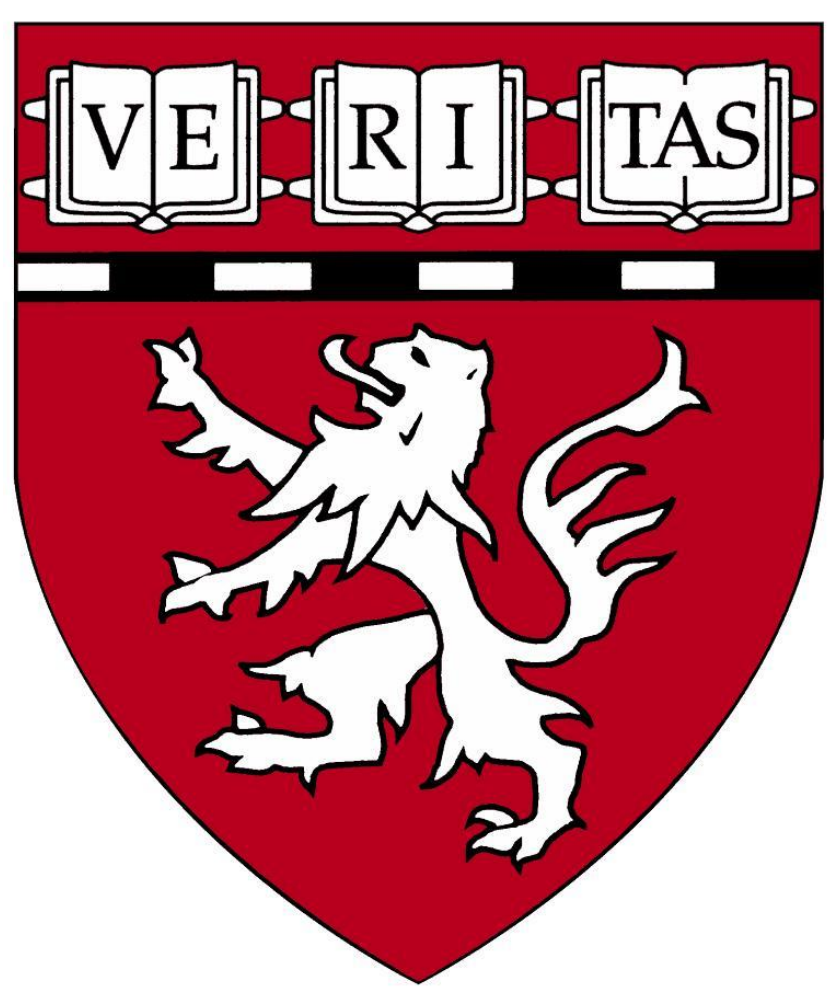




Preoperative Epidural Placement Provides Effective Analgesia without Added Morbidity in Lung Transplantation



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Background

Epidural analgesia provides effective pain control after lung transplantation. Postoperative placement can be delayed due to a poor mental status, coagulopathy, and difficult positioning in intubated patients. Conversely, preoperative epidural safety can be questioned due to the potential need for anticoagulation for ECMO or bypass. We sought to compare pain control and pulmonary and epidural morbidity between patients receiving preoperative versus postoperative epidurals.

Methods

Our institutional database was analyzed to compare postoperative pain control, primary graft dysfunction, adverse pulmonary events, and epidural morbidity in patients receiving a pre or postoperative epidural following lung transplantation. Pain control was measured as an average of all VAS pain scores (0-10) recorded in the first week post-transplant. Pulmonary complications included a composite of pneumonia, prolonged intubation greater than 5 days, and reintubation/tracheostomy. Baseline characteristics and post-transplant outcomes were compared between groups and survival analyzed using a Kaplan Meier method.

