Infection Risk After Heart Transplantation in Patients Bridged with MCS Versus Medical Therapy: A Single Center Analysis

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INTRODUCTION

Infectious complications following orthotopic heart transplantation (OHT) remain a leading cause of early morbidity and readmission. Temporary mechanical circulatory support (tMCS) is increasingly used to bridge patients to transplant following the 2018 UNOS allocation changes. The impact of device type and duration on post-transplant infection risk remains uncertain. We hypothesize longer MCS duration would increase infection risk, but overall infection risk would not differ between tMCS-bridged and medically managed patients.

METHODS

Study Design:
Single-center retrospective cohort of adult OHT recipients from August 2022 through June 2024 at MUSC.

Durable LVADs were excluded. Temporary support included Impella and intra-aortic balloon pump (IABP).

Exposures:
- Pre-transplant support strategy (tMCS vs. no MCS)
- Support duration (tertiles)

Outcomes:
1. Pre-transplant bacteremia (>=2 positive blood cultures)
2. Post-transplant infection within 1 year, including bacteremia, pneumonia (including HAP), UTI, or other infection

Analysis:
- Fisher's exact test and logistic regression for infection risk
- Kaplan-Meier and multivariable Cox regression for time to first infection
- Covariates: age, sex, LOS (pre- and post-transplant)

RESULTS

Cohort Overview:
- 108 total OHT recipients
  - 63 (58%) bridged with tMCS
  - 45 (42%) without MCS

Pre-Transplant Findings:
- 6/63 (9.5%) tMCS patients developed bacteremia
- Associated with longer pre-transplant LOS (OR 1.04 per day, p = 0.02)
- No association with device type or duration

Post-Transplant Findings:
- 77/103 (75%) developed at least one infection within 1 year
- No difference in infection rates between tMCS and no MCS (p = 1.00)
- Multivariable logistic regression:
  - tMCS not predictive (OR 1.13, 95% CI 0.46-2.81, p = 0.78)
  - Age significant: OR 1.04 per year (p = 0.021)
- Cox model:
  - Post-transplant LOS predicted earlier infection (HR 1.02, p = 0.009)
  - tMCS protective (HR 0.40, p = 0.036)
- Kaplan-Meier: Prolonged infection-free survival in tMCS patients

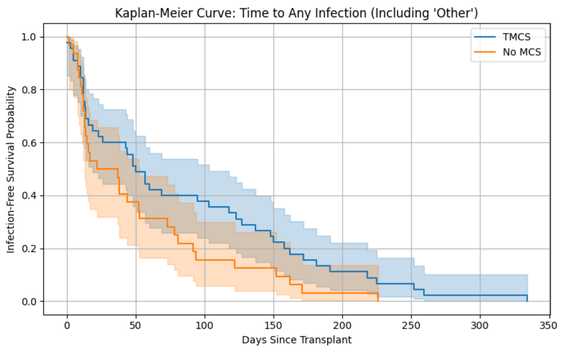

Figure 1. Kaplan-Meier Curve: Time to Any Post-Transplant Infection
Infection-free survival by support strategy (tMCS vs. no MCS). Shaded areas indicate 95% CI.

RESULTS

Predictor	Effect (OR)	95% CI (Lower–Upper)	p-value
tMCS (vs No MCS)	1.13	0.46–2.81	0.78
Age (per year)	1.04	1.01–1.08	0.021
Pre-Transplant LOS	0.99	0.98–1.01	0.43
Post-Transplant LOS	1.05	0.99–1.10	0.12

Table 1. Multivariable logistic regression for any 1-year infection after OHT

Predictor	Hazard Ratio	95% CI (Lower–Upper)	p-value
tMCS (vs No MCS)	0.40	0.17–0.94	0.036
Age (per year)	1.03	0.99–1.07	0.161
Pre-Transplant LOS	1.00	0.98–1.02	0.851
Post-Transplant LOS	1.02	1.00–1.03	0.009

Table 2. Multivariable Cox Regression for Time to Any Post-Transplant Infection

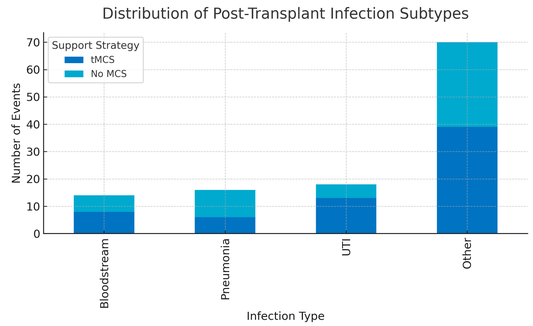

Figure 2. Distribution of post-transplant infection subtypes by pre-transplant support strategy.

"Other" includes wound and surgical-site infections, C. difficile colitis, and viral or fungal infections not classified as bacteremia, pneumonia, or urinary tract infection. No significant differences were observed between groups (all p > 0.10).

CONCLUSIONS

tMCS bridging was not associated with higher infection risk following OHT compared with medical therapy alone.

Length of stay, both before and after transplant, remained the strongest predictor of infectious complications.

Device type (Impella vs IABP) and support duration did not influence bacteremia or post-OHT infection rates.

Findings support the safety of tMCS as a bridge to transplant when infection clearance is documented prior to OHT.

Programmatic implications: emphasize minimizing inpatient exposure, standardizing infection surveillance, and optimizing perioperative pathways.

These data add to growing evidence that temporary support can safely bridge high-acuity patients to successful transplantation in the modern allocation era.

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