

Challenges of vena cava filter

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SUPPORTIVE CARE IN CANCER

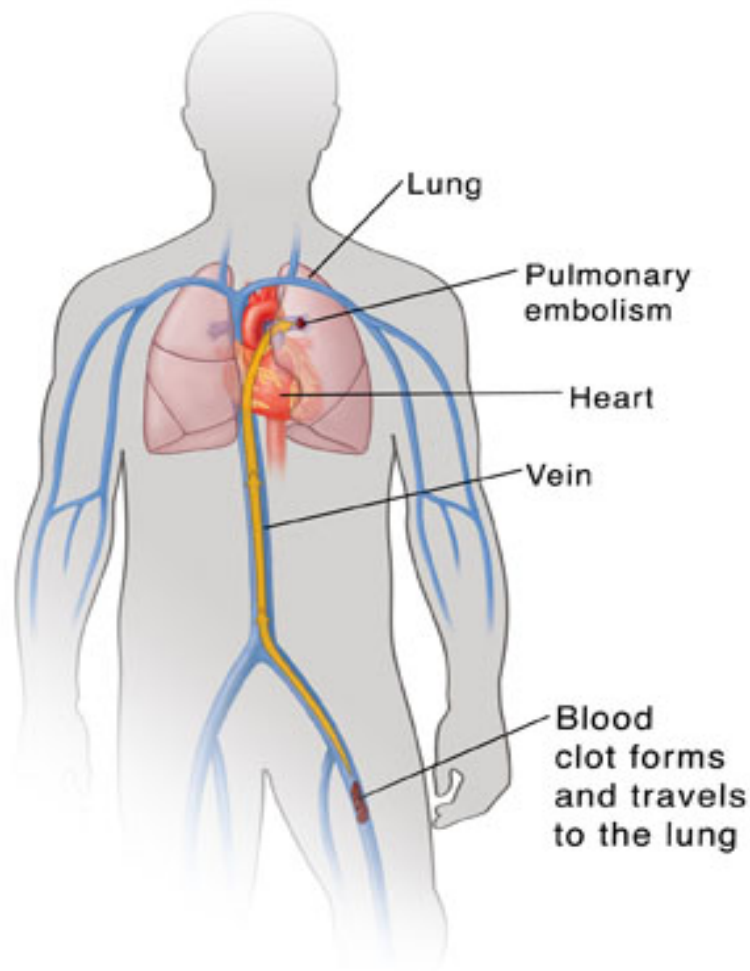


Faculty Disclosure

x	No, nothing to disclose
	Yes, please specify:

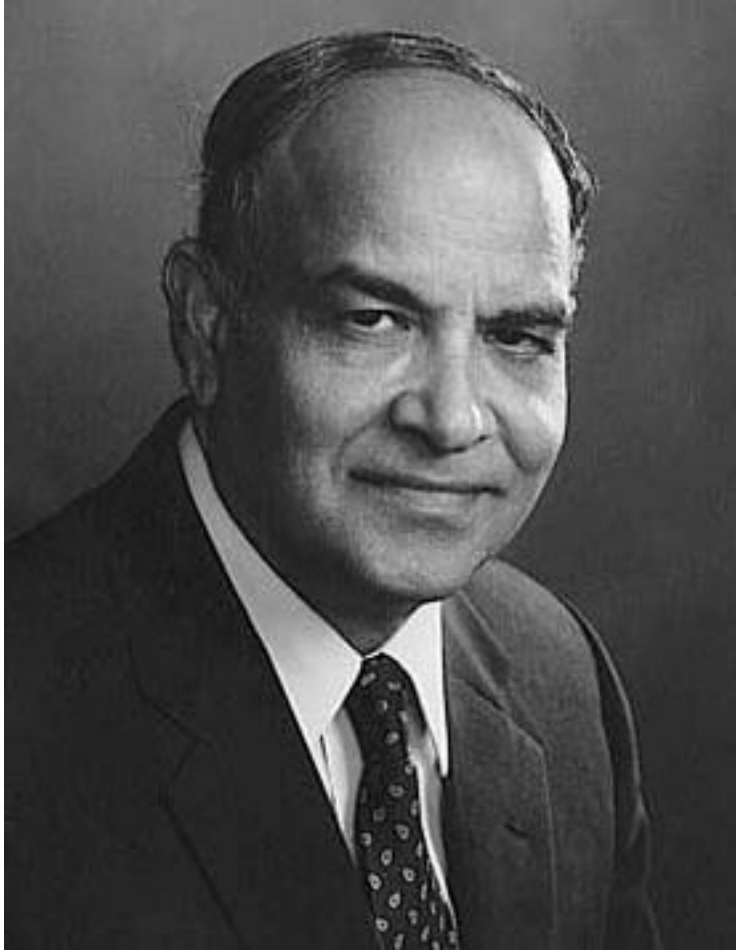
<i>Company Name</i>	<i>Honoraria/ Expenses</i>	<i>Consulting/ Advisory Board</i>	<i>Funded Research</i>	<i>Royalties/ Patent</i>	<i>Stock Options</i>	<i>Ownership/ Equity Position</i>	<i>Employee</i>	<i>Other (please specify)</i>
Example: company XYZ	x		x		x			

