

**SPEAKER 1:** Dr. Stavropoulos's last case for the day is a G-POEM for gastroparesis due to postoperative vagus nerve injury. This is a 54-year-old woman with GERD unresponsive to medical therapy. She underwent, initially, a laparoscopic Nissen fundoplication, which was complicated by post vagal injury induced gastroparesis. Subsequently, she had a laparoscopic pyloroplasty 2013, but due to persistent symptoms, had a laparoscopic revision of fundoplication, Collin gastroplasty, and partial gastrectomy in 2014, unfortunately without relief. Due to prior surgical pyloroplasty, patient underwent trial of transpyloric stenting to assess if further treatment at pylorus would alleviate symptoms. These are the images, with the transpyloric stent placement on the left and imaging on the right, the EGD with fluoroscopy.

These are the gastric emptying studies pre stent, with 89% of the meal retained after four hours showing severe gastroparesis. And then you have the gastric emptying study in October last year post stent, which showed 20% after four hours an essentially marked improvement in gastroparesis. So the plan is for endoscopic pyloromyotomy. The benefits involve the minimally invasive technique of performing pyloroplasty to improve functional gastric outlet obstruction secondary to vagal injury. Thank you.

**STAVROS** Hello, so this is a complicated patient. She has gastroparesis, but she had all these different **STAVROPOULOS:** surgeries, gastroplasty, the gastric resection. You can see up here the fundoplication that she had, then the redo fundoplication, which injured hair vagus nerve. And her stomach looks so funny because of the gastrectomies, and Collin gastroplasties, and all the stuff they did.

There is this scar here, and then there's this rim around the pylorus. That may, to some degree, be related to the stenting. So we stented, and then we sutured the stent and clipped the stent on the posterior wall, and the lateral wall, and here at two o'clock.

**SPEAKER 2:** So is this just a regular stent, or was it a--

**STAVROS** It was an AXIOS. No. Yes, it was an AXIOS stent. And as you see, it gave miraculous results **STAVROPOULOS:** on the gastric emptying, going from 94% at four hours to 20% at four hours. And she felt better until it migrated. It migrated and came all the way out in the stool. Because when we went back, it wasn't there on fluoroscopy. So the question is, since he responded to the [INAUDIBLE], we feel it's worth a shot to perform a pyloromyotomy.

She had a pyloroplasty already. So anteriorly here, the surgeon-- that may be what all this

scarring is here. They do a pyloroplasty where they incised the pylorus longitudinally and then reapproximate the incision transversely to try and make the opening bigger. There is a bit of a cell here, so I'm a bit optimistic that we can make it bigger. And I'm hoping that by going posteriorly, maybe I will avoid all the surgical pyloroplasty stuff. But I may see some fibrosis from the sutures that we put and the stent, the AXIOS stent, sitting there a few weeks before it migrated.

So we'll start 5 centimeters back from the pylorus. This is the pylorus here. It's about 69, 68. That's 63 here. That should be a good place to start the tunnel right here.

**SPEAKER 2:** The pylorus is fairly open.

**STAVROS** And fixed.

**STAVROPOULOS:**

**SPEAKER 2:** You think that's from the stent effect from before and after? Can you recognize if that's the case?

**STAVROS** I believe it looked this way, even before the stent. Dr. Modeo-- do you think we can find from  
**STAVROPOULOS:** Dr. Modeo if it looked patulous even before the stent? When we're putting the stent, the stent was loose. In fact, I believe it went into the duodenum. We pulled it back and then sutured it extensively. Is this the case?

**SPEAKER 3:** It's the one that we started doing and the stent went in with--

**STAVROS** Right. So, yes, I think it was fairly patulous. It may be the effect of the stricturoplasty. But I've  
**STAVROPOULOS:** given up on trying to predict G-POEM response based on what the pylorus looks like.

**SPEAKER 2:** OK, that was the--

**STAVROS** If you look at the video from last year where I did that G-POEM at the end of the day as well,  
**STAVROPOULOS:** while the fellow-- that was Chris now who is doing this with us today. My advance fellow was claiming the pylorus had this pinpoint 1 millimeter opening that was had to get through. And then the camera comes on, and it opened so widely that the ring is completely effaced. And I've seen this a lot on idiopathic gastroparesis patients, so I think it's a very dynamic organ, the pylorus. After the duodenotomy and fancy things like that, and electrogastrograms, it may not be so easy to figure out.

Once you distend on the stomach, some reflex could keep it open. Suddenly you start seeing these contractions, and it all gets down. This motility for gastroparesis, it could affect the [INAUDIBLE] or block the [INAUDIBLE]. It's really a little more complicated than a [INAUDIBLE], I would say.

**SPEAKER 2:** Can you get Endoflip down there to do a before and after?

**STAVROS** Yes, I've done it. When I was going to Temple, Parkman is a big believer. Actually, I think that **STAVROPOULOS:** they have two publications on the Endoflip for gastroparesis. One is his. But if you look at the variation in distensibility in gastroparetics, it was going from, I think, 5 to 50. So I don't think that's very reliable. Having put it at Temple and then a few times up Winthrop, I can get it there by using the scope to shepherd it.

Parkman had to use a snare to drag the Endoflip down to the duodenum. And then if it gets kinked because you put it a little too far back from the duodenum, the readings change. So I think the Endoflip for the pylorus is a bit of a work in progress. They may have to make a sort of a balloon, some kind of weight that anchors it on the pylorus. I think they need to modify it.

