ISHLT November 2024 | Cardiothoracic Transplantation
JOURNAL WATCH

Antonia Gkouma, MD, MSc
Harefield Hospital, London, UK

Aurelie Merlo, MD
GUEST EDITOR

ISHLT.ORG

# Impact of dual thoracic recovery from circulatory death donors on heart and lung transplant outcome

Zhou A, et al. *JTCVS* 2024. | doi.org/10.1016/j.jtcvs.2024.07.008

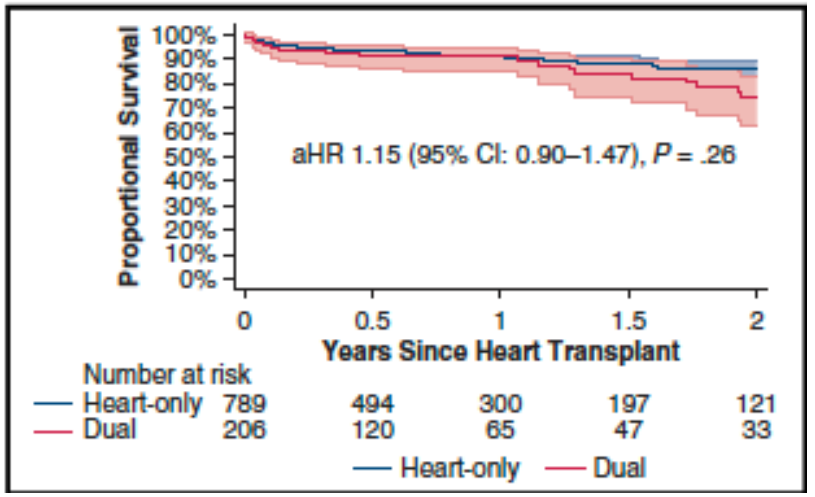
## Study Highlights

**Objective**: Dual thoracic recovery from circulatory death donors may have additional risks which can result in increased operative complexity during procurement, increased ischemic time and competition for resources and anatomic territory. The authors investigated the effects of dual heart and lung recovery from circulatory death donors on thoracic transplant outcomes.

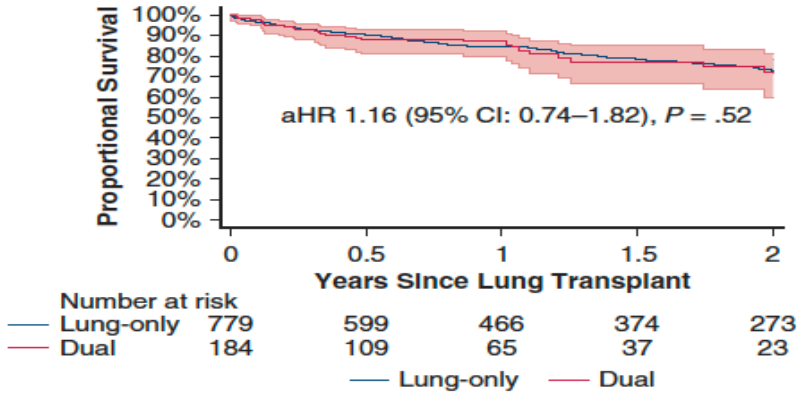
**Methods:** Using the United Network for Organ Sharing database, the authors categorized the adult thoracic circulatory death donor transplants from 2019-2023 by whether the donor heart, lung or both (dual donors) were recovered. Heart and lung transplants outcomes were compared between dual recovery donors and heart only or lung only donors, respectively, using multivariable analyses.

**Results**: Of the 2513 donors included, 42.9% were heart-only, 45.0% were lung-only, and 12.0% were dual donors. Recipients of dual versus heart-only donors had similar likelihood of post-transplant dialysis (18.9% vs 18.3%, P = .84), likelihood of stroke (2.9% vs 4.7%, P= .34), and 2-year risk of mortality (adjusted hazard ratio, 1.15 [95% CI, 0.90-1.47], P= .26), but lower likelihood of acute rejection (10.2% vs 16.1%, P= .04). Recipients of dual and lung-only donors had similar likelihood of predischarge acute rejection (7.6% vs 8.5%, P= .70), intubation at 72 hours (38.9% vs 45.1%, P . .13), and extracorporeal membrane oxygenation at 72 hours (13.1%vs 18.1%, P= .11), as well as 2-year risk of mortality (adjusted hazard ratio, 1.16 [95% CI, 0.74-1.82], P= .52).

