

One-year clinical outcomes of an observational study of static lung preservation at 10° centigrade and semi-elective lung transplantation

Bobba CM, Saha B, Stukov Y, Kugler L, et al. *JHLT Open* 2025 Aug(9): 100241 | DOI: [10.1016/j.jhlto.2025.100241](https://doi.org/10.1016/j.jhlto.2025.100241)

Study Highlights

Objective: To evaluate the safety, semi-elective clinical integration and one-year clinical outcomes associated with static preservation at 10°C compared with conventional preservation practice.

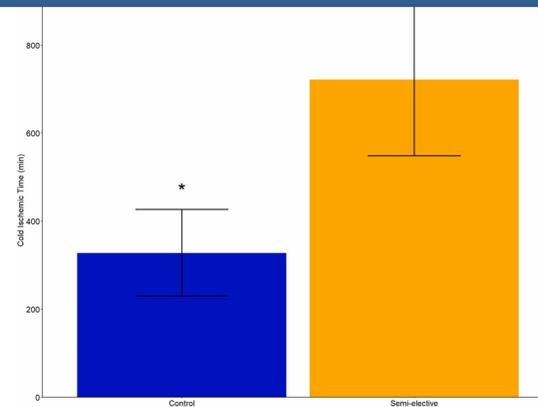
Methods:

- Prospective, non-randomized, open-label single-center study
- 2:1 propensity matching based on lung allocation score (LAS): 15 semi-elective (SE) recipients vs 30 matched controls.
- The maximum cross-clamp-to-anesthesia time allowed was 12 hours.
- Primary outcome: primary graft dysfunction (PGD) grade 3 at 72 hours after transplantation.

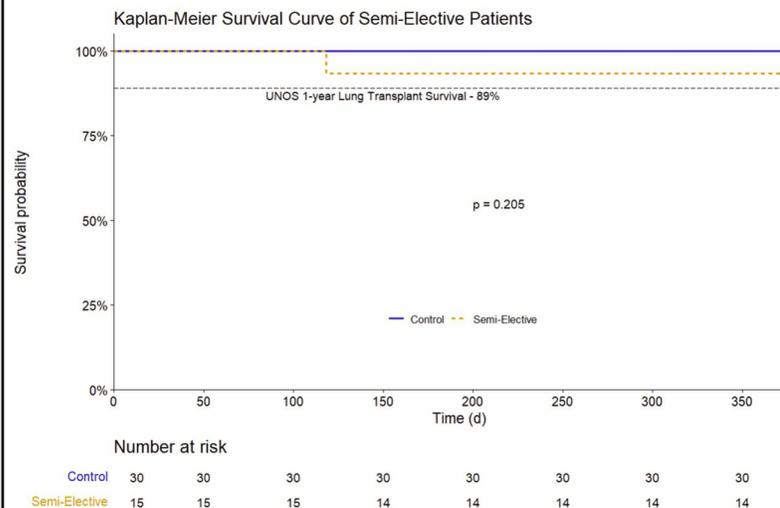
Results:

- PGD grade 3 at 72 hours was similar: 26.7% in SE recipients vs. 24.1% in controls (p 0.999).
- The SE cohort was high acuity: inpatient status 73.3% vs 63.3%, LAS 59.7 vs 62.5, preoperative ECMO 13.3% vs 16.7%, HFNC use 60.0% vs 46.7% and intra-op plasmapheresis desensitization 40% vs 20%.
- No significant between-group differences in postoperative ventilation (40.0% vs 26.7%), ECMO support (40.0% vs 36.7%), ICU LOS (20 vs 29 days), hospital LOS (55 vs 32 days), 30-day mortality (0), 30-day readmission (28.6% vs 16.7%), 1-year survival (93.3% vs 100%), acute rejection requiring treatment (33.3% vs 26.7%), renal failure (6.7% vs 3.3%) and re-exploration (33.3% vs 16.7%).

Conclusions: The SE approach to lung transplantation appears safe, with peri-transplant, short-term, and one-year outcomes comparable to standard emergent transplantation, even in higher-acuity patients.



