Heart Transplant Outcomes in Substance Use Disorder: A Nationwide Cohort Study

Elkrief, Kellie[1]; ***Cyr, Samuel***[1]; & Nicolas Garel[1,2,3]

[1]Research Centre, Centre Hospitalier de l'Université de Montréal (CRCHUM), 900 Saint-Denis Street, Montréal, Québec, H2X 0A9, Canada,
[2]Lady Davis Institute, Jewish General Hospital, 3755 Chem. de la Côte-Sainte-Catherine, Montréal, Québec, H3T 1E2, Canada,
[3]Department of Psychiatry, Faculty of Medicine, McGill University, 1033 Av. Des Pins, Montréal, Quebec, H3A 1A1, Canada,

ASAM 56th ANNUAL CONFERENCE
Innovations in Addiction Medicine and Science
April 24-27, 2025 | Denver, CO

INTRODUCTION

Substance use disorder (SUD) has been associated with adverse post-heart transplantation (HT) outcomes, such as challenges in adherence to medical regimens, engagement in inadequate self-care practices, and increased risk of morbidity and mortality[1-4].

However, evidence on post-HT outcomes for this population remains inconsistent[1, 3], likely due to small sample sizes and poor control of confounders[5, 6].

Assumptions and biases against SUD patients affect their likelihood of being listed for HT and influence strict eligibility criteria[7–10].

This leads to ethical concerns about denying HT solely based on past SUD.

OBJECTIVE

To compare HT outcomes (mortality, hospitalization, and organ rejection rates) between patients with and without substance use disorders, while adjusting for major confounding variables.

METHODOLOGY

Setting and design: Retrospective cohort study utilizing electronic health records from the EVERSANA databank (2015-present).

Sample: A total of n=7874 patients who underwent HT (Patients with SUD: n=808; Patients with no SUD: n=7066).

Outcomes: Mortality, organ rejection and hospitalization assessed at two time points: within one year and between one- and five-years after HT.

Analyses:

- Odds ratios to compare outcomes between patients with and without SUD.
- Cox Proportional Hazard Regression to assess time to death and organ rejection between the two groups, and hazard ratios in survival analyses for overall mortality and organ rejection.
- High-dimensional propensity score (hdPS) used for confounding factors, including multiple medical comorbidities and demographic variables (age, sex, race).

RESULTS

Following hdPS matching, no significant differences were observed in mortality, hospitalization, or organ rejection rates between patients with SUD and those without, at both post-transplantation time points (p>0.05) (Table 1 and Figure 1).

Table 1. Unmatched, basic matched and high dimensional propensity score matched odds ratios for organ rejection within 1-year post-transplant in patients with and without substance use disorders.

	Negative	Positive	OR (95% CI)	P value	E value*
Unmatched					
No SUD	5643	1423	1.00 (1.00, 1.00)	NA	NA
SUD	538	270	1.99 (1,7, 2,33)	<0,001	1.9 (M)
Basic Matched					
No SUD	646	162	1.00 (1.00, 1.00)	NA	NA
SUD	538	270	2.00 (1,60, 2,51)	<0,001	1.8 (M)
High Dimensional Propensity Score Matched					
No SUD	526	277	1.00 (1.00, 1.00)	NA	NA
SUD	534	269	0.96 (0,78, 1,18)	0,670	NA

Abbreviations: CI, Confidence Interval; M, Medium; NA, Not applicable; OR, Odds Ratio; SUD, Substance Use Disorder

*Higher E-value suggests that the observed association is less likely to be due solely to unmeasured confounders.

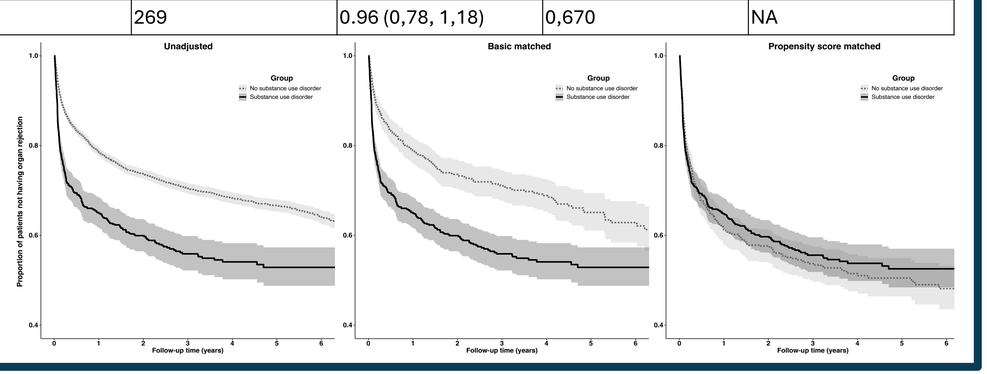

Figure 1. Five-year (or end of available data) analysis for organ rejection rates in selected patients with a substance use disorder and controls without a substance use disorder. Kaplan-Meier survival curves showing time to first organ rejection event, in years. The numbers below the Kaplan—Meier curves represent the numbers of patients followed up and the numbers censored at each time point.
Left: Unmatched analysis
Middle: Basic matched analysis
Right: High-dimensional propensity score matched analysis

CONCLUSIONS

Patients with a history of SUD exhibited no significant differences in mortality, organ rejection, or hospitalization rates compared to patients without SUD histories after adjusting for medical comorbidities and overall health status.

This suggests that poorer post-HT outcomes previously attributed to SUD may be more closely related to comorbidities rather than SUD.

These findings highlight the importance of considering confounding factors when evaluating post-HT outcomes in patients with SUD.

Our results may help reduce stigmatization and improve decision-making in organ transplantation listings.

REFERENCES

1. Hanrahan et al., 2001. Prog Transplant.
2. Velleca et al., 2023. J Heart Lung Transplant Off Publ Int Soc Heart Transplant.
3. Shapiro et al., 1995. Transplantation.
4. Dew et al., 2007. Transplantation.
5. Owen et al., 2006. Psychosomatics.
6. Sözen et al., 2018. Exp Clin Transplant Off J Middle East Soc Organ Transplant.
7. Greenberg et al., 2021. Transplantation.
8. Kelty et al., 2022. Am Heart J Plus.
9. Parker et al., 2016. Transplantation.
10. Neyer et al., 2016. Circ Heart Fail.