Ex vivo Lung Perfusion Device to Preserve and Assess Donor Lungs Prior to Transplant

Who Might Benefit?

Lung transplantation is a treatment option for a variety of respiratory conditions, including chronic obstructive pulmonary disease, interstitial lung disease, cystic fibrosis, and idiopathic pulmonary hypertension. In Canada, the number of people on the waiting list for a lung transplant has doubled during the last decade, from 150 people to more than 300. Although 180 lung transplants are typically performed annually in Canada, more than 40 patients die each year while on the waiting list for transplantation.

Current Practice

Successful lung transplantation depends on several factors throughout the process of organ donation, from preservation of the lung during transportation to transplantation into the recipient. Once the donor lungs have been removed, they are traditionally preserved by being flushed with a preservative solution and placed on ice; however, the longer the lung is kept on ice, the greater the risk of organ damage due to hypothermia and lack of oxygenated blood circulation. Deterioration of donor lungs can lead to impaired lung function, complications such as primary graft dysfunction, or death. It is estimated that 80% to 85% of donor lungs are unsuitable for transplantation.

Potential Advantages

The warm blood lung-perfusion system improves the condition of donor lungs by maintaining the circulation of oxygen and nutrients to the lung tissue. This system minimizes the organ damage commonly seen with cold storage methods. Continuous monitoring and quality assessment of the lungs can be conducted until transplantation. Compared with cold storage, early trial results have shown improved patient survival at six months and fewer lung-related complications. This technology has the potential to improve the quality of donor lungs. As a result, many lungs that previously would have been rejected for transplantation may be considered suitable. This could increase the number lungs available to patients currently on the waiting list for transplant.

What’s New?

A new portable lung-preservation system uses normothermic (warm) oxygenated blood to keep donor lungs functioning outside the body while they are being transported from donor to recipient. The donor lungs are removed and placed into a perfusion module chamber designed to maintain the warm temperature and humidity. This system provides a constant supply of oxygen and preservation solution that contains packed red blood cells. A wireless monitor allows clinicians to continuously assess the function of the lungs to ensure the organ is viable.