Challenges in cancer associated thrombosis



- **Varying thrombogenicity**
- **Intermittant thrombocytopenia**
- **Hypercoaguable despite adequate anticoagulation**
- **Increased bleeding risk**

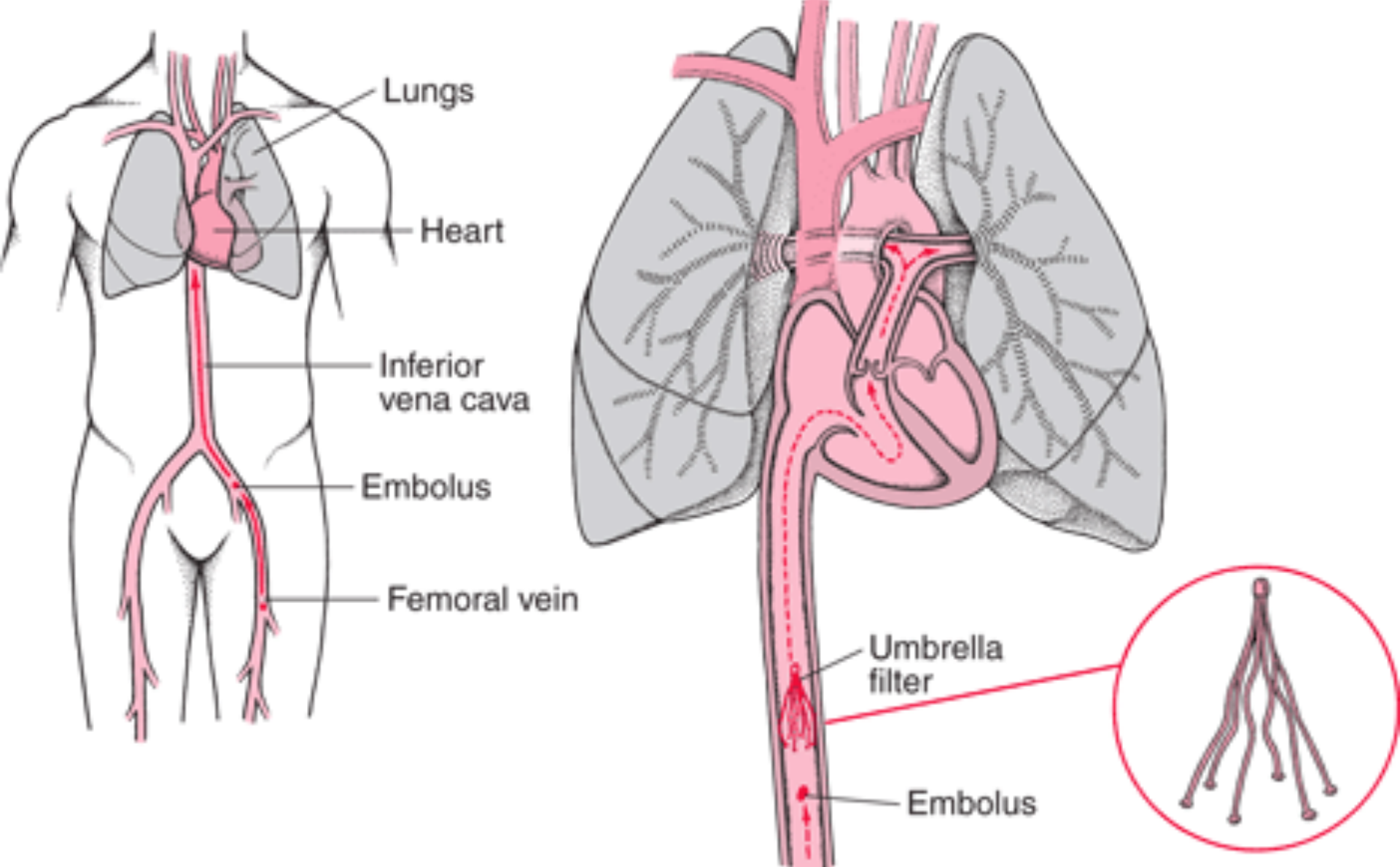
Kazi Mobin-Uddin: 1969