It's a little off to the right there. So let's start there. Again, I make a little incision, and then I inject. I'm not really favorably impressed by the lift here. Let me go a little deeper. We just published with the Temple group in *Digestive Diseases and Sciences* the 13 G-POEMS I did at Temple with, I think, six month followup. So the success rate was really in the 70% range. So you shouldn't expect that type of efficacy that you see, say, for POEM in type 2 achalasia.

So one of the not so pleasing parts of the hybrid knife is that it's thick and makes the incision not so pretty. But if you scrape the coagulum off, it looks prettier. There it is. And [INAUDIBLE] is now making a much thinner and more flexible knife that I should be able to play with soon. So it has a flexibility similar to the dual knife, and it has a thinner electrode but can still inject. I haven't seen it yet, but that would be a nice combination of features.

So any questions about G-POEM pyloromyotomy? There's still a small number of studies with small numbers, and none of the studies shows an efficacy that is more than-- in the 80s. It's like 80% or something. The [INAUDIBLE] study, they publish 3 month data with success in the 80s. And then they published 6 months data on patients that included the initial group where it dropped to the 60s. But then they looked at subgroups. And I believe they found that in the ideopathics it was close to 90%, versus 50% in diabetics and the other subgroups. So the ideopathics may be some group to watch for G-POEM.

The post-surgicals-- 2,000 post-surgicals, people tend to group them together when they publish. But you have a post-esophagectomy patient, they are much tougher and less responsive than this type of patient I'm doing now, where it's a vagal injury, but with esophageal and gastric anatomy being not disturbed. Actually, this is not typical. What you want is those redo Nissens or complicated Nissens that within a month or two after the operation develop gastroparesis, and it's clear, pure vagal injury with completely normal distal gastric anatomy.

Unfortunately, most of our post-surgical patients in [INAUDIBLE] are post-esophagectomy. These patients, often the problem is not a motility problem, it's a severe angulation caused by scar tissue of the stomach in the [INAUDIBLE] and response to aggressive adhesiolysis and freeing up the stomach from the chest, which could be a 4-5 hour thoracic operation to free up the stomach from attachments to the right or left chest that are causing an angulation and poor emptying.

**SPEAKER 2:** Stavros, a question came up. So with these G-POEM cases, do you sometimes see discrepancies between clinical response and the results of just simple barium study, where the barium study suggesting delay, yet the patient telling you they're feeling?

**STAVROS** Yes, that discrepancy is in every possible direction. Gastric emptying improves, symptoms  
**STAVROPOULOS:** don't. Symptoms do, gastric emptying doesn't. And then if you add to the mix things like smart pills, and breath tests, and whatnot, which are even less validated than the gastric emptying test, which also is tricky to do correctly, then there's a lot of discrepancy. That's why a lot of people are focusing on standardized scores. The GCSI is the most commonly used. Because nothing is perfect in assessing response in the gastroparetic patients.

**SPEAKER 2:** There were two questions got caught in that crossover of cases. So there are two lingering questions from Sergei's case. One question was if the lesion was found to have a depressed area and appeared to be scarred, should it be left alone and the patient then sent for surgery to have a segmental resection? So if Sergei was answering this, he probably would say, no, the answer to that is then to complete the removal by doing full thickness resection. That that would be his M.O. I think short of that, your only other option is to consider stopping and sending the patient for surgery.

The other question was related to depressed areas in this lesion. And if the lesion was found to have a depressed area and appeared to be scarred at the base, could this mean deeper

invasion? Sure. I mean this was a large lesion. I think we missed Sergei's initial evaluation of the lesion looking at pit patterns to see if there are any markedly abnormal or distorted patterns that might suggest an invasive lesion. He's certainly encountering fibrosis. We know that. So that all remains to be determined.

You must be getting close to the pyloric ring, right?

**STAVROS** I'm very close, right. Now the question is-- so you want me to answer or take a crack on these  
**STAVROPOULOS:** questions? Is that it?

**SPEAKER 2:** We're refocused on your ring here. So you have to go up and over, huh? Yes, generally, I'd go up, but not over because of the duodenum. Now if the anatomy permits it, then I do it. We'll see how it goes. But unlike POEM, most times you cut the pylorus from the gastric side by hooking it. And some people use [INAUDIBLE], and some people will use the hook. I'm going to do the hook, again, because it's a little more precise.

But even with a hook, you can end up perforating the duodenal mucosa. Because it does this backward fold. So you have the pylorus here. You're like, oh, fine. So you figure the duodenal mucosa is straight away and goes down as a vertical wall. Well, it's not really a vertical wall. It's a wall that at the bottom curves backwards and wraps around the pyloric muscle on the duodenal side.

So you could be mainly cutting through muscle. And as you end the muscle cut, you have perforated the mucosa. Because the muscle is really cylindrically wrapped with the duodenal mucosa, so you have to be really careful. So the hook knife is your best chance of pulling the muscle away from this convoluted, folded configuration with the duodenal mucosa around it. So, yes, I like the hook. And you see the vessels were all coagulated with a knife despite the size. One of them almost bled here on the side, but we got it with prolonged step on the pedal. I can try to get these two right there.

But the other thing you have to be careful is there are dangerous vessels that are part of the gastroduodenal and whatnot that are just deep to the muscle. And they can be cut easily. And that's a very difficult layer to coagulate. Because if one of those starts bleeding, you already have a perforation in the posterior wall of the antrum. So it's not easy to act.

So this ring is the pylorus, I believe. But generally you don't get this kind of plump submucosa on the duodenal side. So I'm a bit perplexed. We hardly ever get a open submucosa on the

duodenal sides. So I'm not sure what's going on here, but I will proceed with caution. Very unusual. Maybe I think I've reached the pylorus, but I haven't.

