

**MALE SPEAKER:** Hey, guys. So for the second case today, we have a 78-year-old woman with past medical history of gallbladder cancer that was resected in 2002. She was referred to us for progressive dysphagia to both solids and liquids over the past year. The symptoms were associated with regurgitation, occasional chest pain, 23-pound weight loss, and reflux about two to three days a week.

The EGD was done by the primary gastroenterologist, and it showed a puckered EGJ with abnormal contractility. There was no previous treatments done for this patient, and her Eckardt score was 9. And that's dysphagia 3, regurgitation 2, retrosternal chest pain 1, and weight loss of 3.

The esophagram showed a dilated esophagus with tapered EGJ, and that gives her a stage 2 achalasia. The HRM was done, and it showed elevated resting LES pressure with an IRP of 33. There were 0 swallows with normal peristalsis, and 5 swallows with premature contractions, with the distal latency being 4.1. 2 swallows had hypercontractility, and the conclusion was a achalasia type III.

So today, we will see a peroral endoscopic myotomy, a POEM, with a type 3 endoFLIP assessment, type 3 myotomy issues, and we'll show you the anti-reflux POEM technique. Now we'll take it to Dr. Stavropoulos.

**STAVROS** OK. All right, so now-- and now this is too far. This is too far there.

**STAVROPOULOS:**

**FEMALE** Line one. Dr. [INAUDIBLE], line one.

**SPEAKER (OVER INTERCOM):**

**STAVROS** So let's show-- there's a question about showing the Erbe settings. So how about we focus that camera? Yeah.

**STAVROPOULOS:**

So basically, we're going to do, again, DRY CUT and PreciseSECT. And then we could sprinkle some ENDO CUT in there as needed. And maybe even some spray coagulation if needed. So this is what we'll do. PreciseSECT and DRY CUT.

And I said things are a little different. The way it works is a little different on the VIO 300 in terms of the numbers. This is 5.35, 5.6. But basically, you got to look at the equivalent watts, and then you figure out the setting. It's not difficult to transition from the VIO 300 to this one.

So let's look now. Let's look at the situation with this type III. So there are various difficulty status for POEM. Few of them. There's even a difficulty score. And persistently the things that make a POEM difficult are end stage disease, with sigmoidization, bad-- those people also get used to persistent food impaction fibrosis in the submucosa, difficulty [INAUDIBLE].

So the end stage disease is one. And type III, or achalasia or other spastic disorder is another. Because the muscle is thicker. The lumen is very small. And there is this contractility that basically makes it a little difficult to do the dissection.

And then the myotomy, the muscle can be-- especially jackhammer patients, it could be a centimeter and a half. So you are like, cutting a steak. So it can be a bit frustrating. And it makes the procedure challenging.

But these are the two big ones. Of course, prior treatment, especially multiple prior treatments, is another. So anyway. So that's why we picked this type III. Because they also have the issues-- how long to make the myotomy, et cetera.

Now let me show you the endoFLIP. See, unlike a live course where you have to flip rooms, we have the luxury to take our time with these cases. So normally I wouldn't show too much of the endoFLIP. I would show maybe the endoFLIP at the end to save time. But now we're going to show much of everything.

So I'm going to show you the uses of the endoFLIP. So what do I use endoFLIP for? That's one of the-- I gave a POEM lecture last week virtually to the Mexican endoscopy society. So one of the questions was, how useful is the endoFLIP? Like, what are real clinical applications for it?

So this is one. This is a study from Northwestern showing that looking at rapid antigrade contractions and retrograde contractions is a sign for type III that can actually drop manometry. So if you have a manometry that is wishy-washy in terms of type II or type III, you can use the endoFLIP as a tiebreaker.

And this comes up frequently. There was another study that gave tracings of various motility disorders using HRM tracings to 10 experts and looked at their agreement in making the diagnosis. And the type III achalasia had the lowest CAPA value. Maybe one decimal higher than, I think, DS? I can't remember. But it was the next to lowest agreement diagnosis.

So that goes to show you some cases are clear, but some cases, distinguishing type III from type II can be not that straightforward even for experts. So here you can use the endoFLIP as a-- obviously it makes a difference in treatment. Because type III, you have to go longer. Type III can be very short. So it's good to have the ability to use an alternative test to manometry in controversial cases.

So here you see why I'm inflating-- [INAUDIBLE] I'm gonna do a little of-- I'm looking for the retrograde contractions here.

**FEMALE** [INAUDIBLE] all the way up.

**SPEAKER:**

**MALE SPEAKER:** Stop.

**STAVROS** Oh, come on. You're gonna catch me early.

**STAVROPOULOS:**

**FEMALE** I [INAUDIBLE] I was trying.

**SPEAKER:**

**STAVROS** Good job on this. OK. Yeah, we're short on little on the inflation.

**STAVROPOULOS:**

**MALE SPEAKER:** I wish I could show that for the whole time.

**STAVROS** Yeah, no. You've got to show. You've got to show that.

**STAVROPOULOS:**

**MALE SPEAKER:** [INAUDIBLE]

**STAVROS** No, don't take it too far. OK, so I'm going to show you the endoFLIP screen now. Are you getting it?

**STAVROPOULOS:**

**MALE SPEAKER:** Uh-huh.

**STAVROS** Well, actually, I could put it-- I could put it--

**STAVROPOULOS:**

**FEMALE** [INAUDIBLE]

**SPEAKER:**

**STAVROS** I could put it on picture-in-picture. Yeah. OK, so now let's see if we can see-- I don't know, hopefully you see the  
**STAVROPOULOS:**screen.

So basically, you have pressure, again, in color format. So you can see contractions signaled through manometry if they occur. Now this is behaving like a type II patient so far. See, there's a tight sphincter, but nothing much going on there.

There, I just saw some kind of activity. So you can see now we are beginning to get some activity here.

Sometimes you can better do this in a lower inflation of the balloon. You might go to 20 or 12. This is a bit debatable. Some people think you should go higher to stimulate the esophagus like a bolus of food, and get it going. I've found that often, going to say, 20-- too much pressure maybe overwhelms the muscle here. Going lower sometimes, you can precipitate this contraction.

Now you can see that two rings that formed, but not typical. Sometimes also, giving air with the endoscope, insufflating the esophagus like I'm doing now gets it going.