- IVC thrombosis 60%
- Filter migration 0.4%



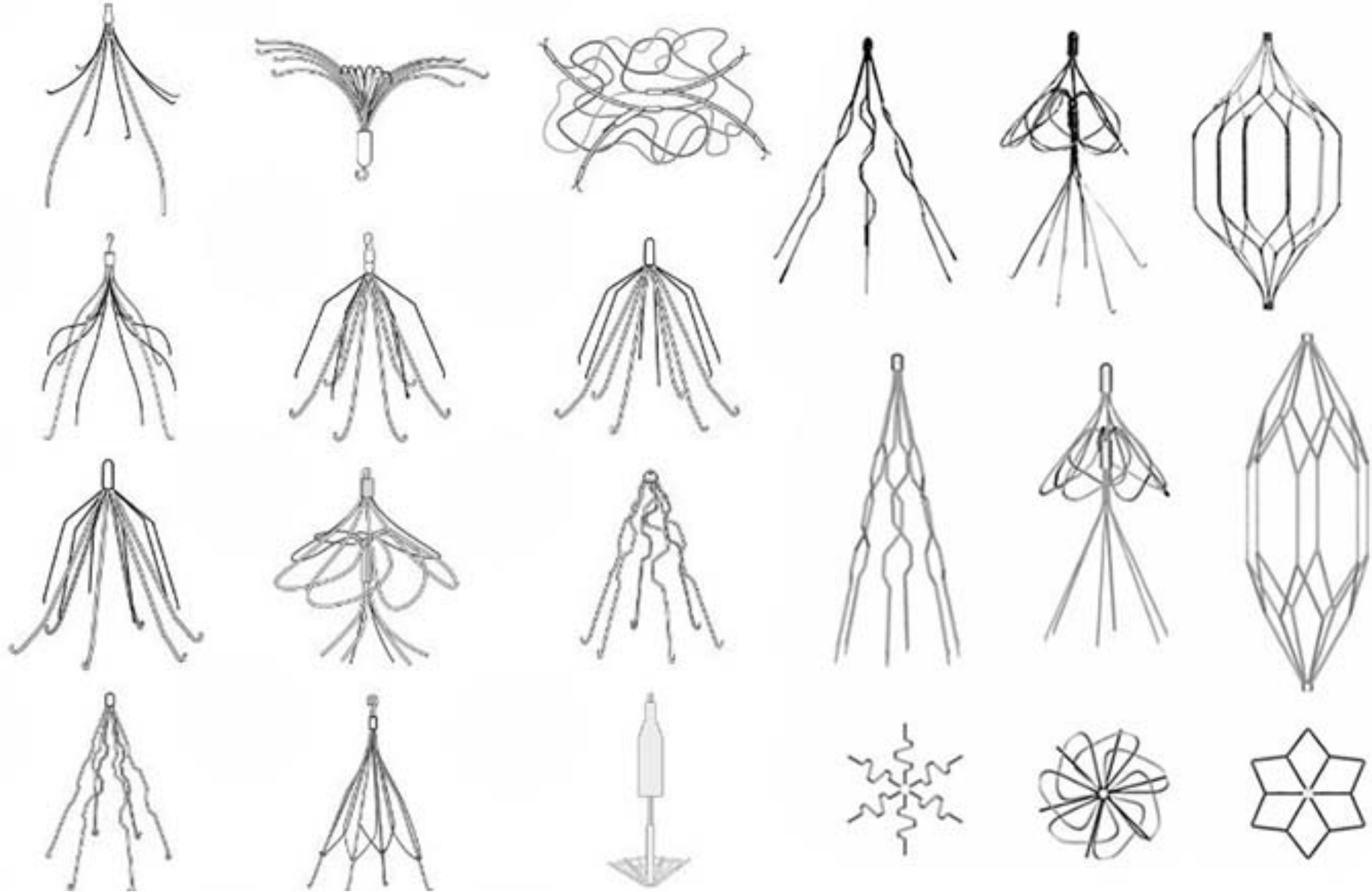
4 Mobin-Uddin K, Callard GM, Bolooki H, Rubinson R, Michie D, Jude JR (1972). "Transvenous caval interruption with umbrella filter". *New England Journal of Medicine*. 286 (2): 55–8



