ISHLT JOURNAL WATCH
July 2022 | PVD + Critical Care

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Association Between Handover of Anesthesiology Care and 1-Year Mortality Among Adults Undergoing Cardiac Surgery

L Sun et al. JAMA Network Open, February 2022

STUDY HIGHLIGHTS

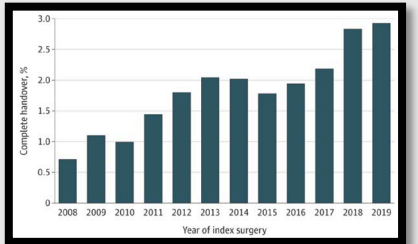
Objective: Complete anesthesia handover or "signing out to the next anesthesia team" is a regular occurrence in adult cardiac surgeries (aCS). The goal of this study was to assess the effects of complete anesthesia handover on patient outcomes

Methods: Retrospective cohort study of 102,156 patients in Ontario undergoing cardiac surgery.

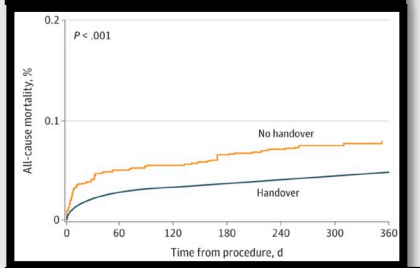
Outcomes:
Co-Primary: 30 day and 1 year post aCS mortality.
Secondary: Length of stay, Patient-defined Adverse Cardiac and non-cardiac events (PACE), defined as any of: Severe stroke resulting in 2 week or longer hospitalization/prolonged inpatient rehabilitation, chronic ventilator dependence, new onset heart failure or dialysis, and/or long-term care admission.

Results: With an analysis using inverse probability of treatment weighting (IPTW), complete anesthesia handover associated w/statistically significant increases in 30-day (4.2% vs 2.0%) & 1 year (8.0% vs. 4.9%) mortality as well as increased hospital/ICU length of stay in aCS. No difference in PACE observed.

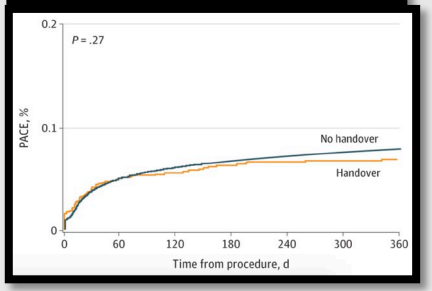
CENTRAL FIGURE



Percentage of aCS with complete anesthesia Handover:



Estimated one year mortality in the IPTW cohort:



Cumulative incidence of PACE in the IPTW cohort:

REVIEWER'S COMMENTS

The largest study examining the effects of complete anesthesia handover in aCS. This study did not examine the LVAD or heart transplant population but given the higher complexity and acuity in these cases, these results would likely apply to that population as well, but further study is needed.

As more literature is published on the effects of anesthesia handovers on outcomes in aCS, institutions should consider undertaking efforts to minimize anesthesia handoffs, as well as standardizing the process to minimize errors.

LIMITATIONS

- Retrospective nature
- Long time period (over 10 years)
- LVAD, heart and lung transplants not included
- Prior to IPTW, there were significant differences in the patient population undergoing handoffs with respect to emergent vs. non-emergent cases as well as case durations (longer cases were more likely to have anesthesia handovers)
- Only 1.9% of cases were identified as having anesthesia handovers: 1,926 of 102,156.

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Avgerinos, E.D., et al. Randomized Trial Comparing Standard Versus Ultrasound-Assisted Thrombolysis for Submassive Pulmonary Embolism: The SUNSET sPE Trial

JACC Cardiovasc Intery 2021; Jun 28 14 (12):1364-1373.

