PHILIPS

Image Guided Therapy

Lead Management

CIED infection

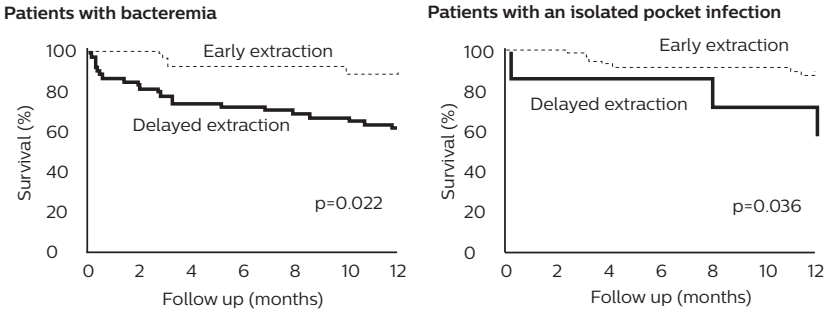
Delayed lead extraction in patients with infected CIEDs[1]

A HRS 2020 poster showed that delaying lead extraction for CIED infection led to higher one-year mortality rates in both bacteremic and locally-infected patients, underscoring the importance of early detection and early removal of CIED infection.[1] A second HRS 2020 poster illustrated that implementing EMR (electronic medical records) to identify CIED patients with positive blood cultures reduced the time to a cardiology consult by 3.4 days, a 71% reduction, giving patients the device care they need and decreasing length of hospital stay.[2]

What is the effect of timing of device removal on patient outcomes?

- **In-hospital mortality increased dramatically** (from 0 patients dying when extraction occurred within 7 days, to 1 and 11 locally infected and bacteremic patients dying, respectively, with delayed extraction).
- The length of hospital stay also increased significantly **(42% - 120%)** when extraction was delayed, causing significant hospital costs.[5]

Significant lower survivability with delayed extraction for CIED infection



"Delayed CIED extraction is associated with higher mortality at one year, and this is statistically significant in both groups."

- Dr. Andrew Lin

Conclusion

Delayed CIED extraction is associated with worse in–hospital mortality and 1-year mortality in both bacteremic and locally infected patients. **There were no in-hospital mortalities in both bacteremic and pocket-infected patients when they had an extraction within 7 days of infection.**

This study underscores the importance of early detection of CIED infection and a strategy for prompt management including lead extraction.

(poster on EMR on back page)

Clinical outcomes of delayed extraction in patients with bacteremia and pocket infection

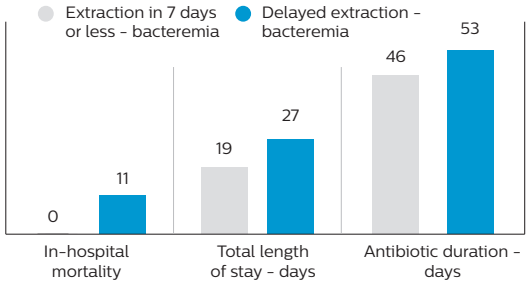


Chart 1 - Bacteremic patients with delayed extraction showed much higher rates of in-hospital mortality, septic shock, acute kidney injury, respiratory failure, decompensated heart failure, experienced a longer hospital stay and had a longer antibiotic duration.

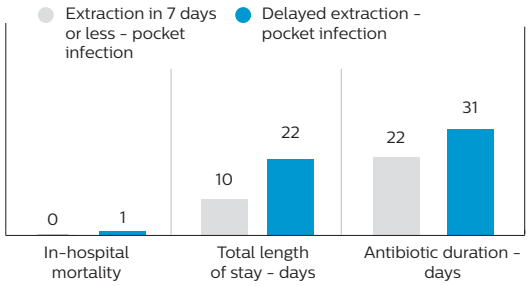


Chart 2 - In patients with an isolated pocket infection, delayed extraction led to a higher in-hospital mortality rate, a longer length of stay at the hospital (more than double the LOHS of early extraction) and an average 8 days longer antibiotic duration.