**Conclusion**: Recovering both the heart and lungs from a circulatory death donor does not negatively impact transplant outcomes. Outcomes in this population should continue to be investigated as more data and longer-term follow-up become available.




**Two- year post heart transplant survival using heart only and dual donors.**




**One- year unadjusted post- lung transplant survival of unmatched lung- only and dual donor transplants.**

## Reviewer's Comments

- Recovering both the heart and lungs from a circulatory death donor does not negatively impact short term transplant outcomes as it was previously feared.
- In a subgroup analysis, the authors showed an increased use of dual thoracic recovery in the past two years.
- There appeared to be no difference in outcomes in a subanalysis between organs recovered via thoracoabdominal normothermic regional perfusion and direct recovery.
- More research in this dynamically evolving field will be necessary to understand impacts on long term outcomes as we gain more experience.

## Limitations

- Retrospective small volume study due to novelty of thoracic DCD transplant.
- Short term outcomes up to 1 year as first dual thoracic DCD in US performed in 2019.
- Lung primary dysfunction could not be evaluated due to missing data on PaO2/ FiO2.

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Antonia Gkouma, MD, MSc
Harefield Hospital, London, UK

Aurelie Merlo, MD
GUEST EDITOR

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# Centralized Static Ex-Vivo Lung Perfusion in the United States

Chen Q, et al. *The Annals of Thoracic Surgery* 2024. | doi.org/10.1016/j.athoracsur.2024.08.008

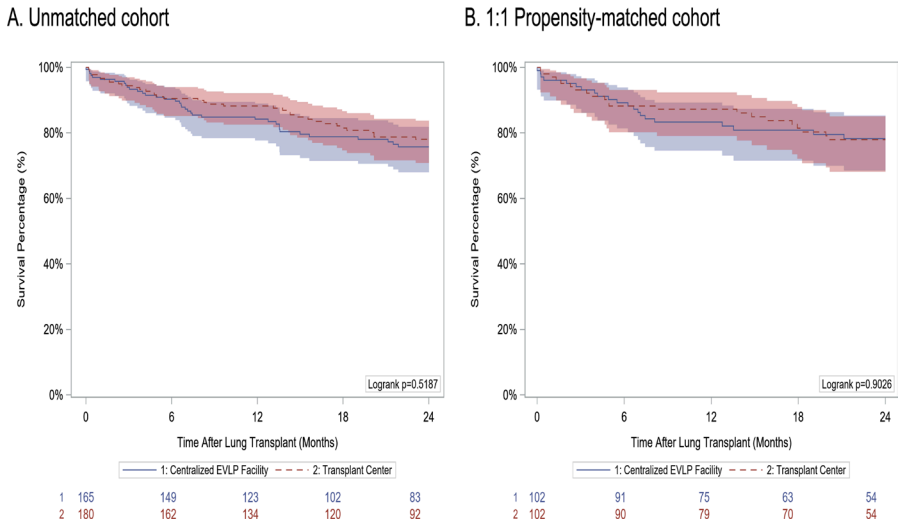
## Study Highlights

**Background**: Ex-vivo lung perfusion (EVLP) may improve donor lung utilization but requires significant infrastructure and expertise. Centralized EVLP facilities may mitigate these requirements.

