What to do With Fractured Filters and Embolic Filter Fragments

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IVC Filter Utilization in the US


What Is Present Controversy with IVC Filters?

- Retrievable filters appear to prevent PE (1.7%)
- 2001-2011 concern for high rate of penetrations, fractures, migrations (MAUDE database)
- Filter removal rates are quite low (20% - 30%)

Complications of IVC Filters

- Device Related Complications
  - Migration
  - Embolization
  - Perforation
  - Fracture

FDA - U.S. Food and Drug Administration

What to do With Fractured Filters and Embolic Filter Fragments

Consultant:  
- C. R. Bard
- Boston Scientific
- Avanos

Speaker/Teaching:  
- Cook Medical
- W.L. Gore
- Penumbra
- Medtronic
- C. R. Bard
- Abbott

Investor  
- Capient medical
- Integrity Medical
- Brightwater medical

Disclosures
IVC Filter Fracture—Why?
- Strut fractures reported in 1-3% of filters
  - thought to be related to perforation and longer dwell times
- How much of “FF” filter related and how much is patient related?

Why do we see fractures?

IVC Filter Fracture—What to do?
- Risk of filter embolization
- Risk of fragment embolization
- Risk of lethal or bleeding event
- Do we treat a fracture filter just like a filter; when deciding whether to remove?
- Does the efficacy change?

Acute IVC Filter Fracture
- When removing a filter assume it may be fractured or going to fracture
- Obtain pre-removal scout films and oblique views
- Know the filter being removed! How many legs?
- Be prepared to remove fracture fragments

Tools for Removal
- Endobronchial Forceps
  - Grasping ability
  - Dissect tissue from an embedded filter top
- Snares
- 16 French Sheaths

Endo-bronchial Biopsy Forceps
- Use to dissect the filter from caval wall
- Grasp filter after dissection
- Comes in 1.5 mm (10Fr)/3 mm (12Fr)
- Lymol (model 4162)
- Use a Cook 16 French sheath
Rate of Success
• Not 100% successful if chronic
• May require a second attempt
• Acute fragment likely easiest at the time

Removal of Fractured Inferior Vena Cava Filters: Feasibility and Outcomes
Lu Anne V. Dinglasan, MD, MHS, Scott O. Terrotols, MD, Richard D. Shinarady-Goldberg, MD, Jeffrey Mondschein, MD, and S. William Stavropoulos, MD

15 patients, 10 symptomatic, 19 total fracture fragments
all fractured body removed; 6 pts with fractured struts remained

Management of Fractured Inferior Vena Cava Filters:
Outcomes by Fragment Location

Rate of success:
• 65 pts
• 116 fragments: 78 fragments attempted
• Successful in 63/78 (81%)
• Extravascular fragments retained
• 50% fragment free

Endovascular Removal of Fractured Inferior Vena Cava Filter Fragments: 5-Year Registry Data with Prospective Outcomes on Retained Fragments
Andrew J. Kramer, MD, Nuna San-Kraen, RA, Alexander Y. Chen, MD, and William F. Evans, MD

University of Virginia Radiology 2019; 28:705–764

• 82 consecutive pts
• 185 fragments: 47% deemed amenable
• Successful in 78/87 (90%)
• 1 cardiac tamponade
• Cardiopulmonary fragment asymptomatic in 81% pts

65 yo asymptomatic female with a
10 year old Eclipse IVC filter and a
filter fragment in the Right lower lobe PA branch
57 yo Female with history of Breast CA and Factor V Leiden presents with an IVC filter placed 8 years ago after a DVT on anticoagulation.
22 yo F with bilateral leg swelling with a filter placed 2 years previously after a MVC with liver laceration and DVT
65 year old male with Painful and malpositioned filter.
3 months later

28 year old male with attempted filter removal was transferred for removal
Conclusion

- A fractured filter and filter fragment at risk for embolization
- May occur during standard removal
- Document, document, document!
- Removal of these filters usually requires proper tools and control of fragments
- Some fragments may be best left alone

Thank You!