By the Name of ALLAH the Most Gracious the Most Merciful

The peritoneum, mesentery, greater omentum and retroperitoneal space Part III

د . أحمد اسامة حسن

Specialist in General Surgery & Laparoscopic Surgery

14th ,October , 2026

To be read in

Bailey & Love's Short Practice of Surgery 28th Edition.

Ch 65.

THE RETROPERITONEAL SPACE AND RETROPERITONEUM

- Peritoneal Fascii
- Retropujukkeitoneal space.
- Pneumoretroperitoneum.
- Retropeitoneal space collection.
- Retroperitoneal heamorrhage.
- Retroperitoneal fibrosis
- Retroperitoneal (psoas) abscess
- Retroperitoneal Tumours lipoma & sarcoma.

Peritoneal Fascii

- Regions of the connective tissue were separately named , as if they are separate entities.

  - Toldt’s fascia.

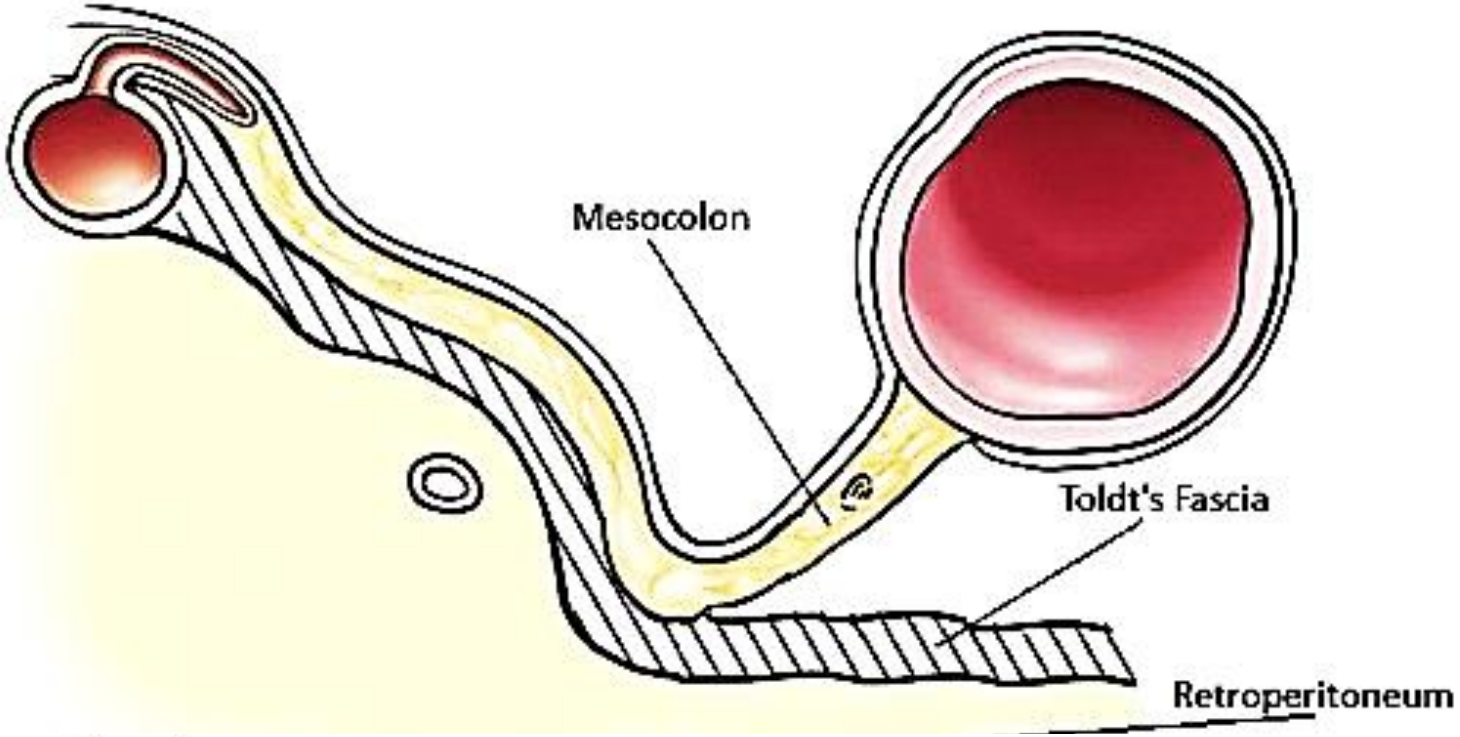
  - Waldeyer’s fascia.

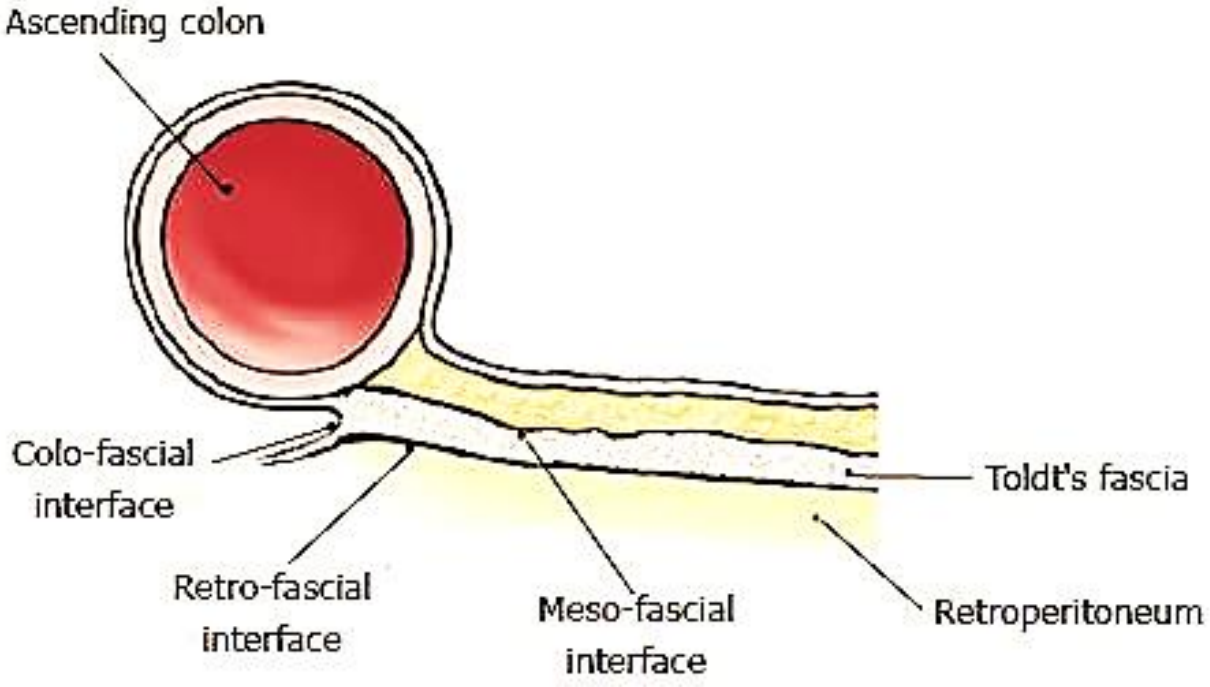
  - Denonvilliers’ fascia.