Lazar Greenfield: 1973



6 Greenfield LJ, McCurdy JR, Brown PP, Elkins RC A new intracaval filter permitting continued flow and resolution of emboli Surgery. 1973 Apr; 73(4):599-606.



Guidelines vary in recommendations

Possible indication	ACCP [2]	SIR [7]	AHA [23]	BCSH [25]	ESC/ERA [24]
Acute proximal DVT or PE and contraindication for anticoagulation	Recommended (Grade 1C)	Recommended (Absolute indication)	Recommended (Class I)	Recommended	Recommended (Class IIa)
Failure of anticoagulation	–	–	Suggested (Class IIa)	Consider	Recommended (Class IIa)
Massive PE with residual DVT	–	–	–	–	–
Iliocaval or large free-floating proximal DVT	–	Recommended (relative indication)	Not recommended (Class III)	Not recommended	Not recommended
Severe cardiopulmonary disease and DVT	–	Recommended (relative indication)	–	–	–
Prior to thromboendarterectomy for CTEPH	Suggested (Grade 2C)	Recommended (relative indication)	–	–	Not recommended
Prior to thrombolysis	–	Recommended (relative indication)	–	Not recommended	Not recommended
Prophylaxis in trauma patients	–	Recommended (relative indication)	–	–	–
Prophylaxis in bariatric surgery patients	–	–	–	–	–

DVT, deep vein thrombosis; PE, pulmonary embolism; IVC, inferior vena cava; CTEPH, chronic thromboembolic pulmonary hypertension; ACCP, American College of Chest Physicians; SIR, Society of International Radiology; AHA, American Heart Association; BCSH, British Committee for Standards in Hematology; ESC, European Society of Cardiology; ERS, European Respiratory Society.

Twenty-one-Year Trends in the Use of Inferior Vena Cava Filters

- 29% of patients with IVC filters suffer complications.
 - improper anatomic placement of the filter (7%),
 - migration (2%-3%),
 - angulation of the filter (2%),
 - caval stenosis or filter narrowing (2%),
 - caval occlusion (2%-9%),
 - air embolism (1%),
 - penetration of the caval wall (1%),
 - lower extremity edema (13%-26%)
 - sequelae of venous stasis (27%)

US Food and Drug Administration (FDA) 2010 Initial Communication: Risk of Adverse Events with Long Term Use

- Past 5 years 921 device adverse events with IVC filters

Adverse event	number	%
Device migration	328	35.5%
Embolization	146	16%
Perforation of IVC	70	7.5%
Filter fracture	56	6%
Other	321	34%

U.S. FDA Manufacturer and User Facility Device Experience (MAUDE) database.