Average cold ischemic time for each group. Bar demonstrates mean with error bars expressing standard deviation. * p<0.05.



Kaplan-Meier plot of 1-year survival for control and semi-elective cohorts.

Reviewer's Comments

- This is a pragmatic study showing that SE scheduling can be implemented in practice by using preservation at 10°C.
- The recipient population was relatively ill before transplant, so stable outcomes are clinically meaningful.
- The main operational trade-off was much longer left-lung ischemic time in the semi-elective arm (722 vs 318 minutes), yet no clear penalty appeared in short-term outcomes.
- These data support the idea that selected overnight donor procurements may be shifted into a more organized daytime transplant workflow.
- Wider adoption may improve procedural safety, expand the donor reach and pool, reduce costs, and warrants confirmation in future randomized non-inferiority studies

Limitations

- Single-center, non-randomized observational design, small number of patients and lack of power analysis means the results are best interpreted as "proof of concept".
- Controls were matched by LAS rather than a broader multivariable clinical model.
- Lungs were transported on ice before 10°C storage, so the study did not assess continuous end-to-end 10°C preservation. As a result, prior ice transport time may have reduced the observed benefit of this approach.
- As all transplant procedures were performed with intraoperative ECMO support, these findings should be interpreted with caution in centres where ECMO is not routinely used.
- The authors explicitly caution against causal inference and call for larger randomized trials.

Differential outcomes of ISHLT PGD 3 after ex-vivo lung perfusion compared to PGD 3 after direct transplantation

Benazzo A, Peel J, Mariscal A, Yeung J, Aversa M, Keshavjee S, Cypel M. *JHLT* 2026 Jan; 45, 59-68. | DOI: [10.1016/j.healun.2025.08.002](https://doi.org/10.1016/j.healun.2025.08.002)

Study Highlights

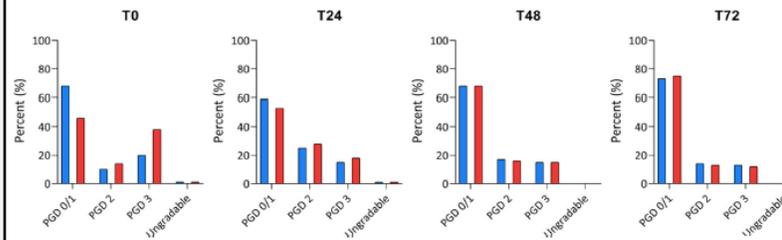
Background: Ex vivo lung perfusion (EVLP) has allowed for expansion in donor pool; however, the risk of Primary Graft Dysfunction grade 3 (PGD 3), adverse short- & long-term outcomes, costs of lung transplantation (LTx) are not well understood.

Objective: To assess the risks of early and late adverse outcomes in patients who develop PGD 3 with EVLP LTx vs Standard LTx.

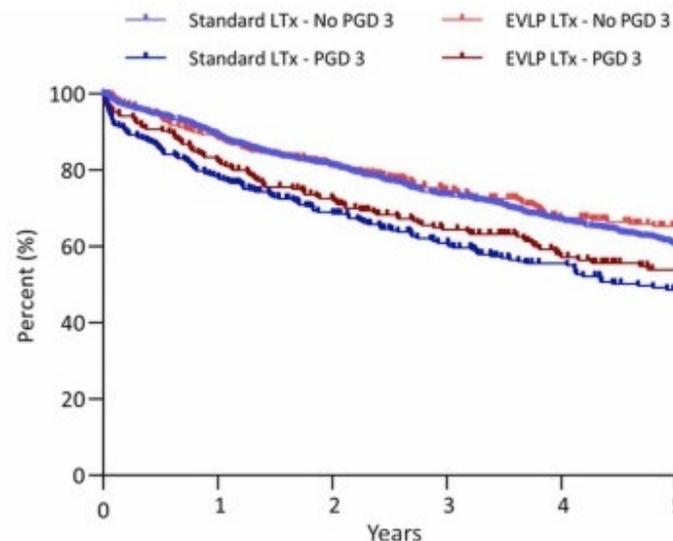
Methods: Retrospective single center study including patients who received LTx between 2008-2021 at the Toronto Lung Transplant program. Primary end point was 90 day mortality. Secondary end points included length of mechanical ventilation (MV), Intensive Care Unit (ICU) length of stay (LOS), hospital LOS, 1 year mortality, total hospital costs and others.

