Lead extraction: Definition standards

To the Editor,

We have read with great interest the article entitled "Cardiac implantable electronic device lead extraction using the lead-locking device system: keeping it simple, safe, and inexpensive with mechanical tools and local anesthesia" by Manolis et al. in the latest issue of the Journal (1). The authors have presented their experiences regarding lead extraction using locking stylet. However, some important issues should be mentioned. Manuscripts regarding cardiac implantable electronic devices and their removal should contain standard definitions to avoid confusion; some of such important definitions include Lead Removal (the removal of any lead using any technique), Lead Explant (the removal of any lead with <1 year implant time using simple traction without specialized tools other than simple stylets), and Lead Extraction [the removal of any lead using specialized extraction tools, removal from a route other than via the implant vein, or any lead with >1 year implant time (2, 3)]. In the current study, reported time range since implantation was 0.3–19 years; thus, there were some leads with <1 year implant time (although locking stylets may have been implemented in some leads with <1 year implant time), and 6 leads were removed with simple traction as stated by the authors. The Lead Locking Device (LLD®) (The Spectranetics Corp.) family has different sizes accommodating a wide range of leads as follows: LLD#1 (0.013"–0.016"), LLD#2 (0.017"–0.026"), LLD#3 (0.027"–0.032"), LLD EZ (0.015"–0.023"), and LLD E (0.015"–0.023"). All except LLD E (85 cm) have 65-cm working length. Definitions of success are also important. Complete procedural success defining the removal of all targeted leads and materials without any permanently disabling complication or procedure-related mortality, clinical success defining the removal of all targeted leads and materials or the retention of a small part of <4 cm that does not negatively impact the outcome, failure defining no achievement of complete procedural and clinical success, or the presence of any permanently disabling complication or procedure-related mortality should be mentioned (2, 3). In the study, partial lead removal was reported in 2 patients. We believe that clinical success was achieved in 1 patient, whereas failure was observed in the other patient. Lead endocarditis is defined as positive blood cultures with lead vegetation(s). In a study, the lead involvement was present in 88% of patients with pocket infection (3, 4). However, in the current study, the exact rate of lead endocarditis was poorly understood. A total of 20 patients with defibrillator leads (14 ICDs and 6 CRTs) were presented. Therefore, all CRTs should have had defibrillator function although a CRT without defibrillator function was illustrated in Figure 2. Another important safety issue related to lead extraction is the availability of a peripheral balloon during the procedure to gain time for emergent surgery when a major vein rupture, such as superior vena cava rupture, occurs. All removal procedures were performed without the need of general anesthesia. However, the usage rate of short-acting agents, such as fentanyl, midazolam, and propofol, was not reported in the current study. Finally, there were inconsistencies regarding numerical values, such as pacing leads in 78 patients, lead endocarditis in 4 or 9 patients, device infection in 46 or 47 patients, simple traction in 6 patients+the sole use of the LLD® in 39 patients+additional sheath use in 15 patients, and lead numbers, in Table 2.

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Author`s Reply

To the Editor,

We thank the colleagues for providing feedback on our article regarding lead extraction using the Lead Locking Device

(LLD) system (1) by placing their emphasis on definition standards, which are indeed good communication tools (2, 3) as long as everybody understands the unique meaning that is conveyed. However, these reflect arbitrary playing with words, and each time they are used one needs to explain their meaning. We explicitly stated in the article that "Lead extraction was accomplished using simple traction for 4 atrial, 1 ventricular, and 1 coronary sinus leads (only test stylet inserted); using the locking stylet alone for 60 (47.4%) leads in 39 (58%) patients; using locking stylet aided by unpowered sheaths for 27 leads; and via a femoral approach for 1 ventricular lead", which is a clear description of our results without the need for referring to and/or explaining any definitions (1). Regarding procedural success, without using too many labels, we again explicitly explained that, "Complete removal of all leads was successful in 52 (96.3%) patients for 96 (98%) leads; partial lead removal with the retention of a lead fragment was effected in 2 patients. … The former patient did well conservatively responding to antibiotic therapy, while the other patient preferred elective surgery over a transfemoral approach for the removal of the retained ICD lead fragment." Of course, the authors' relevant remarks and interpretation of all the above issues are welcome.

Regarding endocarditis, we mentioned in the Methods section that 9 patients experienced bacteremia and 4 patients presented with lead vegetations, which is again a clear statement without mingling with "definitions", whether one wants to refer to these 9 cases as systemic CIED infections (4) and retain the definition of lead endocarditis for the 4 cases with vegetations is a matter of semantics. Thus, among the 46 patients with CIED infection, "Positive blood cultures were detected in 9 (19.6%)... Echocardiography revealed small-/moderate-sized vegetations on the right ventricular pacing leads in 4 patients."

Regarding ICDs, 14 patients were implanted with an ICD device and 5 patients with a CRT-D (a total of 19 patients with defibrillating devices), while the count of defibrillating (DF) leads was 20 because there was 1 patient with 2 DF leads (a ventricular and an SVC DF lead). Hence, there were 6 CRT patients (5 CRT-D and 1 CRT-P patient). In response to the comment regarding the use of sedatives, we did not routinely use these, except sporadically for prolonged procedures. Regarding inconsistencies in numerical values, as explained above, there are no discrepancies except for a typographical error spotted in the Discussion section, wherein "47" should be corrected to "46" (infections). The confusion apparently relates to our referring to number of leads and the number of patients in the Tables, and numbers related to the use of tools are not mutually exclusive or additive.

Finally, we concur with the statement included in the colleagues' letter regarding the need for availability of a peripheral balloon for emergency SCV complications, and we wish to thank them for their comments.

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Lead extraction and contrast venography

To the Editor,

Manolis et al. (1) reported that percutaneous lead extraction can be successful with mechanical tools using the lead-locking device (LLD) stylet. In this prospective observational clinical study, they showed us that leads were successfully removed using simple traction and LLD stylets aided with telescoping sheaths.

Implantation of permanent pacemakers has increased with emerging technologies and use of implantable cardioverter defibrillator and cardiac resynchronization therapies (2). The increased number of device implantation and prolonged survival has led to the increase in the number of lead revision procedures. There are different lead extraction techniques that can be successfully performed in many centers. One of the mechanical lead extraction systems is the LLD system. LLD allows transmitting the manipulation to the distal tip of the lead, thereby protecting the lead integrity. However, venous stenosis may reduce the success of the procedure.

In this well-presented article by Manolis et al., it was demonstrated that lead extraction with the LLD system is simple, safe,