Attitude towards redundant leads and the practice of lead extractions: a European survey

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This survey has compared attitudes towards (endocardial) lead extraction, among European electrophysiology centres, with special attention paid to ‘redundant leads’. The main findings of this survey are: (i) most of the centres performing lead extractions do so in low volume even though the number of implants may be high. (ii) Approaches to the practice of lead extraction are based largely on clinical experience and individual sentiment but not on a rigorous evidence based. (iii) Traction alone or in combination with extraction tools (but not laser) are commonly used for extraction. (iv) The perception of need for involvement of cardio-thoracic surgeon varies.

Keywords Lead extraction • Device • ICD • Pacemaker

Introduction

With expanding evidence-based indications for the implantation of devices, the number and complexity of device-related procedures have increased rapidly over the last decade. Lead malfunction or need for system upgrade during the device’s life time forces the abandonment or extraction of malfunctioning or ‘redundant’ leads. The recently published Expert Consensus on lead extraction 1 advises on the indication, procedure, and facilities. However, the evidence base that serves as a basis for decision-making consists of anecdote or small studies. This survey presents the opinion of 38 European EP centres on the practice of lead extraction, with particular focus on the extraction of ‘redundant’ leads.

Results

The European centres, members of the SIC network, answered an electronic questionnaire on their attitude towards ‘redundant’ leads in November 2009 on the European Heart Rhythm Association website. Responses to the survey came from relatively high volume centres, with 69% having an annual implantation rate of >200 for pacemakers, 61% implanting 50–200 implantable-cardioverter defibrillators (ICDs), and 90% >200 ICDs. Cardiorthoracic surgery is present in the vast majority (84%).

In 47% of these centres, endocardial lead extraction is performed in 10–40 patients annually, in 13% in >40 and in 40% <10 patients. The centres in our survey refer about 10% of patients for lead extraction to other centres. Specifically, patients tend to be referred if they have chronic (>6 months) or infected leads. Certain clinical characteristics (risk of tricuspid insufficiency, age, comorbidity) may cause reluctance when extraction of non-infected ‘redundant’ leads is considered. However, the number of leads is also taken into account and the majority (57%) would consider explantation of a partially failing ICD lead a superior clinical approach to the implantation of an additional pace/sense lead.

Indication for lead extraction is more often infection than lead dysfunction (Figure 1). In the case of infection-related vegetations that are <2 cm in size (on echocardiography), extraction is preferred by most responders (84%). Vegetations, in general, are not felt to prompt surgical removal (72%).

At extraction, cardiologists are usually the primary operator (63%). Procedures take place in the cathlab (20%), in the cathlab with cardiothoracic surgeon standby (23%), or in the operating theatre (20%). The cardiothoracic surgeon is the operator in 34% of cases.

The presence of a cardiothoracic surgeon at the actual procedure is desired only by 9%, whereas most centres (83%) responded that standby in the hospital is sufficient. Another 9% does not feel that the presence of a cardiothoracic surgeon is required.

Traction alone (34%) and traction in combination with extraction tools (46%) are most often used. Laser is not very commonly used for extraction (14%), nor is cardiac surgical removal (6%). The usual extraction technique varies a little with the type of lead that is extracted. Both pace/sense and ICD RV leads are mostly extracted using traction.

There is a strong belief that certain system characteristics such as single shock coil, goretex around shock coil, and active fixation may facilitate extraction (97, 97, and 91% respectively).

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Discussion

To make up for the lack of guideline for clinical practice on lead extractions, a consensus document on this subject was published in 2009. In this paper, the minimum annual number of extraction recommended for each operator is 20. In the current survey, lead extractions were performed in 40% of centres. This practice may lead to unnecessary complications, and it may therefore be better practice to refer patients to high volume extraction centres which could be nationally identified. An alternative approach would be to achieve higher operator skills through a well-designed simulator-training programme.

In the practice of lead extraction, sentiment seems to play an important role. For instance, clinical studies have shown that abandoning leads is generally safe. In this survey, however, extraction of a redundant non-infected ICD lead is still preferred over implantation of an extra lead. Also, the number of leads present is taken into account when such a decision is made as well as other ‘soft’ clinical parameters.

Relatively little laser extraction is performed. This may be related to the relative success of less invasive methods but also to the high cost that is added when this technique is used. Furthermore, laser extraction is not without hazard. In a registry of 7823 extraction procedures performed between 1988 and 1999, with 12,833 leads involved, the predictors of major complications (1.6%) were: implant duration of oldest lead; female gender; ICD lead removal; laser extraction. This increased risk with laser tools may reflect the use of laser extraction tools in higher risk/more complex cases and not risk that pertains to the laser equipment itself. As the technique of laser extraction has evolved and experience grown, the complication rate may have decreased. However, operator experience is clearly important.

The role of the thoracic surgeon is variable, from primary operator to standby and in different operating environments within the hospital. With apparent low complication rates in smaller volumes or with simpler case mix, some centres do not even feel that thoracic surgical standby is necessary although the significant complications and mortality rates that attend lead extraction in reported registries do not really support that perspective. The consensus document recommends the presence of a thoracic surgeon on site who is capable of initiating an emergent procedure promptly.

Conclusion

The current ‘state of the art’ as presented by the outcome of this survey suggests potential for inconsistency in clinical quality of endocardial lead extraction. An European-wide registry for endocardial lead extraction would be a valuable tool to guide practice.

Conflict of interest: J.M.M. provides consultancy services and receives research support or honoraria for teaching from Medtronic, St. Jude and Sorin.

References