So now you're beginning to get these seesaw contractions back and forth. See, these are rapid antegrade because they go left to right. And now hopefully we'll see some retrograde, too. See, now, these are typical rapid antegrade contraction. So that's what we have here.

Now you begin to get-- I think I begin to get some retrograde here. You see it? Let me take a picture of this. Pause, picture. OK, now these are almost simultaneous contractions. Now it's beginning to look like they're going-- that these are some retrograde here, kind of. Well, you see what I'm talking about.

Now, the other thing you can use the endoFLIP for is to-- well, you can see clearly now a spastic ring that has formed several centimeters up from the LES. So anyway, so that's what we have.

Now we-- with this patient, is difficult to get the distensibility and the strength, there, too, because once you get tighter rings in the esophagus, then the FLIP measures those. So it's a little trickier to do. And then, due to the contraction, there's constantly changing numbers. So it's difficult to get the good distensibility.

Now that's the other thing. What else do we use the endoFLIP for? So you get somebody that had a Heller 20 years ago, did well, now is not doing so well. And you want to know would he benefit from a POEM? You can throw-- trying manometry can be problematic. These people have sigmoid [INAUDIBLE] the manometer get the coils-- even if you placed endoscopically, by the time you move them to the manometry [INAUDIBLE], the [INAUDIBLE] would have flopped backwards.

But you can quickly on the endoscopy put an endoFLIP position on the sphincter and measure the diameter, measure the distensibility, and say, you know what? This guy is a little tight. He would benefit from POEM. So that's another very useful criterion.

Now, for the last 500 POEMs, I've got an endoFLIP measurements before and after our POEM. And I tried to correlate these to subsequent reflux or failure. Mind you, our six-year failures are only 9%. So there's not much failures to have statistical power here. So maybe because of that reason, we haven't been able to get something reliable out of that. We've got a little bit of here and there.

But we-- the idea was you get the statistics to show there is this golden range where if the distensibility's less than 4, you will have dysphagia symptoms. If it's more than 8, you'll have a lot of reflux. And keeping it between 4 and 8, whatever technique or technique valuation you are investigating, you may be able to have the best of both worlds.

But despite 500 pairs of values, we don't have strong-- we have some evidence that works on the aggregate population level, but for each individual patient, the viability is too much to work. But as I said, it's very useful for many other reasons.

So OK, so I did-- I measured the numbers at 30, and then we'll measure them after the POEM too. So I'm going to move the endoFLIP now and get on with the POEM.

Now the second question is what length? Years ago, we were at-- I don't know, I've done a 27-centimeter myotomy or 26, on some type III patients. But I think that's excessive. I think now, I run between 11 and 15 at most. But also for type IIs and type Is, we've gone from 10 to 11 to like, 5 or 6.

So it has been a constant shift over the past five, six years to shorten myotomies. Because it was evident that you don't gain much from a long esophageal body myotomy.

So here we start by measuring things. So the beginning of what we call the high pressure zone is here at 38. 38, the high pressure zone. And then we decide how much of this contractility to ablate.

I don't-- I no longer favor ablating a lot of it. And there's some suggestive evidence in the literature that it doesn't help. So it's ironic-- the one indication where we clearly, by the guidelines of Mavens, are superior together may actually turn out to be a bit bogus. Because a length of over 10 centimeters may actually not make as much of a difference as people think for type III achalasia.

So having said that, it's going to be longer than a type II one. Because you can see this distal spasm can have its own obstructive effect. So the question is how far to go.

So 38 is the beginning of the sphincter. Should we go to about-- this looks kind of open. I'm thinking about-- see that's the pericardium clicking in. The spine here at 6 o'clock. I think that it looks as good a spot as any, after the pericardium a bit.

So I'm at 33 or so. So then, obviously, posterior entry is easy. Now you have to watch about-- you have to watch this vessel, see? It's hard to see, but there's a pink vein running at 5 o'clock right here. It's frustrating because they always show up where you want to enter. So we have to go maybe over it.

See, normally I would go right where this vein is. I'm not sure if it's visible, but right here it runs up and down. These are just under the surface. So if you hit it during entry, it can be extremely frustrating to coagulate it, because the edges are parallel to the mucosa. And the more you burn, the more you expose of them. So they can be frustrating to deal with.

So I might try to go either there to the left of it, or to the-- to the left of it, the spine is there. It's very important to pick a good entry. That makes your life easier tunneling, it prevents tearing, and it makes the closing easier. So it's very, very important to pick a good entry point.

So this is a good possibility. Here, a pericardium and spine kissing each other, and down here, it's funneling in. So this-- we should really cut this, probably. So this the best spot. But it has a vein smack in the middle.

Sometimes it's such a good spot, we just have to deal with a vein. And in this case, I'll say, whatever, we'll have to go through it. If I try to go anteriorly to it, the tunneling is going to be a little more frustrating. If I'm to go posteriorly, the spine is going to be pushing the scope to the right. I really want that spot that the vein is occupying. It's mine, and I'm going to take it, even if I have to do some nasty, unsightly coagulation as I'm trying to enter.

OK, open. Let me-- yeah, but now you have to move the cameras. [INAUDIBLE] because I like it here. OK, oops, oops. So that's about 32 right here. OK.

OK, go. So the blob is very important. If you don't see any translucent blue stuff like this, and you see a pale Caribbean green with white opaque stuff, that means you just tapped a very fibrotic area.

**FEMALE**

Do you want more?

**SPEAKER:**

**STAVROS**

No. So this is nice, blue and translucent. If you see whitish with some green tinge, that's a fibrotic area. So you **STAVROPOULOS:** might as well not even try to get in there, and try the opposite wall or some other wall. But here, it looks nice.

So now, the vein is right there to my right. Now you can see it much more clearly. I'm going to try to see if PreciseSECT is going to help me overcome it. So I'll make a puncture to find the proper depth, and then I start slicing.

And now we're getting to the vein. So I'm going to do a sustained pulse of PreciseSECT. Looks good so far, but let's not celebrate yet. OK, you don't need a big hole. Smaller holes are easier to close. So I'm going to extend it a little bit, but it's surprising how small a hole you need in order to enter.