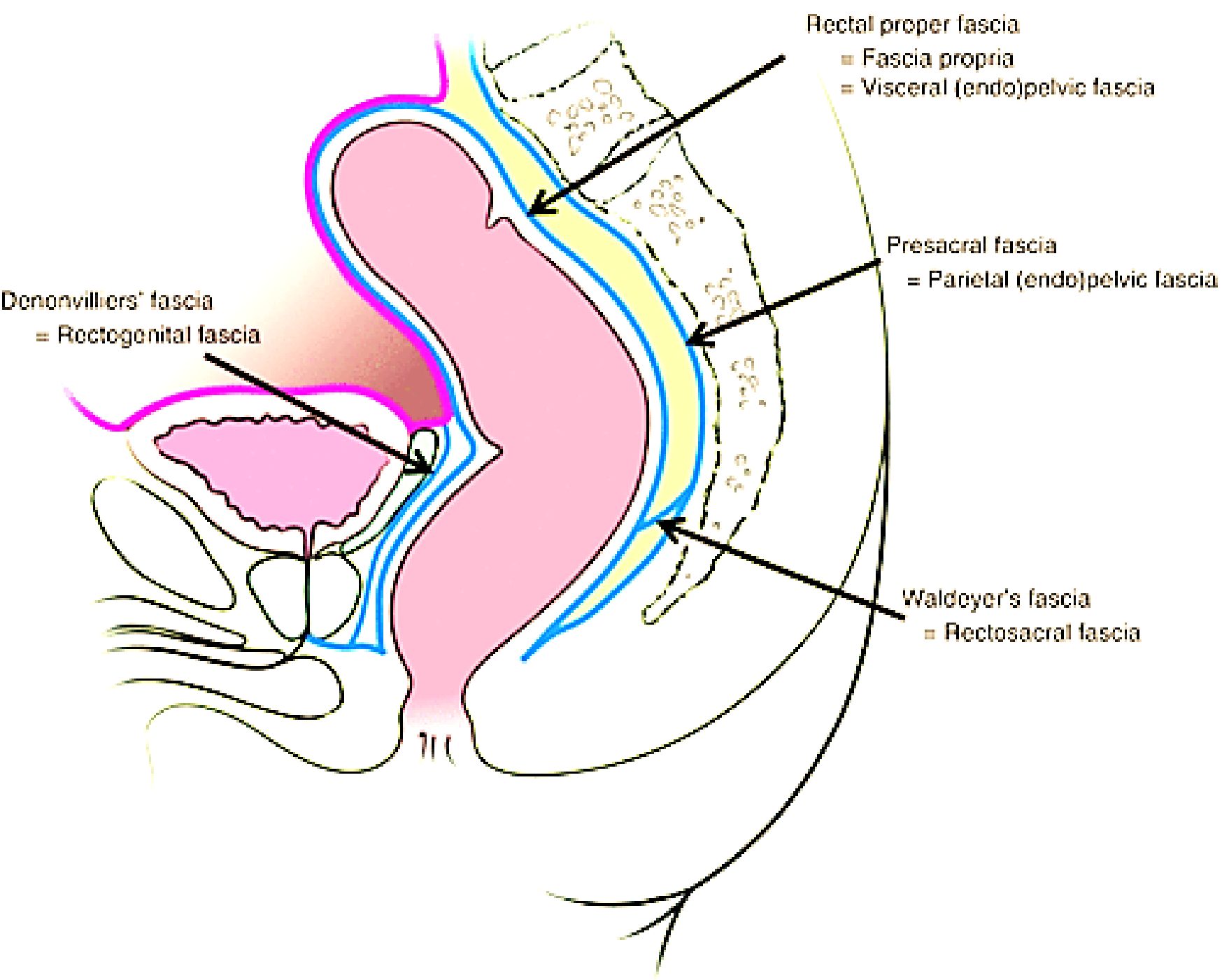
  - Gerota’s fascia .

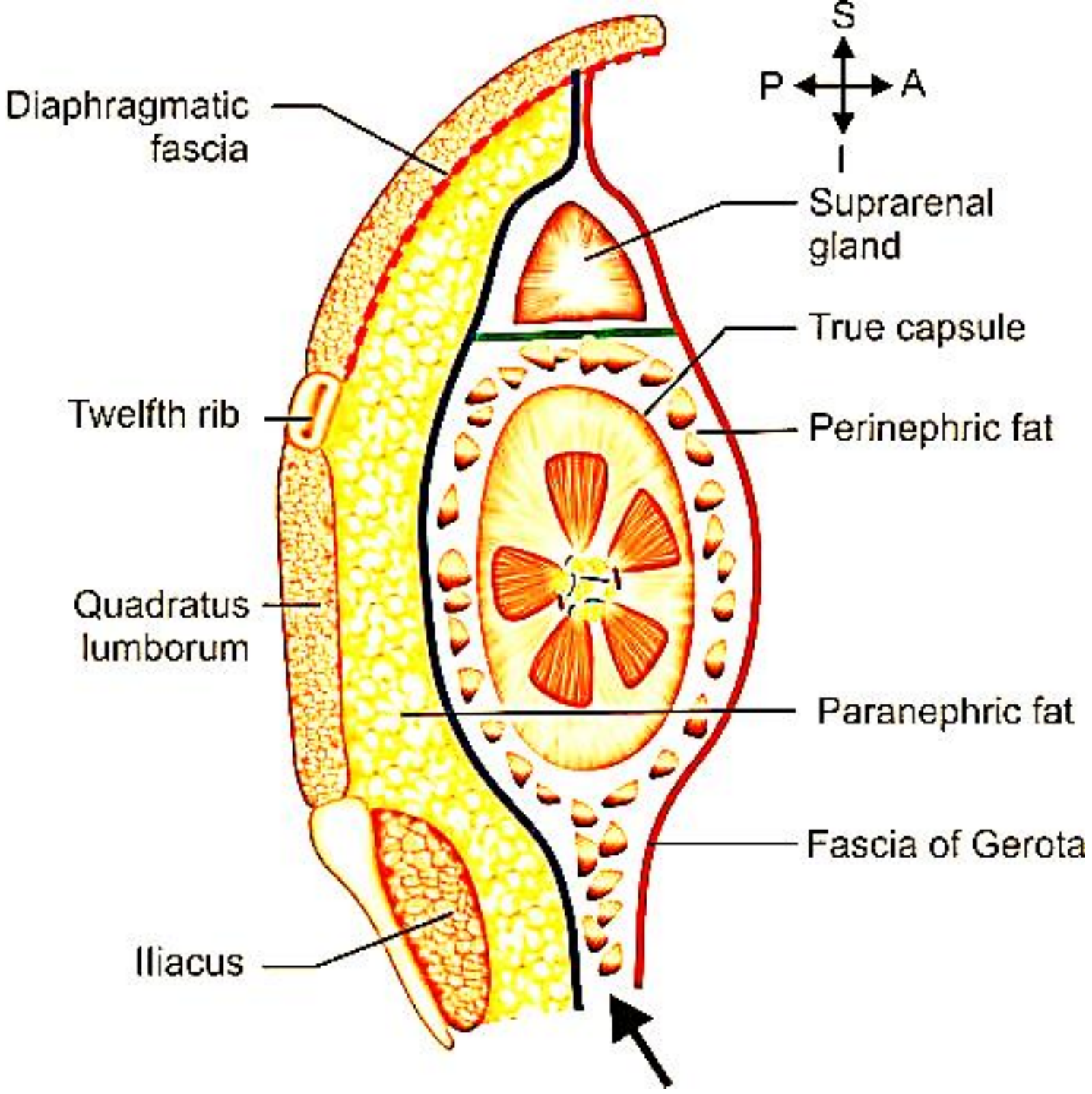
  - Fredet’s fascia.

