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Editorial

The necessity of immediate cardio-thoracic surgical cover for high-risk transvenous lead extraction procedures: the Art of lead extraction

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Percutaneous lead extraction (TLE) is considered the first-line approach when extraction of a transvenous lead is indicated and is most commonly performed from the superior approach by cardiac electrophysiologists. [1] The current practice of TLE would support the fact that this is a safe procedure when performed in experienced centres with a major procedural related complication rate of 1.7% and a procedure related mortality rate of 0.5% in the ELECTRA registry of over 3000 lead extraction procedures [2]. The current European and HRS guidelines recommend that TLE is performed only in centres with on-site cardiothoracic surgery and that 'surgical cover' is available within 5–10 min of a major complication to treat potentially fatal complications such as superior vena cava (SVC) tears. [3] The degree of cardiothoracic surgical cover that is provided may be open to some degree of interpretation but there is a strong argument to adopt a risk stratified approach whereby particularly high-risk cases based on factors including lead dwell time, number of leads and patient co-morbidities are performed in a cardiac or hybrid theatre with the cardiothoracic surgeon present. [4]

In keeping with this Maurizio et al. in the current edition of this journal describe their multi-disciplinary approach between electrophysiologists, cardiac surgeons and anaesthesiologists to improve percutaneous lead extraction outcomes [5]. The authors retrospectively analysed data from all consecutive patients undergoing lead extraction at their centre between 2011 and 2017 comprising 150 predominantly male patients aged 68 ± 13 years with a mean lead dwell time of 7.3 ± 4.4 years. The most common indication for TLE was infection in 86.7% with laser and mechanical dilating sheaths used in 58.6% and 38.7% of patients respectively. Procedural success was achieved in 97.3% cases with 3 (2.0%) major complications including 2 cases of structural injury with tamponade requiring emergency sternotomy. Open surgical extraction was required in 4 patients (2.7%) after an initial failed attempt and in 5 (3.3%) cases the treatment of choice was a combined approach consisting of TLE followed by planned surgery. Notably the procedural and in hospital mortality rate was zero and the authors conclude that a multidisciplinary approach involving electrophysiologist, cardiac surgeon, anaesthesiologist in an operating room allows a safer approach to TLE.

The authors are to be congratulated on their experience in achieving such a low (zero) mortality rate. There are several limitations of the current study in that it was a relatively small sample size of only 150 patients in a single centre and was retrospective. The high rate of infective indications is not in keeping with contemporary European experience of TLE which is performed for non-infective indications in nearly half of patients. The major procedural complication rate is in keeping the ELECTRA registry however the all-cause mortality of 0% compared to 1.4% in ELECTRA is extremely low in this group. The current study certainly highlights the importance of surgical cover for TLE as recommended by the current guidelines. The finding of a 0% procedural mortality is very impressive for this high-risk procedure and one may have expected a small percentage of in hospital mortality due to infection despite successful lead extraction without complications in their group which included a high rate of infection and systemic infection with CIED endocarditis in nearly 30% which is known to be associated with in-hospital mortality rate [2]. It is unclear what the characteristics were of these patients that predicted major complications, and this would be important in terms of risk stratification as it may be that there is a lower risk group of patients that may not require a cardiothoracic surgeon to be present but on stand-by.

TLE is an essential and relatively safe procedure with a high success rate and a relatively low procedural complication rate however when a major complication involving a cardiac or vascular avulsion occurs immediate surgery is essential to prevent mortality thus preparation is crucial. In his military treatise the Art of War the 5th century Chinese general Sun Tzu wrote that if you know the enemy and know yourself, you need not fear the result of a hundred battles [6]. The current study would strongly support a risk-stratified approach with those cases deemed to be at high risk in terms of need for emergency thoracotomy being performed in a hybrid theatre with a cardiothoracic surgeon present and ready to act.

Conflict of interest

The authors report no relationships that could be construed as a conflict of interest.

References

[1] F.M. Kusumoto, M.H. Schoenfeld, B.L. Wilkoff, C.I. Berul, U.M. Birgersdotter-Green, R. Carrillo, et al., 2017 HRS expert consensus statement on cardiovascular implantable electronic device lead management and extraction, Heart Rhythm. 14 (12) (2017) (e503-e51).

[2] M.G. Bongiorni, C. Kennergren, C. Butter, J.C. Deharo, A. Kutarski, C.A. Rinaldi, S.L. Romano, et al., The European Lead extraction ConTRolled (ELECTRa) study: a

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https://doi.org/10.1016/j.ijcard.2019.04.005

European heart rhythm association (EHRA) registry of Transvenous Lead extraction outcomes, Eur. Heart J. 38 (2017) 2995–3005 21.
[3] M.G. Bongiorni, H. Burri, J.C. Deharo, C. Stark, C. Kennergren, L. Saghy, A. Rao, et al., 2018 EHRA expert consensus statement on lead extraction: recommendations on definitions, endpoints, research trial design, and data collection requirements for clinical scientific studies and registries: endorsed by APHRS/HRS/LAHRS, Europace 20 (7) (2018) 1217.
[4] K. Kancharla, G. Acker, Z. Li, S. Samineni, C. Cai, R. Espinosa, et al., Efficacy and safety of transvenous lead extraction in the device laboratory and operating room, JACC Clin. Electrophysiol. 5 (2) (2018) 174–182.
[5] R. Maurizio, S. Sicuso R; Manganiello, V. Catto, M. Salvi L; Nafi, M. Casella, et al., Cardiac surgeon and electrophysiologist shoulder-to-shoulder approach: hybrid room, a kingdom for two A zero mortality transvenous lead extraction single center experience, Int. J. Cardiol. (2019).
[6] Sun Tzu on the Art of War. Translated by Lionel Giles. , Luzac and Company, London, 1910.