And then you can-- it's good not to use a lot of knife. Now, that's the vein here. You see it under there? It's got [INAUDIBLE]. So that's why they're so difficult to coagulate. If it starts bleeding from there, it's just annoying.

Now, I'm using PreciseSECT to enter, slowly. So you see here, you should get down to the muscle, almost, and leave all the submucosa on the mucosal side to bolster it so there's no tearing of the submucosal [INAUDIBLE] sides. So you just work at the bottom near the muscle.

And then we're in the tunnel. And now I'm just dissecting with PreciseSECT going down. OK. Little vessels there that I would deal with with a knife.

OK, so this is good, now. We're getting-- I'm at about 38 now. So now things are going to get interesting, because it's going to get tight. So this is the beginning of the sphincter. Now there's a penetrating vessel here. What we do is we isolate it a little. Looks like a vein. It heated up very easily. So just a vein, nothing to worry about, I think.

Again, PreciseSECT does the job. And now-- again, it doesn't matter hitting the muscle. That gives you orientation. You want to see those circular fibers, so you're always perpendicular to them and you don't end up spiraling. Little penetrating vessels.

OK. There is-- some people advocate doing the myotomy simultaneously with the tunneling in the submucosa, like the way we did for the Zenker's, essentially. I don't see the reason, except when you get very close to the sphincter, sometimes I do what I call a pre-cut. So we start cutting the muscle because it's so tight that we cannot get the proper tangential entry into the cardia. So we'll do a little myotomy before completion of the tunnel.

This woman has some oozing, which can also be irritating. Basically, bleeding from places that you have already dissected. That can be frustrating. Especially this diffuse oozing here. I'm not sure why. And I'm using PreciseSECT, which is like a blue [INAUDIBLE] current. So it has enough coagulation.

And she's just having all this random oozing. Don't know why. This is under the mucosa, so we have to be a little more careful.

**FEMALE** [INAUDIBLE] says it alternates automatically between cutting and coagulation.

**SPEAKER:**

**STAVROS** Ah. OK, so usually-- so the high pressure zone was at 38. Usually, I end up with ending the turn of the myotomy  
**STAVROPOULOS:** at 4 to 5 centimeters after the beginning of the high pressure zone, which is 2 to 3 for the sphincter and about 2 for the cardia. OK, what happened now? What happened?

**FEMALE** It just cut itself off.

**SPEAKER:**

**STAVROS** Why?

**STAVROPOULOS:**

**FEMALE** [INAUDIBLE]

**SPEAKER:**

**STAVROS** Well, we jinxed the Erbe. OK, I lost electricity. I lost electricity.

**STAVROPOULOS:**

OK, so now I'm at about 40. So we need to go-- as I said, 38 plus 4 would be 42. 38 plus 5 would be 43. So-- but this woman is losing a lot. I'm not sure what her coags were, or-- f was she on any anticoagulants before?

**MALE SPEAKER:** Yes.

**STAVROS** Eh, she's having off-field oozing from places we already cut with coagulation current, so. OK, yeah, she's losing  
**STAVROPOULOS:** from everywhere, really. I'm considering a switch to spray, because this is an oozer.

OK, we are at 41, 41. So we should need another one centimeter or two to finish the tunnel. OK, and then, so basically, when you get here, you start thinking about the degree of cardiomyotomy, the angles, the sling fibers.

So I'm going to cover this on my lecture, but in 2018, we started doing-- that's immediately after we finished our anterior-posterior randomized trial, which was a bit of a dud, because it didn't show any difference on reflux. That was the main reason for us doing it. 250 randomized patients to anterior-posterior, and the result was similar reflux. The posterior was faster, and had less mucosotomies in the cardia and whatnot, but nothing on reflux.

So then we're like, well, maybe we need to do a little more careful job trying to preserve the sling fibers. So-- and we did so. We did this-- we called it anti-reflux POEM. Because not really so per anterior or posterior. It's trying to preserve the sling fibers, which come off from the left here when you're posterior. We generally stay to the right of them, so we never really encounter them much anymore.

To encounter them, you probably have to go out the 6 o'clock position with your tunnel. If I dissect here, I'm going to find them for you. But I just think that's a little unnecessary. So they come up from the left. I mean, the deeper you go in the stomach, the more likely to encounter them. Because they run from left to right. Hence, oblique, which is their other name.

So if you go far enough-- so it's not just about orientation. It's also about length. So you can follow down. And you can see here, this is the typical circular fibers. So as long as I stay here on the right, I'm OK. But again, if you go deep enough, you'll see them come in front of you. And they will look circular, because once they come in front of you, they take a similar orientation to the circular fibers. So you got to be a little sophisticated about them, and then you have to avoid cutting them.

So here I'm at 41 approaching 42. This might be a good time to stop, because I don't feel any sphincter pressure anymore. I have a wide open cardia. And that makes it-- see, I tried to power myself with PreciseSECT through these vessels. It almost worked. So you have to think that nothing is magic. Even PreciseSECT is not magic. So you can-- and I could use some spray now to try and overcome it.

**FEMALE** You want spray?  
**SPEAKER:**

**STAVROS** So I don't have to put the FORCED down. Now, this is the mucosa, so we have to be more careful.  
**STAVROPOULOS:**

**FEMALE** You want spray?  
**SPEAKER:**

**STAVROS** Yeah. There's a little there. And now we have to get the one on the muscle side, which is down here somewhere  
**STAVROPOULOS:** bleeding. Oh, it's a squirter! So we have to overcome it with a little spray. OK, so that's that for that little squirter. See, these are very small vessels. But there were arteries. So totally different ballgame.

**FEMALE** You want to stay on spray?

**SPEAKER:**

**STAVROS** Yeah-- no. Let's go to PreciseSECT.

**STAVROPOULOS:**

**FEMALE** OK. On Precise.

**SPEAKER:**

**STAVROS** Now I'm not sure if I need to keep going, though. See right now I'm at 42 going to 43. So I think it may be time  
**STAVROPOULOS:** to stop here. We used to just do it based on experience. But now, also because of the study, we put the XP down and take it out. Take our position, take our orientation, our length of the cardia and whatnot.

So I'm at 42 or 43 here. So I'm going to start the myotomy, and then I'm going to check with the XP to see whether I need to do anything further in the cardia. So I'm going to go here where the main sphincter is and dissect it. I guess she's kind of oozing from everywhere, right?

