



INFERIOR VENA CAVA FILTER RETRIEVAL 23 MONTH AFTER IMPLANTATION WITH STANDARD SNARE LOOP TECHNIQUE : CASE REPORT

Cardiology

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ABSTRACT

1. Introduction.

Pulmonary embolism (PE) and Deep vein thrombosis (DVT) continues to be a cause of significant morbidity and mortality which is also third leading cardiovascular cause of death¹. If not treated properly it also leads to chronic pulmonary hypertension and cor pulmonale. Once DVT is diagnosed treatment is required and consist of oral anticoagulation and inferior vena cava interruption via filter placement in patients with contraindication for anticoagulation treatment.

In 2003, the U.S. Food and Drug Administration (FDA) cleared retrievable inferior vena cava filters (rIVCFs) for clinical use, after that its uses exponentially increases. In parallel with these trends, there has been growing awareness of device-related complication including fracture, penetration to adjacent structure, migration, thrombosis and some time embolisation of fractured segment in heart that leads to cardiac perforation, arrhythmia and death². In response, the FDA released safety communication in 2010 and 2014³ advocating immediate retrieval of filter once mechanical prophylaxis was no longer uses. However retrieval of filter remained rare with rates reported as low as 8.5%.⁴ Once filter remain in place for long duration, normal standard snare retrieval technique usually not work and alternative techniques like, Sling technique, Excimer laser and Endobronchial forcep supported methods can be used⁵. But prolong duration of filter implantation always associated with less chance of filter retrieval and associated with multiple complication.

KEYWORDS

Retrieval Filter (rIVCF), dwell time, IVC, loop snare

Case Report.

A 32 year old male who had history of DVT and PE with contraindication for oral anticoagulant implanted Denali IVC filter (BARD Peiphreal Inc) approx 2 year back (Fig 1). With improvement of his medical condition he was put on oral anticoagulant after 15 days of his filter implantation. He had lost follow up from last 15 month. He came in hospital and want to get his IVC filter removal after knowing the complication of long term implant. Despite possible risk of IVC laceration and other procedural complication with high chance of failure patient was planned due to young age and risk associated with life long in situ implant. Patient underwent doppler of both lower limb which show no evidence of any DVT. After proper consent patient was taken for IVC filter retrieval. Right internal jugular venous access was taken and Cook retrieval sheath, 11 F, 60 cm was advanced over dilator. Cook retrieval sheath is a dual sheath system, inner sheath and outer sheath. Through sheath 80 cm long and 6.3 F loop snare (Cook medical IN) was advanced and tried to catch hook of filter but became unsuccessful multiple time and then tried to catch hook with bioptome forcep (Cook medical IN) but all unsuccessful, due to axis hook and forcep not fall in same line. After repeated failure retrieval sheath axis made coaxial with hook of filter, and this time, snare able to catch hook of filter, now snare loop tighten with help of Pin vise at proximal end of snare wire behind Tuohy-Borst. Now with one hand gentle pull of snare and with other hand retrieval sheath advance over filter, but neither sheath able to move on filter or filter disengage from caval wall, and filter started tilting (Fig 2). After that traction force applied more on snare wire/catheter is more than previous, and this time as usual inner sheath tried to advance first but not successful so outer sheath advance over filter and with much traction force on snare wire this time filter came inside outer sheath and later inner sheath also advanced over filter inside outer sheath (Fig 3) and whole assembly pulled back and filter successfully retrieved outside. In fear of any damage to IVC venogram was taken which show no any evidence of damage of inferior vena cava (Fig 4)



Fig 1 : IVC filter Implant 23 month before

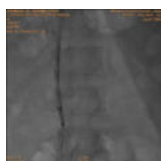


Fig 2 : Filter Hook with catch of snare .



Fig 3 : Filter total in outer retrieval sheath

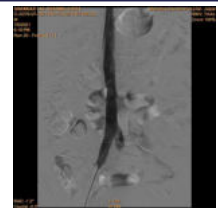


Fig 4 : Post retrieval Venogram.

