



Evaluation of Risk Factors and Outcomes of Early Left Ventricular Assist Device Infections



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ABSTRACT

This study aimed to identify risk factors and evaluate outcomes of early LVAD infections in a community teaching hospital. Primary outcome was early LVAD infection and secondary outcomes included time to early infection, time to death, and risk factors of and time to recurrent infection. Of 160 patients who had LVADs placed during study period, 26 experienced early LVAD infection. Risk factors for early infection were placement of HeartMate III device and BMI > 40. Patients who experienced early LVAD infection had increased hazard rate for death.

BACKGROUND

- Placement of left-ventricular assist device (LVAD) for management of heart failure is increasingly common.¹
- Infection is the most common adverse event for patients with LVAD, with only approximately 60% of patients free of infection at 1 year.¹
- Risk factors for LVAD infections have been previously described and include certain host factors and surgical variables.²
- Management of LVAD infections is highly individualized.²

OBEJCTIVE

- Identify factors associated with and treatment outcomes of early LVAD-specific and LVAD-related infection in a community teaching hospital

METHODS

- Single-center, IRB-approved retrospective cohort study
- Included patients ≥ 18 years with LVAD implantation between October 2012 – September 2019
- Primary outcome was early LVAD infection (LVAD-specific or LVAD-related infection occurring within 90 days of implantation)
- Secondary outcomes included time to initial LVAD infection, risk factors associated with and time to recurrent LVAD infection, time to death
- Relationships between potential risk factors and infection were assessed with multivariate logistic regression. Cox regression was used to ascertain associations with time to outcome variables.

RESULTS



- The mean age was 59 years. Male patients comprised 68.8% of the total population.
- The most common device brand was the HeartWare HVAD (42.3%) in the early infection group, and the HeartMate II LVAS (54.5%) in the no early infection group (p=0.027).

Figure 1. Epidemiology of Early LVAD Infections

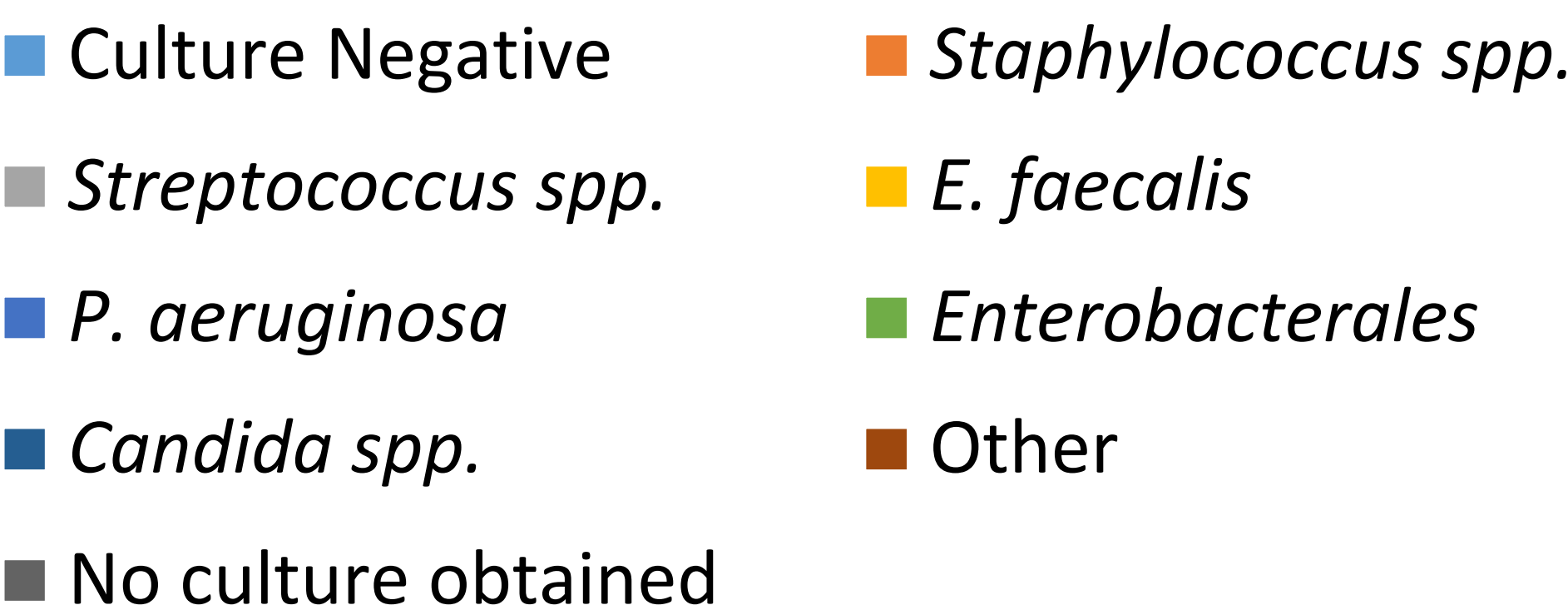


Table 1. Early Infection Risk Factors: Adjusted

Variable	Odds Ratio	95% Confidence Interval	p-value
>55 years old	0.399	(0.136, 1.172)	0.091
Male	1.913	(0.628, 6.746)	0.276
White	2.678	(0.901, 8.273)	0.087
HeartWare	3.187	(0.958, 11.248)	0.062
HeartMate III	4.563	(1.276, 17.232)	0.020
INTERMACS Level 3-5	0.813	(0.291, 2.343)	0.695
BMI >30	1.542	(0.569, 4.192)	0.391
BMI >40	5.396	(1.194, 25.078)	0.027
A1c >6.4	0.890	(0.304, 2.509)	0.826
Diabetes	0.918	(0.332, 2.451)	0.866
CKD	1.044	(0.261, 3.499)	0.947

