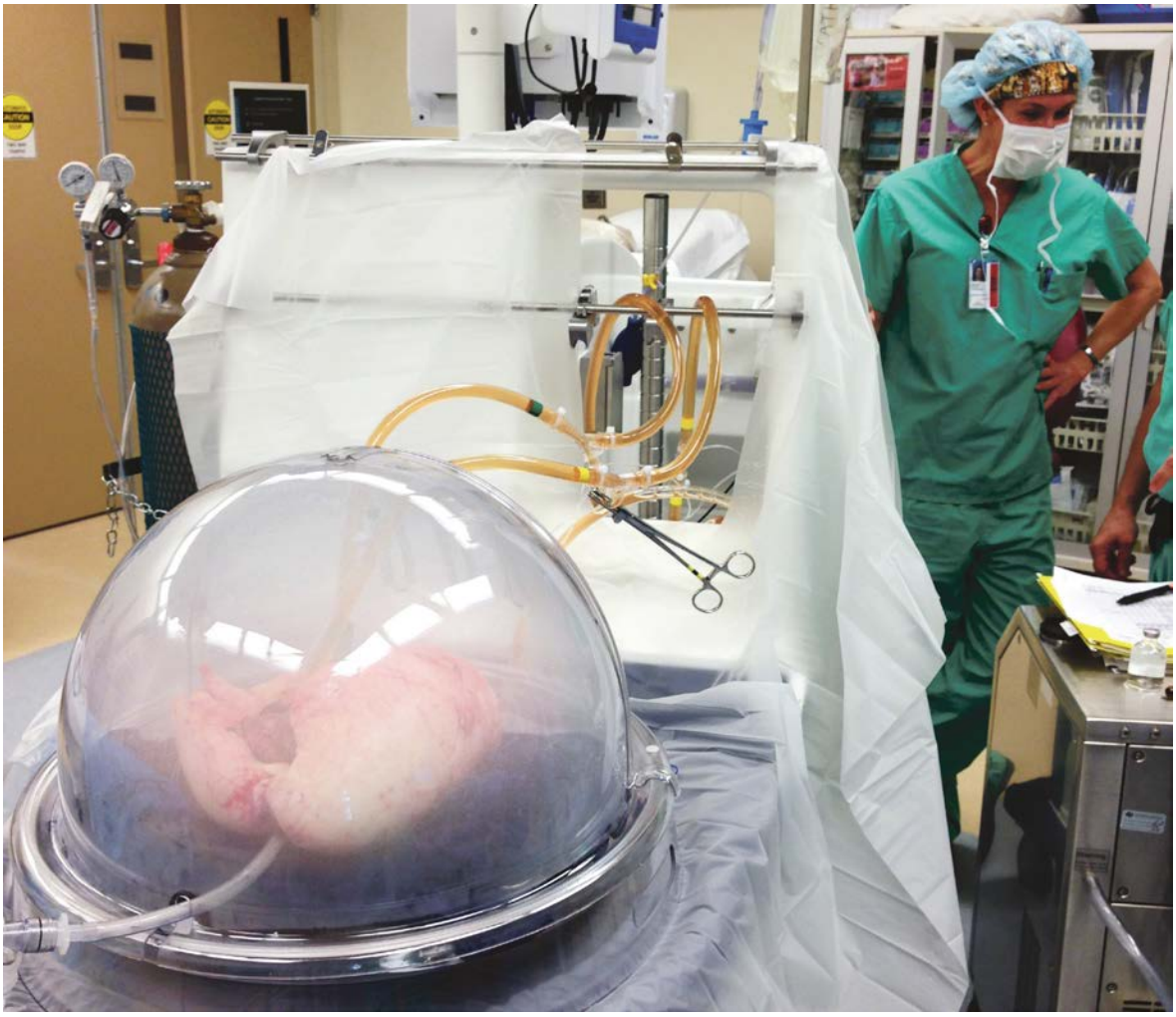
Ex Vivo Lung Perfusion (EVLP) XPS™ with STEEN Solution™

Patient Information



Humanitarian Device. Authorized by Federal law for use in flushing and temporary continuous normothermic machine perfusion of initially unacceptable excised donor lungs during which time the ex-vivo function of the lungs can be reassessed for transplantation. The effectiveness of this device for this use has not been demonstrated.

Rx ONLY - PRESCRIPTION USE ONLY

Caution: Federal law restricts this device to sale by or on the order of a physician.

Introduction

As a part of your upcoming lung transplant, your doctor has elected to use a new XVIVO Perfusion System (XPS™) (pictured on the first page). This medical device will house your lung(s) from the time they are removed from cold preservation solution until it is time to prepare for the transplant procedure and they are implanted in you. Your lungs were considered to be unacceptable for transplantation prior to being placed on the XPS™ System. During their time in the device, the surgical team will have a chance to assess the lungs and make sure that they meet the standards established for being a good lung for use in your transplant. While the donated lung is on the XPS™ System, the doctor is able to gather information on pressures in the lung, how the lung is inflating and deflating, and how well the lung is able to oxygenate. The doctor also has more time to assess the lung and be able to view the lung prior to transplant. The doctor will use the same established standards for determining what is a good lung for transplant as they do now when determining the suitability of a lung in a donor, although the readings obtained from the XPS™ machine during perfusion have not been validated against values obtained from lung donors. Your transplant surgeon will make the final decision as to whether the lung is able to be transplanted.