**SPEAKER 2:** So Stavros, the question came up. Would you methylene blue on the other side of the pylorus?

**STAVROS** Yeah, we tried this even in the early POEM days. It goes everywhere. It's not really very  
**STAVROPOULOS:** reliable. But we can try the double scope. And the Emory group has described using fluoroscopy, putting a clip on the pylorus so you know where you are. I've tried the doubled scope transillumination. It's not as clear cut as it is for the POEM, so I'm not sure if it's worth the effort. Well, maybe in this case it is. Because normally you see the pylorus, and then suddenly you have the vertical duodenal mucosa. And there's no safe place to go. Here, it looks like I can keep going with submucosa plane as far as the eye can see. So that's a little strange. Let me see. See, what happened is the stomach has distended quite a bit. There may have been some kind of tone when we came.

Now I'm much more than what looked like five centimeters from the pylorus. So see, I haven't really reached the pylorus. This is more than minus 5. It happened because I guess there was some tone on the stomach, and it looked shorter. See, I'm far away. I have only gotten to about here, and I still have to do this. So it was a bit deceptive. So, yeah, that's why it looks open. Because this is all thick antral muscle. We still haven't reached the pylorus. So let's continue dissecting.

Talking about what you were discussing with the [INAUDIBLE] case about ulcerated lesions. , if you have an ulcerated lesion in the colon, the so-called apple core lesion, that's invasive cancer. So there's no question there what to do. Now, what happens if you have 2 C lesion that is large? That carries 70-80% chance of submucosal invading cancer. That is sort of a more individualized decision. If something looks like in the 70-80% or better probability of having something submucosal invasion, I'd discuss the patient. I see all the [INAUDIBLE] patients in the office first, mainly to tell them that they will need to wait two months for the [INAUDIBLE] to be removed.

But also in situations where the color pictures from the referring look a high risk lesion 1S, 2C, then I discuss that AST may have only a bit of staging utility. And often, I send them to a colorectal surgeon to discuss colectomy with them. And then the patient sort of decides if they want to undergo a [INAUDIBLE] or not, but not for ulcerated lesions, just for lesions with

depression. But still a pretty decent pit pattern-- no nonstructural [INAUDIBLE] pit pattern and the like, nothing that is approaching 100% probability, especially not in healthy patients that are good surgical candidates.

So that's my view on EFTR for carcinomas. And we have this discussion. I don't think you should be doing EFTR for carcinomas without preclosure techniques, such as you are developing in your lab, because of the risk of contaminating with cancer cells outside the lumen. So I don't think EFTR for carcinomas, ulcerated carcinomas is a good idea.

And then there's Invesco device. What do you think about the full thickness of Invesco device? It's not very reliably full thickness. It's not very reliably R0. So it would be a concern if you try to apply it in something that is clearly an ulcerated and hopefully small cancer in terms of [INAUDIBLE] perforations. So I don't know. What do you think about these thoughts? I think EFTR free hand with an open hole if you have an ulcerated lesion is concerning.

**SPEAKER 3:** Stavros? Chris was away for a bile leak. He's just getting back, so I think he missed most of your discussion. Your question for him was his opinion of the Invesco device?

**STAVROS** The Invesco doing full thickness in in a lesion that is ulcerated and might contain carcinoma. Is **STAVROPOULOS:** it OK to do a free hand full thickness resection or not?

**SPEAKER 2:** Well, there would certainly be a contingent of opinion that would say, no, it's not safe. But if you were doing it for palliation, then I'd say it would be safe. If you're not doing it for palliation, and you're doing for attempted cure, then a lot of people would say we can't do that yet because we can't preserve oncological principles. However, if you were to create an effective pseudopolyp undermining the lesion, so you were able to create literally a pseudopolyp to sandwich the serosa against the serosa and then cut it off, I think you can argue that could be a curative procedure.

Something is amiss. All right, so I'll keep talking.

So the question is if you have an invasive-- if you have an obvious cancer and you want to remove that because it's problematic, either because it's just a cancer or it's been bleeding and the patient's got a refractory anemia, I think if it's symptomatic, you could argue to attempt full thickness resection, just to get rid of the problem of the primary tumor. If it's diagnosed as an invasive malignancy and the person refuses surgery, or is a poor surgical candidate, or less than an ideal surgical candidate, not a poor surgical candidate, then there is a group of

people that will say that you can remove it full thickness. But you're going to have to somehow include a lymph node dissection in that procedure. You certainly can do that, taking it out, and then exiting, and then grabbing some lymph nodes. If you can identify them. So it can be done.

The alternative, as I mentioned, you could do a hybrid procedure, where you do it with a laparoscope, do a lymph node resection, and you do an endoscopic. That's certainly very doable. Otherwise, you can create a lesion into the lumen by some fashion, and we've kind of reported that experimentally, and then seal the pseudopolyp first before you slice off the lesion. That would be a safe oncological procedure. I guess the only thing missing with that would be a lymph node sampling, which you could probably do by EUS even in an FNA. So Stavros is having a powwow probably I would imagine. Or he's resuscitating Sergei, who's collapsed from sheer exhaustion.

[CHUCKLE] Poor guy, he got a tough case.

**SPEAKER 3:** Yep. Well, any questions? Does anybody have any questions?

**AUDIENCE:** Actually, I have one question. What's your approach to a post-Heller patient who has persistent dysphagia? And how do you make the decision of going down doing a POEMS on that patient? What sort of IRP are you looking at? And what are the criteria that you use to decide after a Heller?

