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Micra™ leadless cardiac pacemaker implantation in patients with cardiac implantable electronic device extraction

Autoren:

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Introduction:

Several studies have demonstrated adverse outcomes in patients requiring extraction of infected or dysfunctional cardiac implantable electronic devices (CIED). Micra™ leadless cardiac pacemaker (LCP) may be a beneficial option for patients requiring permanent pacemaker therapy after CIED extraction, especially due to infection.

Methods:

The aim of this study was to assess the feasibility, safety and outcome of Micra™ LCP implantation in patients with CIED extraction because of infection or dysfunction. We reviewed retrospectively the local LCP registry for LCP implantation and CIED extraction.

Results:

CIED extractions (DDD: n = 25, VVI: n = 9, CRT-P: n = 1, ICD: n = 1) were performed in 36 patients (76.6 +/- 9.9 years, female: n = 15) (Table 1). Twenty-seven CIED (75%) were extracted because of infection (pocket infection: n = 13, lead infection: n = 7, pocket perforation: n = 7) with 13 positive microbiological cultures (48.1%, Staph. aureus: n = 7, MRSA: n = 1, Staph. epidermidis: n = 1, Staph. hominis: n = 1, beta-hemolytic Streptococcus: n = 1, Pseudomonas aeruginosa: n = 1, Arthrobacter sp.: n = 1) and 14 negative microbiological cultures (51.9%). Nine CIED (25%) were extracted because of dysfunction (severe tricuspid regurgitation due to CIED lead: n = 5, lead failure: n = 3, chronic pain due to CIED: n = 1). Twenty-one Micra™ LCP (58.3%) were implanted with the CIED extraction procedure on the same day, while 3 LCP (8.3%) were implanted prior and 12 LCP (30.6%) after the CIED extraction (Figure 1). Implantation success rate was 97.2% (n = 35). During a median follow-up of 23.1 months (IQR 6.7 – 45.8 months), no reinfections of the LCP occurred. Survival rates at 30 days, 90 days and 1 year after device extraction were 94.4%, 90.9% and 89.7%, respectively.

Study population (n = 36)	
Age	76.6 +/- 9.9 years
Female	15 (41.7%)
Extracted devices (n =36)	n (%)
DDD	25 (69.4%)
VVI	9 (25%)
CRT-P	1 (2.8%)
ICD	1 (2.8%)
Causes of extraction (n = 36)	
CIED infection	27 (75%)
- pocket infection	13 (36.1%)
- lead infection	7 (19.4%)
- pocket perforation	7 (19.4%)
CIED dysfunction	9 (25%)
- severe tricuspid regurgitation due to CIED lead	5 (13.9%)
- lead failure	3 (8.3%)
- chronic pain due to CIED	1 (2.8%)
Microbiological results (n = 27)	
Positive microbiological cultures	13 (48.1%)
- Staph. aureus	7 (25.9%)
- MRSA	1 (3.7%)
- Staph. epidermidis	1 (3.7%)
- Staph. hominis	1 (3.7%)
- beta-hemolytic Streptococcus	1 (3.7%)
- Pseudomonas aeruginosa	1 (3.7%)
- Arthrobacter sp.	1 (3.7%)
Negative microbiological cultures	14 (51.9%)
Timing of CIED extraction and LCP implantation (n = 36)	
LCP implantation before CIED extraction	3 (8.3%)
CIED extraction and LCP implantation in one procedure	21 (58.3%)
LCP implantation after CIED extraction	12 (33.3%)
Survival rates	
30 days (n =36)	34 (94.4%)
90 days (n = 33)	30 (90.9%)
1 year (n = 29)	26 (89.7%)

Table 1:

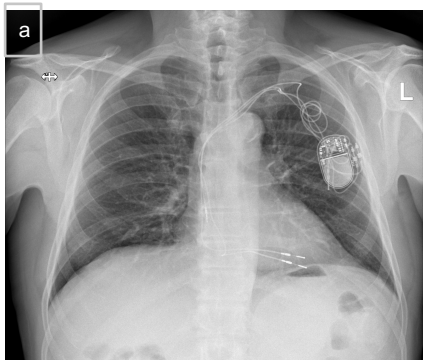
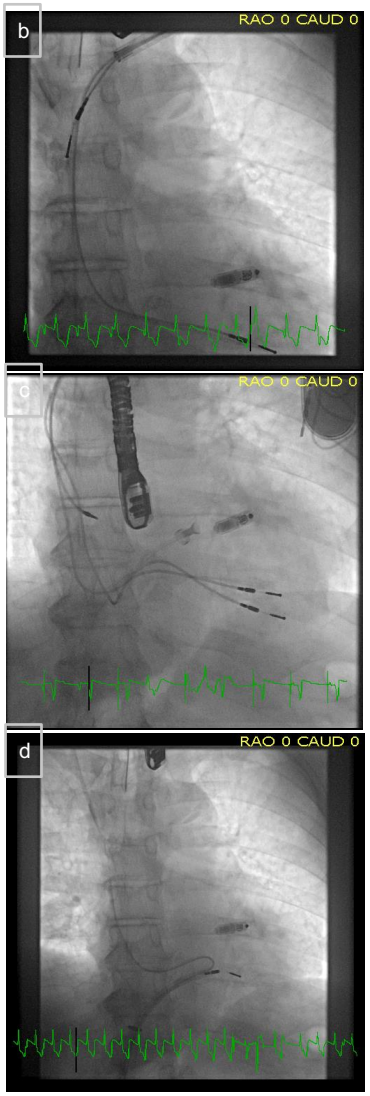
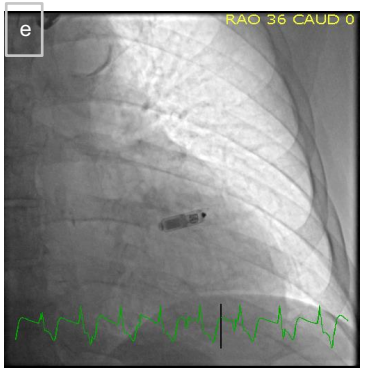
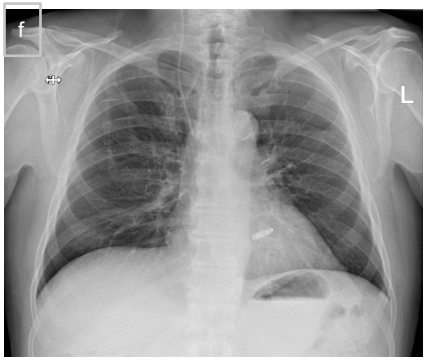


Figure 1:

Pre-operative situs of the CIED (Fig. 1a), Micra™ LCP implantation (Fig. 1b), lead extraction with Evolution® RL (Fig. 1c), lead extraction with snare technique (Fig. 1d), intra-operative situs (Fig. 1e) and post-operative situs with Micra™ LCP (Fig. 1f).







Conclusions:

Micra™ LCP implantation in patients requiring extraction of infected or dysfunctional CIED was feasible and safe in patients requiring permanent pacemaker therapy. No reinfections were detected during follow-up. Long-term follow-up demonstrated high survival rates.