Artificial Lung
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BME 281 First Presentation, November 3, 2015 <James_baez@my.uri.edu>

Abstract—Being on the transplant list for an organ is very difficult especially for a major organ. The lungs are very important and finding a donor could take so long. The artificial lung could extend the waiting period for someone on the donor list. The artificial lung is not a permanent solution it is a bridge to the solution.

I. INTRODUCTION

People who need a lung transplant need to go on a transplant list and sometime they do not get the lung. Most of the time the technology available is not sufficient to help the people in need. The ECMO (extracorporeal membrane oxygenation) is used today but only works for a certain amount of people. The other methods that I am exploring are better options to the ECMO but are still in the trial area and still need to be approved. The first one is the BIOlungs MC3 and a new microfluidic device.

II. METHODS

There are two types of ECMOs the first one is the “The VA ECMO is connected to both a vein and an artery and is used when there are problems with both the heart and lungs”[1]. The second one is “The VV ECMO is connected to one or more veins, usually near the heart, and is used when the problem is only in the lungs”[1]. An new alternative to the ECMO which has yet to be tested, is “composed of tiny channels molded into biocompatible polymer that is capable of handling high blood flow rates”[2]. According to the developers this new technology is safer than using the ECMO because it mimics closely how the lungs work unlike the ECMO which is clunky and sometimes does not sustain the function of the lungs for long. This new device would insert the same way the ECMO would but would not use the machine portion it instead would use 3-D branching with would decrease blood clotting and it puts the blood and oxygen in closer proximity. Another new option which is still in early testing is the MC3 Bio-lung. This “soda-can-shaped implantable device that uses the heart’s pumping power to move blood through its filters. It’s designed to work alongside a natural lung, exchanging oxygen from the air with carbon dioxide from the bloodstream”[3].

III. RESULTS

There are many risks that come with the ECMO some of them being bleeding due the medication given to patients prevent blood clotting, infections at the sites where the tubes enter the body, increased chance of stroke, and small clots or air bubbles forming in the tubing. Also implementing the ECMO is a surgical producer and the patient needs to be bedridden while hooked to the machine. "ECMO works well for patients who have had respiratory failure because of infections, such as pneumonia, or trauma, such as smoke inhalation. They only need to stay on the machine briefly, until their lungs have healed enough to begin breathing normally."[4]. The newer device that is being made Draper technology has yet to be tested but if successful it can replace the ECMO and work better than it, because it will prevent the blood from clotting and its designed with the way the lungs are formed. The MC3 Bio-lung has gone through animal testing only. The Device was tested on 8 sheep, 5 out of the 8 sheep survived the full 30 days and 3 had to be euthanized before the 30 days “due to bleeding, mechanical graft failure, or gastric distress.”[5].

IV. DISCUSSION

In conclusion in the U.S. there are a lot of people who need lung transplants and most of the time these people do not get the organ. The EMCO is only useful for patients who’s lungs are going to get better and just a need assistance, for the patients that need a transplant it does not work well for them. The new device being developed by Draper Laboratory is promising and seems to be an upgrade from the EMCO we will see the results the test have to offer once they begin. The MC3 Bio-lung is another promising technological advancement due to its ability to portability and it seems like it is on a good track with it’s testing. With all these technological advancements people will have a greater chance being able to get the organ they are waiting for and live a better life.
REFERENCES

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