**SPEAKER 2:** The question is post-Heller, what allows you to make a decision to attempt a POEM procedure. So what kind of information do you need other than the operative notes, clinical performance barium study, a manometry that-- and flip is not universally done. It would be of interest to do a flip. Those are probably the three things that you'd want to make that decision, as opposed to just based on clinical impression, they're not doing well, well, let's try a POEM and see how you do. I think you would want some hard data. You'd want at least barium swallow and a manometric study.

**AUDIENCE:** What pressures would you be looking at? Most of these patients the IRP is reduced post-Heller. But at what point are you deciding-- let's say an IRP is now it's either 15, 14, 10, 5, 7-- all of these patients have dysphagia. All of them have an elevated record. At what point do you say, OK, it's probably worth going ahead?

**SPEAKER 2:** That's a really good question. I don't know if there is a zone that I could confidently say that's the cut off supplemented with the clinical performance. I can't answer that.



**AUDIENCE:** [INAUDIBLE]

**SPEAKER 2:** Stavros could probably, yeah.

**AUDIENCE:** [INAUDIBLE]

**AUDIENCE:** Yeah. Yeah. That's kind of what people would say.

**AUDIENCE:** [INAUDIBLE] that shows poor [INAUDIBLE]. You want to have objective data that you're going to act upon. Just [INAUDIBLE] staging alone, I can always [INAUDIBLE].

**AUDIENCE:** [INAUDIBLE]

**SPEAKER 1:** I think also depend on the type of achalasia because, with type III achalasia, the [INAUDIBLE] traditionally is not going to be enough. So the IRP is not good-- may be normal, but the patient have symptom. This as well as a criteria like flip or supplement the criteria like repeat manometry, and looking at the body of the esophagus, and barium swallow will tell you would the patient benefit from [INAUDIBLE] or not.

**SPEAKER 2:** No other questions? OK.

**AUDIENCE:** [INAUDIBLE]

**SPEAKER 2:** So you know, we've seen such a range of cases today, sitting here all day long looking at STRS, full thickness resections. It really distorts the world of case loads and management from day to day, but it's interesting. It's fascinating how facile these things are being done. So we're going to be hitting the witching hour pretty soon of ending transmission. In fact, we're there now, but--

**AUDIENCE:** [INAUDIBLE]

**SPEAKER 2:** Whoa, OK.

**AUDIENCE:** [INAUDIBLE]

**SPEAKER 2:** Yeah, can we get the mic?

**AUDIENCE:** Thanks, sorry. I was just asking about what's being done at a national level to address the reimbursement issue and sort of change those patterns.

**SPEAKER 2:** So reimbursement, that's a tough job. There is certainly interested in getting reimbursement. So I can only speak from the ASG-GI side, not the surgical side. So I don't know what the surgeons are doing to try to mobilize a reimbursement.

The [INAUDIBLE] for example, has certainly, I think, proven itself. It's set itself. There's thousands of cases done. And so what triggers the reimbursement?

Usually, it's the volume of publication and the surfacing of the procedure in the community-- so beyond academic institutions. And I think it's happened. I'm pretty sure that's happened.

But I can't answer that. I don't know where the various committees are, the [INAUDIBLE] committees, et cetera, to try to get that pushed through. But that's the second question I can't answer from you. Yeah, useless.

I just got-- I was just informed that Yahagi is going to do a ESD. So if you want to stick around, you can watch one more colon ESD in the hands of Yahagi. OK, we're going to switch to room five.

We are-- we've been watching room five, I think, haven't we, [INAUDIBLE]? No, it's room one. So we'll take room five. We're not getting any action.

**SPEAKER 3:** [INAUDIBLE]

**SPEAKER 2:** Oh, I see. OK.

**SPEAKER 3:** It's like there's, what we call, a technical difficulty.

**SPEAKER 2:** All right.

**SPEAKER 3:** --computer's timed out at 6 o'clock. So please stand by.

**SPEAKER 2:** So I can tell you for procedures like suturing, there are efforts underway, and there's been some push back saying we want to see, in addition to publications, registries. So one of the ways to try to push for reimbursement is to drive a registry, which you can have all encompassing, you know, academic institutions community people contributing to it. And it could be representative of the broader, you know, practice efforts.

And that is under way, I know, for suturing. So the AGA has initiated a registry to try to get reimbursement for endoluminal suturing. OK, it looks like we're back on with Stavros.

**SPEAKER 4:** Yes I can hear you now. So that may be the pylorus here because it's getting difficult. There's definitely no plane to continue in the duodenum.

So somewhere here, I think I have to be very careful because now I'm began to see something in front of me that could look like [INAUDIBLE] mucosa. And you see I'm doing it under water because this gives me magnification, and also I can see in more detail what's happening.

And by using [INAUDIBLE], I can cut pretty effectively under water. So it's all good. So this looks like pylorus here. You can-- I mean, to get better access to the pyloric ring, you can do some pre-cut the way we do for difficult sphincters in [INAUDIBLE].

**SPEAKER 2:** Stavros, a couple questions came up not related to [INAUDIBLE]. One question is effectiveness of over-stitch for approximating mucosal defects in the second portion of the duodenum. You had much experience with using over-stitch in the post bulbar duodenum?

**SPEAKER 4:** Yes, we've done now four or five EFDIs in the duodenum in D2 and D3. It's doable if it's the right wall. So the middle wall is nearly impossible because number one, the angle is bad, and number two, it's not mobile at all.

It's attached to the pancreas. So even if you manage to place a suture instead of approximating, the suture can tear through. So it's not really a good situation. I've also closed perforations of jejunum from B2 or ERCP and in the bulb and antrum from people putting EUS or ERCP scopes goes through. But these tend to be straight, lateral perforations, where the scope, instead of cutting the middle wall, ends up going laterally.

