

RYAN LEVY: All right, thanks Katie. So I've been asked to talk about conduit preparation. Dr. Hofsetter went through some of the points which are going to be in this talk, which I think is good actually, because it goes to show you that-- and emphasizes what his point was, was that, if you're going to transition an operation from open to minimally invasive, it's got to be done similarly, or the-- close to the same way. So some of the points that he emphasized, you're going to see here for that very reason.

So I think there are four key points to making a good conduit. Some of it is planning in advance. And part of that is suitability of the conduit, meaning can you actually use it for reconstruction?

Part of it is the technical factors actually during the surgery, in that how do you mobilize it? How do you prepare it? How do you form it? How do you staple it? And then it's preserving proper alignment. Once you've made it, you don't want to screw it up by twisting it, or not aligning it properly, because then all the work that-- the hard work is for naught.

So in terms of assessing suitability of the conduit-- and Jim makes a big emphasis on this, about assessing in advance. So many patients now are going for induction therapy. I mean, I, in my practice, I might not do as many esophagectomies a year as Jim does, but you know, I'd say 80% of the cases I'm doing are induction cases right now.

And assessing the stomach in advance, especially when a lot of these tumors have gastric cardia extension, is very important. A lot of times, I think the scans and the outside endoscopy reports often underplay the amount of involvement of the stomach on these gastric cardia tumors.

And endoscopic and laparoscopic assessment is critical. So it should be done, ideally, prior to induction therapy, both endoscopically and laparoscopically. It lets you assess proximal distal extents of tumor, is the stomach usable, and then how high does it need to go. Does the patient have long-segment Barrett's, that's gone all the way up to the proximal esophagus?

And those are all considerations, in terms of what conduit am I going to use, and is it going to reach. We talked about the point of is there significant gastric extension of tumor. That's going to impact where I'm going to have to start making my gastric tube, because-- and this is why I think the laparoscopy is so critical.

Sometimes, endoscopically, it can be a little bit hard to tell, is that tumor close to the inside [INAUDIBLE] or not. And then you put the laparoscope in, and you see, jeez, there's bad looking nodal extensions that-- you know, perigastric fat-- that's going all the way down to the inside [INAUDIBLE]. And you say, well, maybe I can't use that conduit. So there's both tumor-related factors, and then there's non-tumor-related factors.

Monday, I did an esophagectomy on a lady that had two prior giant paraesophageal hernia repairs. So it was an induction case. She'd had a laparoscopic giant para repair about 10 years ago. And then she developed a big recurrence. And an outside surgeon had done an open giant para repair re-do.

So now, I've got a lady that's had induction therapy, has had two prior giant repairs. And you know, I don't know if that stomach is going to be good or not, so we had her prepare for a colon. We were able to use the stomach.

And we did the whole thing minimally invasively, thank goodness, but you know, that's a case where, as we're mobilizing the stomach intraoperatively, and dissecting out this third-time-redo hernia, I didn't know if that stomach was going to be usable. So all these are considerations before you get to the time to do the esophagectomy, not the day of.

Gastric mobilization-- what are the key points? We want to do a no-touch technique. We want to minimize grasping and grabbing along areas that are going to be our new conduit. We never want to grab the arcade, or really manipulate the arcade.

If you have to get close, try to grab the fat around it. Don't grab any of the branches of it. And we try to limit our grasping on the lesser curved side as much as possible. And on the posterior side, try to lift, as opposed to grabbing a lot.

So all of these things avoid all that bruising and ecchymosis. And you know, the last thing you want to see when you go to pull it up in the chest, when you getting ready to do your anastomosis, is this thing looking all purple, and beat up, and ecchymotic. That's, kind of, when you get that, kind of, feeling in your gut. And you just start praying, I hope it works. You don't want that feeling.

So, in terms of the sequence of events for mobilization, mobilizing the greater-- the lesser curve, aggressive mobilization along the greater curve to make things mobile-- during the course of that, sort of, antropyloric mobilization, we always want to preserve the right gastroepiploic.

As Dr. Hoffstedder said, he's using a lot of omental flaps. I pretty much, and I know Jim does now, almost routinely use omental flaps on induction cases. I'm not using them on non-induction cases.

And Katie actually just, I think, presented an abstract, or submitted an abstract that we looked at. We didn't see a difference in our complication rates with omental flaps, but I still do them, maybe because it just makes me feel better. I'm not sure.

But if you want to create an omental flap, you've got to plan it as you're doing the mobilization. So you preserve a couple of branches, so the flap is viable. I think one of the things that I've noticed in training a lot of the fellows and residents is, the place where they get the most, sort of, hesitant is that antropyloric stuff and the retropyloric stuff.