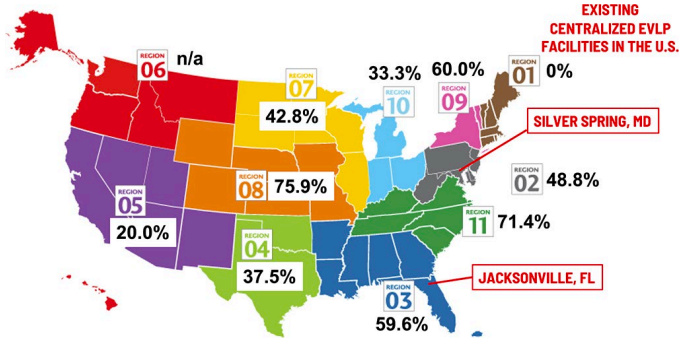
**Methods:** From the United Network for Organ Sharing (UNOS) database, the authors identified 345 adults undergoing isolated, first-time lung transplantation using donor lungs perfused by static EVLP (03/01/2018-12/31/2022). Recipients of lungs perfused at centralized EVLP facilities (n=165) were compared to recipients of lungs perfused at individual transplant centers (n=180). Propensity score matching was used to create balanced groups for comparison.

**Results**: Centralized EVLP facilities were increasingly utilized from 2018 to 2022 (35.3 vs. 55.8%, p=0.04) and were more likely used when the annual center volume of EVLP lung transplants was low. Compared to allografts placed on EVLP at individual transplant centers, those placed on EVLP at centralized facilities had longer median ischemic time (11.3 vs. 9.6 hours, p<0.001) and were less likely to come from donation after circulatory death donors (25.4 vs. 39.5%, p=0.003) or be used for double lung transplant (73.3 vs. 83.9%, p=0.02). In 102 well-matched recipients, 2-year survival was equivalent between those receiving allografts perfused at centralized facilities (77.9% [95% CI 68.0-85.1%]) versus individual transplant centers (77.7% [95% CI 67.8-84.9%], p=0.90). Multivariable Cox regression analysis also showed equivalent 2-year survival (adjusted hazard ratio 1.02, 95% CI 0.57-1.84, p=0.95).

**Conclusion**: Transplanting lung allografts that underwent static EVLP at centralized facilities had similar outcomes compared to transplanting lungs perfused at individual transplant centers. The centralized model of clinical EVLP can potentially improve access to EVLP.




**Survival after lung transplant using lung allograft perfused with static EVLP, stratified by where static EVLP was performed in the (A) unmatched cohort and (B) 1:1 propensity matched cohort.**




**Regional variations in the utilization of centralized EVLP facilities**

## Reviewer's Comments

- Centralized EVLP is increasingly used especially by centers less experienced with this technology.
- Compared to individual transplant center EVLP facilities, those in centralized facilities had longer graft preservation time, ex-vivo perfusion time and total graft ischemic time, but had similar outcomes, supporting the expanding use of these centers

## Limitations

- The exact mode of ex-vivo perfusion was not directly available in the UNOS registry.
- The authors could not determine the intended reason for EVLP.
- Grade 3 primary graft dysfunction could not be determined due to missing PaO2/FiO2 and radiographical data.
- Donor allograft discard rate could not be determined.
- There was no information regarding the physiological function of donor lungs after EVLP prior to transplantation.

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Panagiotis Tasoudis, MD
University of North Carolina, USA

Aurelie Merlo, MD
GUEST EDITOR

ISHLT.ORG

# Clinical outcomes among cardiogenic shock patients supported with high-capacity Impella axial flow pumps: A report from the Cardiogenic Shock Working Group

Fried J, et al. *JHLT* 2024. | doi.org/10.1016/j.healun.2024.05.015

## Study Highlights

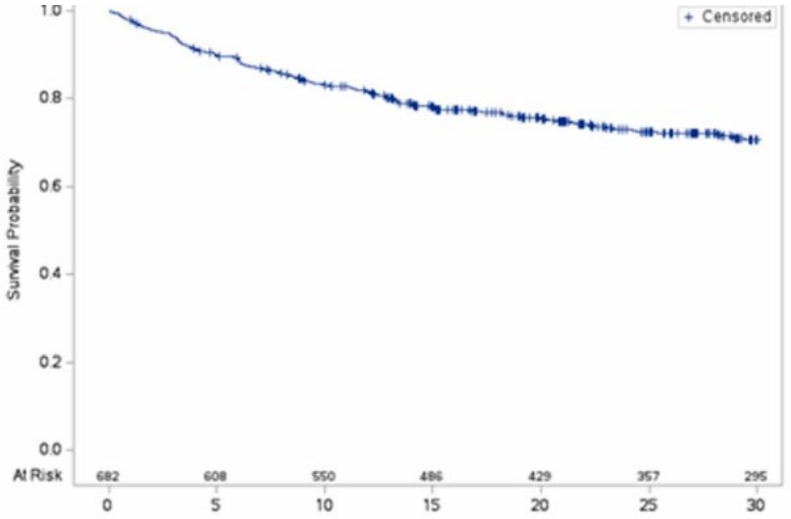
**Objective**: To examine the clinical profiles and outcomes of patients in a contemporary, real-world cardiogenic shock registry of patients who received an Impella 5.0/5.5 alone or in combination with other temporary mechanical circulatory support (tMCS) devices.