- Database review January 1, 2009, to December 31, 2012
- 1606 adverse events (AE) involving 1057 IVC filters
- 1394 (86.8%) retrievable
 - Most common AE was fracture
- 212 (13.2%) permanent
 - Most common AE was placement malfunction

Indications for IVC Filter

- **Absolute**
 - contraindication to anticoagulation
 - complication of anticoagulation
 - inability to achieve or maintain therapeutic anticoagulation
 - recurrent VTE while on adequate anticoagulation
- **Relative**
 - massive pulmonary embolism
 - limited cardiopulmonary reserve
 - free-floating IVC thrombus
 - poor compliance with anticoagulation therapy

Retrievable IVC Filter Failure Modes



Filter Fracturing

Sending pieces of metal into the abdomen, lungs, liver, kidneys and even the heart and other organs. Surgeons often have to leave the fractured portion of an IVC filter embedded into an organ, because trying to take it out would be too dangerous.



Filter Shifting or Tilting

The filter has shifted or tilted to another area of the body, making it almost impossible to remove. Leads to loss of efficiency, fracture and tissue perforation leading to formation of scar tissue.



Migration

Caudal (Downward)
Cephalad (Upward directly towards the heart)



Perforation

Causing stress that leads to fracture. Fractured components can become embedded in the tissue. Including organs and may not be removable.



*** Studies show 1 out of 4 IVC filters fracture, potentially causing death.**

900+ Adverse Events

328 Adverse Events Involving Device Migration

Numerous Lawsuits Already Underway

* Source Medscape from WebMD | Article: FDA Warns of Adverse Events With Inferior Vena Cava Filters