Results: 1871 patients with 538 LTx after EVLP. Incidence of PGD 3 on ICU admission was higher in EVLP LTx group compared to the standard LTx group (38.1% vs 20.8%, $p < 0.001$). However, at 48 and 72 hours there was no significant difference in PGD grades between the two groups (Fig 1). Among patients with PGD 3, EVLP LTx group had shorter median length of MV, ICU LOS, hospital LOS, lower 90 day mortality (6% vs 11%, $p=0.078$), similar long term outcomes- 1 year mortality (18% vs 22%, $p=0.244$) and 5 year survival (50% vs 44%, $p=0.515$), and lower total hospital cost for LTx (\$123,693 vs \$176,432, $p=0.007$)

Conclusions: Although EVLP LTx group had higher incidence of PGD 3 at ICU admission, there was faster resolution and comparable rates of PGD 3 at 72 hours. In this cohort, among patients with PGD 3, EVLP LTx had shorter time on MV, shorter ICU and hospital LOS, similar long term survival outcomes and lower total hospital cost for LTx.



Incidence of PGD 3 at 0, 24, 48 and 72 hours post LTx



Kaplan Meir curve showing survival based on EVLP status and PGD 3 on ICU admission

Reviewer's Comments

- First single center study in a large cohort comparing several adverse short & long term outcomes and costs with EVLP LTx vs Standard LTx.
- Study shows that PGD 3 in EVLP LTx often resolves quickly and may overestimate adverse outcomes. The study challenges conventional interpretation of PGD 3 in this subgroup and invites consideration of an alternate underlying pathophysiology that pertains to factors inherent to the acellular perfusate as opposed to intrinsic graft damage.
- Study challenges prevailing concern of financial burden associated with EVLP LTx.

Limitations

- Retrospective study with possibility for missed data or incorrect coding.
- Although inverse probability of treatment weighting was used to balance confounders, unmeasured confounders and their interaction with included variables and residual bias could persist in this observational setup
- Single centre study with limited generalizability to other programs with different protocols, population and resources.
- Long study period introduces time bias.

**Escalation of mechanical circulatory support in patients with STEMI-related cardiogenic shock:
 A post hoc analysis of the DanGer Shock trial**

Schrage B, Beske RP, Hassager C, Jensen LO, Eiskjaer H, et al. *EHI Acute Cardiovascular Care* 2026; zuag015. | DOI: [10.1093/ehjacc/zuag015](https://doi.org/10.1093/ehjacc/zuag015)

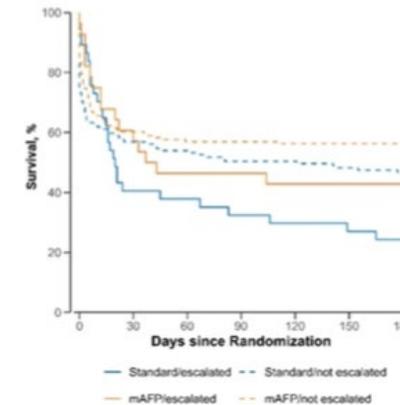
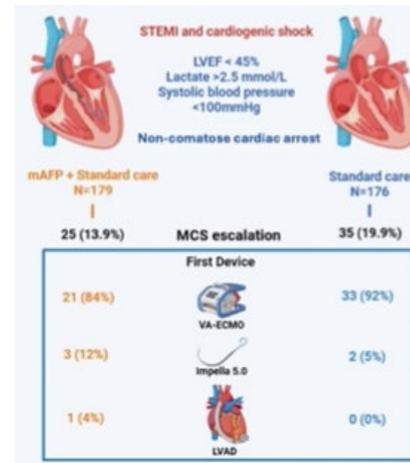
Study Highlights

Objective: In STEMI-related cardiogenic shock, the DanGer Shock trial showed an improved survival with micro-axial flow pumps (mAFPs). Some patients in both groups were escalated to additional temporary mechanical support (tMCS). This study uses a post-hoc analysis to investigate which patients were escalated to tMCS (VA ECMO, Impella 5.0, LVAD) vs not escalated and their respective 180-day all cause mortality.

