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Basically, it is replacing the patient's diseased heart, sometimes attached to a mechanical assist device, and replacing it with a donor heart. Patients who have heart failure-- so the ones who in whom we exceeded all the other treatment modes and modalities.

We exhausted-- we reached the maximum of medical therapy.

In other words, so there's no other medical treatment or surgical treatment that we can do to improve that patient's heart.

At that point, we either put them on some external support and put them in the ICU to wait for a heart, or sometimes if they're a lot sicker, we put a mechanical sort of a heart pump, mechanical assist device or a ventricular assist device that we implant inside the patient's chest, and then patients can have an almost normal life until they get better on that device. The procedure that you already have seen and recorded is actually describing the way patient's brought to the operating room, is prepped and sterilely draped.

We get invasive monitoring lines in the neck to check the pressures inside the heart that is used before and after the transplant.

And then we open the chest with sternotomy and give heparin.

We go heart-lung machine and then isolate the recipient's heart.

That's diseased heart.

We put snares and tapes around the vena cava, aorta, and the PA, and we clamp those and then take the old heart out.

And then we try to time this with the recovery team, who's a colleague of mine, who goes out, flies out, or sometimes just have, if it's a local donor, drives to the local hospital.

And that team comes-- we should have the heart in the operating room.

We will try to minimize the time the patient is without a heart on heart-lung machine.

So most of the time the new heart, the donor heart will wait a few minutes.

We don't want much longer until we do this transition.

So we take the new heart.

We prepare it in a way that will match the recipient.

On the back table we say on ice slush and cold solution, and we then bring that closer to a patient's chest, and we start sewing the heart in.

First we start with left atrium. That's how the blood comes into the left heart.

So we suture that.

That's also the deepest part of the transplant, anastomosis, so the deepest in the chest.

So we attach the new heart first on the left atrium, and then we do the inferior vena cava anastomosis.

Then we do the pulmonary artery and then the aorta.

And at that point we take the cross clamp off.

Sort of we let the new heart being perfused, and the heart starts beating, and we finish the superior vena cava anastomosis and complete the part of the inferior vena cava.

So in that way, one beating heart.

That way we save some time.

We don't need to do all the anastomosis when the heart is not beating.

Then we monitor for-- make sure the heart has a good rhythm.

We use medication to support the blood pressure and the rhythm especially.

And if it's a good heart-- and we always try to-- we go through multiple checks and to make sure that it's a perfect heart for every patient, and we shouldn't have any problems.

But as you alluded to earlier, complications can be the heart is not working, and that's called primary graft dysfunction.

And the incidence of that ranges from 5% to 30%. And so that's something that we all worry about.

That happens early on, and we don't have a specific cause for that.

It's not rejection.

It's just the heart doesn't work for-- it could be multiple reasons that could be attributed to that but not a specific reason.

Rejection is also a common cause.

However, in this day and age with immunosuppressive therapy and steroids and other agents like tacrolimus and cyclosporin, the incidence is very low.

In majority of times we catch low-grade rejections by doing the biopsies of the heart.

We do those biopsies the week of the heart surgery from the transplant and then weekly for a couple of months, and then we do less often but still we do it every two weeks, every month, and then once a year at some point.

So rejections are easily treated.

And then there's surgical complications related to transplant with any heart surgery such as small risk of stroke, about 2% risk of that.

Bleeding is always a concern.

Sometimes a trip back to surgery to wash the clot from around the heart.

It's about 3% chance of that.

The kidney failure is also exacerbated by the immunosuppressive treatments.

And also knowing that sometimes patients don't come in because of the weak heart with the best kidney function, and we worry about the kidney failure and requiring dialysis post transplant, although that's very low.

I would say in single digits as well.

And wound infection, any surgery we have a concern about that.

And even though patients have a lower immunity and power to fight infections, the infection rate is not much higher than regular heart surgery in normal patients. The, I think, majority of physicians in the region know how important and precious is heart transplant for patients.

It is the ultimate therapy for heart failure, and it's so far the most successful.

The mechanical assist devices, they still do not reach the level of quality of life and survival that heart transplant has.

I think traditionally that's been the pinnacle of heart-failure treatments, and we try to continue to improve the results and the immunosuppression and the surgical technique that makes this procedure even better.

The ideal would be to have, because it's a limited resource, what is important that everyone in the state should be a donor and to work on increasing awareness for people to, when this tragic events happen, to at least allow life to continue in other people, in other patients.

And often families of the recipients will reach out to donor families after a year. Some of the families become friends for life, and it's very important to make sure that happens.