Impact of electronic medical records to decrease time to consult and extraction[2]

This study aimed to determine the impact of electronic medical alerts in individuals with CIED related infections and the time to consultation and treatment of these patients.

A single-center, observational study of patients with positive blood cultures and CIEDs that presented to the hospital before and after the implementation of EMR alerts. The measured outcomes were time from the positive culture alert to clinical evaluation and device removal.

Conclusion

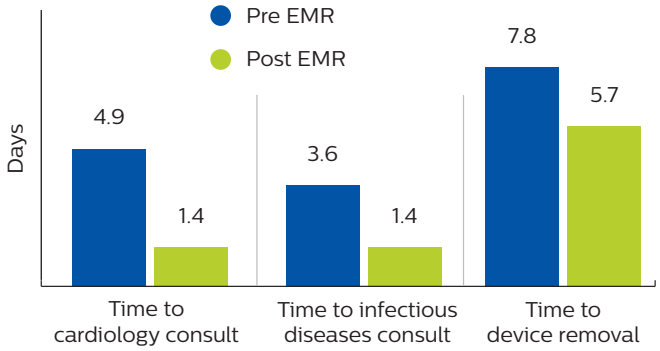
Early CIED infection identification and removal increases survival, reduces length of hospital stay, and reduces the economic burden on hospitals and the healthcare system.

The implementation of EMR can help make a significant impact to the hospital patient care for little to no cost.

"Very simple systematic changes can lead to significant improvements. EMR was fairly easy to implement, and I think anybody, where it's compatible with their electronic system, should think strongly about implementing this."[3]

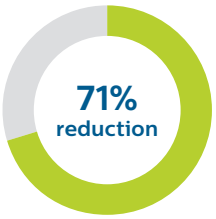
- Arnold Giedrimas, MD
SouthCoast Hospital

27% decrease in days to device removal, and 71% decrease in days to cardiology consult, by implementing EMR



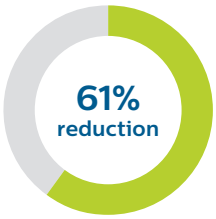
Streamlining the treatment pathway

4.9 to 1.4 days is a



Time to cardiology consult may equal **$7,500 in hospital savings***

3.6 to 1.4 days is a



Time to infectious diseases consult may equal **$4,750 in hospital savings***

7.8 to 5.7 days is a

Time to device removal may equal **$4,500 in hospital savings***

*Difference between average hospital days (x) $2,157 average inpatient per day hospital cost (U.S.)

1. Lin, Andrew, et al. "Early Versus Delayed Lead Extraction in Patients with Infected Cardiovascular Implantable Electronic Device." Moderated ePoster Presentation. 2020 Heart Rhythm Society Annual Abstract Presentations Online.
2. Paz Rios, Luis, et al. "Effect Of An Electronic Medical Alerts For Patients With Positive Cultures And Cardiovascular Implantable Electronic Devices." Moderated ePoster Presentation. 2020 Heart Rhythm Society Annual Abstract Presentations Online.
3. Philips data on file, D039963 'Using electronic medical records in the fight against CIED infection.'
4. Sohail, M Rizwan, et al. "Incidence, Treatment Intensity, and Incremental Annual Expenditures for Patients Experiencing a Cardiac Implantable Electronic Device Infection: Evidence From a Large US Payer Database 1-Year Post Implantation." Circ Arrhythm Electrophysiol. 2016; 9(8).
5. Greenspon AJ, Patel JD, Lau E, et al. 16-Year Trends in the Infection Burden for Pacemakers and Implantable Cardioverter-Defibrillators in the United States: 1993 to 2008. J Am Coll Cardiol. 2011;58(10):1001-1006. doi:10.1016/j.jacc.2011.04.033. $2,157K for each day a patient is in the hospital. and the extra days were 8 for bacteremic, 12, for local pocket infection, which equates to $17,256-$25,884.

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