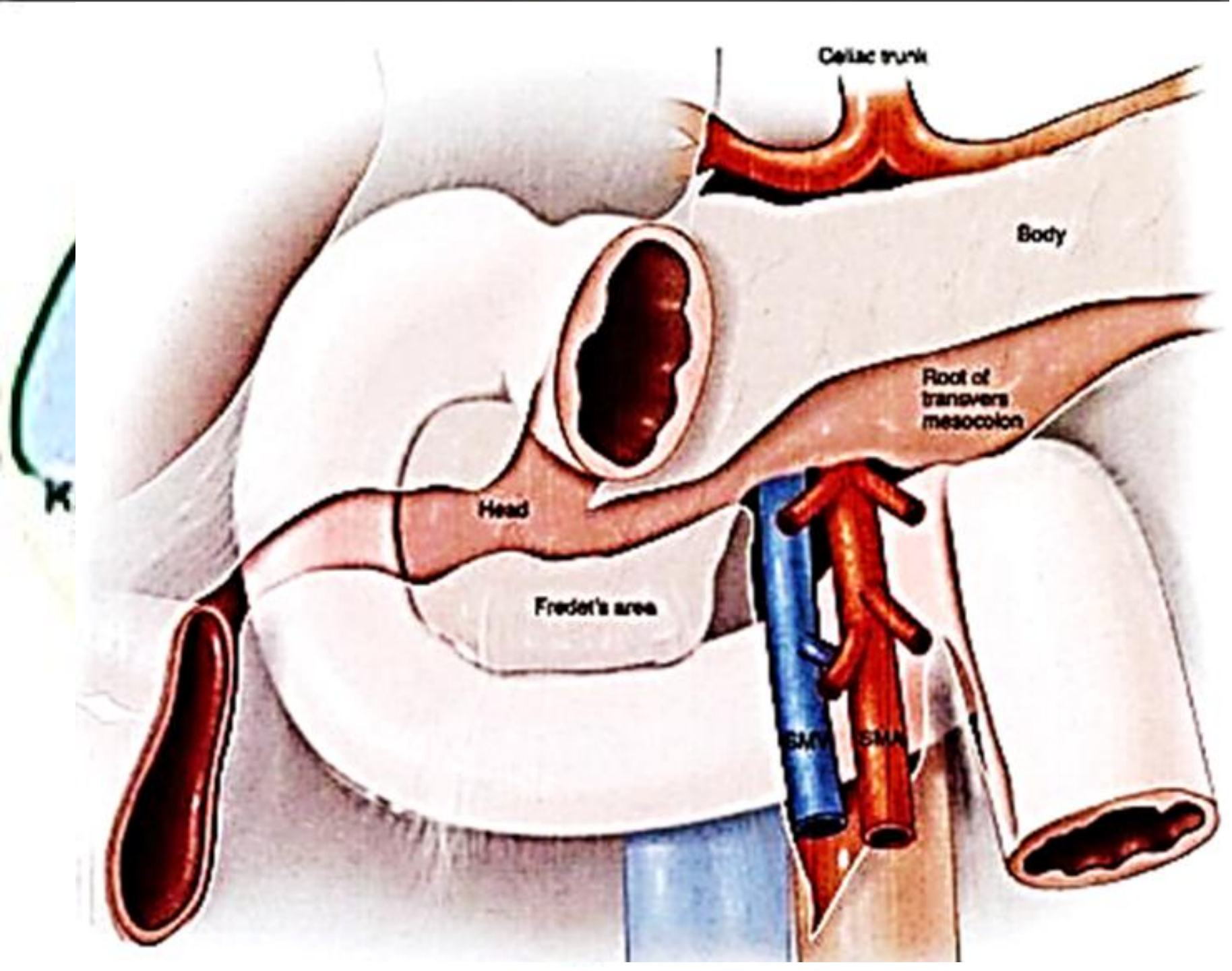
- These are merely different zones of the same connective tissue layer that is interposed between the mesenteric domain in front and the non-mesenteric domain behind.


Mesocolon
Toldt's Fascia
Retroperitoneum


Ascending colon
Colo-fascial interface
Toldt's fascia
Retro-fascial interface
Meso-fascial interface
Retroperitoneum


Rectal proper fascia
= Fascia propria
= Visceral (endo)pelvic fascia
Presacral fascia
= Parietal (endo)pelvic fascia
Denonvilliers' fascia
= Rectogenital fascia
Waldeyer's fascia
= Rectosacral fascia


S
P
A
I
Diaphragmatic fascia
Suprarenal gland
True capsule
Twelfth rib
Perinephric fat
Quadratus lumborum
Paranephric fat
Fascia of Gerota
Iliacus


Celiac trunk
Body
Root of transvers mesocolon
Head
Fredet's area
SMV
SMA

THE RETROPERITONEAL SPACE

Introduction

- The retroperitoneum is the region confined to the non-mesenteric domain posterior to the mesenteric domain. It contains the kidneys, adrenal glands, major vessels, ureters and gonadal vessels and is surrounded by adipose tissue.
- Swellings in the retroperitoneum include abscess, haematoma, cysts and malignancy from retroperitoneal organs (kidney, ureter, adrenal).
- The term retroperitoneal tumour refers to primary tumours arising in connective tissues in this region.

- The **space continues** into the thorax and thereafter into the neck. This explains why, on occasion, a patient with an intestinal perforation during colonoscopy develops surgical emphysema and crepitus at the neck level, (Pneumoretroperitoneum) tracks along the space into the thorax and thereafter into the neck, where it accesses subcutaneous tissue to generate surgical emphysema and crepitus.
-
- **The space may be obliterated** following radiation treatment, in Crohn's disease or in longstanding diverticular inflammation. This presents considerable challenges for the surgeon who needs access to the plane whenever conducting visceral surgery.

