

Left Ventricular Assist Device Driveline Infection: What Drives the Problem?

AUTHORS: NOELLE V. PAVLOVIC

AFFILIATIONS: JOHNS HOPKINS HOSPITAL DEPARTMENTS OF SURGERY AND MEDICINE; JOHNS HOPKINS HOSPITAL DEPARTMENT OF HOSPITAL EPIDEMIOLOGY AND INFECTION CONTROL; JOHNS HOPKINS UNIVERSITY SCHOOL OF NURSING, BALTIMORE, MD

1 Background

The current gold standard treatment for end-stage heart failure is heart transplantation. However, available hearts are limited. We can provide supportive measures such as a Left Ventricular Assist Devices (LVADs) (Figure 1). These LVADs are implanted into the heart and aid the failing heart in blood circulation. While helpful for managing heart failure symptoms, LVADs put patients at serious risk for life-threatening complications, such as infection, particularly at the driveline site (power source line) exiting the abdominal wall (Yarboo, 2014). Driveline infection (DLI) is often the initial source of infection that can travel into the LVAD device and the heart, leading to systemic infection and potentially sepsis (Angud, 2015). Figure 2 shows an example of an infected LVAD driveline site. Researching and identifying the risk factors for driveline infection and methods for reducing infection is crucial for reducing patient morbidity and mortality and promoting safe, quality care. Here, we seek to understand the risk factors for DLI and how those can guide nursing interventions.



Figure 1: Depiction of a Left Ventricular Assist Device (LVAD)



Figure 2: Infected LVAD Driveline Site (Angud, 2015)

2 Objectives

- Consolidate JHH LVAD infection data from Johns Hopkins Hospital into one, comprehensive database.
- Examine the existing literature to define important factors that may influence risk of LVAD driveline infection.
- Develop and implement a new, evidence-based driveline dressing change policy.

3 Methods

- Systematic literature review

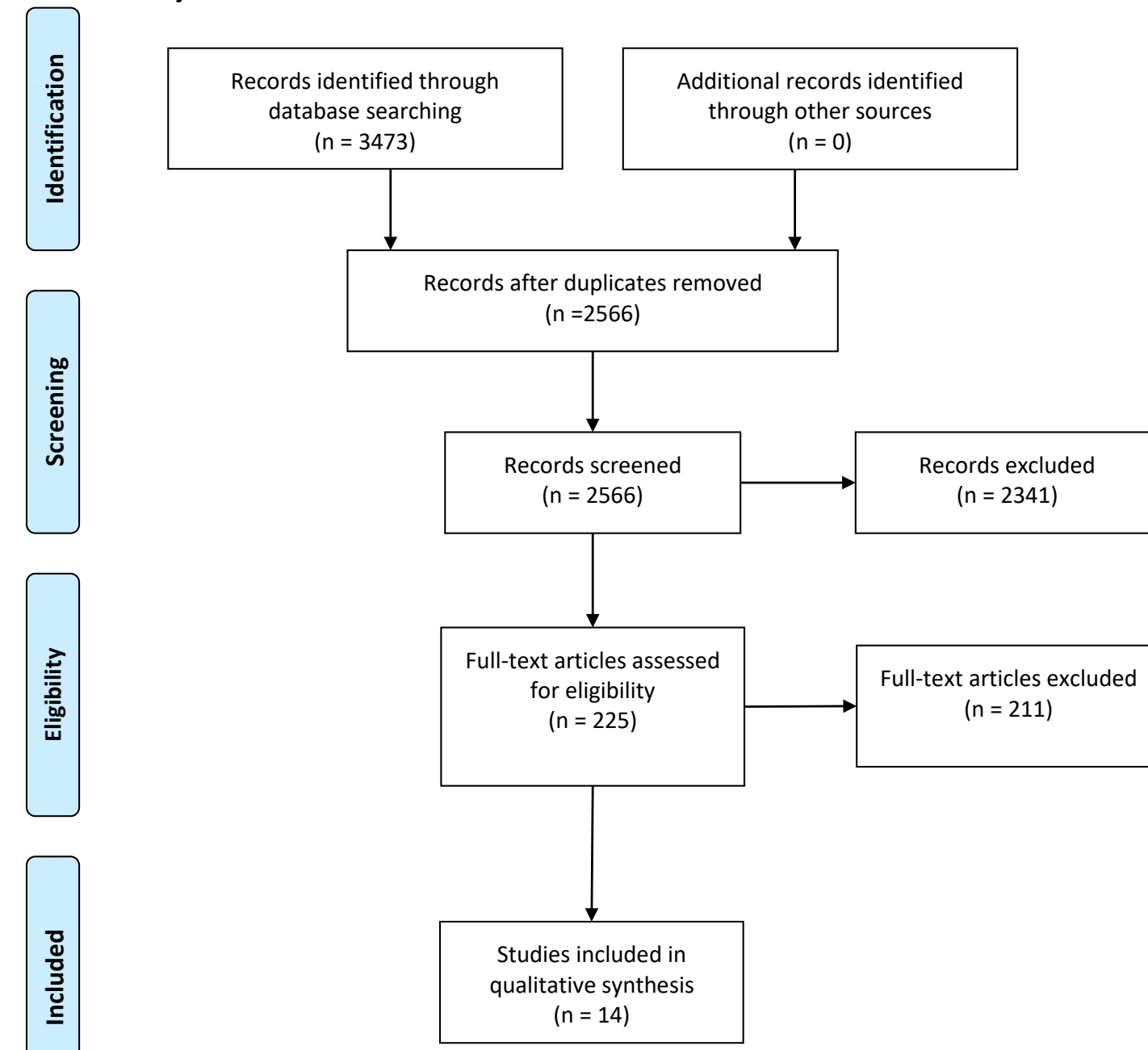


Figure 3: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009).

- Summarize the use and clinical value of silver wound care products and their potential for use in LVAD driveline dressings.
- Review of LVAD patient electronic health records and identification of true driveline infection according to the INTERMACS definition (INTERMACS Executive Committee, 2013).

4 Results

- We currently have a consolidated database of true LVAD driveline infections at Johns Hopkins Hospital from 2014 through June 2016.
- 14 papers from the literature review were selected. Each were examined and results on patient demographic data and predictors of infection were synthesized.

5 Conclusions

- We will continue to improve our database through collaboration with cardiac surgery, and add more variables of interest as we identify them.
- Silver products have had significant clinical value in wound care settings and acts to reduce bacterial bioburden at and around the site of the wound (Beele, 2010). Silver has also been used at other institutions in their LVAD driveline dressing change protocol with significant reductions in driveline infections.
- The results from the literature review showed that there is very little literature examining risk factors for driveline infection, results are conflicting, samples sizes are small, and variables investigated varied significantly between studies. More research must be performed to identify clinically relevant risk factors for driveline infection.

6 Future Directions

- Perform retrospective electronic health record review of LVAD patients from Johns Hopkins Hospital and possible collaborating institutions. Collect demographic data that may influence driveline infection risk and perform statistical analysis to determine relationships and statistical and clinical significance of those relationships.
- Create and implement new LVAD Driveline Dressing Management protocol as a Quality Improvement initiative hospital wide, educate nurses on new protocol, and evaluate effect on LVAD driveline infection rates.
- Perform comparison study to examine the effect of a new driveline dressing change kit (including a silver-based product) and care bundle on the rate of LVAD driveline infection in the CVPCU, PCCU, CVSICU, CCU, and CVOR of Johns Hopkins Hospital.

7 References

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