So those were closed successfully. Yeah, I haven't-- I had some media perforations, delayed perforations, [INAUDIBLE]. But fortunately, the last one was three or four years ago. At that time, I don't know if I didn't over-stitch or didn't try. We tried the [INAUDIBLE]. It deployed only on one lip. We then moved it.

We tried some other things-- loops, clips. But in the end I had to send the patient to surgery. So yeah, the medial wall in D2 is not a good area.

I don't know. Chris, you have experience with that? I don't think-- these things happen so rarely that you got to depend on other people's experience too. I definitely would not want to encounter a medial wall perforation ever since the last one I had four years ago.

**SPEAKER 2:** Yeah, a medial wall [AUDIO OUT] tough. However, there is, yeah, a single channel over-stitch device that will be coming out that you can rotate around at the tip of the scope. So you can redirect the throw of a needle if you're in an [INAUDIBLE] situation.

And it's going to be on a diagnostic scope, so you'll have more maneuverability. We'll see. We'll see if it--

**SPEAKER 4:** But do you think that maneuverability will outweigh not having something to grab with? That's what I'm thinking.

**SPEAKER 2:** No, no, you'll still be able to use the helix. It will be an outside [INAUDIBLE] that straps onto the scope, enable you to use the helix.

**SPEAKER 4:** Sounds like a good situation. Yeah, because the big problem is the maneuverability, both the things, [INAUDIBLE] or the over-stitch, you know, therapeutic scope, turning towards the medial wall is very difficult.

**SPEAKER 2:** Yeah.

**SPEAKER 4:** So we have a penetrating artery there.

**SPEAKER 2:** There is another question about reimbursement. Are there any codes already in existence for notes procedure? If you put the word notes on anything, you will not get reimbursed.

It's definitely a no-no. So all reimbursement parties regard notes as experimental. So you should not use the word notes. You can use anything else that's descriptive and gets the message across, but don't use that word.

**SPEAKER 4:** See now, I believe we are at the pylorus.

**SPEAKER 1:** How you could tell is the duodenal mucosa is [INAUDIBLE] when you're cutting will tell you you get to duodenal mucosa?

**SPEAKER 2:** OK, so the question is, the duodenal mucosa-- how do you make that-- how do you discern that?

**SPEAKER 4:** Well, it has this orange color when seen from the underside. It's vertical in front of you like a wall stopping you. I assume we are talking about [INAUDIBLE].

**SPEAKER 2:** Right, right.

**SPEAKER 4:** And sometimes, it has little clumps of fat globules about a millimeter each interestingly. I don't know what that's from. I was wondering.

A lot of my patients had Botox before, and I was wondering if that's the reaction to the Botox injections. But they often have these fat globules. We may be-- we may see this soon here.

So I just have to get through this vessel. I see some pink-ish [INAUDIBLE] wall ahead of me, I believe. So let's see if I can coagulate this very carefully.

Yeah, there's the fat globules. You see them? So there's the fat globule.

**SPEAKER 2:** Straight ahead, right? Yep.

**SPEAKER 4:** And there's-- you can see the salmon colored orange pink layer dipped to the submucosa right there, right? So where-- yeah, so this is about where we should stop. I'll try to show it better if I can. This is basically the pull technique that Dr. Joe was talking about.

See, this is the [INAUDIBLE] technique. But then here on the edges, I will basically cut like this, pulling the scope backwards and trying to not go to D, this kind of pull technique. And again, the reason is the same-- mucosa that is very close to the muscle and you are trying to cut away from.

OK, there. You see that? You see it more.

Like, you see this whole network of little fat globules. And you can see that pink salmon-colored mucosa right there behind the few strands of submucosa that are left. I tried to do as complete a pyloromotomy as possible.

But what I'm doing now is dangerous because the front end of the hybrid knife is very flat, and I could injure the [INAUDIBLE]. I'm gonna inject a little more, and now it's time to switch to the hook knife because where we need to go. There's more submucosa than you usually see, though, and that's partly because of the manipulation that I did to the pyloroplasty.

See, normally, you don't see it straight away similar to the [INAUDIBLE] and the [INAUDIBLE]. See, here, I do see it, kind of straightaway in the duodenum there. See, that's the pull technique.

So let's-- I'm going on now go and see. Sometimes, you can tell where your tunnel is from the

puffiness and/or cautery on the surface of the mucosa. So I'm gonna see if I see any marks like that to tell me that my tunnel is exactly where I want it over the pylorus.

So let's go outside and see. Yes, so it's getting-- so I'm suck this. Suck out the water.

Normally, [INAUDIBLE] is faster than this, but this is a tricky one. OK, so let's see. So this is the entry. So you can see the balls now there, right? At the bottom of the pylorus?

**SPEAKER 2:** Yeah, it's kind of-- it's [INAUDIBLE] on the opening of the pylorus. Yep.

**SPEAKER 4:** Interesting that it almost appears as something like a lesion here, right? Here-- it's probably a hyperplastic polyp, but you can see that puffiness now going all the way to there.

So we are good. Let's go from inside. Hang on. I see a very long tunnel.

OK, so we can now use the hook knife to carefully cut. We need lubricant. The thing with the hook knife is it's a very fat catheter. So if you get into a bleeder [INAUDIBLE], you can suck.

You can with a dual and even better with a hybrid, which is something like 2.3 or 2.4 millimeters. So this is the-- OK, open. So again, see, when you hook this, it appears perfectly safe because you're on muscle.