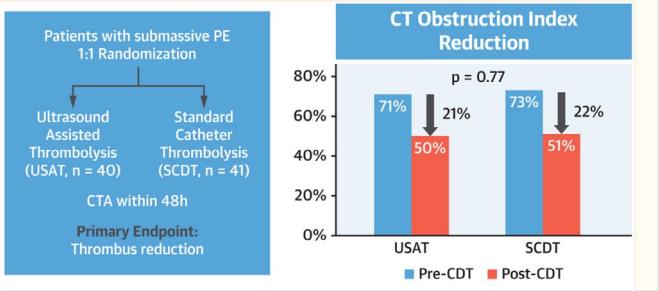
STUDY HIGHLIGHTS

Background: Catheter-directed lysis techniques are increasingly used in patients presenting with submassive pulmonary embolism (PE).

Objective: To determine whether ultrasound-assisted thrombolysis (USAT) is superior to standard catheter-directed thrombolysis (SCDT) using traditional multiple side-hole catheters.

Design: Multi-center, randomized, head-to-head, single-blind trial enrolling patients with acute submassive PE in a 1:1 fashion. The primary outcome was 48-hour clearance of pulmonary thrombus.

Results: 81 patients were randomized. There were no significant differences in reduction of clot burden between the two groups. Reduction in RV size was greater in SCDT group.



Secondary Endpoints:

- 2 patients in the USAT group had major bleeding
- While ICU stay was similar between the two groups, patients in the USAT group had longer hospital stay (7.7 ± 8.7 days compared to 4.6 ± 1.8 days)

REVIEWER'S COMMENT:

- Catheter-directed thrombolytic therapy remains a safe alternative to systemic lytic therapy, with bleeding risk of 2.5% compared to 11.5%
- Use of an ultrasound catheter is much more expensive than standard catheter, and this study suggests that a cost-conscious approach to treating submassive PE.

LIMITATIONS:

- The study was designed to detect an improvement of clot burden by at least 50%, so smaller improvements were not appreciated
- tPA dose and timing was not standardized, allowing Interventionalists to determine when hemodynamic or clinical improvement was achieved
- Enrollment period was relatively long at 4 years, which may have introduced biases into the care of patients with PE

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Lanspa M, et al. Right Ventricular Dysfunction in Early Sepsis and Septic Shock
CHEST 2021; Mar 159 (3):1055-1063.

STUDY HIGHLIGHTS

Background: Cardiac dysfunction in sepsis is common and association with increased mortality. Earlier studies focused primarily on left ventricular (LV) dysfunction. Little is known about the impact of RV dysfunction.

Objective: To evaluate effects of right ventricular (RV) dysfunction on outcomes in sepsis and septic shock using specific echocardiographic measurements of fractional area change (FAC) and tricuspid annular systolic plan excursion (TAPSE).

Design: Secondary analysis of a prospectively identified cohort of ICU patients admitted at an academic tertiary care hospital between Oct 2012 to Nov 2015 for sepsis or septic shock.

Analysis: Echocardiographic assessment of LV (LV ejection fraction <45%) and RV dysfunction (FAC <35% and TAPSE <1.6cm) within 24 hours of admission and relationship to 28-day mortality.

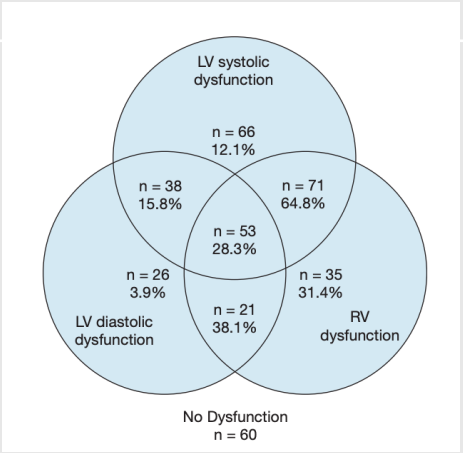

TABLE 3] Multivariable Logistic Regression for 28-Day Mortality (Adjusted for Admission APACHE II Score, Mechanical Ventilation at Time of Echocardiogram, Receipt of Fluid and Vasopressor Dose at Time of Echocardiogram)

