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Session : Postgraduate Course 2 (Organ recovery)

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Session Title : Organ Recovery and Bench Procedures in deceased donor transplantation

Organ recovery and bench procedures in deceased donor transplantation [Lung]

Samina Park

Seoul National University, Republic of Korea

Transplant surgeons should share organ procurement responsibilities among surgeons. It results in increased donor organ usage and efficiency in human resource allocation. However, organ procurement is assigned to a junior member of the team, in general. It impacts the outcome due to the learning curve. Herein, the standard process and tips of thoracic organ procurement will be discussed.

After median sternotomy, the pleural spaces are bilaterally opened carefully to avoid burn injury to the lungs. It is mandatory to conduct an accurate inspection of the lungs and the pleural cavity for detecting abnormalities. The lungs should be palpated and inspected thoroughly to detect abnormal nodules, atelectasis and adhesion. Recruitment of collapsed lung is performed by gentle massage under moderate inflation (30cm H₂O pressure). Every suspicious nodule should be biopsied. After tagging of the pericardium, the heart and vessels are inspected for congenital anomaly or atherosclerosis of coronary artery, and contractile dysfunction. The ascending aorta is separated from main and right pulmonary artery. The superior vena cava (SVC) is dissected from the mediastinal attachment up to the origin of the innominate vein and it is encircled with a heavy silk suture. At this point, dissecting and encircling of the mid-trachea before the preservation results in reducing cold ischemic time. Next, interatrial groove should be dissected carefully. Cannulation suture is placed on main pulmonary artery (when concomitant heart procurement is needed, aorta root cannulation is applied at the same time). During the whole procedure, surgeons should pay attention to limit blood loss and secure hemostasis under stable vital signs. After the dissection of all thoracic organs is completed, the organ preservation and excision is initiated by the administration of heparin. Then, cannulas for cardioplegia and pneumoplegia are placed. Prostaglandin E1 is administered into main pulmonary artery. The SVC is ligated and the left atrium is vented via left atrial auricle or previously dissected interatrial groove. The inferior vena cava (IVC) is partial divided. After that, the ascending aorta can be safely cross-clamped without ventricular distension. Both cardioplegia and pneumoplegia are infused after cross-clamping. Ice slush is placed into pericardial and bilateral pleural cavities for topical cooling. The adequate aortic root pressure and heart distention should be

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continuously monitored for heart recovery. Simultaneously, clearing pneumoplegia from left atrial opening and even distribution to both lungs should be assured. After completion of organ preservation infusions, the apex of the heart is elevated and the transection of the IVC is completed. The cardiectomy starts from the left atrium by extension of the previous left atrial incision toward the base of the atrial auricle without injury to atrioventricular groove. A minimum 1-cm cuff should be retained on the cardiac side for the subsequent heart transplant. Simultaneously, four pulmonary vein orifices should be seen with preservation of sufficient atrial cuff for the lung transplant. The SVC is transected below the previously ligated level. The main pulmonary artery is transected at the level of cannulation site. After the completion of cardiectomy, the retrograde perfusion is performed via each pulmonary vein orifice. Excision of the bilateral lungs starts from dividing the pericardium at the level of the diaphragm. Bilateral inferior pulmonary ligaments are divided. The remaining mediastinal tissues are detached from the spine, esophagus and descending aorta. The endotracheal tube is withdrawn and the trachea is divided with double stapling. At the level of aortic arch mediastinal tissue is divided up to the level of tracheal division. Heart-Lung en bloc procurement requires only three steps: the tracheal stapling SVC and IVC division, and heart-lung en bloc resection from the mediastinum. In this procedure, retrograde pulmonary perfusion is excluded.

Procurement is 50% of the transplant operation and impacts the outcome significantly. Therefore, a systematic road-map should be served to ensure the safe and efficient procurement of thoracic organs for the successful transplantation.