

DR. SCOTT

Welcome. I'm Dr. Scott Shikora. And I'm the director for the Center of Metabolic and Bariatric Surgery at Brigham and Women's Hospital in Boston. And I'd like to talk to you today about the robotic sleeve gastrectomy, which is an operation currently being performed to treat morbid obesity and its associated medical diseases.

SHIKORA:

Currently, bariatric surgery is safe and usually results in meaningful and sustainable weight loss that improves a patient's health and well being. There are a number of different operations to choose from. The sleeve gastrectomy is a relatively new operation that is growing in popularity worldwide. And we're going to talk about that procedure.

Additionally, we're going to talk about performing the procedure with the aid of the surgical robot. This little illustration demonstrates that obesity is more than just having a weight problem. It is a major health consequence. And literally, every organ system in the body is adversely affected by being overweight.

Well first of all, let's talk about the criteria for surgery. We don't perform weight loss or bariatric surgery on people just because they're heavy or they want to look better in a bathing suit. They have to have what's considered medically significant obesity. And how that's defined is that they have to have a body mass index of greater than 40, which takes into account one's weight and height. And a body mass index of 40 is generally about 100 pounds overweight.

Or if they have health issues already, as many do, they can have a body mass index of 35 or greater and qualify for surgery. That's about 80 pounds overweight.

Patients who are interested in having surgery should have attempted some weight loss modalities in the past whether it's Jenny Craig, Weight Watchers, working with a dietitian, working with their physician. And they have to be free of significant psychiatric disorders.

Now as I mentioned when I started this presentation, there are a number of operations that a patient can choose from. And traditionally, they had the choice between two-- the laparoscopic adjustable gastric band and the Roux-Y gastric bypass.

Now what about the vertical sleeve gastrectomy or sleeve gastrectomy? As I mentioned, this is a newer operation and very popular worldwide. It involves removing the outer crescent of the stomach leaving behind a stomach that's shaped like a tube or a sleeve. There's no

involvement of the intestine at the time of surgery. Like the band, it's a much safer and simpler operation than the gastric bypass.

Now the sleeve is being performed in increasing amounts throughout the world. Like the other operations, it does require general anesthesia. The surgery takes about an hour. It is performed laparoscopically for the most part worldwide through five or six small incisions. And the hospital stay is generally two to three days.

The results of the sleeve are quite good. Patients are expected to lose somewhere between 50 to 60% of their excess body weight which generally is significantly more than they would have lost with the band and just a little bit less than the gastric bypass. Like the gastric bypass, the sleeve is a very good operation for improving or even putting into remission conditions such as diabetes, high blood pressure, sleep apnea, high cholesterol.

We think that they're going to be very few long term issues with the sleeve. Once it's healed, it's healed. And we don't expect problems to occur down the road.

And the risks of the sleeve are quite low. Like the gastric bypass, there's a risk of leakage, only 1 or 2% of patients, and of narrowing or stricture. Once again, only 1 or 2% of all patients who have the procedure. So a very good low risk profile.

And what about the role of the robot? Well in the past decade, surgical robots have been developed to assist in the operating room. And it involves many components. There is a console where the surgeon sits comfortably and can operate the robot which is over at the patient a distance from where the surgeon is sitting. And the whole thing is played out on an extremely high definition 3-D vision system that makes seeing for the surgeon very, very clear.

What are the benefits of the robot? Well first of all, it's much more comfortable for the surgeon to sit ergonomically at the console. There's better visualization of the organs, which hopefully particularly for complicated cases or redo cases may make the surgery safer. And there's more precise movements. Probably the biggest advantage of the robot are the instruments are built like arms. They have essentially elbows and wrists so they articulate and move in directions that conventional instruments may not be able to match.

So it has the potential to improve surgery. And again, might be even more beneficial to more complicated procedures.

From this picture you can see two instruments and they're sewing. And the one instrument has

a 90 degree bend on it. That's the instrument on the right side. And the left one looks like it's about a 30 degree. And you can control that from the console to make the angles and the movements as precise as they need to be.

I now want to show you a short video of how the operation is performed robotically.

This is a 50-year-old woman who had a body mass index of approximately 45 so she was about 120 pounds overweight. She suffered from severe high blood pressure. She had mild diabetes. She had a lot of back and joint discomfort, high cholesterol.

She was seen in our program. She was evaluated by our psychologist who thought she was a good candidate for surgery. She met several times with the dietitians who thought that she learned and understood the dietary changes quite well. She met with me, the surgeon, twice. We discussed the operation including risks, benefits, expected outcome. I answered all of her questions.

She also attended our new patient session where she learned about all of the operations as well as the program and she chose this one. And at the end of all the evaluation it was the consensus of the program that she was a very good candidate.

Here we are in the operating room. And you can see my two robotic instruments. We're looking at the stomach which is in the center. The red lines on it are blood vessels. And the liver is at 10 o'clock. It's reddish on the background.

Now everything you see that's yellow, that's the fat on the inside of the abdomen. And what we're going to do first is we're going to free up the outer edge of the stomach from the top to the bottom taking off this layer of fat that we call the greater omenta. And we also have to take down all of those blood vessels, hopefully without any bleeding.

So what you can see here is that there are two robotic instruments. Those are the ones at the top. There's a non-robotic instrument that's coming in from the left side bottom. And as you can see, it doesn't articulate. And the instrument that looks like it's doing all the work is called a Harmonic scalpel. It's an energy source for dividing tissue and also sealing blood vessels. So we're starting the process right now of taking down the outer edge of the stomach.