Filter tilting

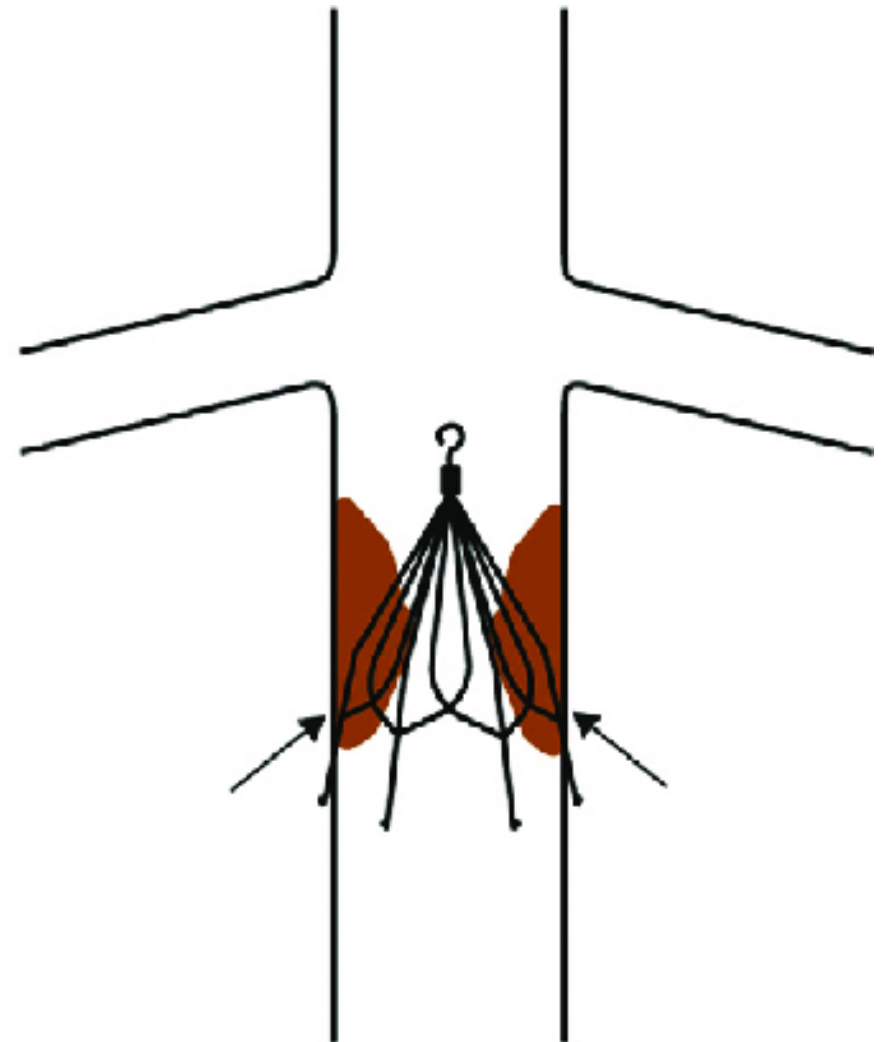
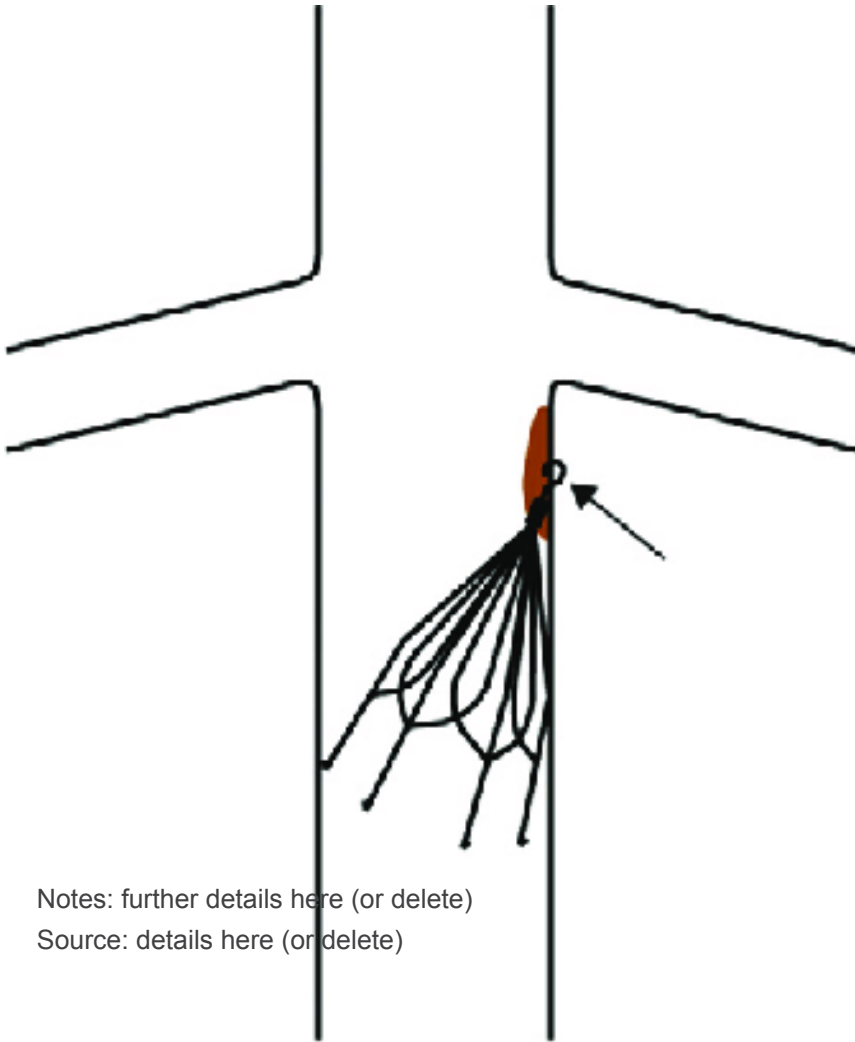


- 2.3 – 41%
- Reduced ability to trap clots
- Difficulty to remove

Notes: further details here (or delete)

Source: details here (or delete)

Filter tilting



Notes: further details here (or delete)

Source: details here (or delete)

15 a.

b.

