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3-2019

Inferior Vena Cava Filter Clinic and Hospital Registry: One Year Review

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Background

Inferior vena cava (IVC) filters are small, cage-like devices placed percutaneously into the inferior vena cava to prevent propagation of thrombus into the pulmonary arteries. Currently, there are two available types of filters, permanent and temporary. Retrievable inferior vena cava (IVC) filter use has increased over 115% since the Food and Drug Administration (FDA) approval in 2009. Likewise, there has been a marked increase in complications related to their increased use. In 2014, the FDA initiated a comprehensive analysis of filter placement and issued the following recommendation: “The FDA recommends that implanting physicians and clinicians responsible for the ongoing care of patients with retrievable IVC filters consider removing the filter as soon as protection from pulmonary embolism is no longer needed.” Therefore, it is imperative that a hospital system develop a comprehensive approach to IVC filter placement and follow up to ensure good patient outcomes and comply with FDA mandates.

Methods

Parkview Regional Medical Center (PRMC), a tertiary care 440 bed hospital with approximately 25,000 admissions per year developed a hospital wide process for following IVC filter patients. An IVC Filter Clinic was created which allowed for the development of uniform implanting guidelines for filter placement, consultative services for inpatients, and registry tracking of patients receiving IVC filters. The registry administrator facilitates a follow-up appointment in the IVC Filter Clinic where the Physician Director will determine if and when removal is appropriate. The IVC Filter Clinic started July 1st 2017.

Results

In the first year, July 2017 through July 2018, the IVC Filter Registry captured 100% of the 63 patients receiving an IVC Filter implant procedure code. Of the 63 patients followed in the registry, 13 were deemed permanent and not forwarded to the clinic for follow up. Four patients were deceased before the clinic follow-up appointment and removal of the filter. One patient was determined to be an outlier with the removal on the start day of the clinic and no records of the implant. This resulted in 45 patients that were followed by the clinic in the first year. Seven patients were not seen in the clinic with two scheduled for removal at the time of implant and the clinic visit was not needed. Four patients were lost to follow-up despite multiple attempts by staff to reach them (91.5% scheduled for a visit made it to the clinic appointment

(Continued)

IVC Filter Implant Patients

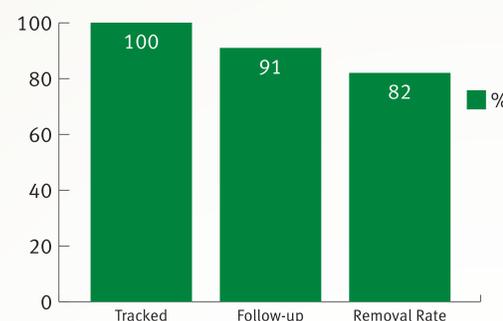


Fig.1 The first year of the IVC Filter Clinic seeing 63 patients

IVC Filter Dwell Time

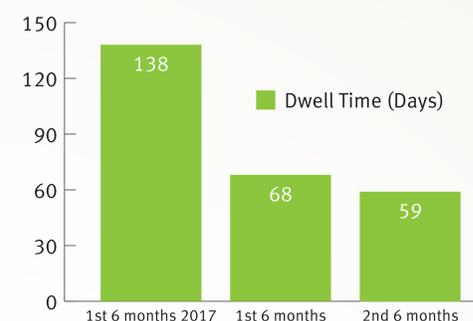


Fig.2 IVC Filter Dwell time decreased within the 1st 6 months of initiation of the clinic and continued to drop in the 2nd 6 months.

| Reason for staying | Complications | Comments |
|--------------------------|---|---|
| Poor long-term prognosis | | |
| | Removal attempted Unable to remove due to occluded IVC. Pt. rescheduled for FU visit, Device now deemed permanent | |
| | Filter placed then MD found out repeat imaging at outlying hospital prior showed no DVT | Filter removed same day |
| | | Pt. no showed appt and is refusing further treatment |
| | Unable to remove, now permanent, occluded IVC with collaterals | |
| | Lost to follow-up | Called three times and sent letter |
| Filter Protrusion | | Cardiology consult was requested by oncology Made Permanent due to IVC Filter protrusion noted during surgery |
| | Lost to follow-up | Missed FU appt due to rehab. Working on getting him seen pt. in halo. Sent note to get rescheduled |
| | | Insurance required removal at Parkview |
| | | Seen in clinic, has another surgery come back when cleared by ortho |
| | | pt. no show for appt, sent note to scheduling to attempt to reschedule, got rescheduled |
| | Lost to follow-up | Lost to follow-up. Called and sent letter with no response. Pt. still having surgeries. |

