[MUSIC PLAYING]

ALBERTO POCHETTINO: The outcomes of lung transplant have improved significantly over times, both the fact that medical therapy has been able to delay when transplant is required and when transplant happens, the mortality of the operation is much lower than it used to be, and the survival after lung transplant has improved significantly.

Cystic fibrosis is one of the most common genetically transmitted disease that affects primarily the lung. The lung is affected by repeated infections and eventually that lead to lung failure.

DIANE MEYER: Because Mayo Clinic is a certified cystic fibrosis center, we have several specialists that manage our patients' pre-transplant and post-transplant. Part of the pre-transplant management includes a visit with a certified cystic fibrosis pulmonologist as well as a certified cystic fibrosis nurse.

MARK E. WYLAM: Our three practice sites allow us to be the largest transplant centers in the country. At each of these surgical sites, new surgical techniques pioneered by Dr. Pochettino will allow many of these patients to have a much greater success than they would previously.

ALBERTO POCHETTINO: The traditional way to do lung transplant was through a thoracosternotomy, which was a transverse incision, and sequential removal of the lung, usually one lung first. Take it out, put a new lung in. Then take out the other lung and put it in. It was common, many of the cystic fibrosis patients early after surgery to develop pneumonias in the newly implanted lungs, typically with bacteria from their own flora. The first implanted lung is the one that got the worst pneumonia because it was bathed by all these secretions. The second lung was a little bit more immune because you had cleared up more by that point.

So with the frustration of seeing this, and sometimes those pneumonia ended up in mortality, I came up with the option of changing that approach. And my approach was to use a midline sternotomy instead of a thoracosternotomy and remove both lungs. Of course, when you take both lungs out, you have no lungs. You need a pump to oxygenate for the patient. You can't live with no lungs. So the requirement was to go on a heart-lung machine. You can actually open the airway and clear it of all this junk that all cystic fibrosis patients have as much as you can. While you cannot sterilize the airway, you can certainly clean it sufficiently to minimize the risk of infection. Once that's done, then you can then put in the two lungs, one at a time, and

the risk of infection, the incidence of pneumonia was very low.

The pump allows more efficient operation, avoiding of spillage, especially in cystic fibrosis patient, a smaller incision, where you can then decompress all structure in the chest, especially in the heart and have more space to work without the huge incision, and the additional advantage of a smaller incision is that the pulmonary mechanics, the respiratory mechanics, are such that the patient will recover much faster.

In 2003, I presented the data in an international meaning, and I was asked to defend my approach because it was very revolutionary at the time. There was a lot of people that didn't like what I had to say. But it's interesting that I think about, I would say, one third to half of the program now use that technique across the country, in fact, across the world. In Europe, it's becoming even more popular. Advantages to a sternotomy are that you can apply to more debilitated patients.

MARK E. WYLAM: Many patients are almost too ill for transplant in the setting of cystic fibrosis. For these patients, we have a long history of bringing them into the hospital, resuscitating them from both a nutritional perspective, an infective perspective, and to prepare them for the opportunity for a lung transplant.

DIANE MEYER: Many of our patients have difficulty meeting their basic caloric needs. Many of them are below the required BMI for a double lung transplant. It is imperative that they maintain their calories to help with their strength so they will succeed post-transplant.

MARK E. WYLAM: Mayo Clinic has a Legacy in cystic fibrosis. We've been caring for patients with cystic fibrosis for about 90 years. We've been fortunate to develop several drug studies that are unique to patients with cystic fibrosis. These unique drug studies are available at very few centers.

ALBERTO POCHETTINO: The technology available today has improved and will improve further, the availability of good organs, but the effort has been to improve the number of donor available, but more importantly, to take marginal organs, that are marginal because of what happened to the donor but that donor was otherwise healthy before the event that caused them to die, and improve them.

Ex vivo perfusion would allow to do two things-- to test those lungs, which sometimes are hard to know whether they're good or not, and if they're not good enough but they are likely to be, to improve their function. And that's what the new technology of ex vivo perfusion will allow us

to do, thus improving available organs and improving the total number of transplant that we can do.

MARK E. WYLAM: The life expectancy of cystic fibrosis today approaches 40 years of age, and for many, it's gonna be much greater than that, as those persons born in the last two decades have access to not only the standard cares sponsored by the Cystic Fibrosis Foundation but by the new drugs and the pipeline drugs that are in place. Take that together with the opportunities for lung transplantation, and I think we have a very favorable life expectancy for the future patients with cystic fibrosis.