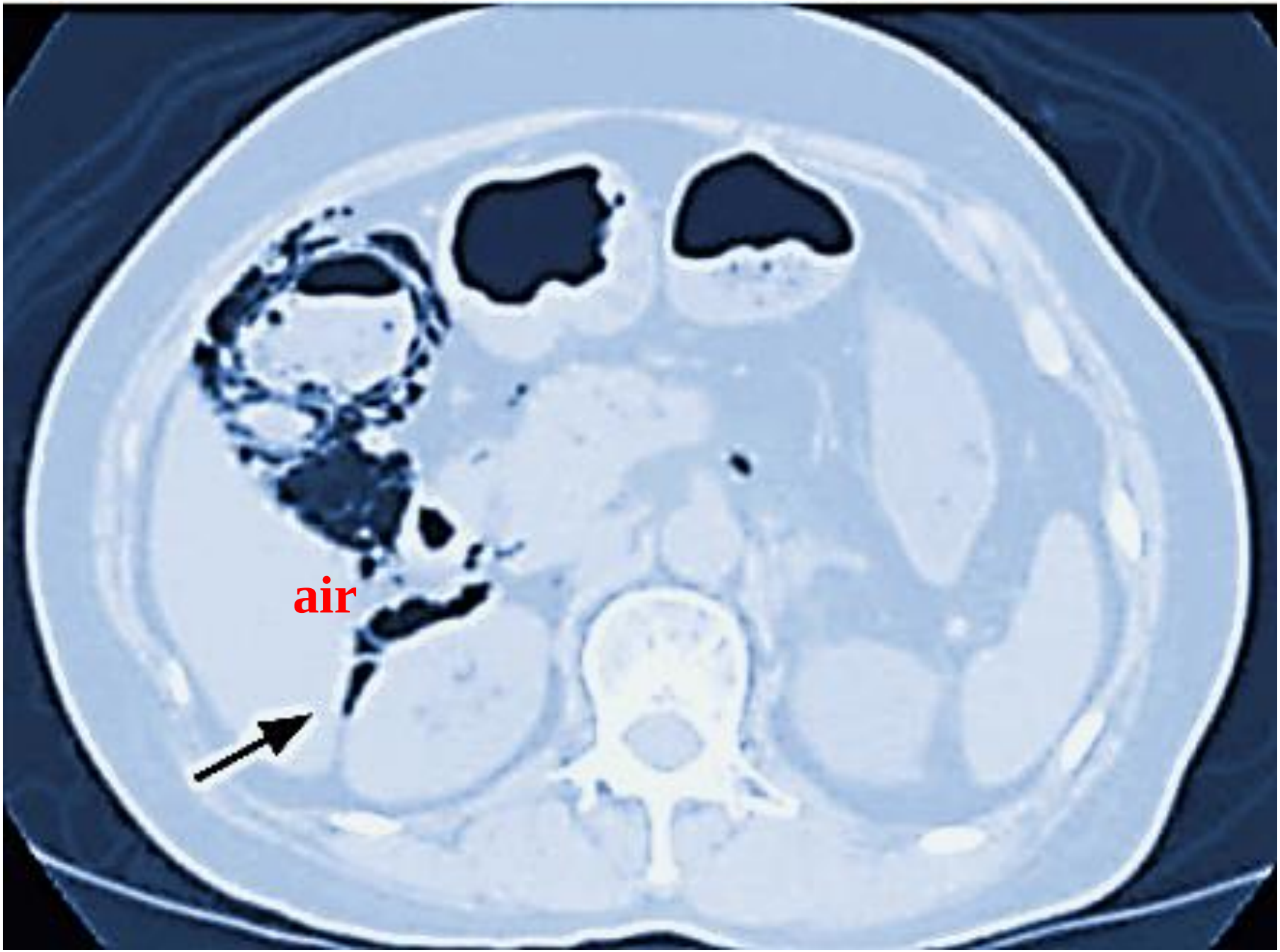
Pneumoretroperitoneum

Free air in retroperitoneal space

- **Duodenum**
  - Posterior perforation, blunt or penetrating abdominal, trauma & endoscopy +/- biopsy (rare)
- **Ascending/descending colon**
  - colorectal carcinoma (CRC), diverticulitis, endoscopy +/- biopsy & ischemic colitis
- **Rectum**
  - surgery, e.g. transanal excision of rectal carcinoma , endoscopy & Trauma.
- **Pneumatosis intestinalis**
- **Residual air from retroperitoneal surgery**
  - urological/adrenal & spinal (anterolateral approach) .

Axial computed tomography section of the abdomen demonstrating gas (arrows) in the retroperitoneal space




air

RETROPERITONEAL SPACE COLLECTIONS

- These are fluid collections in the retroperitoneal space and these differ from intraperitoneal collections because of their location .
- They are a common finding in moderate to severe acute pancreatitis. Fluid accumulates as a result of pancreatic inflammation, dissecting the left mesocolon of the underlying fascia and posterior abdominal wall. With continued expansion retroperitoneal space collections track subperitoneally around the flanks.
- A rapidly expanding retroperitoneal collection, such as occurs with a ruptured aortic aneurysm, may rupture intraperitoneally (????).

EXAMPLE (acute pancreatitis)

- Pancreatic exudate may lead to :

- Halo's sign. F
- Cut off sign.

Retroperitoneal Hemorrhage.(Grey Turner sign).

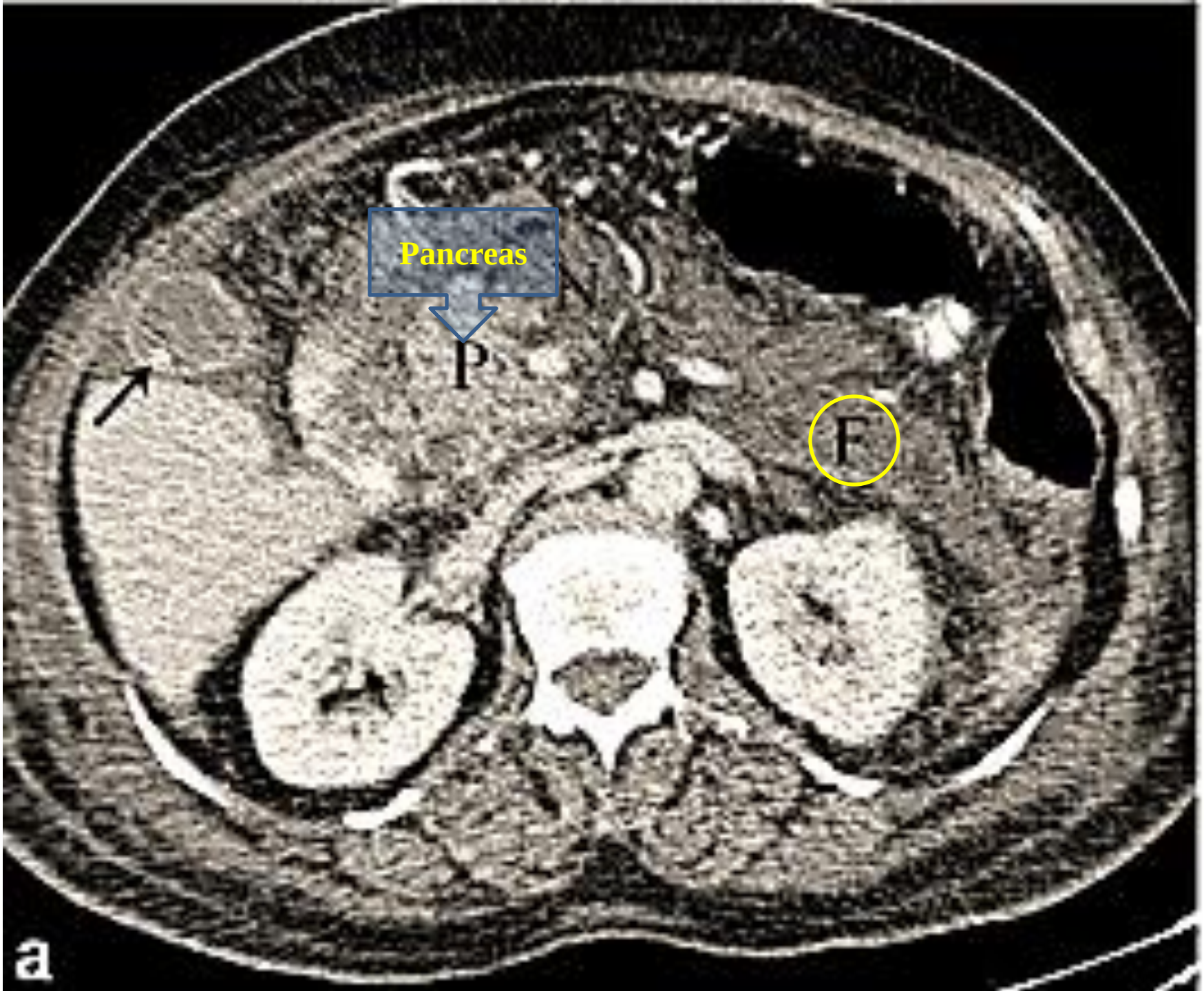
- Acute haemorrhagic pancreatitis .
- Ruptured aortic aneurysm (posterior).
- IVC injury.
- Pelvic fracture.
- Antithrombtic drugs (heparin, warfarine).