But unfortunately, as I said, the mucosa could be right under the hook knife there because of the way it drops backwards on the duodenal side. And then there are these big vessels in the depths here. This looks nice and thick. I don't think anybody has figured how far back to go here in the antrum. You definitely need to cut the pylorus, which is very nice and fake, as thick as you see it here-- that's a bit satisfying.

**AUDIENCE:** [INAUDIBLE]

**SPEAKER 2:** Yeah, I think, you know, this really demonstrates how nicely-- how thick it is in that spot.

**SPEAKER 6:** A little bit to the right?

**SPEAKER 2:** Hm, I'm OK.

**SPEAKER 6:** OK

**SPEAKER 4:** [INAUDIBLE] is getting uncomfortable. He wants to turn my knife to the side. Now, it's a good-- that's a good point because we're getting to some thin membrane here.

And the fear there is the vessels that lie in there. Let's see. OK, OK, It's nice and thick.

**SPEAKER 6:** Nice.

**SPEAKER 4:** So now the question is do we-- what we have here. So this doesn't look very muscular and should probably be left alone. And now we can cut a little bit out here.

So here, we can switch back to the hybrid because it's so dangerous to continue cutting with a hook knife this way. And I want to inject between the serous and the muscle just to clarify the plane. I mean, most people would stop right now, right?

**SPEAKER 2:** Yeah.

**SPEAKER 7:** Most people. We're not most people [INAUDIBLE].

**SPEAKER 8:** That's for sure.

**SPEAKER 4:** We just want to make sure.

**SPEAKER 7:** We're spicing it up a little bit.

**SPEAKER 8:** [INAUDIBLE] put you in the tunnel?

**SPEAKER 4:** What's happening with Yohagi?

**SPEAKER 7:** [INAUDIBLE] 6:59 [INAUDIBLE] hour. Already one hour over time.

**SPEAKER 4:** Open.

**SPEAKER 7:** 6:59 [INAUDIBLE]

**SPEAKER 4:** Open. OK, so look. So now you can use the injection to clarify the plane.

So you can inject there and then that gives a little protection, and then cut that, and maybe inject there, and sort of do a little pool maneuver there. Oh, I just sucked some vessel. So you can see even a small bleed here could turn into a very difficult situation because the fluid is pooling there and the scope has no one to one movement.

In fact, you have to push with all your force to get to the end of this tunnel. So it is not a good place to get the bleeding

OK, so this is a little deep. OK, so sometimes, I go full thickness, to be honest. But then this person, maybe that's not exactly a good idea.

Her abdomen, if there's a perforation and you want the surgeon to do something, it will be impossible access. Up to three operations of that magnitude, the stomach is going to be encased in a wall of scar tissue. So you gotta be careful.

**AUDIENCE:** [INAUDIBLE]

**SPEAKER 4:** See here, here you start seeing the vessels. That's a vessel they're crossing, and they're all embedded in the scar tissue.

I don't know, what do you think? Greece, what do you think? I think this is the duodenal mucosa there. I can try to cut here, but I'm afraid that this--

**SPEAKER 2:** No, I think-- I think-- I think you're good.

**SPEAKER 4:** Behind there is where the mucosa is. So I could cut this maybe.

**SPEAKER 2:** Yeah, if you could, but I don't think it's going to matter that much.

**SPEAKER 4:** [INAUDIBLE].

**SPEAKER 2:** I think you-- you know, I really think you've pretty much got it.

**SPEAKER 4:** OK. See there, you can see the serosa right here. Yeah, I think that's it. So we're gonna call it here.

And that's it. So this made a bit of a divet on the bottom where the [INAUDIBLE] is, but let's hope it helps here. I don't know.

See, now the shape changed, making it more of a drop shape. So anyway, that's it. So I'm going to suture this closed. OK, sure, sure.

**SPEAKER 3:** OK, we're going to go to-- we're going to get a history on the next case, [INAUDIBLE] and then we're going to drop in room five with Yohagi, OK?

**SPEAKER 4:** Yes.

**SPEAKER 9:** So this is an 83-year-old woman with a history of coronary artery disease, status post MI, hypertension, emphysema, and a T4N1b colonic adenocarcinoma, status post extended left



hemidiaphragm colectomy in October, 2016, with subsequent chemotherapy who was noted on one year surveillance colonoscopy to have a 2.5 centimeter Paris IIa lesion in the ascending colon with aborted EMR due to non-lifting sign. So the patient now presents for lumenDi-assisted endoscopic submucosal dissection. The benefits are minimally invasive technique to assess histopathology and resection and block to ensure zero chance of recurrence.

**SPEAKER 10:** Yep, welcome. I already inserted the colonoscopy to this patient, and I found the lesion is located right behind the hepatic fracture. Unfortunately, most of the lesion is located right behind this [INAUDIBLE], so it is quite difficult to get the entire image of this lesion.

But I guess that this is much bigger than three centimeter and this region is crossing over the [INAUDIBLE], and it's extending to the other side like this. Unfortunately, the majority of the surface structure still keeping the regular shape. So this looks like a benign lesion, not a malignant one. Therefore, minimal invasive treatment by ESD would be the best treatment option for this patient.

As I mentioned, I always spray indigo [INAUDIBLE] before studying actual endoscopic resection procedure to have nice enhancement of the surface structure and also to check the gravity, direction of the gravity. Now I already sprayed indigo [INAUDIBLE] to the target point. And again, most of the surface structure keeping the regularly arranged shape-- so this is basically a benign lesion.

