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Commentary: Lung transplant: No support is best

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The optimal intraoperative support for lung transplant remains undetermined. For patients who are able to tolerate single-lung ventilation with no significant pulmonary hypertension, lung transplant (single or double) may be performed without any extracorporeal life support. For patients requiring extracorporeal life support, both cardiopulmonary bypass (CPB) or extracorporeal membrane oxygenation (ECMO) are options. Single-center studies have compared CPB versus ECMO and have demonstrated decreased mortality, blood use, and primary graft dysfunction (PGD) with ECMO support,¹ although other studies have shown excellent outcomes with CPB support.² Other single-center studies have shown decreased PGD in patients supported with intraoperative venoarterial ECMO versus off-pump.³ Overall, the data remain limited by retrospective single-institution studies with no consensus regarding the ideal intraoperative support for lung transplant.

Loor and colleagues⁴ presents a registry analysis evaluating 852 lung transplants from 8 institutions, with 422 (50%) off-pump, 273 (32%) ECMO, and 157 (18%) bypass. The primary end point was PGD grade 3, with a PGD 3 rate of 12.1% with off-pump, 28.9% of ECMO, and 42.7% of patients who received CPB. The data also demonstrated that the off-pump cohort had the lowest mortality, reintubation, tracheostomy, postoperative ECMO requirement, and length of stay. In addition, 1-year survival was 91% for the off-pump group versus 84% in the ECMO group and 84% in the CPB group.

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CENTRAL MESSAGE

A retrospective analysis of institutions with varying intraoperative support suggests off-pump lung transplant has the lowest risk of PGD. Further analyses are required to fully ascertain the truth.

While this study shows a PGD 3 odds ratio of 4.24 in CPB versus off-pump, 2.24 in ECMO versus off-pump, and 1.89 in CPB versus ECMO, there are some factors that should be taken into account. First, the centers all varied with regard to institutional practice, which creates significant selection bias. The rate of CPB use ranged from 0% to 67%, whereas off-pump ranged from 0% to 79% for off-pump use. This may be related to varying surgical approach—some centers used an anterior thoracotomy/clamshell approach, whereas others used a sternotomy (which often requires CPB). Blood transfusion requirement, which is likely greater in the CPB group and can be associated with development of PGD,⁵ was also not measured in this study. In addition, the recipient demographics are very different, with a statistically significant greater rate of obstructive disease, lower mean pulmonary artery pressure, decreased preoperative hospitalization, and no preoperative ECMO use in the off-pump group. Each of those factors can play a role in the development of PGD.

While this study is interesting, the outcomes are still hampered by inherent selection bias. For many of these patients who were placed on ECMO or CPB, the patient may not have been a candidate for off-pump transplant. A subset analysis comparing modes of support and rates of PGD 3 for patients who would tolerate off-pump transplant including those with no significant hypoxia (such as oxygen requirement ≤ 6), no severe pulmonary hypertension, and who are not hospitalized preoperatively would be helpful. Further, prospective evaluation in this patient population

would be ideal. While these data would be helpful for transplant surgeons to decide optimal mode of support, most surgeons would agree that in patients who can tolerate it, no support is best.

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Commentary: Why a routine venoarterial extracorporeal membrane oxygenation support strategy is a good idea in lung transplantation

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CENTRAL MESSAGE

A strategy of routine intraoperative VA ECMO use leads to extremely low rates of primary graft dysfunction and translates into improved survival compared with off-pump concepts.

Loor and colleagues¹ addressed the still controversial issue of intraoperative mechanical circulatory support during lung transplantation (LTx). For this purpose, the authors performed a retrospective analysis of a registry initiated by 10 high-volume transplant centers. We would like to congratulate the authors for their enormous effort to shed further light on this important topic in clinical LTx.

Once more, this multicenter approach confirmed previous reports on the inferiority of cardiopulmonary bypass (CPB) as the primary support device.²⁻⁶ CPB is associated

with a higher risk of postoperative bleeding, a higher risk of severe primary graft dysfunction (PGD), higher risk for renal failure, longer intensive care unit and hospital stays.⁷ Based on this profound body of evidence, it is hardly justifiable anymore to cling onto CPB for mere intraoperative haemodynamic support during LTx.

However, the extracorporeal membrane oxygenation (ECMO) results presented by Loor and colleagues¹ require a closer look. As acknowledged by the authors, this retrospective dataset is quite heterogenous and therefore difficult to interpret. Firstly, the study did not distinguish between routine or selective ECMO use. Secondly, study sites did not apply uniform indications for ECMO. Thirdly, the

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