

Transvenous lead extraction of cardiac implantable electronic devices.

Indications, results and complications.

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Abstract

Background: Lead extraction is by far a complex procedure as it carries some risks for the patient. Clear indications, expertly trained personnel, adequate tools, and appropriate environment and facilities are mandatory for its safe removal. When considering indications for lead extraction, whatever they be, it is important first to evaluate the strength of the indication and the risks of the intervention on an individualized patient basis. Thereafter, the risk/benefit ratio of each patient should be balanced with the level of experience of the operator.

Objective: to present and analyze the first experience of Critical Care Department in Cairo University in the patients who were referred for percutaneous lead extraction as regards indications, results, outcome and complications.

Patients and methods: a prospective study conducted from March 2016 till December 2017. Twenty consecutive patients were included for permanent pace maker and defibrillator percutaneous lead extraction. Transvenous lead extraction was done according to the Heart Rhythm Society (HRS) indications (2009) for lead extraction class I & II e.g. infections, non-functional leads, lead vegetations, thrombosis and venous stenosis. All Patients were subjected to full history taking, clinical examination and investigations then the procedure of extraction was done according to specific protocol involving proper environment, personnel and techniques.

Results: The study included 20 patients, 11 males (55%) and 9 females (45%) with a mean age of 51.5 ± 17.7 years. The indications for lead extraction were pocket infection in 9 patients (45 %), lead vegetations in 4 patients (20 %), malfunctioning leads in 4 patients (20 %), lead displacement in one patient (5%), lead extrusion in one patient (5 %) and one patient (5 %) with upgrade to ICD device. The extracted devices included 13 dual chamber pacemaker (DDD) devices (65 %), 4 CRT-P devices (20 %), 2 CRT-D devices (10 %) and one VVI device (5 %). Forty two leads were extracted with a mean age of 49.1 ± 4.2 months. They included 17 right ventricular pacing leads (40.5%) (13 active fixation and 4 passive fixation), 17 atrial leads (40.5%) all were active fixation and 6 coronary sinus leads (14.2%). and 2 shock leads with dual coils (4.8%). Simple manual traction using regular non-locking stylet was successful in 50 % of leads, and the other 50 % of leads were extracted by using locking stylet and evolution dilator sheath after failure of simple traction.

The method of the lead extraction showed statistically significant relation with the age of the lead (**P-value < 0.001**). The more the duration of lead implantation, the more the difficulty of extraction by simple traction technique and the leads were extracted by locking stylet and evolution dilator sheath.

Complete procedure success rate was 95 %, while clinical success rate was 100%.

Complications occurred in 30% of patients and all of them were minor complications in the form of hematoma in 15%, moderate pericardial effusion in 10% and retained part of RV lead in 5% of patients. All of complications were managed by conservative measures with no surgical intervention.

The age of the patient showed higher rate of complications which was statistically significant with a P value <0.041, however, the gender of the patient, patient comorbidities, fixation type of the lead, lead implant duration and the method of extraction had no statistically significant effect on occurrence of complications and procedure outcome.

Conclusion: Transvenous lead extraction of cardiac implantable electronic devices (CIED) can be performed safely and effectively, without major complications even when only basic extraction tools are used. Good preoperative preparation together with the presence of well trained and experienced operators positively impacted the outcome of the procedure and decreased the rate of the complications even in low volume centers.

Key words : lead extraction of cardiac implantable electronic devices