Methods: All 355 patients were included in the post hoc analysis. Patients were stratified as “escalated” to tMCS vs “not escalated”. Elective LVADs (n=14) and cross-over from control to mAFP implantation was not considered an “escalation” (in accordance with the main trial). Statistical methods were used to investigate predictors of tMCS escalation and Kaplan-Meier method used to assess the primary end-point.

Results: 60/355 patients (17%) were escalated to tMCS (25 (14%) in the mAFP arm and 35 (20%) of the control group). 54/60 (90%) were escalated to VA-ECMO, 5 (8.3%) to Impella 5.0 and 1 (1.7%) to emergency LVAD. Escalation was more likely to occur in younger, male patients with Left Main culprit lesion and a lower presenting LVEF. Randomization to the mAFP group significantly reduced the likelihood of being escalated. 180-day all-cause mortality for all patients was 52.1%. Escalated patients had a significantly higher mortality than non-escalated patients (71.7% vs 48.1%, p<0.01). Mortality was highest in patients from the escalated control arm (80%), and lowest in the non-escalated mAFP arm (43.5 %).

Conclusions: Escalation to tMCS occurred in almost 1/5 patients, was more likely in the control group, and was associated with a higher mortality. Even with early escalation (<1 h), patients in the control group had the highest mortality.



Temporary mechanical circulatory support escalation occurred in 17% of patients which was associated with a high mortality especially in the control group.

Reviewer's Comments

- A thoughtful and relevant *post hoc* analysis that continues to highlight several important points about STEMI-mediated cardiogenic shock: that escalation to tMCS was a common intervention in both arms of the DanGer Shock trial.
- As mortality was significantly higher in the escalated control group, this raises questions about whether mAFP should be used in all STEMIs with SCAI C+ cardiogenic shock, and in a timely manner.
- Understanding the physiological challenges experienced by the 1 in 7 mAFP patients that required escalation to additional tMCS would help guide future decision-making regarding escalation.
- Further multi-national trials are needed to support the work of Shock Teams around the world.

Limitations

- Given the retrospective *post hoc* nature of this study, there are definitely unknown and unmeasured confounders.
- The reason for escalation was not captured and limits reproducibility.
- Only 3 countries (Denmark, Germany and 1 hospital in the UK) were involved, significantly limiting external validity.
- Data was collected over 10 years and didn't account for evolving practice.
- Caution must therefore be used when interpreting these results.

A randomized trial of open lung protective ventilation compared to conventional mechanical ventilation in deceased organ donors

Ware LB, Koyama T, Shaver CM, Swain S, Nguyen J, Saleh A, et al. *JHLT* 2025 Aug; 44(8):1251-1259. | DOI: [10.1016/j.healun.2025.03.027](https://doi.org/10.1016/j.healun.2025.03.027)

Study Highlights

Objective: To evaluate whether an open lung protective ventilation (OLPV) strategy improves donor lung utilization compared with conventional ventilation (CV) in deceased organ donors with neurologically determined death.

Methods: Prospective multicenter randomized controlled trial conducted across 175 hospitals within a single organ procurement organization. Deceased brain-dead organ donors were randomized to protocolized OLPV—low tidal volume ventilation (8 mL/kg predicted body weight), higher fixed PEEP, and recruitment maneuvers—or conventional ventilation (10 mL/kg predicted body weight) with lower PEEP and recruitment maneuvers only after ventilator disconnection or bronchoscopy for the duration of donor management. The primary outcome was donor lung utilization for transplantation.

Results: Study was terminated early as organ procurement service changed usual care conventional protocol. A total of 174 donors were randomized; 153 were included in the modified intention-to-treat analysis (OLPV n=74, CV n=79). The OLPV group had significantly lower tidal volumes and driving pressures compared with the CV group. Donor lung utilization rates were similar between groups (23% vs 22%, p=0.85), with no significant differences observed in secondary outcomes.