Fig.3 Various issues seen following IVC Filter patients in the Clinic and Registry for the 1 year

| | Men | % | Women | % |
|---------------------------------|------|------|-------|------|
| Number | 19 | 42.2 | 26 | 57.8 |
| Age | 58.2 | | 58.8 | |
| Caucasian | 18 | 40 | 24 | 53.3 |
| Inpatient | 13 | 28.9 | 19 | 42.2 |
| Outpatient | 6 | 13.3 | 7 | 15.6 |
| Indication | | | | |
| Acute VTE inability to anticoag | 6 | 13.3 | 15 | 33.3 |
| Factor V inability to anticoag | 0 | 0 | 1 | 2.2 |
| Unstable with massive PE | 2 | 4.4 | 2 | 4.4 |
| PE Prophylaxis | 11 | 24.4 | 5 | 11.1 |
| Recurrent VTE despite anticoag | 0 | 0 | 1 | 2.2 |
| Trauma unable to anticoag | 0 | 0 | 1 | 2.2 |
| Ordering Practice | | | | |
| Cardiology | 2 | 4.4 | 6 | 13.3 |
| Emergency Medicine | 1 | 2.2 | 0 | 0 |
| Family Medicine | 0 | 0 | 1 | 2.2 |
| Hospitalist | 3 | 6.7 | 4 | 8.9 |
| Intensivist | 1 | 2.2 | 1 | 2.2 |
| Oncology | 1 | 2.2 | 5 | 11.1 |
| Ortho | 5 | 11.1 | 4 | 8.9 |
| Pulmonology | 0 | 0 | 1 | 2.2 |
| Radiology | 1 | 2.2 | 0 | 0 |
| Trauma | 4 | 8.9 | 4 | 8.9 |
| Access Route | | | | |
| Internal Jugular | 10 | 22.2 | 12 | 26.7 |
| Femoral | 9 | 20 | 14 | 31.1 |

Fig.4 Demographics for the 45 patients that had device removal

Results (cont.)

and 100% were scheduled initially). There were two unsuccessful removals. One filter protrusion noted during a cardiovascular surgery was rendered permanent. All three were included in the clinic numbers since they were seen in the clinic. The average device dwell time for the group was 78.2 days with a median of 61 days. In the two years before the clinic started, 128 filters were placed at PRMC at a rate of 0.55% of total hospital patient volume, compared to a rate of 0.24% after the initiation of the IVC Filter Clinic, related to a reduction in “soft” implant indications. All filters were successfully tracked and 82% were removed compared to the national average of 30%. The indication for IVC Filter implantation for men was highest in pulmonary embolism prophylaxis at 24.4%. The indication for women was highest for acute venous thromboembolism and the inability to anticoagulate at 33.3%.

Conclusions

Parkview Regional Medical Center has demonstrated the feasibility of a hospital-based IVC Filter Clinic and registry in a large volume tertiary care center. We were able to establish that this process resulted in approximately a 50% reduction in filter use. Additionally, all filter patients were able to be tracked with 91% seen in follow-up and a removal rate of 82%. This uniform hospital process has resulted in compliance with FDA mandates, better patient outcomes and system reductions in legal liability.

References

Food and Drug Administration. Removing Retrievable Inferior Vena Cava Filters: FDA Safety Communication. Posted online May 6, 2014. Available at: <https://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm396377.htm>

Patel, G., Panikkath, R., Fanire, M., Gadwala, S., & Nugent, K. (2015). Indications and appropriateness of inferior vena cava filter placement. *The American Journal of the Medical Sciences*, 349(3), 212-216.

Disclosures

T. Eric White, MD, Emily Keltner, MA, BS, Lisa Hollister, MSN, RN: none