

**DAWN** I am Dawn Jaroszewski, a Cardiothoracic Surgeon. My specialty is pectus excavatum, or chest wall deformity.

**JAROSZEWSKI:** Pectus excavatum is the most common congenital chest abnormality and it's present in about one out of 300 to 400 Caucasian men.

More common in men, about five to six times more than women and more common than white males, for an unknown reason. A patient that we're going to be seeing today has come a long way, all the way from Peru.

He's got a chest x-ray, which shows the defect severely dropping in, almost touching his spine, the front of his chest. And obviously they have symptom. So symptoms or fatigue, inability to achieve a normal level of exercise performance, he can also have some chest pain. They get heart palpitations.

Some people will have problems with swallowing that they'll complain about or reflux disease. And occasionally we have patients that have just really severe self image issues.

Pectus has been treated for many years and the standard surgery used to be one where they actually open up the skin, take the muscles off the chest, and they would cut pieces out of the bone and either wire part of the chest back together to let it heal.

But Donald Nuss was a surgeon in Virginia for children that developed a procedure where you slide a bar in and you actually put that bar in place to hold the chest out similar to braces. And that's the majority of what we do now today.

All patients get an epidural, or at least that's strongly recommended. And that epidural will stay in the patient for three to four days which pretty well blocks most of the initial pain. We have a full team here at Mayo. It is a cardiothoracic surgical team.

This is what we consider a chest disease. There's complete monitoring. We use a trans esophageal echocardiogram. So the anesthesiologist is watching the heart at all times, making sure we're not having any complications.

We're marking out exactly where the rib spaces are, where the ribs are, and in this young man's case, he's what we call asymmetric, which means one side is a little bit deeper than the other. That gives us an idea of where we're going to be placing the bars, how many bars we need, the shape of the bars, et cetera.

So patients are positioned on their back. We tuck the arms at the sides so that we have plenty of space here to reach. And we began by making incisions on either side right underneath where the pectoralis muscle inserts.

Everything that I do in the chest, we do under visualizations. We do nothing blind. That, for me, is what is safest. We use a little bit of gas. You can see that the white right along there that I'm pointing to is the actual phrenic nerve. So be very careful to avoid that nerve.

But the goal is to get safely across the heart to the other side so that we can pass the bars completely through. This case, we actually put a little hook in pulled up so that while I was dissecting, I could pull that hump out further and do it even safer.

So again we found a space. We have what's called a dissector. It looks like a giant crowbar. And you just, as gently as possible, we're going to pass it through one side, between the ribs. You're going to slide back behind the sternum and it's going to pop back through the ribs on the other side.

And then we're going to use that to actually elevate and pull up the defect and stretch out those ligaments very carefully. So now, instead of being down on top of the heart, you've got a good three, four centimeters that have been pulled up there.

Once that's done, we tie a piece of string that's actually made with stainless steel, it's called fiber wire, we'll tie that to the end of the passer. And I'll pull it back through and we'll use that then as our guide to slide and put the bars in place.

We've bend all of our bars ourself. They come straight. We measure. We figure out exactly what's the right length and exactly what shape we want the bar in to pull the chest up to the exact confirmation.

It's put in kind of in the half moon curve shape. And just as Ness described, we will take it and we'll flip that bar over so that it locks in place and braces and holds that chest up. Pretty substantial bit down below that we've got to get lifted.

And I would say that for a hundred percent of my patients over age 20, and probably 80%, age 15 to 20, we'll put at least two bars. Some patients will get three. I do not use the t-bar fasteners.

I've had a lot of problems with patients having pain. They're big and bulky. I take a piece of this fiber wire, which works wonderfully. It's extremely strong. And we go circumferentially all the way around through the ribs on the inside, around the rib on the outside, and around that bar and we tie it down.

We'll do it on two different places around separate ribs on both bars on each side. When we go to remove this, it just is cut just like any other wire. As you can see the bars, we always pass them in the curved up position to make sure that nothing gets poked, especially the heart.

It's basically just like putting braces on the teeth. So you brace it out. You leave it there. We recommend three to four years to make sure it's going to stay out and then you remove the bars.