Outcomes of Implantable Cardioverter Defibrillator (ICD)/Pacing Lead Extraction Over 8 Years

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Outcomes of Implantable Cardioverter Defibrillator (ICD)/Pacing Lead Extraction Over 8 Years

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Background

- Cardiac Implantable Electronic Devices (CIED) are used to regulate a patient's heartbeat when arrhythmia is present
- Indications for lead extraction include lead and pocket infection, lead fracture, skin erosion, recalled lead, lead migration or dislodgement
- Due to binding tissue that can form around the leads if implanted for multiple years, extraction can be challenging. An understanding of complication risk factors is beneficial for optimal CIED management and lead extraction decision making

Objectives

1. Gain a better understanding of LVHN Lead-Extraction Patient Population.
2. Determine any correlation between identified risk factors and survivability.
3. Analyze Complication and Mortality Rates (Perioperative, 30 Day, Yearly)
4. Evaluate overall intraoperative and postoperative outcomes.

Methods

Retrospective study of 195 adult patients with the discharge condition of lead extraction treated at LVHN CC over an eight year period, from 2011 to 2018.

1. • Build Lead Extraction Database
   • REDCap
2. • Configure Relevant Data for Analysis
   • Epic, OnBase EHMR
3. • Create Kaplan-Meier Survivability Curve
   • Excel, XLStat

Table 1: Population Demographics

Age (Mean, SD)	67.19 (15.28)	Chronic Renal Disease	60 (39.5%)
> 75	73 (37.4%)	On Dialysis	13 (6.7%)
Male	133 (68.2%)	Peripheral Vascular Disease (PVD)	28 (15.4%)
Female	59 (30.3%)	Previous Cerebrovascular Accident (CVA)	19 (12.8%)
ICD Device	131 (68.2%)	Hypertension	142 (72.8%)
Pacemaker Device	64 (32.8%)	Previous Myocardial Infarction (MI)	43 (25.1%)
Current Tobacco Use	26 (13.3%)	Previous Open Heart Surgery (OHS)	51 (26.2%)
Anticoagulents	109 (55.9%)	Anemia	49 (30.8%)
Ejection Fraction <50%	106 (54.4%)	Chronic Obstructive Pulmonary Disease COPD)	42 (22.1%)
Diabetes Mellitus	77 (42.6%)	Coronary Artery Disease (CAD)	104 (72.8%)

Outcomes

Figure 1: Indications for Extraction

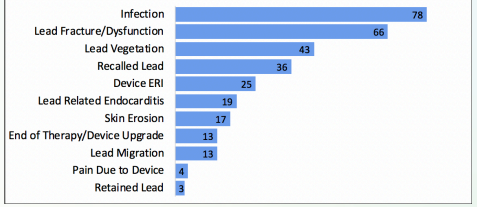


Figure 2: Procedural Outcome

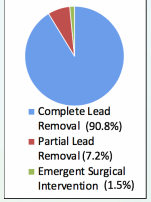


Figure 3: Complication Rates

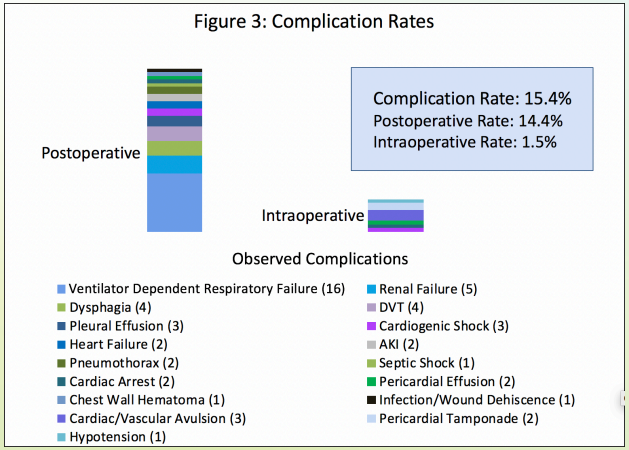


Table 2: Hospital Stay

Median Length of Stay	5 Days
Average Postop to Discharge	6.05 Days
Readmission Within 30 Days	13.4 %

Table 3: Mortality Rate

Perioperative	3.1% (6)
30 Day	4.1% (8)
1 Year	15.9% (31)

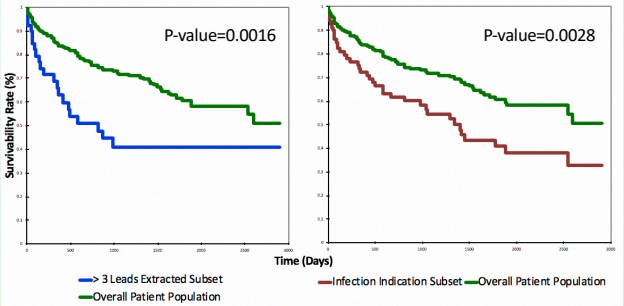
Table 4: Risk Factors and Respective Complication Rates

Risk Factor	Patients	Subset Population
ICD Device Extraction	15.3% (20)	131
Extraction Due to Infection	18.0% (14)	78
3+ Leads Extracted	20.0% (8)	40
*Leads >5 Years Old	12.5% (6)	48
Females	15.3% (9)	59
Not On Anticoagulents	15.1% (13)	86
*High Risk Cohort	16.7% (8)	60

*A High Risk cohort of 48 patients was established using the following criteria: 75+ years of age; >2 comorbidities.
*Age of Leads at Time of Extraction are at times excluded in digital records; analysis was therefore based on 103 data points.

Results

Figure 4: Kaplan-Meier Survivability Curve Comparisons



3+ Leads Subset: P-value = 0.0016
Infection Indication Subset: P-value = 0.0028

→ Survival Rate for Each Group is Unequal

→ "3+ Leads Extracted" and "Extraction Due to Infection" Has a Significant Effect On Patients' Survivability

Conclusions

- Patients in increased risk subsets (Infection as Extraction Indication; 3+ Leads Extracted) have a significantly lower survivability rate than those in the general population
- LVHN Lead Extraction Patients have a higher age and high risk demographic, however mortality and complication rates are kept low
  - Age: >75 Years 37.4%
  - High Risk: >2 Comorbidities 69.7%
  - Complication Rate: 15.4%
  - Perioperative Mortality Rate: 3.1%
- Future Steps:
  - Further Exploration Within Significant Risk Factor Subsets
  - Infection Prevention and Awareness: Antibiotic Envelope/Emerging Leadless Tech

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