Variable	OR	95% CI	P
RV dysfunction	3.37	(1.67-6.78)	.001
LV systolic dysfunction	0.63	(0.32-1.24)	.32
LV diastolic dysfunction	1.26	(0.64-2.50)	.51
APACHE II	1.09	(1.04-1.13)	<.001
Ventilated during echo	0.48	(0.19-1.17)	.11
Pao_2/Fio_2 ratio	1.00	(1.00-1.00)	.29
NEE dose (per 0.01 μg/kg/min increase)	1.02	(1.01-1.04)	.01
Fluid 6 hours before echo, mL	1.00	(1.00-1.00)	.41

RESULTS/COMMENT:

- 1,093 patients screened. 393 patients enrolled
- 38% required vasopressors and 26% required mechanical ventilation.
- RV dysfunction, whether isolated or in combination with LV systolic or diastolic dysfunction, resulted in higher mortality
- While RV free wall strain was significantly associated with mortality, RV strain was not

LIMITATIONS:

- Single center study
- Results limited to authors'' definition of LV and RV dysfunction
- RV tissue doppler not routinely assessed
- Smaller proportion of patients requiring mechanical ventilation compared to other studies, which may affect RV dysfunction

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Inhaled Pulmonary Vasodilator Therapy in Adult Lung Transplant
K Ghadimi et al. JAMA Surgery, January 2022

STUDY HIGHLIGHTS

Objective: To determine the rates of severe primary graft dysfunction (PGD level 3) in lung transplant recipients randomly assigned to inhaled nitric oxide (iNO) or inhaled epoprostenol (iEPO). The study assessed the equivalence of this outcome between the two groups.

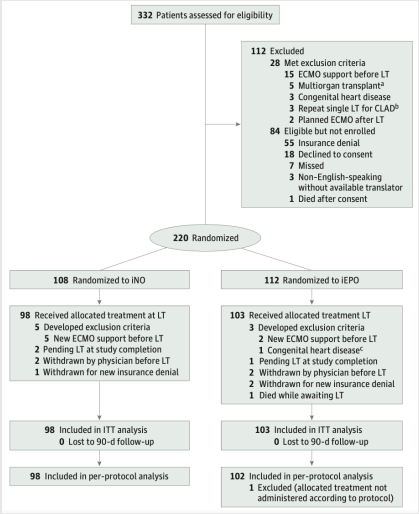
Methods: Prospective randomized trial, 201 single or double lung transplant recipients randomized to either iNO or iEPO after implantation of the first lung during tx surgery.

Outcomes: Primary: Incidence of severe PGD at time points 24, 48 and 72 hours post surgery. Secondary: duration of mechanical ventilation, incidence of tracheostomy and severe AKI, hospital and ICU length of stay, and hospital, 30-, and 90- day mortality.

Results: The primary outcome occurred in 46 of 103 patients (iEPO) and 39 of 98 (iNO). P = 0.02 for equivalence. No significant differences in the secondary outcomes.

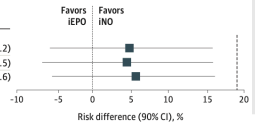
CENTRAL FIGURE

Study Enrollment:



Adjusted and Unadjusted Comparison:

Analysis	iNO No.	iNO Total No.	iEPO No.	iEPO Total No.	RR (90% CI)[a]	RR (95% CI)[a]	Risk difference (90% CI), %[b]
ITT							
Unadjusted	39	98 (39.8)	46	103 (44.7)	0.89 (0.68 to 1.17)	0.89 (0.64 to 1.23)	4.9 (-6.4 to 16.2)
Adjusted[c]					0.94 (0.74 to 1.20)	0.94 (0.70 to 1.26)	4.7 (-7.2 to 16.5)
Per protocol					0.88 (0.67 to 1.16)	0.88 (0.64 to 1.22)	5.3 (-6.0 to 16.6)



REVIEWER'S COMMENTS

By far the largest randomized double-blind study comparing the use of inhaled pulmonary vasodilators in lung transplant recipients.

This study is an important step in the ongoing comparison between inhaled nitric oxide and inhaled epoprostenol in various critically ill patient populations, and contributes to cost containment efforts.

LIMITATIONS

- Medium-size, single center trial
- Patients supported with ECMO pre transplant were excluded, patients with ECMO planned post transplant were excluded
- Powered for equivalence and not non-inferiority
- No placebo arm
- Additional echo, CPEX or electrophysiological data could be included