Filter fracture

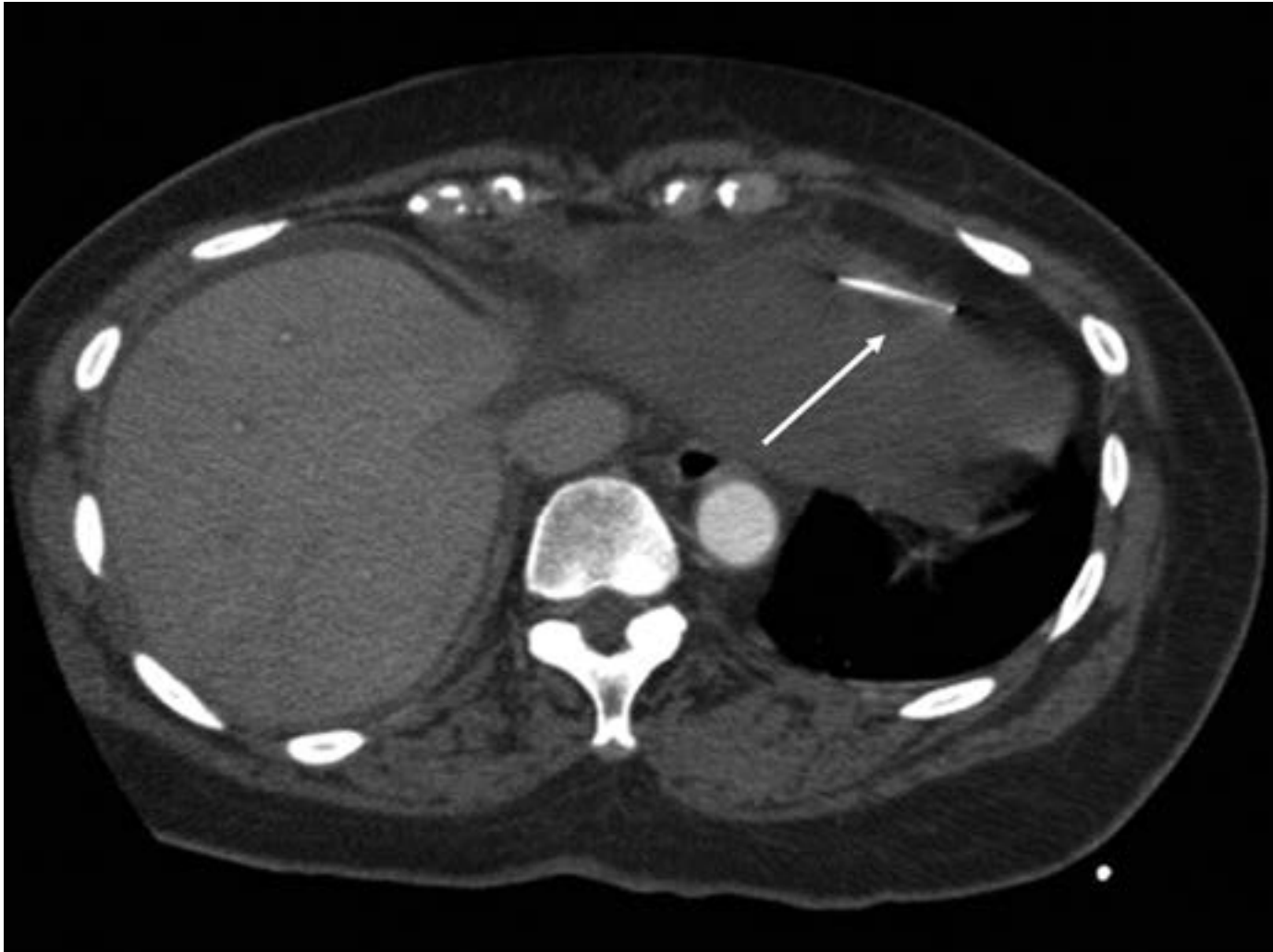


- **One cohort study:**
- **Strut fracture in 16% patients**
- **End organ embolisation 11%**

Notes: further details here (or delete)

Source: details here (or delete)

Chest CT scan with arrow delineating a linear foreign body in the left anterior pericardial space.



Nicholas A. Rogers et al. *Circulation*. 2009;119:2535-2536

My practice

1. Avoid wherever possible
2. Use retrievable filters
3. Remove at earliest opportunity



**Marie
Curie**

**Care and support
through terminal illness**