

Technique of Lung Retrieval and Preservation for EVLP

Specialized Equipment Required for EVLP Lung Recovery

1. 8 liters of LPD (Perfadex® or equivalent)
2. 2 x 1ml amps of Prostaglandin E₁ (alprostadil) (500 µg/mL)
3. 1 amp of CaCl₂ (1 g/10 mL)
4. 1 amp of THAM or Tris (3 mEq/10mL)
5. 1 Foley catheter #20 Fr

LPD Preparation

1. 0.3 mL of concentrated THAM injected into each liter of Perfadex® or 0.3 mL Tris into each liter of LPD
2. 0.6 mL of CaCl₂ injected into each of the 8 liter LPD
3. Prep two syringes: 500 µg Prostaglandin E₁ (alprostadil; PGE₁) diluted with 10 ml normal saline.
4. Add one of the PGE₁ syringes to 4L of prepped LPD.
5. *The LPD is kept on ice in the cooler at 4°C until the lungs are ready to be flushed.*

Back Table Preparation

The plastic bags are set up and 2 liters of LPD are poured in the first bag in a sterile fashion. The 1st bag is then placed in a 2nd empty bag, which is placed in a 3rd bag containing sterile ice slush. *No slush should be placed in the bag containing the lungs.*

Pre-Recovery

Intra-Operative Bronchoscopy: Check airways and clear secretions

Lung recruitment to 25 cmH₂O: Performed by anesthesiologist

Technique of Lung Preservation

In traditional fashion, encircle the SVC with heavy tie or umbilical tape and then administer a bolus of heparin (minimum of 300 u/kg). A 4-0 Prolene purse string suture is then placed in the PA at the midpoint between the pulmonary valve and PA bifurcation; this can be a square (four bites) or a U-stitch if in a hurry or performing a DCD cannulation.

1. The PA is incised with a #11 blade and dilated with a hemostat.
2. The PA cannula is inserted (usually #21 French, for pediatric retrievals evaluate the size of the PA and consider a smaller cannula.

3. The LPD bags are hung 30 cm above the level of the operating table. **DO NOT use a pressure bag.**
4. An additional 500 µg of Prostaglandin E₁ (alprostadil) is diluted with normal saline in a 10 mL syringe.
5. When all teams are ready, inject the Prostaglandin E₁ directly into the PA and wait 10-12 heart beats.
6. The aorta is cross-clamped after the systemic blood pressure starts to decrease, if retrieving the heart, the cardiac surgeon will do this in the ascending aorta and start cardioplegia. If not a cardiac donor, the abdominal team will cross clamp the infradiaphragmatic aorta.
7. After the aorta is cross clamped, first the SVC is ligated, second the IVC is transected, and lastly the left atrial appendage is cut (2 cm orifice).
8. The lungs are flushed with 4 liters of LPD (50-60 mL/kg) containing PGE1. Remember: in very heavy donors (>100 kg) there is usually no need to flush with larger volumes since this is not ideal body weight, if any questions consider the ideal body weight, but usually 4 L of LPD is adequate for all adults. For pediatric retrievals, calculate 60 mL/kg.
9. Continue ventilation until lung explantation using FiO₂ of 50%, PEEP of 5 cmH₂O, and V_T of 10 mL/kg.
10. The heart is then excised. If EVLP is planned, please communicate with heart procurement team to leave as much as possible main pulmonary artery cuff and left atrium cuff for EVLP cannulation.
11. The flush tubing is disconnected from the PA cannula and then connected to the Foley catheter.
12. The foley catheter balloon is inflated to 4-5 mL in order to be used to occlude each of the pulmonary veins during the retrograde flush.
13. 1 liter of LPD is hung, as before, 30 cm above the level of the operating room table.
14. A retrograde flush with 250 mL of LPD is run into each of the four pulmonary veins sequentially using a foley catheter attached to flush tubing, while lung ventilation continues.
15. The lung bloc is then dissected.
16. Prior to stapling the trachea, the lungs are recruited with a sustained airway pressure of 15-20 cmH₂O and a FiO₂ of 50% (do NOT over inflate). The lungs should be approximately 60-70% inflated and should not be tense. Before stapling, make sure to examine the lungs one last time, especially the lower lobes to make sure all atelectatic areas are recruited.
17. Reload the stapling device, staple the trachea more proximally a second time and transect between the two staple lines. The trachea should be transected as close to the larynx as possible, leaving as much trachea above the carina for EVLP cannulation.
18. The lung bloc is removed and placed in the plastic bag floating in the 2 liters of LPD on the back table.
19. The preservation bags are tied, the lungs are placed into the cooler or shipper surrounded by ice. *Do not place the lungs in direct contact with ice.*

Questions? Call 1-844-367-3857