Table 1: Baseline Characteristics of Recipients and Donors

Characteristic	Pre-op epidural (n=48)	Post-op epidural (n=26)	p-value
Recipient Age, years	53 ±14.7	52 ±16.0	0.97
Sex, female	17 (35%)	10 (38%)	0.81
Race			0.99
White	46 (96%)	25 (96%)	
Non-white	2 (4%)	1 (4%)	
Indication for Transplant			0.37
Pulmonary Fibrosis	13 (27%)	7 (27%)	
COPD/Emphysema	15 (31%)	7 (27%)	
Cystic Fibrosis	16 (33%)	6 (23%)	
Other	4 (8%)	6 (23%)	
LAS score	44.7 ±12.9	53.1 ±23.7	0.12
Smoking	25 (52%)	13 (50%)	0.99
Diabetes mellitus	19 (40%)	4 (15%)	0.04
BMI			0.95
<18.5	7 (15%)	4 (15%)	
18.5-25	19 (40%)	9 (35%)	
25-30	17 (35%)	11 (42%)	
>30	5 (10%)	2 (8%)	
Creatinine	0.85 ± 0.25	0.83 ±0.26	0.75
Wait time, months	12.8 ± 20.0	9.6 ±11.4	0.93
Ventilator dependent	0 (0%)	5 (19%)	<0.01
ECMO dependent	0 (0%)	4 (15%)	0.01
Donor Age, years	34.6 ±12.6	32.6 ±3.7	0.55
Sex, female	16 (33%)	10 (38%)	0.80
Cause of death			0.33
Anoxia	18 (38%)	13 (50%)	
CVA/Stroke	13 (27%)	4 (15%)	
Trauma	17 (35%)	8 (31%)	
Other	0 (0%)	1 (4%)	
Donation after Circulatory Death	7 (15%)	5 (19%)	0.74
Ex-vivo Lung Perfusion	9 (19%)	2 (8%)	0.31
Ischemic time, hours	6.5 ±1.8	6.4 ±1.9	0.58

DISCLOSURES

• None of the authors have a financial conflict of interest or relationship to disclose.