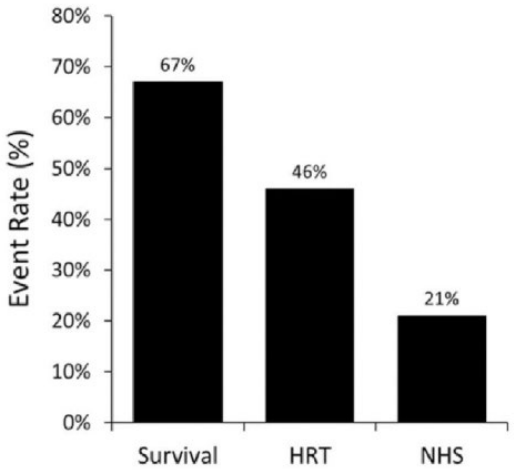
**Methods:** Patients from 34 hospitals in the United States who are part of the Cardiogenic Shock Working Group who received an Impella 5.0/5.5 between 2020–2023 were included. Use of Impella 5.0/5.5 with or without additional temporary mechanical circulatory support therapies therapies, duration of support, adverse events and outcomes at hospital discharge were studied. For those who survived, rates of native heart recovery (NHR) or heart replacement therapy (HRT) were recorded. Results were stratified by shock etiology (acute myocardial infarction or MI-CS vs. heart failure-related CS or HF-CS).

**Results**: The study sample included 754 patients who received an Impella 5.0/5.5, 210 of which had MI-CS (27.8%) and 484 had HF-CS (64.1%). Impella 5.0/5.5 was used as the sole tMCS device in 32% of patients, while 68% of patients received a combination of tMCS devices. Survival to hospital discharge for those supported with an Impella 5.0/5.5 was 67%, with 20.4% NHR and 45.5% HRT. Patients with MI-CS had higher in-hospital mortality when compared to HF-CS (45.2% vs 26.2%, p <0.001) and were less likely to receive HRT (22.4% vs 56.6%, p <0.001.) For patients receiving a combination of tMCS during hospitalization, this was associated with higher rates of limb ischemia (9% vs. 3%, p <0.01), bleeding (52% vs 33%, p <0.01), and mortality (38% vs 25%; p <0.001). Among Impella 5.0/5.5 recipients, the median duration of pump support was 12.9 days (IQR: 6.8–22.9).

**Conclusion**: In a multi-center cohort, using Impella 5.0/5.5 for cardiogenic shock (CS) yielded a 67.1% survival rate with fewer adverse events when used as the sole support, suggesting potential benefits of early intervention.

## Overall survival to hospital discharge




## Reviewer's Comments

- This is an interesting and valuable real world study describing outcomes after Impella insertion in a large group of patients
- Improved outcomes in patients who only received Impella may suggest Impella first strategy can be beneficial for patients or may suggest this is a separate subgroup of patients
- Outcomes are worse with MI-CS both with Impella but also as they are less likely to be bridge to transplant, which is likely multifactorial

## Limitations

- Specific treatment algorithm for shock were not used resulting in significant heterogeneity across centers
- Lack of temporal data to better understand the relationship between device insertion and adverse events
- Impella 5.0 and 5.5 were combined for the analysis
- Adverse events were assigned by treating clinicians, with standardized definitions applied only in later registry versions.
- Adverse events relate to the entire CS hospitalization, not specific to Impella