I.V.C. Filters

- ***Definition:***

  Devices placed into IVC for patients at risk of DVTs of the legs.

- ***Function:***

  Traps ***LIFE THREATENING*** blood clots and prevents them from reaching the lungs & causing pulmonary embolism.

- ***Types:*** A- Permanent B- Removable

⇨ *Permanently implanted devices*:

Until recently, the standard mechanical method used to prevent pulmonary embolism.

⇨ *Removable or Retrievable*:

- A new kind of IVC filters.
- Left in place as long as filter protection needed, & removed if such protection is no longer needed.

- ***IVC, Normal anatomy & variations :***

  - IVC is the ***largest*** venous structure in the body.
  - **D**rains venous return from: ***L***ower limbs, ***P***elvis, and ***A***bdomen into Rt atrium.
  - **O**riginates at the L 4-5, confluence of Lt & Rt common iliac veins.
  - **A**scends Rt to the aorta, anterior to the spine, retro-peritoneally.
  - At level of *renal veins*, the IVC lays **P**osterior to the head of the *pancreas.*
  - Renal veins join IVC at vertebral ***level L1-2***.
  - Rt Renal vein is *shorter* & more *caudally*.
  - Lt renal vein is *longer* and typically crosses in front of the aorta.
  - IVC receives the **L**eft, **M**iddle, and **R**ight hepatic veins.
  - Then it passes behind Rt crus of the diaphragm to enter the right atrium.

Transposition of the IVC:

- 0.2-0.5% of individuals.
- ***Left-sided IVC***.
- It then continues cranially in the normal position.

Circum-Aortic & Retro-Aortic left renal vein:

- 8.7%.
- Retro-aortic left renal vein is more common *but* does not impact filter placement.

Indications:

- DVT Patient cannot be treated with anticoagulants.
- Anticoagulants failed to prevent PE.
- In pregnant women with proven DVT ← protection against PE

Contraindications of anticoagulants:

- Recent major **S**urgery
- Major **T**rauma
- Hemorrhagic **S**troke
- Active internal **B**leeding
- **B**leeding diathesis : *(eg, 2ry thrombocytopenia, ITP, hemophilia)*
- Unsteady Gait or tendency to Fall *(as in previous stroke, Parkinson disease)*
- Intracranial neo**p**lasm
- **P**regnancy
- **P**oor response with medications

- ## Contraindications :

Only a few relative contraindications in some patients, such as:

(1) Receiving therapeutic anticoagulants.

(2) Thrombus between the venous access site and expected deployment site.

(3) If (MRI) is expected after filter placement "*For Metalic Filters*".

- ## Preparation :

I. Assess IVC by vena cavography.

II. Measure the diameter of the IVC.

III. Document the position of the renal veins.

- ## Technique :

I. Routes:

- Femoral or
- Jugular venous route.

- Depending on the *site* and *extent* of the thrombus.
- The right jugular vein being the ideal choice.

II. Site:

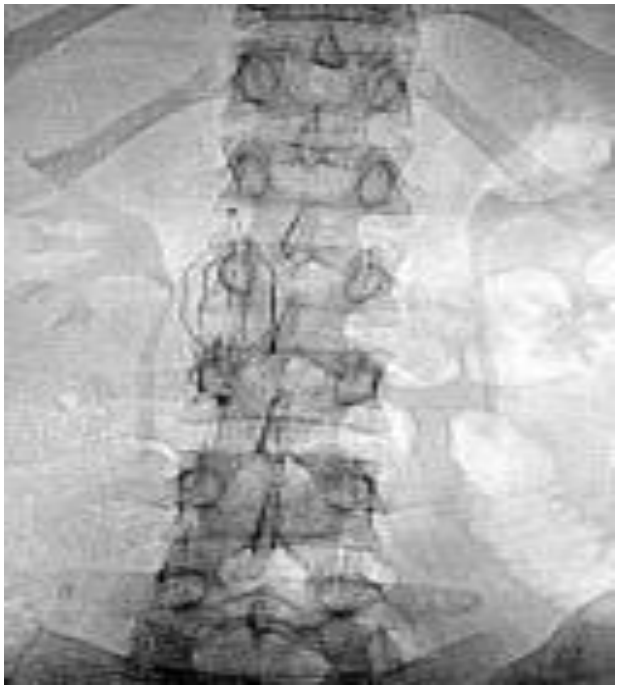
a. The ideal position in *the infra renal IVC* with the apex of the filter at or just below the level of the **renal veins**.

b. *Suprarenal positioning* :
   i. In IVC thrombosis extends above the renal veins or
   ii. In renal vein thrombosis.
   iii. Thrombus above a previously placed filter.
   iv. Pregnant women → there will be compression of the infra renal vena cava.

Complications: *"No procedure is completely risk-free."*

- Undesirable location (May occur with any implanted device).
- Injure adjacent organs (Rare).
- Migrate to the heart or lungs, → significant injury or death.
- Filled with clots → block all flow in the IVC (Rare). → Significant and chronic swelling in legs.

- Retrievable filters are relatively new to clinical use and their *long-term safety* and *efficacy* are **less well documented** than permanent filters that have been in use for a very long period of time.



References:

- *Gary P Siskin, MD; Chief Editor: Kyung J Cho, MD, Radiological Society of North America, and Society of Interventional Radiology.*