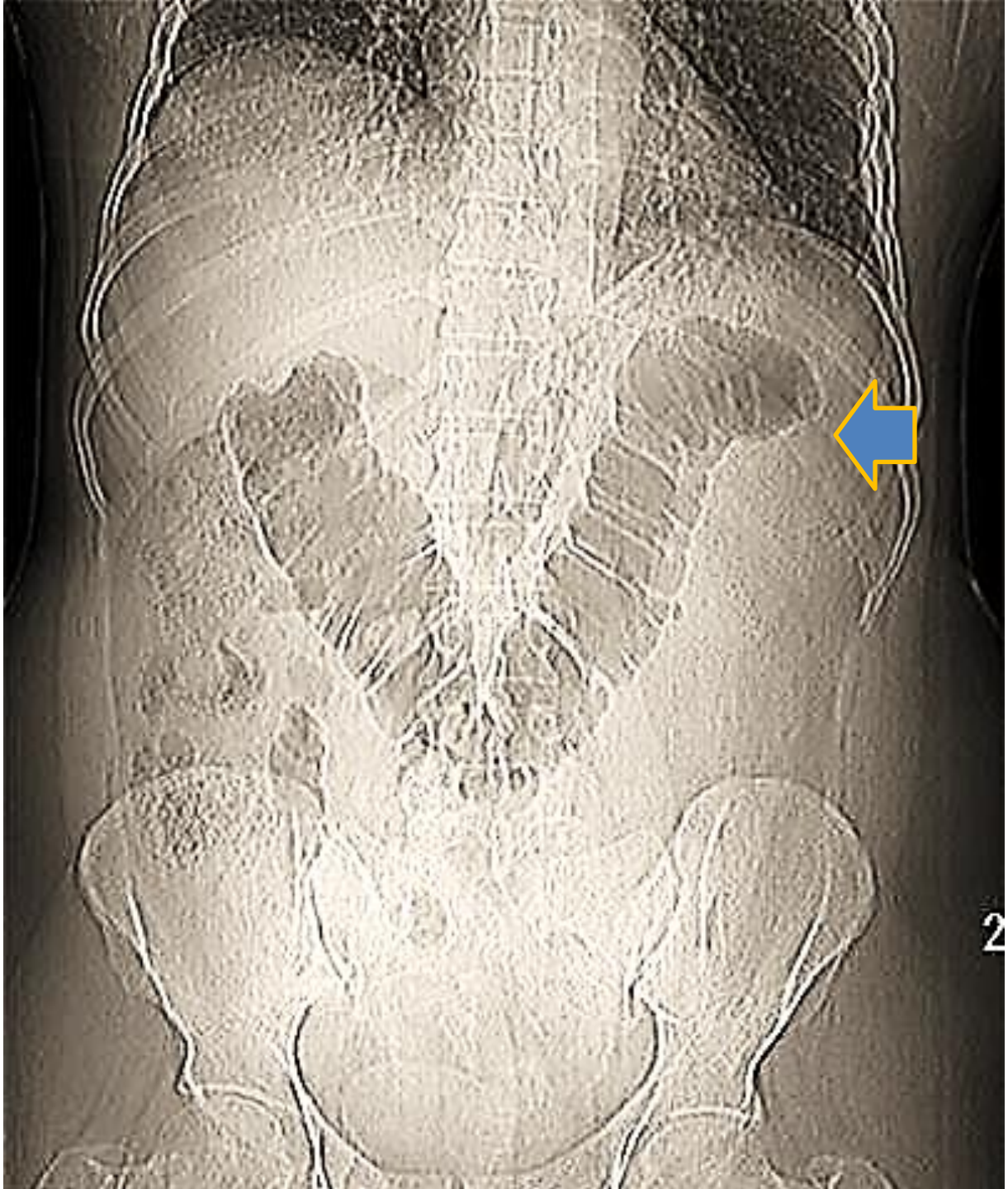
Diagnosis:

- History.
- Heamodynamically unstable.
- Peritoneal aspirate & Abdominal ultrasonography are negative (unless there is a tear in posterior peritoneum) .
- Abdominal CT scan.

Treatment :

Resuscitation and treat the cause.

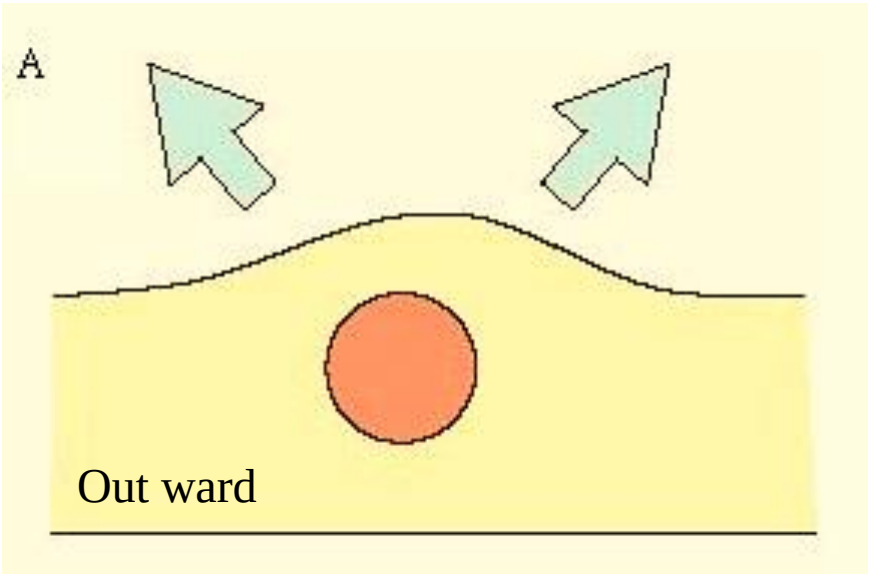

Pancreas
P
F
a

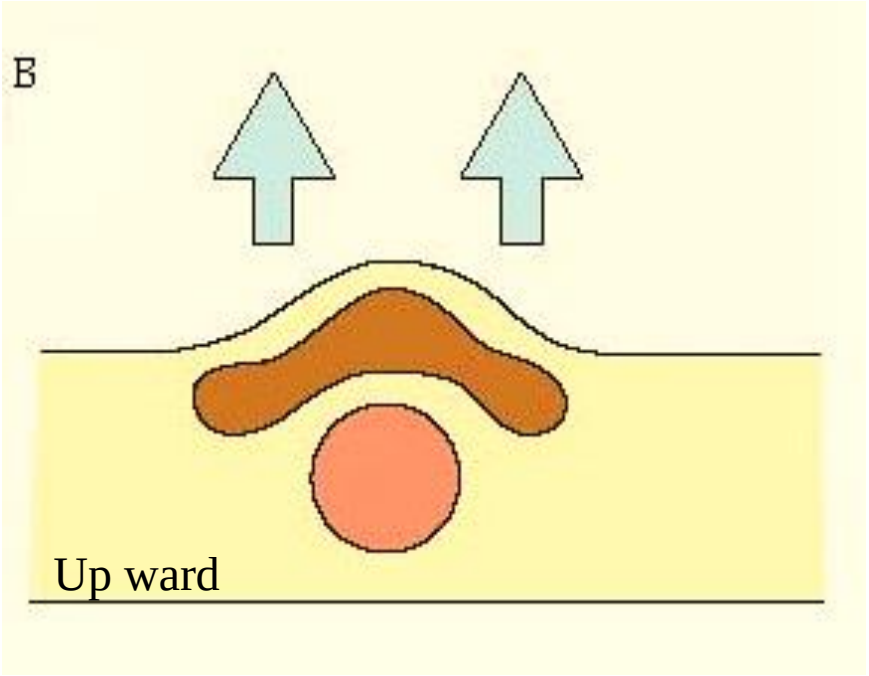


- Cut off sign.

EXAMPLE (Aortic Aneurysm)

- Thrill.
- Expansile pulsation (A).
- Posterior : Retroperitoneal Hemorrhage. (Grey Turner sign).
- Anterior : Intra-abdominal Hemorrhage. (Cullen's sign).