OK, so these are longitudinal fibers, right? And I will do a full thickness myotomy. So we're going to go through them. And there we go. Now give me spray. I'm really tired of the oozing. I'm really tired. She keeps oozing and oozing and oozing. So it's going to be-- we're going to use some spray here. OK, yeah.

Yeah see that? From the initial cuts, it's just oozing. She's oozing from the mucosa, too. I'm injecting to protect it. Going to get this vein here. Yeah, she's got some kind of coagulation issue. Has she had any previous surgery? Huh? Yeah, this is-- maybe she's taking omega 3 and didn't tell us about it.

Yeah, this is a bit frustrating, this oozing. Look at this. OK. OK, we did the sphincter here, which should facilitate putting the XP down. OK, let's put the XP and see what's the situation in the cardia. In the meantime, she's oozing and oozing and oozing. Actually, let me-- give me the forceps. Give me the forceps.

I mean, if you use a spray current to do the tunnel, you're probably going to get less bleeding. The problem is the spray current tends to spread everywhere, no matter how careful you are. You can-- if the mucosa-- see, this type III patient has a very small lumen. If the mucosa of the tunnel is touching the mucosa on the opposite wall, you can get a burn just because of the way the current jumps and delivers energy where there's resistance. So here, this is on the mucosa, so we're being gentle.

OK, let's try to do the XP, OK.

**MALE SPEAKER:** There's a question about have you ever tried to use ORISE gel [INAUDIBLE]

**STAVROS** OK, there's a question about ORISE gel. I just don't see the purpose. Because with a hybrid knife, the technique  
**STAVROPOULOS:** is exact cut, exact cut, exact cut. So say you're cutting immediately what you injected. So saline works fine.

Rarely, you get somebody that, I don't know, two Hellers and 15 Botox injections. And you're now trying to bypass a monolithic wall of scar. There, you need to find a plane, a microplane, and then expand it by dissecting the scar tissue and finding your way.

On those cases, the gel, when injected in that little microplane, can have a more sustained effect than the hybrid knife. But I would say that even before the gel, these were the cases where I don't think anybody would be able to do them without the hybrid knife. And the thousands of PSI pressure that drives the saline into that microplane.

So in fact, many expert centers have a 2% to 3% abort rate on POEM, and it's nearly always due to extensive fibrosis. So my abort rate is exactly 0. But I've always used hybrid knife from the beginning. So I don't know. I think that hybrid knife is very helpful. But occasionally, I think having the right gel can give you an extra advantage by getting a little sustained blue plane that could show you where to cut.

So I'd use it on extreme cases. But I also use it on every SD I do because of how tremendously useful it is. But for POEMs is one area when I don't think-- I think saline does fine. Especially in a patient like this without extensive fibrosis.

OK, sometimes putting the XP next to the regular scope can be a little annoying. We have to try on one side or the other, and then wiggle. And that should do it usually. But she's-- in these type III patients, everything is tight. The upper sphincter, the lumen can be really fighting us. Elderly female patients, too, I think, have some degree of cricopharyngeal achalasia.

**MALE SPEAKER:** Another question about this particular patient. From your other courses, you haven't seen that much oozing. Is this an anomaly, I guess, is what they're asking? You don't see this often?

**STAVROS STAVROPOULOS:** No. This oozing is unusual. Usually we have a bloodless POEM. This oozing-- I assume-- I think a lot of patients take some supplements that we don't know or haven't meticulously told them to stop, and that's what happens.

OK, this is unusual. I'm having trouble putting the XP down. I'm going to try the nose. Because that gives you a straighter shot to the UES. I used to do it through the nose in the beginning, but then I decided-- eh, her nose is not so-- yeah, the nose is no good. She has small nose and she has a super tight UES. But these elderly female is that people that get the Zenker's, because of this reason.

Also you have UES dysfunction in achalasia patients. 50% of them. It may be a protective reflex because of food sitting around in the esophagus. OK, this is unusual. OK.

**FEMALE SPEAKER:** Want to add [INAUDIBLE]?

**STAVROS STAVROPOULOS:** It's not the lube. Her UES is really tight. She almost has the beginning of a Zenker's here, that pushes the scope to the side. I hope we don't injure the mucosa. OK. All right, thank you, brother.

OK, we finally made it. Now in these difficult ones, you have to make sure you are not pushing the other scope down and perforate the tunnel. So Dasina, please. So Dasina is holding the other scope so I don't accidentally push it in by friction and end up tearing up my tunnel.

So there we go. So this is the other scope going there, and this is my XP wiggling down. Huh. The light looks a little high up, let's see.

OK, so there we go. So in our usual definitions, this would be a 3 o'clock myotomy there. OK. It's completely opposite the fundus, kind of 9 o'clock or so. So it's approximately-- see, the bottom is anterior, and the part behind us on the top is posterior. So that would be 12 6. And then the fundus 9, and the other side, 3. This is about 3.

And now the length of the myotomy is a conservative, I don't know, maybe one centimeter or slightly less. I think that's too short. So when I do my tunnel, I'm going to extend it by another centimeter or so. So I was going to go-- the thickness of the XP scope is like 5.7 millimeters. So this is a 5 millimeter cardia extension, and I'd like to be at 15 or 20. So I'm going to do another centimeter at the end as I'm doing the myotomy in the cardia.

But it looks good. OK. So the orientation looks good. See, the sling fibers, you can see them forming the angle of His there. They would be wrapping around the endoscope on the left side of the screen, going up and below. So we are right [AUDIO OUT] penumbra of this comet of sling fibers running anteriorly and posteriorly.

So it looks good. OK, so let's go extend the tunnel. Let's see if she started bleeding again. But yes, this amount of diffuse oozing from random spots is unusual. We've seen it before, and it hasn't translated into any tunnel bleeds or anything. But it is a bit frustrating. OK, well, there's no more blood, so we're good.

OK, now let's extend-- well, let's finish with the proximal myotomy. You don't want to extend the cardia part, because if you puncture the peritoneum, then you have air blowing-- I mean, gas blowing in while you are doing your proximal myotomy where you never have any gas problem if you know what you're doing. So you leave the cardia for last in case there's a ding into the peritoneal membrane.