DISCUSSION

An IVC filter provides a mechanical barrier that prevents pulmonary embolism origination in the vein of the lower extremities. Adverse event including caval perforation, strut fracture, IVC occlusion, and filter migration have been associated with long-dwelling retrievable filters⁶. Some serious complication can occur with perforation including penetration into pericaval structure such as spine, pancreas, duodenum and aorta⁷. Despite high number of filter implant, retrieval rate is very less⁸. Risk factors for difficult retrieval are tilt, tip embedded in IVC wall, significant leg penetration and prolong dwell time⁹. Prolonged dwell time, variably defined in the literature from >90 days or >180 days. Complication associated with filter retrieval in such condition are IVC damage, filter fracture and migration and failure to retrieve. Overall procedure-related complications are rare but are likely underreported. From a search of the Manufacturer and User Facility Device Experience (MAUDE) database, investigators found that retrieval-related complications accounted for 13% of all IVCF-related complications¹⁰ however, failure to retrieve the filter was the most commonly cited procedure-related complication¹⁰. In view of multiple risk associated with prolong dwelling time and risk associated with alternative technique, standard method was use with increase force and little modification; first outer sheath followed by both inner and outer sheath advancement for retrieval. This also highlight that patient need regular follow up after implantation and even after long duration extraction with standard loop snare technique is feasible. This Denali IVC retrieval filter (rIVCF) was approved in 2011 by FDA and mean retrieval duration after implantation is 136.2 days and maximum duration of retrieval after implantation is 454 days¹¹. Present case show even if duration are prolonged retrieval should be attempted, first with conventional method with increase force on snare that lead to success even in case with prolong indwell time. Safety and efficacy of alternative methods are not established. This case also

highlight retrieval can be done with either of same company retrieval system or with other company dual sheath retrieval system ie Filter was of BARD vascular and retrieval kit of Cook In .

CONCLUSION.

Retrievable IVCs continue to have a role in the prevention of pulmonary embolism in selected patients. Rising awareness of device related complications paired with historically low retrieval rates has prompted renewed emphasis and interest in filter retrieval. In conclusion, the retrieval of the IVC filter should be performed as soon as possible if it is no longer necessary and even if came after long duration retrieval should be attempted with standard conventional snare technique first .

REFERENCES

1. Wendelboe AM, Raskob GE. Global burden of thrombosis. Epidemiological aspect. *Cir Res* 2016;18:1340-1347.
2. Nicholson W, Nicholson WJ, Tolerico P, et al. Prevalence of fracture and fragment embolization of Bard retrievable vena cava filters and clinical implications including cardiac perforation and tamponade. *Arch Intern Med* 2010; 170:1827-1831
3. Removing retrievable inferior vena cava filters: initial communication. US Food and Drug Administration. <https://www.fda.gov/oc/ohrt/removing-retrievable-inferior-vena-cava-filters.pdf>. Last Updated November 20, 2012. Accessed October 5, 2016.
4. Andreoli JM, Lewandowski RJ. Comparison of complication rate associated with permanent and retrievable ivc filter : a review of the MAUDE data base. *J Vasc Interv Radiol* 2014;25:1181-1185
5. Al-Hakim R, Kee ST, Olinger K, Lee EW, Moriarty JM, McWilliams JP. Inferior vena cava filter retrieval: effectiveness and complications of routine and advanced techniques. *J Vasc Interv Radiol* 2014; 25:933-939; quiz, 940.
6. Johnson MS. Vena cava filter fracture unplanned obsolescence. *J vas interv Radiol* 2012;23(2):196.doi:10.1016/j.vir.2011.12.004
7. Brown JD, Raissi D, Han Q, Adams VR, Talbert JC. Vena cava filter retrieval rates and factors associated with retrieval in a large US cohort. *J Am Heart Assoc* 2017; 6:e006708
8. Jia Z, Wu A, Tam M, Spain J, McKinney JM, Wang W. Caval penetration by inferior vena cava filters: a systematic literature review of clinical significance and management. *Circulation* 2015; 132:944-952
9. Geibusch P, Benenati JF. *Retrievable vena cava filter factors that affect retrieval success*. *Cardiovascular Intervent Radiol* 35 (5):1059-1065.
10. Angel LF, Tapsos V, Galgon RE, Restrepo MI, Kaufman J. *Systematic review of the use of retrievable inferior vena cava filters*. *J Vasc Interv Radiol* 2011; 22:1522-1530.e3.
11. David Hahn, MD, Semin. *Intervent Radiol* 2015;32:379-383