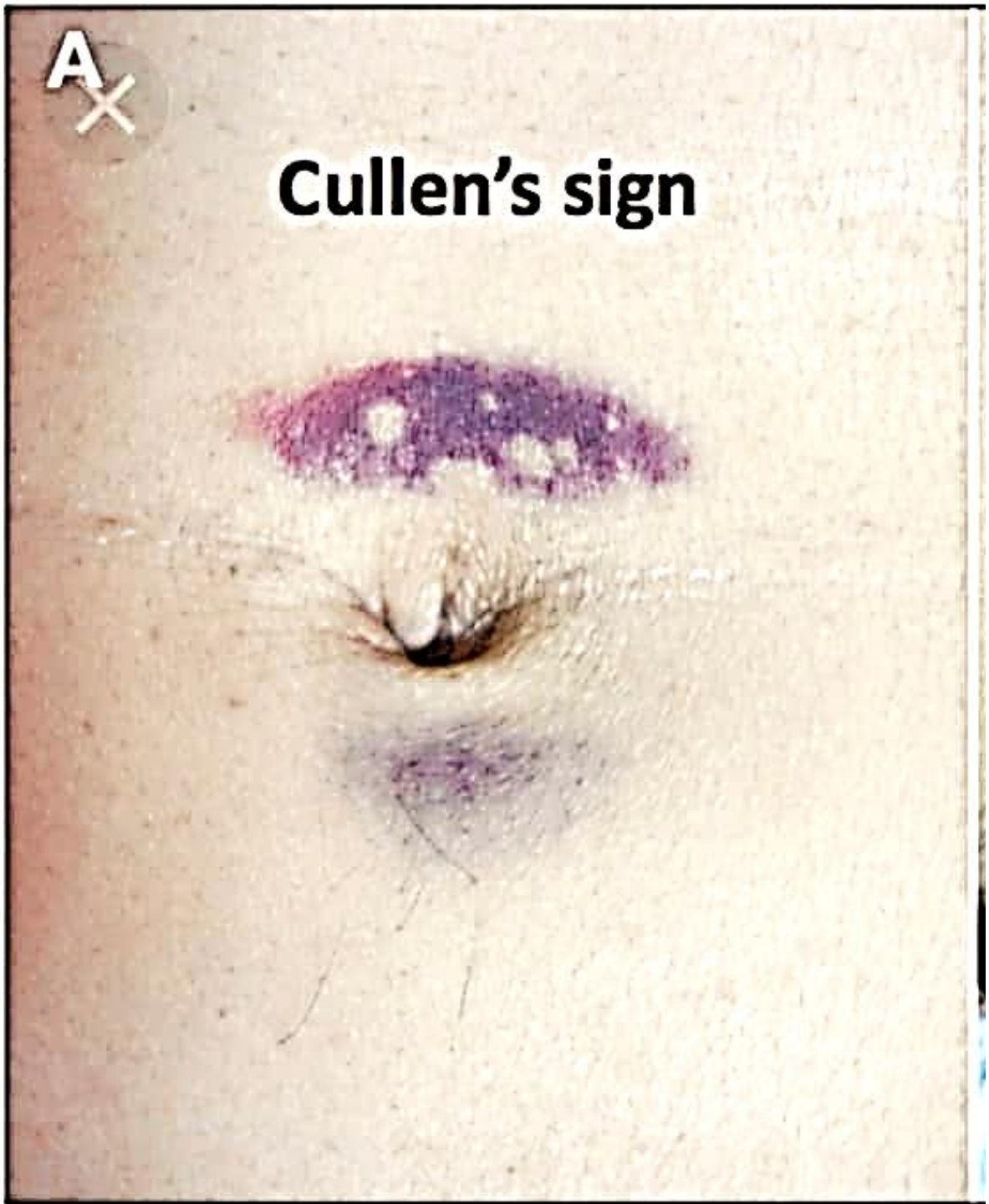






Grey Turner sign

Cullen's sign



Retroperitoneal fibrosis

- Rare , characterised by development of a flat grey/white plaque of tissue that usually develops in the low lumbar region and later spreads laterally and upwards to encase the common iliac vessels, ureters and aorta.
- Histological appearances vary from active inflammation with a high cellular content interspersed with bundles of collagen through to one of relative acellularity and mature fibrosis/calcification.
- Its aetiology is obscure in most cases (idiopathic; synonym Ormond's disease), being allied to other fibromatoses (others being Dupuytren's contracture and Peyronie's disease).

Causes of Retroperitoneal Fibrosis

Benign

- Idiopathic (Ormond's disease)
- Chronic inflammation
- Extravasation of urine
- Retroperitoneal irritation by leakage of blood or intestinal content
- Aortic aneurysm (inflammatory type)
- Trauma
- Drugs (chemotherapeutic agents and previously methysergide)

Malignant

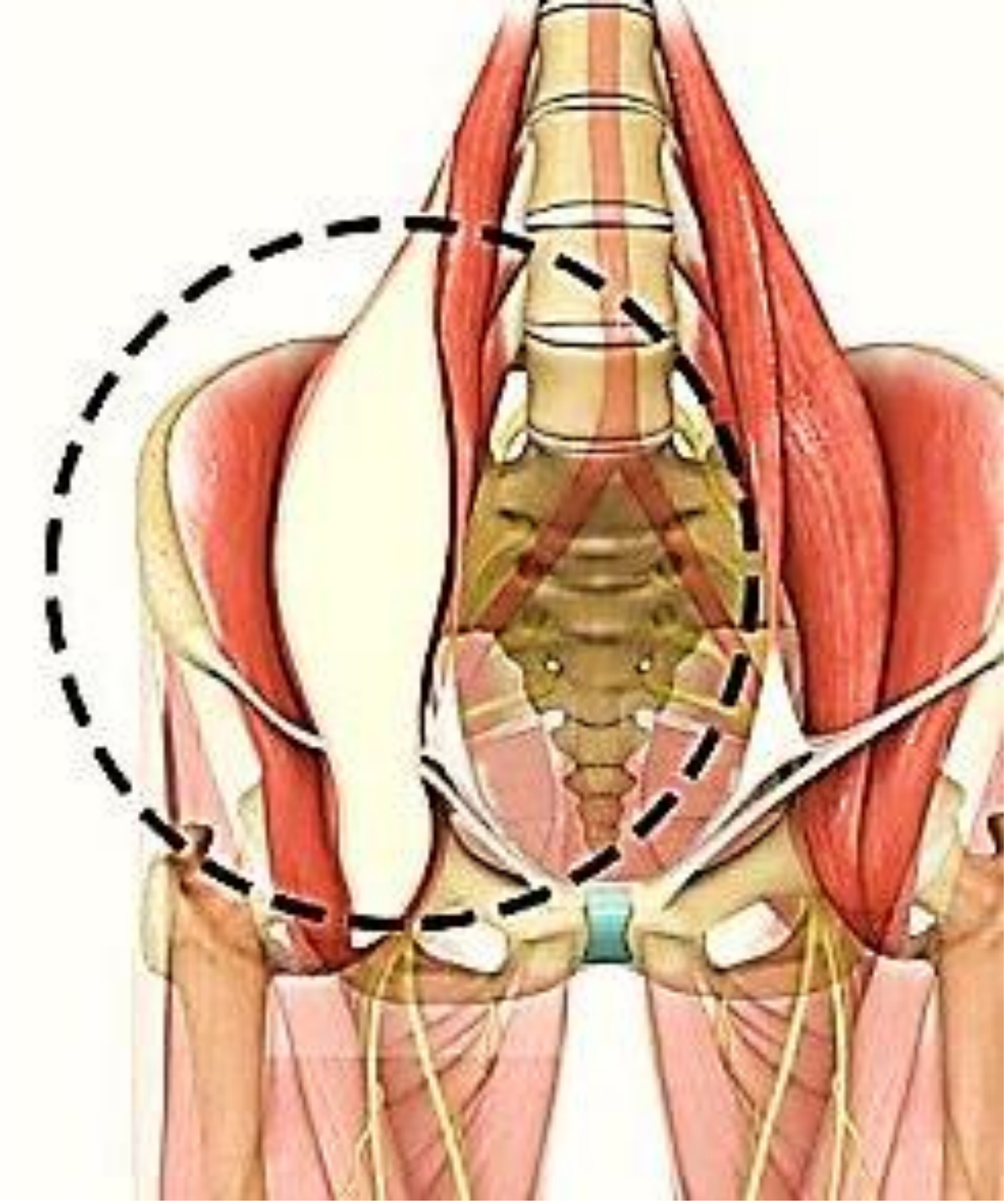
- Lymphoma
- Carcinoid tumours
- Secondary deposits (especially from carcinoma of stomach, colon, breast and prostate)