So we're going to finish the proximal part of the myotomy. And again, it's a type III patient. So we're going to do at least an 11, I would say.

**FEMALE** Do want to stay on spray?

**SPEAKER:**

**STAVROS** Yeah. With her, yes.

**STAVROPOULOS:**

**MALE SPEAKER:** Got a question. Some people are posting-- many people are starting to--

**STAVROS** So this is the opening of the tunnel. So I'm going to do just a little more, because I'm at about 34 here. So I'm  
**STAVROPOULOS:** just going to cut this here.

**MALE SPEAKER:** Question-- do you always go proximal to distal?

**STAVROS** Yeah, so there is a question about going proximal to distal or distal to proximal. In the esophagus, it really  
**STAVROPOULOS:** behooves you to go proximal to distal, because then you can see what you're cutting. And you can basically hook and cut, regulating the depth precisely.

Now, when you get to a very tight sphincter, however, going proximal to distal may end up having that knife pulling the muscle towards the mucosa and burning it, and creating a perforation in a very difficult area to close. So people there do what Joe calls the push-pull technique. So even though here, we do the push technique, like push, grab, lift, cut, at the area of the very tight sphincter, you do the pull technique. Like that.

But obviously, the depth here is much less controlled if you're a beginner. So you're going to end up hitting some of the internal structure or something of that sort. So generally, push-- in the [INAUDIBLE] it's a push, meaning you push and you cut proximal to distal. In a very tight sphincter, carefully, you might do at least partially a pull technique, distal to proximal.

I have to say, this sphincter is not particularly thick for a type III patient. So again, sometimes there's a bit of a confusion between type II and type III. So there's a full thickness myotomy. And now, we are going to extend in the cardia. It's that time. So we're going to inject here and then lift and cut.

No, but I really need the monitor there. Why can't you pull the cameras to the side?

**MALE SPEAKER:** I am, I am.

**MALE SPEAKER:** [INAUDIBLE] OK.

**STAVROS** Or pull them more. I really need my monitor here.

**STAVROPOULOS:**

**MALE SPEAKER:** OK.

**STAVROS** And for the EST, it may be even more important. This is a POEM, who cares. But I can-- I need the monitor right

**STAVROPOULOS:** here, OK?

All right, now, as I said, we'll need to extend a little on the cardia, because we stop just a smidgen too early. And we need to do just the next centimeter. But that's not a problem. We're just going to extend by a centimeter here.

Well, it is a bit of a problem, because part of the reason I stopped there-- and that's probably one of the most common reasons of people failing POEM-- is because I ran into a bunch of vessels that I really would rather not mess with. But now, we have to mess with them, I think. They're hiding there at the end of the tunnel.

**FEMALE** Room 3, [INAUDIBLE] recovery.

**SPEAKER (OVER INTERCOM):**

**STAVROS** So let's extend the tunnel here a little. So we're going to inject right here. There's also fibrosis here, because the **STAVROPOULOS:** lifting is terrible. People biopsy over here all the time. Anyway, so I'm going to do a little tunneling on the top to expose the muscle and then cut it. So basically, I am extending my tunnel a little here.

See? There's a lot of coagulum on that endoscope. That's why there's all these white yellow reflections. Ideally, I should bring it down and clean it, but I'm almost done with the myotomy, so I can clean it and then show your final view while I'm doing the endoFLIP.

See, I'm using spray here, but very carefully to avoid burning the mucosa. I'm hugging the muscle. Right here. See, I did almost an extra centimeter here. Almost an extra centimeter. But I'm beginning to get the oblique fibers here, you see? You see how it's getting a little screwy? So I got to stay to the right here. There's a vessel hiding there.

So there's the extra almost 8 millimeters plus 6, 1.4 centimeters. She'll be fine. There's a vessel here, yeah. OK. Yeah, there's some vessel hiding there. Can't see exactly where.

**MALE SPEAKER:** Do you always perform full thickness myotomies-- this is a question-- for type III? What about for other types?

**STAVROS** Another question is, do I always perform full thickness myotomy for type III, and what about other types? So

**STAVROPOULOS:** yes, I always perform full thickness myotomy, because frankly, that's what the surgeons do when they do a Heller. I've never really tried to titrate the thickness of the myotomy, yeah. I think that's a proven procedure, invasive as it may be-- a very proven result.

The advocates of the partial myotomy mainly focus on safety. But I think at this level of experience, and posteriorly, I think safety is preserved, even with full thickness. So I think I did enough of an extension here. All right?

**MALE SPEAKER:** Here's a followup to what you've already answered, and that is, what do you think of using penetrating gastric vessels to guide the extent of the cardia myotomy?

**STAVROS** Yes, so the question is a good one. There are some penetrating vessels described by Tanaka-- the Tanaka

**STAVROPOULOS:** vessels, or the two penetrating arteries, branches of the left gastric-- that tend to sneak into the submucosa right between the end of the oblique bundle and the circular. So there may be a good landmark to identify the oblique fibers.

It's a bit of a early [INAUDIBLE], maybe, frankly, I have found it to be not a constant feature. It's present in a lot of people, but it's not a constant feature. The anatomies-- arterial anatomy is not as constant as you think. So here, for example, we didn't see any Tanaka vessels, even though I'm hugging the end of the oblique fibers there.

So you just have to have an understanding of where the oblique fibers are. And that's much more constant in terms of the orientation, and where they start and where they go compared to where you're tunneling. and that's, I think-- in the end, after you've gained some experience, that's the more predictable and reliable way to preserve them, is to basically know where they are and avoid them altogether.

But yeah, sometimes you see them, sometimes you don't. I did a live POEM at the NYSG course in December before COVID, and I saw an anti-reflux POEM where you could see very nicely the Tanaka vessels and the oblique fibers. But in this patient, if I saw them, I would point them out to you. But she didn't really have them. Or at least, she didn't have them at this orientation. But it's a supportive evidence that if you find, helps you orient.

So I extended by, I think, almost 1.5 cardia myotomy here. I can extend more. But at this point, we're going to start getting into reflux territory. This is a type III patient. Mind you, she's a woman, and she's old, so she's not prone to reflux anyway. But there's no-- you're not going to get any further advantage beyond this point here.