Now I skipped a little bit ahead. And once again, the robotic instruments are holding up the stomach. There was a blood vessel that had a little bit of bleeding that we took care of. This is

really a minimal amount of blood because the image is magnified. And the instrument that's moving from the left side towards the middle, that's the non-robotic instrument from the assistant.

I am controlling the two robotic instruments at top-- top left, top right-- as well as the Harmonic scalpel from my console. And again, to remind you, I'm not over the patient's body at the moment. I'm in the back of the operating room with my head in a console.

And as you can see, we're starting to free up the stomach. We've made progress. We got to go all the way up to the top. But once you get in a nice rhythm, it doesn't take very long. And the entire operation takes about an hour, sometimes even less.

Now if we had a patient that needed to have their operation redone for whatever reason or they had a bypass many years ago and it has dilated or it has a problem, the robot would also be available for that revisional or redo operation.

And again, I want to point out, if you look at that instrument on the left, look how it can bend to make just the right angle necessary to assist the operation. Here's another blood vessel that we just coagulated or closed off with the Harmonic scalpel.

Laparoscopic surgery and robotic surgery is generally quite bloodless compared to open surgery. And once again, the perspective here is that what you're seeing is magnified. So a little bit of blood will look like more than it is. But if you look where we are working, there's essentially no blood.

All right. Well we did fast forward a little bit. And we're now up at the very top of the stomach freeing up those last attachments. And if you look on the upper left, you'll see a round purplely structure. That's the spleen. The area of the omenta that we're currently taking down, there are blood vessels we call short gastrics and we have to be very careful to not let any of these vessels go as we're taking them down and cutting them because we could get into some bleeding. And this just takes a bit of experience and a little patience.

So now we have freed it all the way up to the top. We're coming back down to the other side. We have a little bit more to go to free it up from right to left which is the lower end of the stomach. And then we can work on the sleeve. So as you can see with the robot instruments, once again, can really help expose for us so that we can precisely take down the omental tissue from the edge of the stomach. Bleeding and no injury to the stomach or other organs in

the area. And although it's not well visualized, underneath is the pancreas, another organ that we don't want to injure in the process of doing this procedure.

All right. Well we actually started the sleeve. We put down a thick rubber tube into the mouth into the stomach called a bougie to help us size the sleeve so that we can precisely make the sleeve just as narrow as we need to but not too narrow. What you're seeing now is an instrument called a surgical stapler. What you see now is the stapler has been applied to the stomach and the moving part is a blade that cut and laid down staples at the same time, and what the staples on the seams.

So the piece of stomach on the left is the sleeve as it's forming. And we're holding right there. And if you look below, that's the tube. You can see the instrument pushing it a little bit. The sleeve is going to form on the left side of that ravine.

What I'm doing now is I'm pushing up the tube, the bougie, so I could see exactly where it is. And that's about the width of the sleeve that we want. And as you could just see what happened, I asked the anesthesiologist who's at the head of the table to push it down a little bit more, and you saw it move.

So now we're going to apply the stapling gun probably about five or six times to finish up the separation of the body of the stomach from the sleeve and finish up the operation called the sleeve gastrectomy. We've been working right under the liver, which I'm lifting up now with my robotic instrument.

The sleeve operation is much less complex than the gastric bypass, but it still has to be done precisely. If we make the sleeve too narrow, then food won't pass and patients will have a lot of vomiting and be very unhappy and uncomfortable. And if we make it too wide, it won't be as effective for the ultimate outcome which is weight loss and improvements in health. The tube helps to size it, but it's also uphold it.

And as you can see, we're holding the staple line with the instrument on the left lifting up with the instrument on the right and exposing it so that we can see as clearly as possible. We just have a few more firings to finish this sleeve. The part that we're going to take off of the sleeve, the big part of the stomach we will remove through one of the small incisions we made when we started the operation. We don't leave anything behind.

And again, you can see the white which are the staple lines. The little dashes on them are the

actual staples. A lot of patients ask me about the staples. What are they made of? They're made of titanium. They're quite small. And they're extremely inert. I've never seen a patient have a reaction to these staples. And within a short period of time, the stomach tissue will grow over these staples. So if you go back for an operation at some point later on and the surgeon is looking at your sleeve, it's very hard to see any of these little staples.

And again, we're working from the lower end of the stomach up to the top of the stomach. We're going to come up alongside the esophagus, which is this tube that connects to the stomach. And at that point, the tissue that we're hoping now that you can see on the right will be removed. And you'll see the stapler come back in the abdomen for another firing. That's a surgical sucker which can remove a little bit of fluid or blood from the field.

So we're just looking to see that the stapler is positioned exactly where we want it. We're starting to see the very top of the stomach. It's possible that it will only take one more firing of the stapler after this one to finish the operation. And once again, we want to be very precise in where we position it. So we'll look and we'll look again.

And we won't fire the stapler until we're absolutely convinced we're in the exact right spot. See, we just opened it and moved it again because it wasn't exactly where we wanted it. And now we're firing it.

And as you can see, we just snipped a little bit of what was left holding that piece of stomach and now it's coming out. You can see we're moving it from the field. We'll take another look at the sleeve. We'll look at all of the work we did, make sure we're satisfied with it. You can see I'm pushing it with my left instrument a little bit, lifting it over. We'll take out that bougie tube and get one good look at this. Clean up the area a little bit as I'm doing now with the sucker. And that is pretty much the entire operation.

So I want to conclude by saying that bariatric surgery, all three procedures we perform, are safe and effective. The surgical robot offers an exciting approach to bariatric surgery for operations like the bypass and the sleeve and revisional surgery for those patients who need it. So I hope this lecture was helpful. And with that, I'm going to say thank you very much.