Talk to your doctor about all available options, including perfusion with the XPS™ System and STEEN Solution™ Perfusate, so you may make an informed choice for your treatment.

The XPS™ with STEEN Solution™ Perfusate device is indicated for use only on excised donor lungs in an *ex vivo* setting. There is no direct patient contact with this device; however, the device has a direct contact with the lungs that are subsequently transplanted into the recipients. The donor lung quality and optimization after preservation has a direct effect on allograft function and survival. The potential for contamination and mechanical trauma, due to the manipulation and cannulation of the lung airway and vascular structures, may lead to complications after transplantation (e.g., infection, pneumonia, pneumothorax/hemothoroax, etc.).

Patients receiving a lung treated with the XPS™ System with STEEN Solution™ Perfusate device may experience adverse events including those experienced with any lung transplant:

- Death;
- Renal failure or dysfunction;
- Respiratory dysfunction/infection;
- Primary graft dysfunction;
- Acute rejection;
- Cardiac arrhythmias;
- Bronchiolitis Obliterans Syndrome (BOS)
- Bronchiole stenosis/Dehiscence

Product Intended Use

The XVIVO Perfusion System (XPS™) with STEEN Solution™ Perfusate is indicated for the flushing and temporary continuous warm machine perfusion of initially unacceptable donor lungs during which time the *ex-vivo* function of the lungs can be reassessed for transplantation.

What does it do?

The STEEN Solution™ used in the XVIVO Perfusion System has been around for about 14 years and has been used in Europe and Canada. The XPS™ system has been used since 2011 and has just been approved under a Humanitarian Device Exemption (HDE) for use in the USA with STEEN Solution™. The system is used to pump STEEN Solution™ through the donated lungs from the time they have been removed from the cold preservation solution, connected to the device and re-warmed until they are cooled down again prior to being implanted in you. The perfusion solution (i.e. STEEN Solution™) is a combination of proteins, sugar, and soluble salts.

Previous Human Experience

The XPS™ System with STEEN Solution™ Perfusate was evaluated in two (2) human studies which compared lungs perfused with warm STEEN Solution™ Perfusate to those preserved using conventional, cold storage without perfusion. One study was called the HELP study and included up to 61 lungs transplanted after perfusion with STEEN Solution™ Perfusate. That study did not include the XPS™ System, but another, equivalent machine and components. The other study was called the NOVEL study and included 31 patients who received lungs perfused with the XPS™ System and STEEN Solution™ Perfusate. In both studies, the lungs chosen to be treated with warm perfusion of STEEN Solution™ were considered non-ideal and unsuitable for transplantation before the preservation procedure. After perfusion, they were re-evaluated and transplanted if they were found to be suitable. Post-transplantation survival was then assessed for patients transplanted with STEEN Solution™-preserved lungs and compared to patients transplanted with lungs preserved with conventional, cold storage without perfusion. For the HELP study, the thirty-day survival rate was 96% for STEEN Solution™-preserved lungs

compared to 97.5% for conventionally preserved lungs, and the one-year survival rate was 83.7% for STEEN Solution™-preserved lungs compared to 85.1% for conventional-preserved lungs. Similarly, for the NOVEL study, the thirty-day survival rate was 97% for STEEN Solution™-preserved lungs compared to 100% for conventionally preserved lungs, and the one-year survival rate was 84% for STEEN Solution™-preserved lungs compared to 94% for conventionally preserved lungs.

Talk to your physician about the use of the XPS™ System and STEEN Solution™ and its previous clinical experience so you may make an informed choice for your treatment.

Advantages

The lungs will be oxygenated during this time and do not need to be transplanted into another body as quickly. This gives:

- More time to prepare you to receive them.
- More time to make sure the lungs meet the acceptability criteria required by your transplanting surgeon before being transplanted. Time to ensure any donor blood is flushed out of the lung.
- Increase in the organ donor pool and the utilization of donor lungs.

Typical Process

Typically, the medical device is used between 2 and 8 hours. The lungs are placed in the disposable organ dome (e.g., the bubble chamber on the front of the machine). The lungs are attached to a Lung Circuit and liquid is pumped through the lungs. The lungs are warmed to normal body temperature (37°C) and the liquid, STEEN Solution™, is pumped through the lungs. The lungs are ventilated and the system allows for the surgeon to do a complete evaluation of the lung while on the machine. The process is done under sterile conditions.

The manipulation required for airway and vascular cannulation carries the potential for contamination, which may lead to infections, and mechanical trauma of the donor lungs.