And dilation of gravity is good enough, but the maneuverability of the endoscope is quite poor and I cannot keep the good position of the endoscope because of the location of the tumor. But I'll try to do my best. In this particular situation, I usually inject a little bit larger amount of solution to lift up this area from the muscle [INAUDIBLE] of the [INAUDIBLE]. So I'm going to inject the [INAUDIBLE], I guess.

**SPEAKER 11:** [INAUDIBLE]

**SPEAKER 10:** Yep. Then if it is necessary, I will switch to the much viscous agent. So I'm introducing reducing the injection needle.

Unfortunately, we already use all the [INAUDIBLE] now. So we have only standard steel knife. And unfortunately, I don't have any experience using [INAUDIBLE] system, so I just want to perform Carrasco ESD procedure using Carrasco dual knife. But I try to do my best.

OK, needle out, please. Flush it. OK, after we start the initial mucosal incision, I usually target the light beside the [INAUDIBLE], like here.

OK, injection please. OK, stop it, please, and go to little bit up the slide. Injection please. OK, stop. It's relatively difficult.

**SPEAKER 2:** OK, we're going to jump to Stavros' room real quick, OK?

SPEAKER 10, Yes, [INAUDIBLE].

**SPEAKER 4:** So actually, I did do the full thickness [INAUDIBLE]. I just couldn't stop myself. So this is full thickness myotomy here.

You can see the big vessels I'm talking about. This is like the area of the gastroduodenal [INAUDIBLE] So this is full thickness, but we preserved the peritoneal membrane.

So it looks-- now I'm satisfied that we don't leave any muscles about 1 and 1/2, 2 centimeters long. And it's through the pylorus. You can see the fibers of the pylorus there, and there. And it's full thickness, OK?

So now we're going to suture. So you can go back to [INAUDIBLE]. And then maybe you come see two minutes of the suturing and that will be the end for this case.

**SPEAKER 2:** We should we should go over to Sergei's room. Let's--

**SPEAKER 4:** OK, Yeah--

**SPEAKER 2:** --jump in there.

**SPEAKER 4:** OK, maybe Sergey, yeah.

**SPEAKER 2:** OK, Sergey. We're--

**SERGEY:** So Chris, the problem was that I ran into major, major bleed in there. So the lesion was practically completely attached with that submucosal injection. So at some point, I could not go any further.

And when I did dissection, I got into major bleeding. So in order to stop the bleeding, I had to finish it piecemeal and after piecemeal injection was able to control the bleed. And now I'm just

evacuating all the blood out of it.

It's huge, polyp. No question about it. But the biggest problem was not death. So here, you can see this is the place where used to be a polyp.

So everything is done. Everything is resected. But this part of the polyp is just-- it's almost circumferential. So you see it starts from here, and it goes up to here. But this portion of the polyp was [INAUDIBLE].

**SPEAKER 2:** Wow.

**SERGEY:** So that's where I could not separate myself.

**SPEAKER 2:** That's quite a surface area. Yeah.

**SERGEY:** Yep, so everything is done. Everything is removed unfortunately in piecemeal fashion. But there was no other choices for me.

I went as far as I could with this [INAUDIBLE], and unfortunately at some point, it could not continue like this. So that's the end of it. I will suture it, but let me clean all the pieces and then we will suture. Even this is still blood vessel. Can I have those quarts of--

**SPEAKER 2:** OK.

**SERGEY:** So there is no active bleeding, as you can see. But just to show you how much blood was there, look at this.

**SPEAKER 2:** Oh, yeah, OK.

**SERGEY:** The whole colon was filled with blood.

**SPEAKER 2:** Sergey, that was a monumental effort to try to get at this monstrous polyp.

**SERGEY:** Should have stopped early.

**SPEAKER 2:** OK, we're going to go to room five real quick. Jump to five.

**SPEAKER 10:** I just started the initial mucosal re-incision from the anal side in a straight position. And unfortunately, as I mentioned, the maneuverability of the endoscope is quite poor. So I tried to stabilize the tip of the endoscope using some sort part of the transparent hood, then tried to make a smooth mucosal re-incision at the lower side of this polyp.

Now I'm cutting the surrounding tissue here using dry cut mode of the biosystem. And right after the initial musosal incision, I usually trace the same line using swift [INAUDIBLE] mode to open the submucosal space. Maneuverability is really poor at this moment.

And unfortunately, this knife doesn't have injection capabilities. So I have to carefully dissect the submucosal tissue until it completely opens. I'm stepping the hood pillow intermittently to control the rinse of the dissection and also to minimize some damage of the tissue. So it's gradually opening. OK, may I have injection-- wait, wait a moment. I would like to open here to the left side a little bit.

**SPEAKER 2:** OK, let's-- we're going to switch to room one to watch Stavros close his pyloral myotomoy, OK? Yep.

**SPEAKER 4:** After interacting with [INAUDIBLE] Yohagi [INAUDIBLE] for suture--

**SPEAKER 12:** [INAUDIBLE]

**SPEAKER 4:** So here, so we're gonna suture in one minute and then you're going to go back to [INAUDIBLE]. So this is the nice, small defect. And we're going to have maybe two pairs of sutures. That's it.

So start on the left. Try not to grab the muscle because that will cause pain. But try to cut submucosal. Basically, [INAUDIBLE]-- you're pulling on my suture, and I cannot give slack.

**SPEAKER 13:** I'm sorry.

**SPEAKER 4:** The problem with doing this in the [INAUDIBLE], you need to give slack. You need to come to mid-body because, otherwise, there's too much friction.

We also [INAUDIBLE] everything. So for this, and we're-- here it is. And then it just is running suture again, distal, proximal. Now we're cutting the suture.