So yeah. So that's-- we did the extension. So now I'm at 44. And the beginning of the high pressure zone was 38. So yeah, 6 centimeters beyond. So I'm good. I'm good.

Now, OK, we're done with the myotomy. Now let's do a little touch up, because she has all these oozers. Let's touch up this one here-- with the forceps, of course. Let's touch up this one. And then we'll do the endoFLIP. Mind you, this POEM can be done in-- and usually is done by me in half the time. But here, I'm taking my time to make it more educational. Well, may not half. Maybe 20% less time.

OK, so now let's find all the oozers. So there's another little oozer there on the mucosal side. See, I wish I could inject it a little, but. Smoky. OK, a little more oozing there from somewhere.

So in like 700 POEMs, I think I've had 2 tunnel bleeds. And one of them was because they had to go on heparin the day after the POEM. The cardiologist insisted. So we really got one true bleed, 1 out of 700. That's probably because of the electrical profile of the dissection that we do. But also, we never leave any oozers the end of the case.

Now, this kind of preemptive coagulation at the end, I don't know if I'd do it in 2% of cases. At this point, 99% of POEMs are fully hemostatic. This woman, everywhere I move my scope backwards to get out, she starts oozing. Unusually smoky, too.

**MALE SPEAKER:** To talk about you're not opening the fat [INAUDIBLE] using it like a contact probe, basically.

**STAVROS** Yeah, for these minor oozers, you don't have to grab and pull and coagulate. Just a little bit of a touch of the **STAVROPOULOS:** soft coagulation current ensures you're not going to go too deep. See, I do little taps of soft coagulation to avoid any mucosal injuries. I think that's good enough, I think.

OK, all right. That's it. Now this is the difficult [INAUDIBLE] to close. So the reason I do transverse defect is obviously because for the last 600 POEMs, I've sutured them closed. So there. So it looks nice and open now, but not too open.

OK, now I'm going to clean the scope and put the endoFLIP down. And we can do-- we can see what we have. It's going to be-- in most POEMs, the pre-POEM distensibility is in the 1.5 to like 0.3 range. And then after the POEM, we get it to somewhere between 3.8 and 5. And that shows a well-done POEM without tremendous risk of reflux.

**FEMALE SPEAKER:** Do you want to confirm [INAUDIBLE] or? Before you [INAUDIBLE]

**STAVROS** So another utility of the endoFLIP is this curse of a disorder called EGJ outflow obstruction, which is-- it's like the **STAVROPOULOS:** sphincter of body dysfunction of people that do POEM. A testable disorder, because it's often functional, and a POEM would not only not work, but make the patient worse.

So who do you pick with an EGJ outflow obstruction-- which, mind you, is defined very loosely, very permissively, and that's probably why we overdiagnose it. But the schedule classification is working on making a more restrictive set of criteria. But who-- so you get these people with EGJ outflow. How do you pick who to do a POEM on?

One essential-- you have to do a very good evaluation. Can't jump into a POEM. That will be a disaster. At least half of them may not benefit. So you have to do-- try a Botox, maybe, try a medication. But endoFLIP, if you do it and the distensibility is less than 1, that's slam dunk a maybe early achalasia, or the beginning of achalasia. Or an achalasia-like EGJ outflow obstruction.

And if it's more than-- if it's 3 or more, clearly, you should stay away in terms of POEM. 2 to 3 is a bit borderline, but you should probably stay away anyway. Less than 2 is what you want to see if you are considering POEM. It still doesn't guarantee success like it would in a typical achalasia patient, but you are in safe territory, I would say, if distensibility is clearly below 2. So that's a very useful application, because there is a lot of EGJ outflow diagnoses out there, and everybody's trying to do a POEM on them.

**MALE SPEAKER:** Quick question on antibiotic prophylaxis. Do you routinely give it, and is it a single dose, or more?

**STAVROS** Antibiotic prophylaxis is a bit debatable. We give it-- you use it at least one or two days. And then when they go home, the length depends on how complicated the POEM is, what comorbidities, immune suppression that patient has, things like that. But the least we'd do is today, tomorrow in the hospital, and maybe one day at home.

Could it be too much? Yes. But is it a big downside? No. And you don't want to get any infections. It covers-- what does it prophylaxis? Maybe a little small inoculum in the mediastinum, and maybe some little aspiration during the intubation also. You cover those.

So yes, I think antibiotics, few days. Not one day, not seven days. A few days. Like one day, one day in the hospital, if they stay. We send some patients home the same day. Some people stay and go the next day. So they get antibiotics in the hospital. And then when they go home, maybe one day, maybe two days, maybe three days-- not seven days or something-- depending on various aspects. For example, sigmoid esophagus full of little monilia candida spots yet there, they get more antibiotics.

So we are doing the endoFLIP now. So again, you want to see a distensibility of 4 to 5 at 50 where we do it, and something like 7 or 8 at 30. And that indicates a good POEM.

Sometimes you get smaller numbers. In young healthy males with a nice strong hiatus, you get smaller numbers. But that's OK. I used to get concerned, but they do OK. They just have a nice unstretched muscular diaphragmatic hiatus that is almost like having a second sphincter there.

So this is the LES here. OK, so here we go. You let it equilibrate a little, but it's in the upper 4s, maybe up to 5. There's 4.95, 5.0. It's smack in the range that we like. I haven't been able to statistically prove that this is the ideal range, but that's partially because I don't have enough figures and other reasons that have to do with statistics, but.

So I'm going to freeze it there, and it went up to 5.6, because we delay. So 5.6. Yeah, very good distensibility at 50. We do measurements at 50, and then we do them at 30. Any other questions, Derek? Anything?

**MALE SPEAKER:** People were asking about the solution you use.

**STAVROS** The solution-- I answered that. You mean gel? Gel?

**STAVROPOULOS:**

**MALE SPEAKER:** You use ORISE, or do you use [INAUDIBLE]

**STAVROS** Yeah, for this, I use saline. Apparently you can put ORISE in a hybrid knife, but it's not needed in a POEM, except **STAVROPOULOS:** if you get severe fibrosis. Yeah, please, do it, because I'm getting distracted. Deflate. OK.