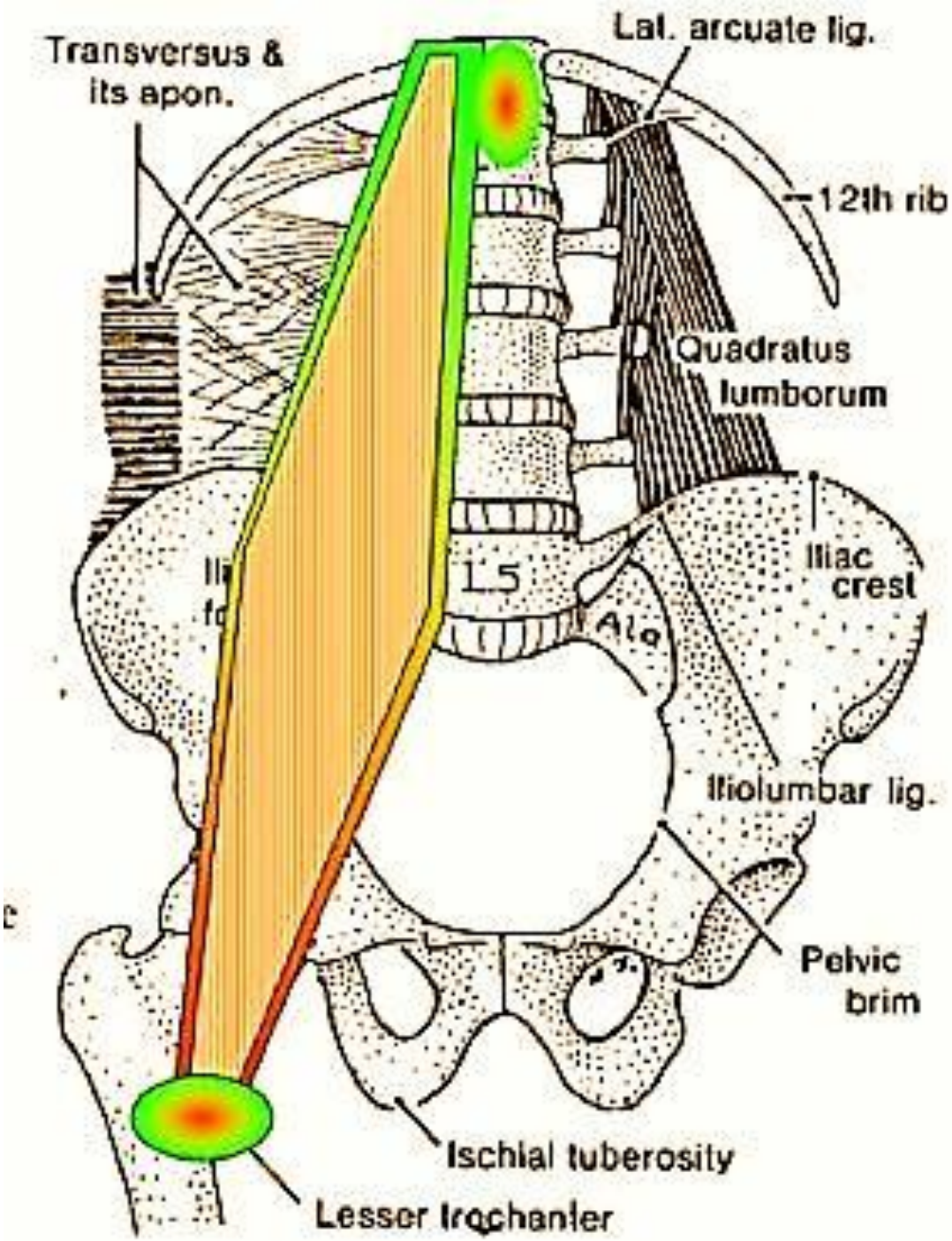
Retroperitoneal (psoas) abscess

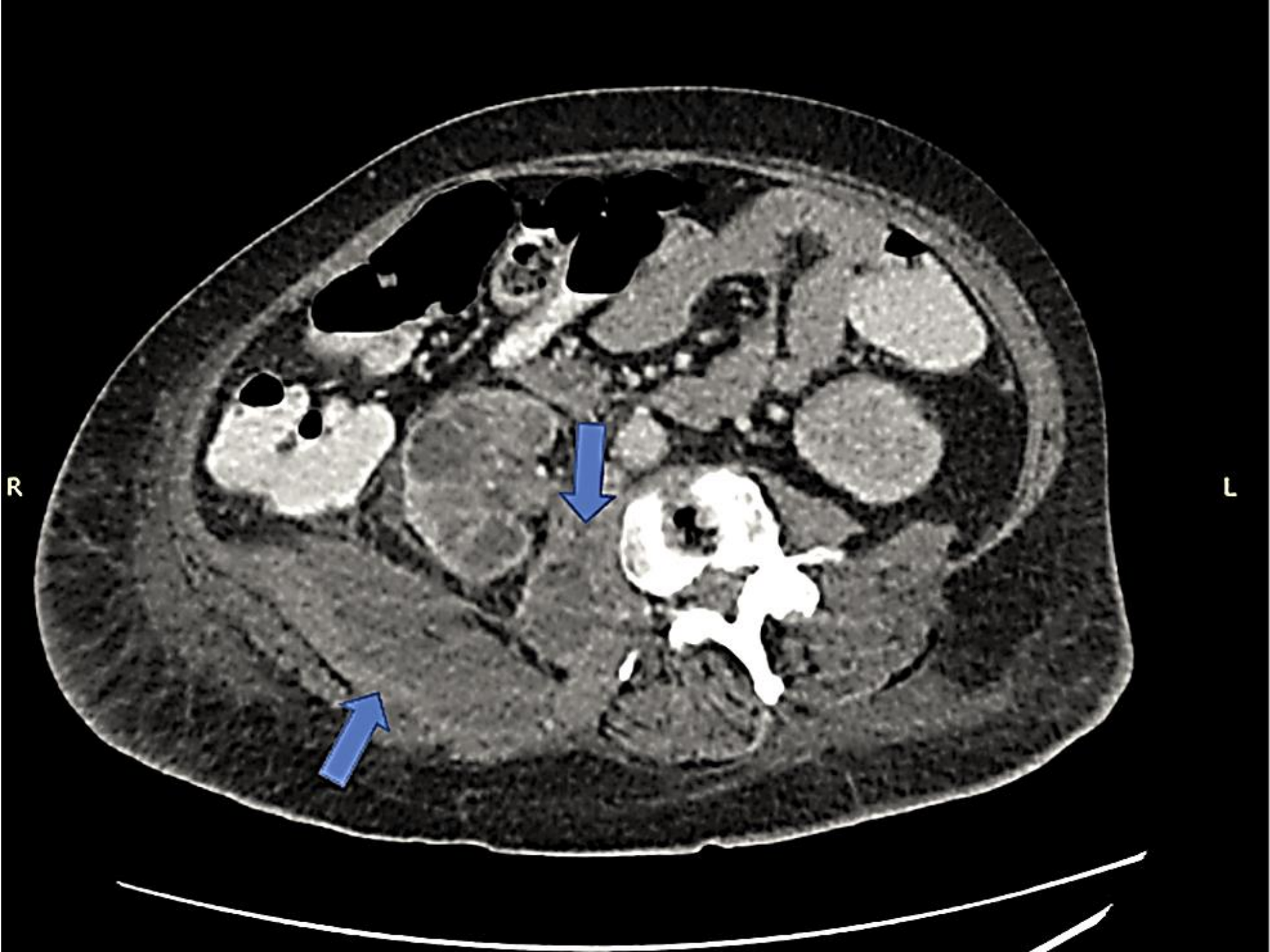
- The psoas abscess is an abscess of the retroperitoneum .
- TB of the spine (Pott's disease),.
- Secondary to direct spread of infection from the inflamed digestive or urinary tract with or without perforation.
- Recently it is most commonly seen in advanced Crohn's disease.
- Rarely, it arises due to haematogenous spread from an occult source in immunocompromised patients and in association with intravenous drug misuse.
- Clinical presentation is with back pain, lassitude and fever. A swelling may point to the groin as it tracks distally along the iliopsoas muscle, under the inguinal ligament. (DDx Femoral H.)
- Pain may be elicited by passive extension of the hip or a fixed flexion of the hip evident on inspection.

