Increased Cardiac Perforation Risk with a Screwed Ventricular Cardiac Implantable Electronic Device Lead

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Introduction: Clinicians increasingly are more faced with the challenging choice of lead extraction, they used to more screwed lead when implanting cardiac implantable electronic device (CIED) leads. The relationship between the characteristics of CIED leads in terms of fixation types and cardiac perforations remain controversial.

Methods: Cardiac computed tomographic (CT) images of 472 CIED leads with 276 consecutive patients (age: 67.7±15.0 years, 49.6% male) were reviewed by one radiologist and two cardiologists. We compared radiologic and clinical cardiac perforation rate in various situations. We defined radiologic perforation on reformatted CT images when the lead tip traversed past the outer myocardial layer. We defined clinical perforation if, in addition to radiologic perforation, there were accompanying hemopericardium or need for pericardiocentesis.

Result: 220 patients had permanent pacemaker and 56 patients had ICD or CRT. Radiologic cardiac perforation was shown in 6.6% of total leads. Radiologic cardiac perforation of screw ventricular leads was significantly more frequent than tined ventricular leads (12.8% and 3.8%, respectively, p=0.006). There are no significant differences in cardiac perforation between atrial and ventricular leads (5.0% and 7.9%, respectively, p=0.386), between screw and tined atrial leads (6.4% and 3.3%, respectively, p=0.351), between pacing and defibrillator ventricular leads (7.0% and 11.3%, respectively, p=0.390), between MR-conditional and MR-unsafe ventricular leads (9.5% and 6.3 %, respectively, p=0.768). There was no radiologic cardiac perforation in the case of septal ventricular leads. Also, 4 clinical perforations (0.08 %) were documented and three in four had the history of anticoagulation.

Conclusion: Radiologic cardiac perforation by CIED leads is not rare. For reducing cardiac perforation by a screwed ventricular CIED lead, septal pacing strategy may help the physicians in case of high-risk patients.