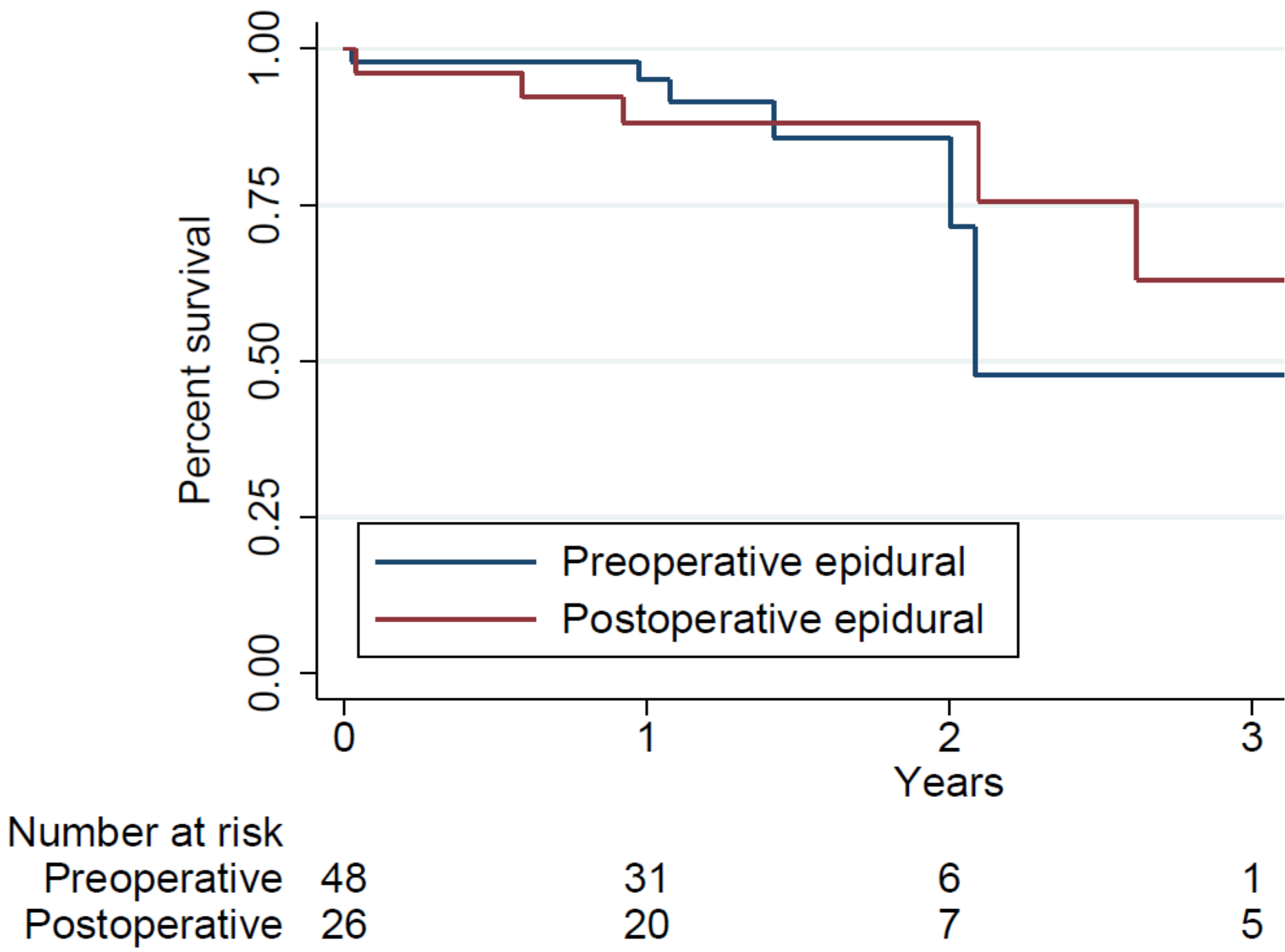
Results

A total of 74 patients were identified, 48 had an epidural placed preoperatively and 26 had an epidural placed within 72 hours post-transplant. Of the postoperative group, 38% had delayed placement by at least 48 hours. There were no significant differences in the rates of CPB (2 vs 4%, p=0.99) or ECMO use (31% vs 50%, p=0.14) and the mean duration of epidural therapy was similar (6.4 vs 5.8 days, p=0.12) for patients who received a preoperative vs postoperative epidural. Post-transplant, there were no significant differences in the mean pain scores (2.0 vs 1.6, p=0.19), length of mechanical ventilation (19.5 vs 24hrs, p=0.18), or rates of adverse pulmonary events (35% vs 53%, p=0.15). Additionally, there was no significant difference in primary graft dysfunction at 72 hours (13% vs 30%, p=0.07). There were no adverse events resulting from epidural placement in either group and one year survival was equivalent (92% vs 87%, p>0.05).

Table 2: Intraoperative Details and Post-Transplant Outcomes

Operative Details	Pre-op epidural (n=48)	Post-op epidural (n=26)	p-value
Bilateral Lung Transplant	47 (98%)	24 (92%)	0.28
Intraoperative CPB	1 (2%)	1 (4%)	0.99
Intraoperative ECMO	15 (31%)	13 (50%)	0.14
Post-Transplant Outcomes			
Epidural duration, days	6.5 ±2.5	5.8 ±1.6	0.12
Mean VAS pain score	2.0 ±1.2	1.6 ±1.3	0.19
Length of mechanical ventilation, hrs	19.5 [11-30]	24 [13-48]	0.18
Pulmonary complications	17 (35%)	14 (53%)	0.15
PGD at 72 hours	6 (13%)	8 (30%)	0.07
PGD 3 at 72 hours	3 (6%)	1 (4%)	0.99
ICU Length of Stay, days	5 [4-10]	7 [5-14]	0.08
Hospital Length of Stay, days	20 [14-32]	19 [14-34]	0.91
Severe Epidural Complications	0 (0%)	0 (0%)	n/a

Figure 1: Overall Post-Transplant Survival



Conclusion

Preoperative epidural placement provides effective analgesia without increased morbidity following lung transplantation. Given the immediate postoperative analgesic benefit, preoperative epidural placement should be considered in appropriate patients.

REFERENCES

- Pottecher J, Falcoz PE, Massard G, Dupeyron JP. Does thoracic epidural analgesia improve outcome after lung transplantation? Interact Cardiovasc Thorac Surg. 2011;12(1):51-3.
- Feltracco P, Barbieri S, Milevoj M, et al. Thoracic epidural analgesia in lung transplantation. Transplant Proc. 2010;42(4):1265-9.
- Cason M, Naik A, Grimm JC, et al. The efficacy and safety of epidural-based analgesia in a case series of patients undergoing lung transplantation. J Cardiothorac Vasc Anesth. 2015;29(1):126-32.