Investigation and treatment

- CBP, ESR, CRP.
- Specific Ix for T.B.
- Plain CXR
- CT scan.
- Treatment is usually by percutaneous CT-guided drainage and appropriate antibiotic therapy.
- Culture & sensitivity.
- Surgical intervention is required if these are unsuccessful.




Lat. arcuate lig.
Transversus &
its apon.
12th rib
Quadratus
lumborum
Iliac
crest
L5
Ala
Iliolumbar lig.
Pelvic
brim
Ischial tuberosity
Lesser trochanter


R
L

Retroperitoneal lipoma

- The patient may seek advice on account of a swelling or because of indefinite abdominal pain. The swelling sometimes reaches an immense size.
- Diagnosis is usually by CT scan.
- A retroperitoneal lipoma sometimes undergoes myxomatous degeneration, a complication that does not occur in a lipoma in any other part of the body. A lesion that rapidly increases in size is often malignant (liposarcoma).

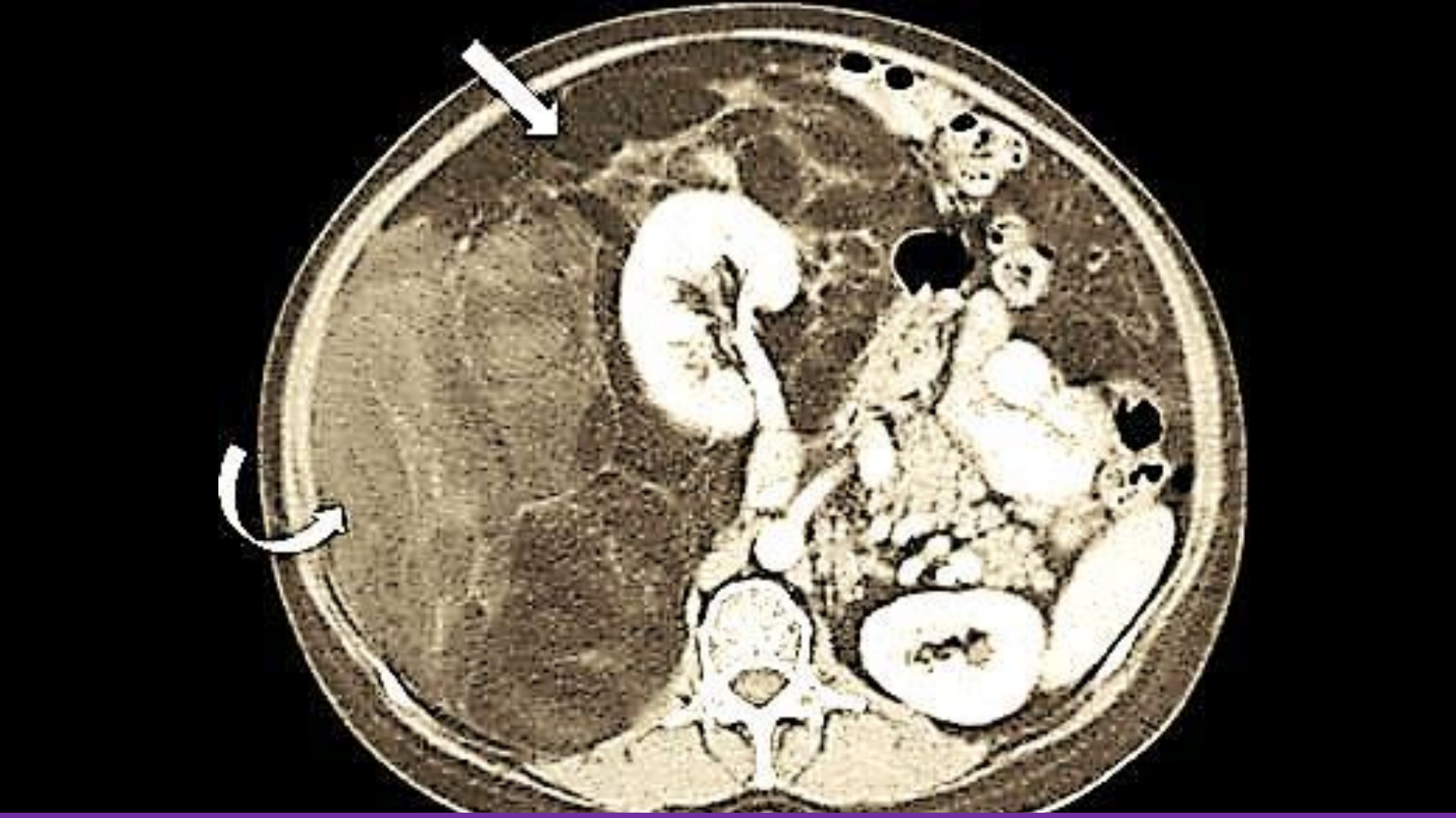
Retroperitoneal sarcoma

- Retroperitoneal sarcomas are rare tumours accounting for only 1–2% of all solid malignancies (10–20% of all sarcomas are retroperitoneal). The peak incidence is in the fifth decade of life, although they can occur at almost any age.
- The most frequently encountered cell types are:
  1) Liposarcoma. 2) Leiomyosarcoma 3) Malignant fibrous histiocytoma.

- Presentation is late because these tumours arise in the large potential spaces of the retroperitoneum and can grow to a considerable size without producing symptoms. Moreover, when symptoms do occur, they are non-specific, such as abdominal pain and fullness, and are easily dismissed as being caused by other less serious processes. Retroperitoneal sarcomas are therefore often very large at the time of presentation.
- Some times it makes a pressure symptoms (ureter, Aorta, IVC) , invasion to the kidney or bowel displacement .

- Investigation
- Detailed multiplanar imaging (CT and MRI) with reconstructions is required not only for tumour detection, staging and surgical planning but also for guiding percutaneous or surgical biopsy of these tumours.
- Treatment
- The definitive treatment of primary retroperitoneal sarcomas is surgical resection.
- Chemotherapy and radiotherapy without surgical debulking have rarely been beneficial, when used alone or in combination.
- A multidisciplinary treatment approach with imaging review will be required when assessing operability (based on adjacency or involvement of vital structures) and approach.

- Up to 75% of retroperitoneal sarcoma resections involve resection of at least one adjoining intra-abdominal visceral organ (commonly large or small bowel or kidney).
- The most common types of vascular involvement precluding resection are involvement of the proximal superior mesenteric vessels or involvement of bilateral renal vessels.
- Prognosis
- Survival rates are in general poor, even after complete resection, being of the order of 35–50% (excluding low-grade liposarcomas, which may frequently be cured by resection).



CT scan of the abdomen and pelvis with intravenous and oral contrast demonstrates the presence of a large, complex, predominantly fat containing right sided retroperitoneal mass displacing both the right kidney and loops of bowel anteromedially (arrow). Several septations are noted within the lesion and there are focal areas of higher attenuation (curved arrow)



PRAISE BE TO ALLAH