Objectives: Current guidelines for venous thromboembolism management recommend that inferior vena cava filters (IVC) placed for therapeutic or prophylactic purposes in patients who cannot tolerate or adhere to anticoagulation. There is conflicting evidence about the safety and determinants of filter-related complications. Therefore, we sought to report the incidence of filter complications in general practice.

Methods: The Vascular Quality Initiative registry (2013-present) was explored. Immediate insertion filter-related complications were defined as a composite of any of the following: venous injury, placement complications (failed to open properly, deployed>20 mm from intended site, wrong vein, or embolized to the heart), angulation of >20° and insertion site complications (DVT, hematoma, pseudo-aneurysms requiring transfusion or surgery). Late complications were migration, fracture, thrombosis, fragment embolization, and perforation. Survival analysis was employed to examine late filter-complications accounting for patients’ and operative factors like imaging technique, renal vein visualization, insertion and landing sites, and abnormal anatomy. Patients were censored at filter retrieval or death.

Results: A total of 7,788 patients were examined. Mean follow-up time was 1.2(±1.2 years). Immediate complications were 2.3% (Venous injury: 0.7%, angulation: 1.4%, placement: 0.5% insertion site complications: 0.4%). Late complications occurred in 3.4% (Migration: 0.07%, angulation: 0.7%, fracture: 0.07%, caval/iliac vein thrombosis: 0.8%, in-filter thrombus: 1.6%, fragment embolization: 0.02%, perforation: 0.6%). Complications were more likely to happen if filter was inserted under fluoroscopy compared with US/IVUS (Immediate: 98.5%vs97.6%; p=.04. Late: 97.9%vs96.4%; p=.035). Immediate complications were more common if abnormal vein anatomy was reported (5.2%vs2. 2%; p=.015) or had landing site other than infra-renal (4.4%vs2.2%; p=.007). In the multivariable analysis, ultrasound/IVUS guidance was associated with less immediate [adjusted odds ratios (95%CI): 0.62(0.38-0.99); p=.048] and late complications [aHR(95%CI): 0.54(0.30-0.97); p=.040] compared with fluoroscopy and had better complication-free survival (Figure). Other factors did not have significant effect on complication risk.

Conclusions: This study reports the occurrence of IVC filter-related complications in a multi-center national dataset. The rate of immediate device complication was 2.3% while late complication rate was 3.4%. Both could be mitigated if ultrasound or IVUS was used to guide IVC filter insertion. Patient’s characteristics or comorbidities did not seem to impact device complications.