Transvenous lead extraction in patients with permanent left ventricular assist device support

Objectives
Transvenous lead extraction (TLE) has been reported to be safe and effective. However, data from patients carrying a permanent left ventricular assist device (LVAD) undergoing TLE are lacking. Aim of this study is to investigate major- and minor complication- and success rates in this complex subgroup of patients undergoing TLE.

Methods
We retrospectively analyzed all patients with a LVAD-System who underwent TLE between January 2015 and January 2022 in our center. The CIED (cardiovascular implantable electronic device) was characterized by the type of implanted system, number of leads and it’s indication for TLE. For each lead the lead location, type of lead, implant duration and the type of fixation was identified. Operative characteristics such as procedure time, fluoroscopy time and the requirement of temporary pacing or extracorporeal circulation were obtained. For each patient, extraction techniques for each lead as well as complication rates and survival were described.

Results
In this analysis 71 patients (66 (93%) male) were included between January 2015 and January 2022. The average age at the time of the procedure was 59,9y (±8,5y). The mean time of LVAD implantation until TLE was 890d (±842,9d). Most common indication for TLE was infection (61 patients: 85,9%). In 22 patients (36,1%) local infection was the reason for TLE; systemic infection occurred in 39 patients (63,9%). Lead dysfunction as the reason for extraction was given in 10 patients (14,1%). Out of an overall amount of 169 leads (mean dwell time of 7,02± 4,12 years; leads/patient: mean: 2,4±1,2), complete procedural success was seen for 166 leads (98,2%), whereas incomplete lead removal was observed for 3 leads (1,8%). Minor complications were noticed in 14 (19,7%) patients (10=pocket hematoma; 3=pleural effusion requiring drainage; 1=pulmonary embolism without clinical significance). Major complications appeared in one (1,4%) patient. During TLE, the LVAD-flow dropped to 1l/min due to sudden right heart failure. The procedure was stopped and postponed for recompensation. No patient died during the procedure. 30d-mortality was 11,3% (8 patients due to septic shock and subsequent multi organ failure).

Conclusion
TLE in patients with permanent left ventricular assist devices can be performed with high success rates and a low major complication rate, but it is associated with a higher rate of minor complications than in patients without LVAD. Minor complications in this patient group are mainly driven by bleeding complications resulting in pocket hematomas.

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