So what you do is you pull back. And then you close and open, close and open, pull back, close and open. Ah, and usually, this works, but not in the antrum.

OK, I'm free. So one more-- one more pair, and that will be it. And again, the closing with clips, I think, for [INAUDIBLE] is even more problematic than for [INAUDIBLE] because of how thick-- you saw these thick edges. I mean, I don't know that clips would hold very nicely over that at

all. It's-- that's a small hole.

**SPEAKER 13:** [INAUDIBLE] One.

**SPEAKER 4:** OK. Oh yeah. OK, [INAUDIBLE] is so easy, you don't even have to see what you're doing.  
So here-- so now we're going to cinch it. And Demitri has a special delivery. We'll show you the [INAUDIBLE] specimen fresh from the transumbilical extraction.

**SPEAKER 14:** Unreal.

**SPEAKER 2:** Yay!

**SPEAKER 4:** Can you-- see? Intact capsule, intact mucosa.

**SPEAKER 2:** And the pulley.

**SPEAKER 4:** And the pulley is in there, right. Can you zoom more?

**SPEAKER 13:** They said zoom out. Yeah.

**SPEAKER 4:** Oh, zoom out? OK. OK, there you go. [INAUDIBLE], yeah.

**SPEAKER 13:** Good.

**SPEAKER 4:** OK, So we're done with our closer, done with the specimen. So you can return to--

**SPEAKER 2:** We can back to Yohagi.

**SPEAKER 4:** And I'll go in his room, and maybe we can say goodbye together in, say, five minutes.

**SPEAKER 2:** All right. Let's do that.

**SPEAKER 4:** With Doctor Yohagi. So I'll see you in Yohagi's room.

**SPEAKER 10:** I just extended mucosal re-incision to the oral side. Again, the maneuverability is still very poor, but I carefully made a mucosal re-incision in conducting the submucosal dissection and the incised area. So sometimes, the ESD is very difficult.

But if we are carefully dissect the submucosal tissue, still it is possible to conduct the ESD even with this very difficult situation. Now we can see the nice submucosal array here catching the submucosal tissue and very carefully dissect the target tissue with the small tip of dural

knife. And inserting the tip, we can then recognize the submucosal layer and dissect it.

Usually, we can use the gravity effect to open the submucosal space. But in this particular condition, it becomes very difficult to utilize the gravity to open the submucosal space. Therefore, I'm using the transparent food to open the space.

Still, it's very effective but very slow. OK, can I have injection? So basically, once we get good maneuverability of the endoscope, the ESD is not a difficult procedure.

But if the maneuverability of the endoscope is quite poor, it is very difficult and even risky. So please check the maneuverability before starting actual procedure, and if you feel it's very difficult, please try to get some accessories, such as [INAUDIBLE] system, or balloon-assisted overtube from Olympus or Fuji. Open it, please.

Injection, please. OK. OK, stop it.

And also here-- now it widely opens. Injection, please. OK, that's very good. OK, could I switch back to the dual knife?

**SPEAKER 2:** So you've made it to circumferential?

**SPEAKER 10:** Oh, not yet.

**SPEAKER 2:** Not yet, OK.

**SPEAKER 10:** Yeah, I usually make a partial mucosal incision and quickly make a submucosal dissection. Still, upper part is remaining.

**SPEAKER 2:** Oh, yeah, OK. I see it. Oh. [INAUDIBLE]

**SPEAKER 10:** Open, please.

**SPEAKER 13:** Down. And also [INAUDIBLE] here [INAUDIBLE].

**SPEAKER 10:** Very difficult-- OK, now it widely opens. Mm-hm, yep, yep.

**SPEAKER 13:** [INAUDIBLE]

**SPEAKER 10:** Now we can see the muscle fiber below the submucosal tissue. [INAUDIBLE] this area is already mascerated, so we should be careful not to injure the muscle [INAUDIBLE]. We can change the patient position to have much better maneuverability.

Could you change this patient position to the left [INAUDIBLE] side again? Oh, the [INAUDIBLE] of the chorion is very, very severe. So it becomes really difficult to keep the good scope position.

**SPEAKER 14:** [INAUDIBLE] scope [INAUDIBLE]

**SPEAKER 10:** Can I have an injection? I'll try to inject a little bit large amount of solution to the upper sides here and try to open the space to have enough working space. Open it, please.

OK. Injection, please. OK, stop.

Oh, looks fine. A little bit more here. Oh.

Injection, please. OK, stop it, please. OK, can I have dual knife?

Open it, please. OK. Oh, slippery.

**SPEAKER 2:** OK.

**SPEAKER 10:** Mm-hm.

**SPEAKER 4:** It's that time, unfortunately.

**SPEAKER 10:** Yeah, yeah, it's [INAUDIBLE]

**SPEAKER 4:** No, we officially declare Long Island [INAUDIBLE], but [INAUDIBLE] is not over. [INAUDIBLE] is never over. You should take that lesson.

**SPEAKER 10:** Of course, I'll try to do my best.

**SPEAKER 2:** Yeah.

**SPEAKER 4:** Sergay did a giant job, tried to beat this polyp, the white whale.

**SPEAKER 2:** You've all done all done a wonderful job.

**SPEAKER 4:** Yes. Thank you very much for staying, those of you in the audience and Chris. Great job, thank you for all the hours of moderating.

**SPEAKER 2:** You're good.

**SPEAKER 4:** See you at dinner.

**SPEAKER 2:** Yep.

**SPEAKER 13:** Thank you.

**SPEAKER 10:** Thank you.

**SPEAKER 2:** Bye bye.

**SPEAKER 4:** Bye.

**SPEAKER 10:** Bye.