*Logistic regression used to estimate odds of early infection
**Adjusted for age, gender, race, device brand, INTERMACS level, and BMI

- There was not sufficient evidence to suggest association between odds of recurrent infection and any variable studied.
- Increased hazard rate of recurrent infection demonstrated for patients with chronic kidney disease (CKD) (HR 3.588; 95% CI 1,154,11.156); p=0.027)

RESULTS

Figure 2. Time to Death

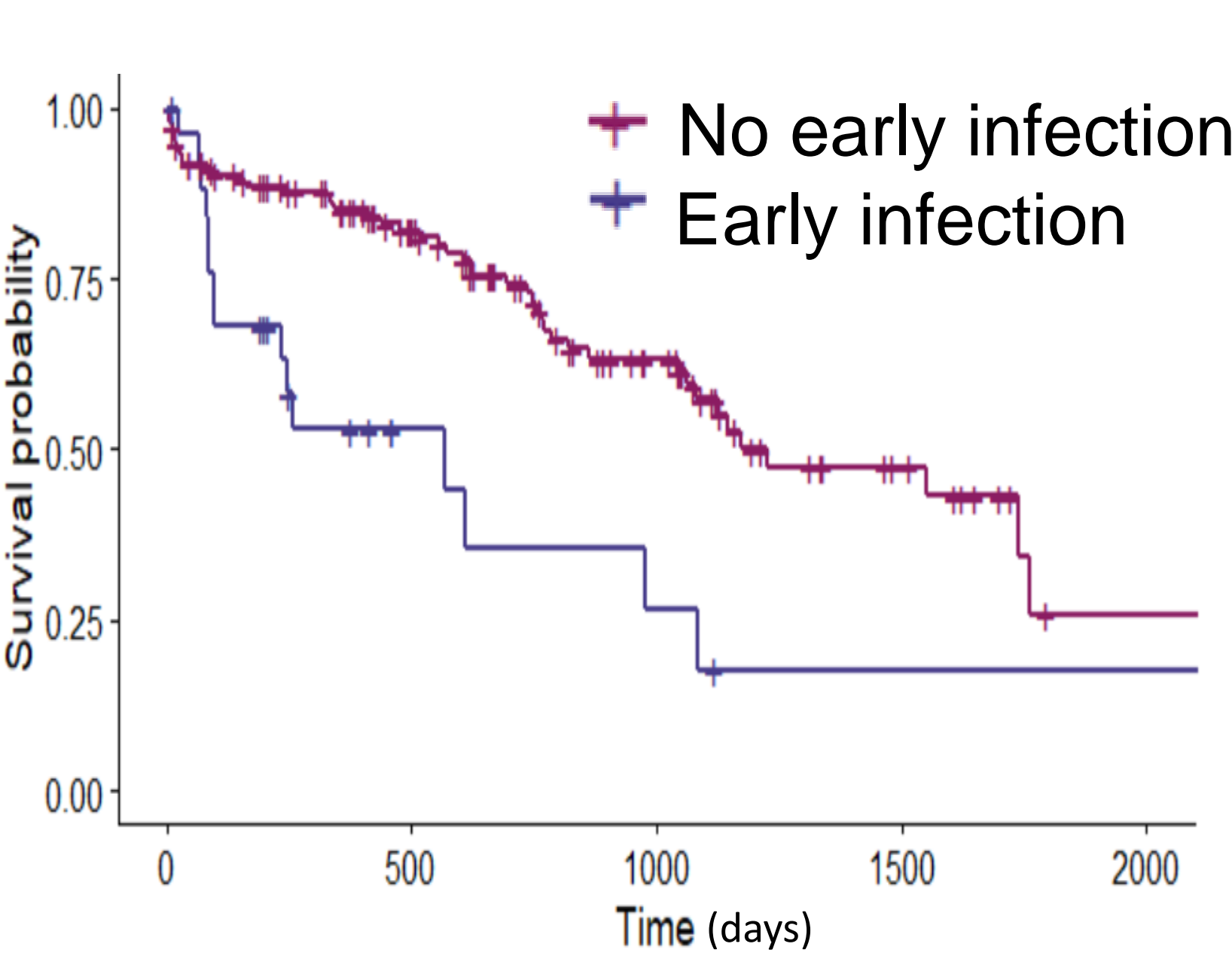
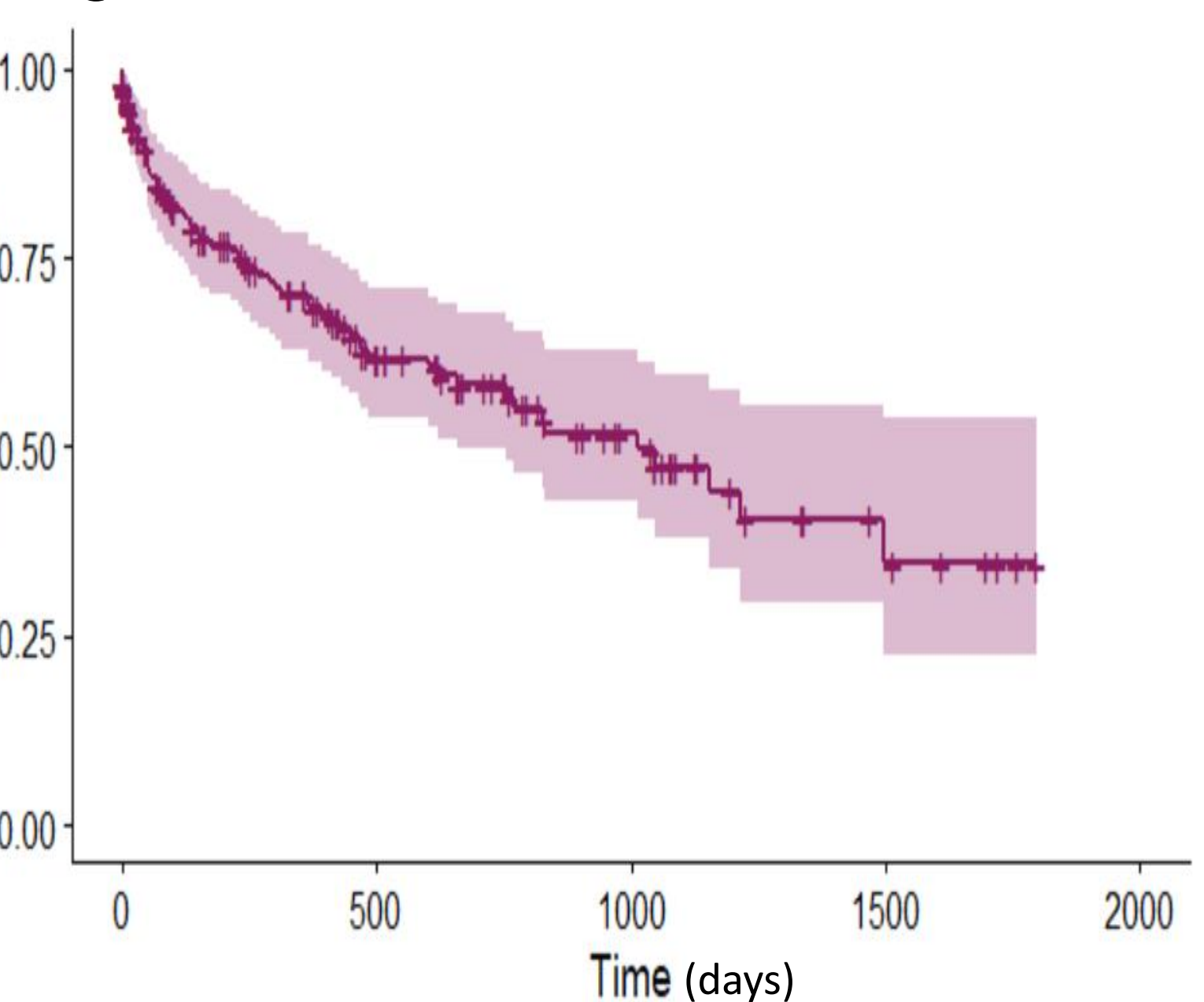


Figure 3. Overall Time to Infection



- Increased hazard rate of death for patients with A1c > 6.4 at baseline (HR 1.028; 95% CI 1.002,1.054; p=0.032) and patients with early infection (HR 3.824; 95% CI 1.928,7.584; p<0.001).
- Compared to patients with HeartMate II device, patients with HeartWare device and HeartMate III device had increased hazard rate of infection (HR 2.344; 95%CI 1.222, 4.496; p=0.010 and HR 2.858; 95% CI 1.231, 6.635; p=0.015, respectively).
- Increased hazard rate for infection for patients with BMI > 40 and those with history of diabetes (HR 2.437; 95% CI 1.131, 5.252; p=0.023 and HR 1.736; 95% CI 1.012, 2.978; p=0.045, respectively).

CONCLUSIONS

- Risk factors for early LVAD infection included placement of Heartmate III device and BMI > 40.
- No risk factors were identified for recurrent LVAD infection.
- Patients with early LVAD infection had increased odds of mortality at any given time point post-implantation.

REFERENCES

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2. O'Horo JC, Abu Saleh OM, Stulak JM, et al. Left Ventricular Assist Device Infections: A Systematic Review. *ASAIO J.* May/Jun 2018;64(3):287-294.

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