Can people hear me well still? Did you--

**MALE SPEAKER:** You have a lot to be proud of.

**STAVROS** Shout out to Kristella, who used to be our nurse. She's our ears in California, assuring us that people can hear **STAVROPOULOS:** me. But I just kept checking.

**MALE SPEAKER:** [INAUDIBLE] hears you and sees you.

**STAVROS** Because I had some-- the morning, that was the issue in the beginning. We had some audio issues.

**STAVROPOULOS:**

OK, let's go to 30 mLs. And then take another set of measurements.

**FEMALE  
SPEAKER:** Stop.

**STAVROS** Some people take even 3 points of measurements, and they create nice little beautiful compliance graphs. And **STAVROPOULOS:** then you can then look at slopes, too. So not only going to see a static compliance at some inflation, you can see how rapidly compliance changes at different volume calibers, which is a nice extra metric. I think it's maybe a little overkill. Post, right?

So the distensibility at 30 is 5.8, as well. Normally, it's a little higher when you go from 50 to 30. Any other questions? All right, you've got the numbers? First one, 30. OK. So that's it. Now we're going to suture. Deflate. Deflating.

So I'll answer, too, as I said, how do you close? You saw how anxiety-producing the Zenker's closure is, dealing with little mucosal clips. I was doing a lot of suturing from the beginning. So just putting a scope down and doing some suturing is very easy.

So very early on, I could see that-- we did a study that we published as part of a review of suturing of 70 clipped POEMs, and that's the only ones I ever clipped, the first 70, versus the subsequent 70 that we sutured. And the time for closure for both was essentially identical. Back then, it would take me 9 minutes with the clips and 10 minutes with the OverStitch.

Now, people are like, oh, what about the cost? Well, the United States, an OverStitch plus 1 suture is about \$1,000. Which means, that if on the average POEM, all the publications say you use 5 or six clips, even if the clips are \$150, or \$160, the cost is equal. So we found that the cost was equal, based on US numbers, for the OverStitch. Much more expensive in Europe and elsewhere. But it's very equivalent.

And there was no other difference in complications than anything else. There was a slightly better length of stay with the OverStitch. But then, this was all later in our experience. So it can be a learning curve bias. So, but there was no difference. So in which case, if you have a much more secure closure, why not avail yourself of it? So I've been suturing. And now, the average suture duration is more like three or four minutes or so.

**MALE SPEAKER:** Shawn asks if distensibility is greater than 8 after POEM, would you consider any [INAUDIBLE] at time of endoscopy?

**STAVROS** Yes. That is-- OK, so there's a question from the audience that says, if you do the distensibility and it's more  
**STAVROPOULOS:** than 8-- mind you, as I said, there is very flimsy, if any, evidence that this number means anything. There is some Northwestern study where they-- based on 30 patients, and some statistics that my statistician does not agree with, because I tried to make him do it on my data, and he wouldn't-- they found maybe a 4 to 8 golden area. But it's very flimsy, very flimsy evidence.

So, let's say you believe that. Would you go then, at the same time during the POEM, and do something like a TIF? I don't agree with this. Because even if the distensibility of 8 or more is useful, its area under the curve is not going to be more than 0.7. That means maybe a good third or 40% of patients with that distensibility will be fine with PRN, PPI, or maybe once a day, or whatever.

So now you're going to talk about put down a device in a first tunnel, and do a TIF. Obviously, the complication is going to be slightly higher than doing the TIF later. And you're going to close down an orifice that may be just fine with a 40% probability.

The endoFLIP of 8 or more doesn't mean-- it may mean that a particular patient will have a 60% probability of reflux instead of a 30%. Why would you be suturing at the same setting the other 40% of patients, increasing that Eckerdt score by a little, decreasing, maybe, the possibility that 30 years later, they will be more likely to need further treatment than patients with a bigger hole? It's just-- it's a very simple way to have to have an area under the curve that is 1.

You do a BRAVO in three months, ask them about their symptoms, check for [INAUDIBLE] and then you go-- you get as close to 100% certainty that this patient has reflux, number one, and number two, how severe their reflux is. Because if it can be managed with PRN, or once a day PPIs, or even H2 blockers, acting at TIF to the mix has a lot of potential for problems. So--

**FEMALE SPEAKER:** Second [INAUDIBLE]. I gave it a little [INAUDIBLE].

**STAVROS** OK. So this is the issue with the same-- I'm not a believer in same time TIF. People get all excited. Oh, we can do  
**STAVROPOULOS:** the same thing as a surgeon doing a [INAUDIBLE] door. But I'm like, why? The surgeon has a reason that he's doing a door.

The initial studies with no fundoplication show that the reflux rate run in the 80% to 90% range for traditional Heller. And going back then to do a door as a second laparoscopic operation is obviously a whole different ballgame. So then, if almost all people will have reflux, and doing an antireflux procedure involves a second operation in a nonvirgin abdomen, of course doing them together makes sense.

Now if you're doing a POEM, you've got to scope the patient again in three months. You're going to do a BRAVO. You got to do a check for [INAUDIBLE]. Doing another endoscopy to do a TIF is just another endoscopy to do a TIF. We can check and do them now in 25 minutes. So-- or so he says.

So what does it mean? I mean, why do it at the same time? Wait to see if they have reflux, how much reflux. And then you can do your 40-minute super express TIF and try to fix that. And we use TIF for severe refluxes. Obviously, having-- even though I have 700 POEM patients and their reflux rate now, overall, is in 40, 50%, and the severe reflux is 15% to 20%, very hard to convince people to have a TIF. So we've done recently, one, but it's there-- a lot of them are happy with the PPI.

**MALE SPEAKER:** We've got several questions coming in.

**STAVROS** OK, we have a lot of questions coming in. So maybe I should get suturing.

**STAVROPOULOS:**

**MALE SPEAKER:** Yeah. What about the-- in your experience, dysphagia [INAUDIBLE] acceptable endoFLIP?

**STAVROS** I'm sorry, what's the question?

**STAVROPOULOS:**

**MALE SPEAKER:** Have you had any dysphagia after an acceptable endoFLIP in the good range?

**STAVROS** Yes. Have we seen dysphagia even though the distensibility is at the acceptable range? Absolutely. Number

**STAVROPOULOS:** one, 1 out of 5 of my patients are terrible, Hail Mary, end of the road people. Sigmoid esophagus, erosion, some of them have not partial peptic stenosis. Really bad material. You're going to get some dysphagia on those. The dyspeptic patients can still have some dysphagia-- maybe related to the spasm, maybe related to hypersensitivity of the esophagus, whatever.