Conclusions: Among deceased brain-dead organ donors, an OLPV strategy did not increase donor lung utilization compared with conventional ventilation.

Table 2 Protocol Compliance, and Ventilator Settings After Randomization

	Open lung protective ventilation (N = 74)	Conventional ventilation (N = 79)	p value
Randomization to Vent Change (Minutes)			<0.001
Missing	1	1	
Median (Q1, Q3)	24 (0, 48)	0 (0, 0)	
Randomization to OR (Hours)			0.20
Missing	4	6	
Median (Q1, Q3)	51 (41, 69)	49 (37, 65)	
Recruitment Maneuvers Per Day			<0.001
Missing	4	6	
Median (Q1, Q3)	4.1 (3.5, 4.8)	2.5 (1.0, 3.2)	
PEEP			<0.001
Missing	1	1	
5	1 (1%)	77 (99%)	
8	1 (1%)	0 (0%)	
10	71 (97%)	1 (1%)	
Tidal Volume (cc/kg pbw)	8.0 (7.9, 8.6)	10.0 (9.8, 10.1)	<0.001
Driving pressure (cm H ₂ O)			0.008
Missing	26	42	
Mean (95% CI)	10.0 (8.4–11.6)	13.3 (11.5–15.1)	

OR, operating room; PEEP, positive end-expiratory pressure.

Table 3 Primary and Secondary Donor Endpoints by Treatment Group

	Open lung protective ventilation (N = 74)	Conventional ventilation (N = 79)	p value
Lung utilization	17 (23%)	17 (22%)	0.85
Lung utilization (Potential Donors)	14/50 (28%)	14/51 (27%)	1.000
PaO ₂ /FiO ₂ Change ^a			0.72
Missing	4	6	
Median (Q1, Q3)	69 (18,127)	74 (-27, 170)	
Static Compliance Change ^a			0.67
Missing	22	24	
Median (Q1, Q3)	5.4 (-3.8, 11.7)	5.4 (0.0, 12.9)	
RALE Score Change ^a			0.30
Missing	20	18	
Median (Q1, Q3)	0.0 (-5.8, 2.0)	0.0 (-3.0, 4.0)	
Atelectasis Score Change ^a			0.012
Missing	20	18	
Decrease	28 (52%)	16 (26%)	
No change	13 (24%)	17 (28%)	
Increase	13 (24%)	28 (46%)	
Maximum Concurrent Vasopressor			0.98
Missing	4	7	
0	8 (11%)	10 (14%)	
1	26 (37%)	27 (38%)	
2	29 (41%)	28 (39%)	
3	7 (10%)	7 (10%)	
Weight of Both Lungs (g)			0.17
Missing	53	60	
Median (Q1, Q3)	812 (692, 889)	721 (645, 794)	
Kidney Transplanted	66 (89%)	67 (85%)	0.48
Liver Transplanted	60 (81%)	64 (81%)	1.00
Heart Transplanted	31 (42%)	27 (34%)	0.41
Pancreas Transplanted	8 (11%)	4 (5%)	0.24

RALE, radiographic assessment of lung edema.
^aChanges are from randomization to procurement.

Reviewer’s Comments

- Strategies that open collapsed lung units and keep them open with lung-protective ventilation may improve oxygenation, reduce further lung injury, and increase the number of usable donor lungs.
- This well designed trial achieved good separation in recruitment maneuvers (key part of an open lung strategy) and airway driving pressure (strongest mediator of lung injury) performed between groups.
- Despite using this strategy, there was no difference in donor lung utilization.

Limitations

- Early termination led to an underpowered study; protocol changes to conventional ventilation would have reduced generalizability if the trial had continued.
- Although protocol achieved clear separation in lung-protective parameters, external validity may be limited in centers with different ventilatory practices.
- Use of a fixed PEEP strategy may reduce the generalizability of this open lung approach.
- Intervention did not meaningfully change parameters used to assess donor lung suitability (e.g., PaO₂/FiO₂ ratio, respiratory compliance), making differences in utilization rates unlikely.