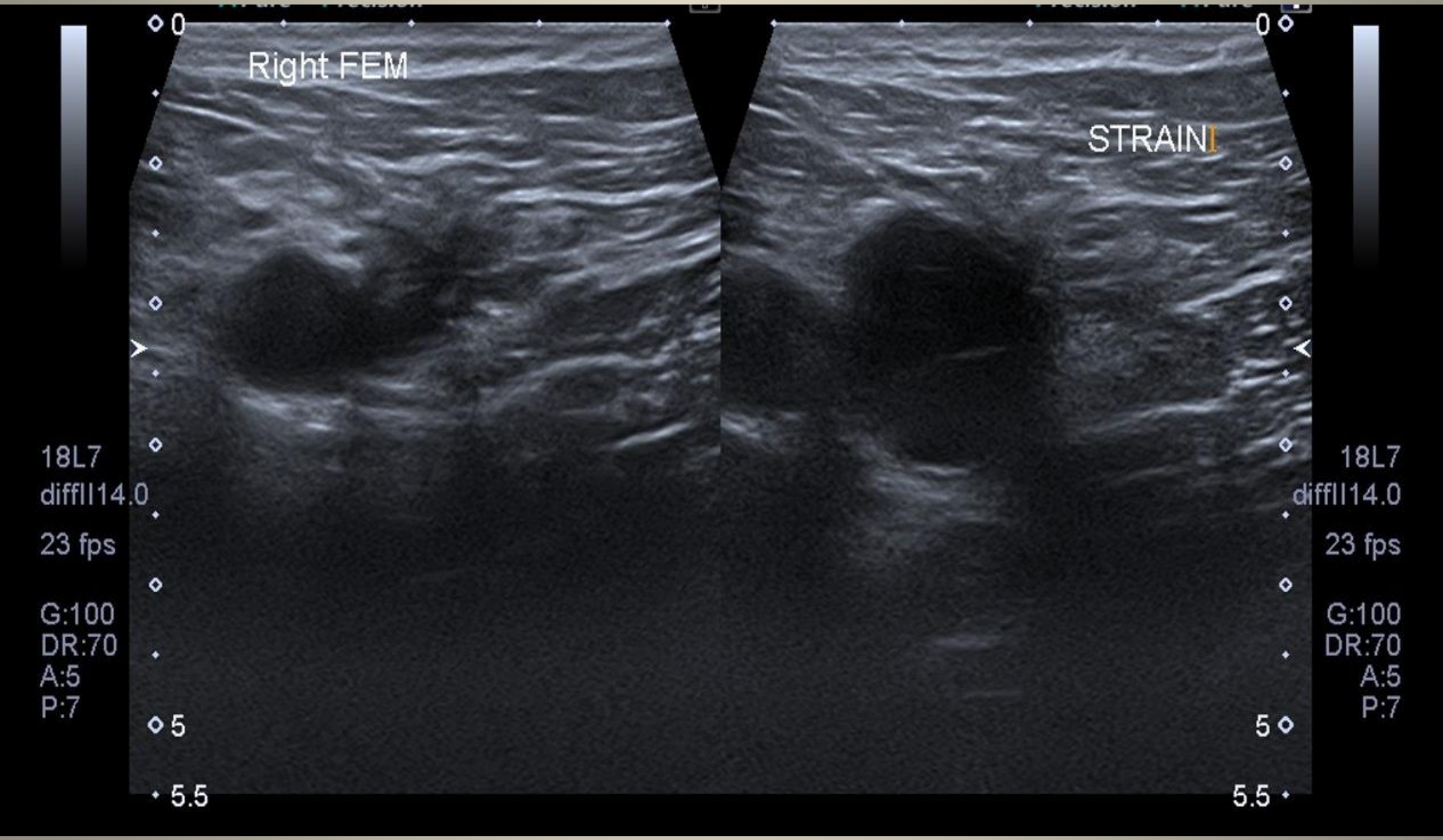




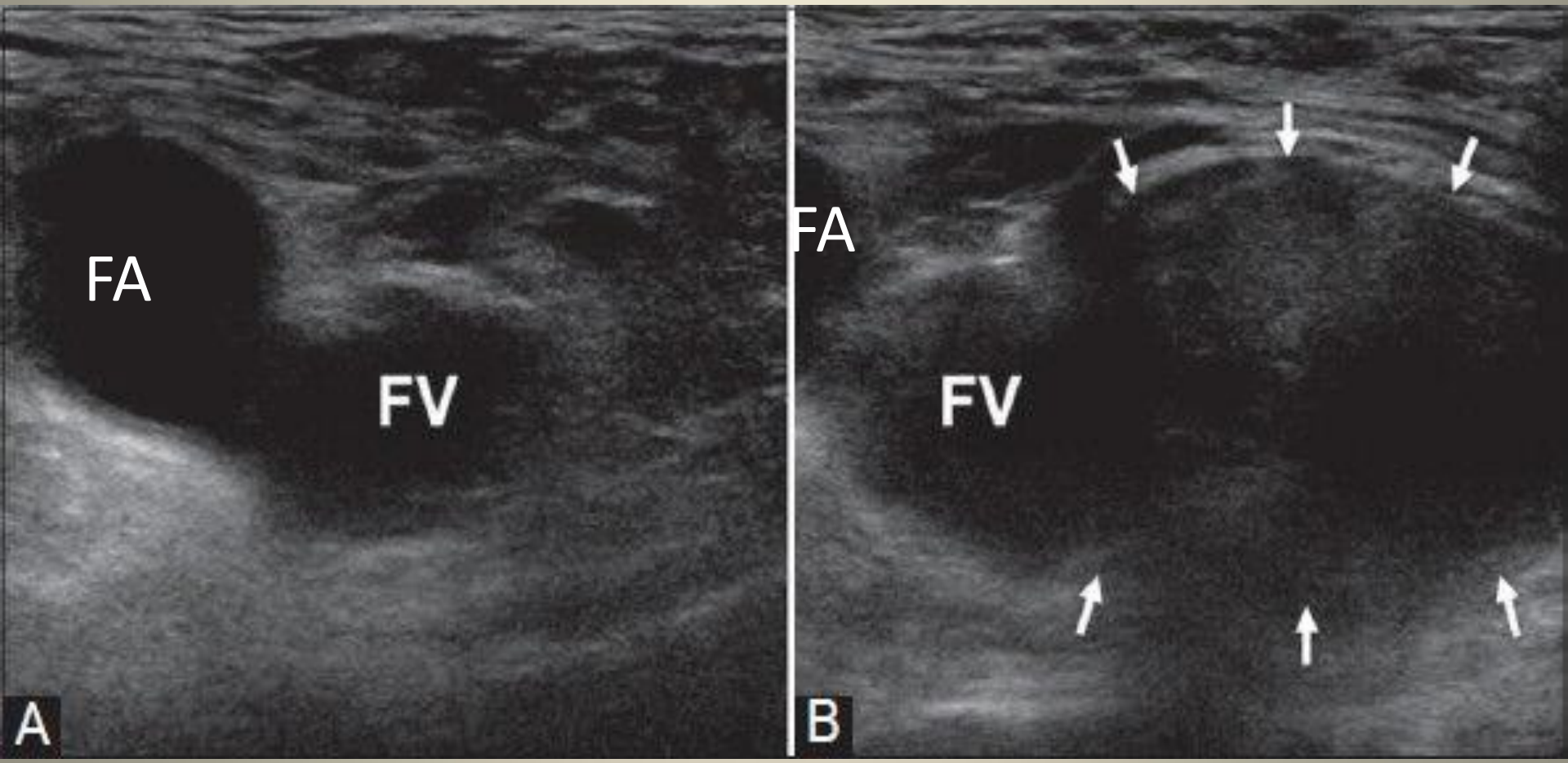
Femoral hernia

- Defect in the transversalis fascia overlying the femoral ring
- 4:1 female : male
- Risks-obesity constipation
- Contents pushed inferiorly through femoral canal into groin
- Medial of femoral vessels, inferior and lateral to pubic tubercle

Femoral Canal



Femoral hernia



Sportmans hernia

Sportsman's hernia
- Not a true hernia -no protrusion through a fascia, no lump
- Also called Gilmore's groin, athletic pubalgia
- Insidious pain-difficult to pinpoint, often after training
- Pain over pubic tubercle common symptom
- Pain radiating to adductors and testicular region
- Exacerbated by sit-ups, sneezing etc

Sportsman's hernia
- Involves the aponeurosis of abdominal muscles and conjoint tendon with the inguinal ligament
- May involve adductors insertion tear
- May involve conjoint tendon tear
- May involve external oblique tear
- May involve entrapment of genitofemoral nerve
- May be osteitispubis

Differential diagnosis

- Seroma
- Haematoma
- Abscess
- Cord lipoma
- Undescended testes
- Lymph nodes
- Ovarian
- Bowel masses
- Iliopsoas bursitis
- Adductor tendinopathy
- Urinary bladder issues
- Vascular – aneurysm, DVT, varicose veins.
- Nothing

Reporting tips - Hernia

Reports should be concise and clear including relevant information that will allow easy assessment of the need and priority for subsequent surgical referral.

Include:

Side

Site (inguinal, femoral, umbilical etc.)

Type (indirect or direct)

Reducibility

Size of the hernia neck/fascia defect

Contents

The end



Useful websites:

E-learning for health

Ultrasound cases

You tube videos of herniae

Books:

Practical Musculoskeletal Ultrasound – E, McNally

Articles:

http://www.ijri.org/article.asp?issn=0971-3026;year=2007;volume=17;issue=4;spage=290;epage=298;aulast=Gokhale

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3932585/