You have so many reasons where-- some people don't understand the concept of an achalasia diet. So the first year, they tell you, I feel fantastic. And then on the second or third year, oh, I'm having problems and whatnot. And then you find out they tried to stuff themselves in 10 minutes in a short lunch break with a big hamburger. They're like, hold on, you're not normal. OK? Maybe the first year, you felt normal, but you were careful. You still had to take 30 minutes, chew well, occasionally lubricate with a little water. So you have to keep a little re-education.

So yeah, you can get dysphagia. And these are difficult, sometimes, problems to solve. Like, this distensibility looks good, but they have dysphagia. So then you have to do bariums, you have to do endoscopy, you have to look for things like Schatzki rings. You can have achalasia and a Schatzki ring.

You have to look for peptic stenosis. Edema from reflux, because they are not compliant with PPIs. Evaluating continued or relapse symptoms after pretty decent looking POEM based on the distensibility requires some experience. But it definitely happens.

**MALE SPEAKER:** What about correlation between--

**STAVROS** So I'm losing the air, so please, somebody has to do the--

**STAVROPOULOS:**

**MALE SPEAKER:** Explain [INAUDIBLE] while you're doing that. People don't understand [INAUDIBLE].

**STAVROS** Well, for some reason, the double tunnel Olympus scope-- and I hate to pick on Olympus-- loses the air when **STAVROPOULOS:** you try to suture. And it can be frustrating. You can sometimes overcome this by giving cricoid pressure, because it's-- the loss is somehow around the scope. Or between the scope and the OverStitch cable that generates a little sneaky pathway for the air to leave.

Now, Dr. Peller, my chief of anesthesia, and the person that does 80% of my cases and who is incredible-- he is also now famous around the country, because he was the anaesthesiologist that did my 23-hour ESD for the whole case-- but anyway, he's giving cricoid pressure now. I have-- I can see a little more. So what other questions?

**MALE SPEAKER:** Is there a correlation between FLIP measurement and LES pressure by high [INAUDIBLE] manometer?

**STAVROS** Yes. The LES pressure-- so the question is really for somebody-- it's really more of a question for a motility **STAVROPOULOS:** person than myself. But the question is, is there a correlation between LES pressures and manometry and endoFLIP distensibility and other metrics? And yes, there is correlation, of course. It's not a perfect correlation, but it's very, very good correlation. So that's why we use endoFLIP very liberally as a substitute for manometry.

Let's say the patient had the bad manometry and refuses to have another one. We do endoFLIP. Patient has dysphagia despite an adequate POEM, how do you evaluate it? You can try to do manometry, but people hate it. In sigmoid patients, you may still not get it to sit at the sphincter. So we use endoFLIP. So yeah, it's sort of a poor man's manometry that can be done in an easier way.

**MALE SPEAKER:** Couple of questions on pressure with the endoFLIP device. Do you measure at only 30, like you did in this case, or do you do 50 and 60 like many of the [INAUDIBLE] people?

**STAVROS** There's a question about what balloon inflations we measure endoFLIP at. We do 30 and 50. Other centers do **STAVROPOULOS:** 30 and 40. Some people do 30, 40, 50, or something of that sort. That long balloon from Atronic goes up to 70 or such. So you can do even more.

And as I said already, you can use these to generate a graph of compliance or distensibility at different balloon volumes, OK? And that creates a new metric, which is the slope of that graph as you go from 20 to 40 and 50.

For example, if you have somebody with a very tight diaphragmatic part of the sphincter, you're going to see an almost vertical increase in distensibility ability as you go from 30 to 50. Because once you hit this tight diaphragm, boom, you hit a wall. Somebody that has a very loose diaphragm, you're going to go gradually. As you inflate, the distensibility will not rise very much.

In this patient, for example, the distensibility was identical at 30 and 50. That probably means that her diaphragmatic sphincter is just not that tight at all.

**MALE SPEAKER:** Do you know of any comparisons or anecdote around dehiscence, comparing--

**STAVROS** OK-- I'm sorry, what?

**STAVROPOULOS:**

**MALE SPEAKER:** Dehiscence.

**STAVROS** Dehiscence of the suture is unheard of in my experience. And I've done maybe 600 of them. Dehiscence of **STAVROPOULOS:**clips-- people that do-- these are not so secure here. Yeah, I'm going to go empty the stomach over there.

But people that do second look endoscopy in Europe, I think they have reported there was a study from Hamburg that showed that they had dehiscence of clips, I think, in 10% of patients. That did not necessarily translate into leaks, but it's pretty sobering, I think.

OK, so this is the hole. Looks nice. Open, but not too open. Then-- not too open. And that's it. So now we can go--  
- I think, I don't know, is it a break now, and then a lecture? Or--

**MALE SPEAKER:** The office has a break, but we can-- you want to take like five minutes?

**STAVROS** We can do a 10 minute break and then do the lecture. Or 10 or 15? What time is it?

**STAVROPOULOS:**

**MALE SPEAKER:** 5 to 10:00.

**STAVROS** 5 to 10:00.

**STAVROPOULOS:**

**MALE SPEAKER:** You want to grab a cup of coffee?

**STAVROS** So should we-- you guys can visit the exhibits. We have this app that maybe our CME department sent to you  
**STAVROPOULOS:**by email. But you can have on your phone, and you can go see all the sponsors that helped us. And it's really cool, because it's a virtual booth. And some of them, apparently, can have a one-to-one communication there. You can go check out the endoFLIP, and the new endoFLIP, and the endoFLIP 2.0 and all that stuff. Or you can take the vial three, or whatever you want.

I forgot, I'm not supposed to mention even names, I think. So I don't know if I just-- I'm sorry about that. Well, visit all the exhibits to see all the stuff I discussed, OK? Whatever those might be. So I'll go get some coffee. So 10:00-- should we meet again at 10:15?

**MALE SPEAKER:** Yeah.

**STAVROS** 10:15. OK, so we'll regroup at 10:15 to do the POEM lecture. OK.

**STAVROPOULOS:**