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Editorial

Editorial: What makes transvenous extraction more difficult?

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The number of cases of transvenous lead extraction in Japan has been dramatically increasing since the approval of laser lead extraction in 2010. Till date, the majority of the cases are performed against device infection, which is a class I indication for lead extraction [1]. However, the indications for transvenous lead extraction include venous occlusion, thrombus, abandoned leads, lead revision, and pain [1]. The indication will expand and the cases will increase further. The complete removal and/or clinical success rate using the laser sheath SLS II (Spectranetics, Colorado Springs, CO, USA) was reported to be around 97% [2]. There are several factors which make a transvenous lead extraction more difficult and subsequently more challenging and dangerous. One of the factors that makes the lead extraction difficult is the longer time from implantation [3,4]. Fibrous adhesions around the lead can become hard and sometimes calcified after many years, which make the extraction extremely difficult even by the use of a laser sheath. Also, implantable cardioverter defibrillator (ICD) lead has been known to be associated with the need for laser extraction and major adverse events [3–5]. The use of a superior vena cava ICD coil was reported to be a risk for complications [6].

Fu et al. analyzed their experience of lead extraction and proposed a risk stratification scheme so that they could select high-risk patients [5]. They stratified the risk as: high with a >10-year-old pacing or a >5-year-old ICD lead; moderate with a 1–10-year-old pacing or a 1–5-year-old ICD lead; and low with any lead <1-year-old. According to this risk stratification, the major complication rates were 5.3%, 1.2%, and 0%, respectively. Serious adverse events associated with lead extraction are rare, but can happen in 1–2% of patients [2]. To minimize the risk of fatal complications, backup with skilled cardiothoracic surgery is essential. However, according to the expanding indications and the increasing number of lead extractions, it will be more important to judge the difficulty and the risk of the cases to set up the room for extraction properly.

The possibility of coronary sinus (CS) lead extraction has also been studied. More than 70% of CS leads implanted for more than two years were reported to be removed by only manual traction and laser sheathes or mechanical sheathes were required in the remaining cases [7,8]. However, CS lead model 4195 (Attain StarFix; Medtronic, Dublin, Ireland), an active fixation CS lead, has been reported to present quite a different maneuver. StarFix lead was designed to expand its lobes to hold the vein wall, so that it can be fixed in a large branch of CS [9]. Maytin et al. reported their extraction of StarFix leads [10]. Among 12 cases who underwent StarFix extraction that were implanted for 14.2 ± 5.7 months, the fixation lobes were completely retracted in only one case and an extraction sheath was required in all cases. The adherence of tissues around the StarFix lead was also reported in the initial experience of laser extraction in Japan [11]. In the current issue of the journal, Golzio et al. report their experience of StarFix extraction using a modified mechanical sheath and a snare. They well managed the troubles and they also summarized the reports along with StarFix extraction [12]. Considering the difficulty of extraction, StarFix lead should be used in the situations in which StarFix lead seems to be the only choice to overcome the difficulty to place a CS lead.

Recently, case reports on StarFix extraction using a mechanical rotating device were published [13,14]. Mechanical rotating

Fig. 1. A hand-powered rotation dilator sheath, Evolution (Cook Medical, Bloomington, IN, USA). The threaded metal distal tip can be rotated with hand-power bi-directionally.

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device, Evolution (Cook Medical, Bloomington, IN, USA), is a hand-powered rotation dilator sheath with a threaded metal distal tip (Fig. 1). The efficacy of Evolution, not only for the use of an alternative to a laser sheath but also as a tool to overcome the calcified tissue which is difficult to manage with a laser sheath, has been reported [15].

In a difficult case of lead extraction, various types of sheaths and tools such as locking stylets, laser sheaths, resin sheaths, metal sheaths, rotation dilator sheaths, and snares should be prepared to be selected. Also, operators need to be trained to accurately determine what is happing during the procedure and how to manage the troubles to be faced.

Disclosure

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Hideo Okamura (MD, PhD)*
Department of Cardiovascular Medicine, National Cerebral and Cardiovascular Center, Osaka, Japan

*Correspondence to: 5-7-1 Fujishirodai, Suita 565-8565, Osaka, Japan. Tel.: +81 6 6833 5012; fax: +81 6 6872 7486
E-mail address: hokamura@hsp.ncvc.go.jp (H. Okamura).

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