

Submission No.: PG04-5370

Session : Postgraduate Course 4

Date & Time, Place : November 17 (Thu), 10:30-12:00, Room 5F-1

Session Title : Multi-organ recovery video session

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## Lung

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Median sternotomy is the preferred approach for thoracic organ procurement. Extension of the incision cephalad to the thyroid cartilage helps expose the head vessel and trachea. After opening the pericardium, preliminary dissection for cardiac venting and cannulation is to be performed as follows: 1) circumferential dissection of the superior vena cava (SVC) at the proximal azygos vein and encircling a silk suture for ligation; 2) circumferential dissection of the inferior vena cava (IVC); 3) separation of the aorta and pulmonary artery (PA) to allow for cross-clamp application. If the heart is procured, heart and lung procurement teams must discuss and agree on venting strategies and PA cannulation sites. After preliminary dissection of the heart, the bilateral pleura are widely opened below the sternum for assessment of the lung. The lungs are inspected for edema, pleural adhesion, lung atelectasis, or contusion, and palpated for masses. When atelectasis is encountered, gentle sustained Valsalva maneuver and massage can be performed for recruitment. After lung examination, abdominal organ dissection is performed. After all procurement teams are ready for cannulation, 400 U/kg of intravenous heparin is administered for anticoagulation. PA cannulation is placed on the main PA 1.5 cm proximal to its bifurcation under agreement with the heart procurement surgeon. Care should be taken to prevent the cannula tip from entering either the right or left PA. After, all teams completed cannulation, the lung procurement surgeon checks the atelectasis in both lungs and performed recruitment, and 500 mg of prostaglandin E1 (PGE1) is injected through the PA. Next, venting and perfusion are initiated as follows. 1) SVC ligation 2) incision at the LA appendage or the Waterston's interatrial groove 3) IVC partial transection 4) aortic cross-clamp (ACC) 5) perfusion After confirming sufficient venting of the left atrium (LA), lung preservation solution (PERFADEX®, XVIVO Perfusion, Gothenburg, Sweden) is perfused through the PA. A total of 4 L of PERFADEX is administered antegrade until the effluent from LA became clear. An ice slush is placed in the thoracic cavity to lower the temperature. After perfusion, the SVC, IVC, ascending aorta, and main PA are cut. By retracting the apex of the heart, the LA anterior wall can be easily seen and opened; then, through the incision of the LA, the surgeon can see each orifice of the pulmonary veins and excise the LA wall with sufficient LA muscular tissue for LA anastomosis. If the heart is procured, it is recommended that the heart and lung procurement team should discuss and cooperate to preserve a sufficient muscular cuff

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around the opening of the pulmonary veins. Subsequently, retrograde perfusion through the pulmonary veins is performed with a Foley catheter (250–500 ml per vein) until the effluent from the PA became clear. The esophagus is the most important anatomical landmark for en bloc resection of the lungs and trachea. From the diaphragm and thoracic inlet, the esophagus is the dissection plane, which is located just below the pericardium and trachea. After completing retrograde perfusion, the pericardium is resected transversely at the diaphragm level. The esophagus could be easily seen, and the left lung retracted to the right side. The dissection is continued along the anterior wall of the esophagus upward up to the thoracic inlet. During the dissection, the descending aorta is divided. Then, the right lung is retracted to the left side. Dissection is performed at the same plane of the anterior wall of the esophagus. Azygos vein is divided. After dissection, the lung is placed at its natural position. The trachea is then exposed. A hole can be made using a finger below the head vessel (innominate and jugular vein and carotid and subclavian artery) from both sides of the trachea to the apex of both thoracic cavities, and all the mediastinal tissue and the head vessel can be cut easily. Next, the trachea is freely dissected from the esophagus, the lungs are inflated moderately, and the trachea is divided using a stapler. The procured lungs are stored in a cold lung preservation solution, enveloped in an ice box filled with ice, and then transported to the transplant hospital.