And that's the most critical area. If you talk to Jim, he'll tell you, he thinks pyloric mobilization and antral mobilization is more important than a Kocher maneuver, in terms of getting things to reach. So all those little attachments down by the base of the arcade where it, kind of, inserts, that's the critical stuff, more so than a Kocher.

We'll do aggressive Kochers when we're going to the neck. But for most Ivor-Lewises, we're not doing a real aggressive Kocher maneuver. We used to, but we've, kind of, gotten away from that. I remember the old days, where we would have the whole darn thing done. That was when we were doing all the 3-holes. And now, very rarely does it look like that after we've mobilized.

When you're assessing your length, a good estimate is that the pylorus should very readily reach the caudate lobe or the base of the right crus. And if it does, and you're doing an Ivor-Lewis, you should be good, shouldn't be a problem.

What we really do these days, as I mentioned, is really a mini-Kocher. I don't consider it a full Kocher, because we're really only doing D1 into just where the thing turns over into D2. I put this slide up. And again, Dr. Hofstetter brought this point up, but I'm going to emphasize it, because when you're mobilizing on the arcade, along that greater curvature, I think it's very important to try to preserve those ultimate branches of insertion.

Because exactly as Dr. Hofstetter said, I don't like that anastomosis-- if we're doing an Ivor-Lewis, I don't like it to be more than two centimeters away from the insertion of that last branch, so I'll make a mental note when I'm doing the case of where that last branch inserts. And I want my spike to be coming out just above that last branch, so that it's really close, so that tip is always perfused. And one of the ways that I think you can ensure that is, when you're starting out, most people, when they enter the lesser sac, they'll, kind of, enter right over here, kind of, where that left and right arcade will have that little anastomosis, where it, kind of, tends to be clearer.

But what happens a lot, and I see this when people are mobile-- are doing Nissens, for example, or giant hernias, is that a lot of people will take that ultimate branch, because it's the one that anastomosis with the vessel that's going out towards the spleen. And I try to, kind of, save that as much as I can, and go, as I'm coming in here, make sure this is saved. And I'll, kind of, come out here a little bit, and then go up.

And I think that gives you that extra blood vessel or two sometimes, so that when you're in the chest, you'll always have that spike within a couple of centimeters. You'll never have-- be looking at three or four centimeters, and then the first blood vessel when you're doing the anastomosis.

So I think it's really important to pay attention to that area where the left and right side anastomose right here, and try to come out just a little bit to save that last branch. It's much easier just to take it all the time, but I've found, at least, that I think it helps.

So before you start stapling, make sure there is no NG tube in the stomach. I've seen this happen before. It is a very sickening feeling when you start stapling, and you staple through that NG tube-- so nothing in the stomach. Generally, the vascularized tissue and the lesser curve, we try to-- tumor permitting, we try to save a couple, one or two, of the branches of the insertion in the gastric. Those are, kind of, those crow's foot branches along the lesser curve. And we'll take those with a gold load.

And then it's the assessment time, in terms of starting on the lesser curve, and where do you start. And this is tumor-related factors. How low did the tumor go? How high do I need to make the conduit? How narrow am I going to make it? Sometimes, if we have a tumor that had a fair amount of cardia extension, we've got to start real low, almost right above the pylorus. And then you're making a really, really narrow tube, with almost no antral reservoir, so that's dictated by tumor factors.

And then for induction cases, lots of times, I'll just start with a black load, because it always tends to be stiffer. So I've gotten away from using purple loads on the first two fire-- first fire or two. And I'll almost always use a black load now. It just tends to crack less, and bleed less. And you never have that, sort of, tension feeling.

We always use 45s. We never use 60s. And the reason is, it's much easier to correct a mistake or a bad angle of one load with a 45 than a 60. And we-- again, we want to elongate that tube, so we want to follow this-- the greater curve, and follow the line of the short gastrics. And if we're firing with 60s, it tends to be more angulated, whereas, if we're firing with 45s, it's little bites following the circumference of that greater curvature, which tends to elongate the tube and give you more length.

If you need to measure the diameter of your tube as you're making it, the quick and dirty way is just to open a Snowden, and from tip to tip, it's 2 and 1/2 centimeters. So for most of the time, we're making, like, a, anywhere from a 3 and 1/2 to 4, or 4 and 1/2 centimeter tube. That Snowden distance is a very good measurement, so that you can keep it constant. So often, as I'm making it, I'll just open the Snowden, open it, open it, open it, and measure from the short gastrics in with the Snowden, so that my distances are the same, and I'm not varying the width of the tube as we make it.

So pitfalls, and things to avoid-- tearing at the staple line V. You have to keep an eye on your assistants when you're doing it minimally invasively. And you have to constantly reposition their hands. If people's hands get a little lazy, what's going to happen is, it's going to drop.

Because we want the gastric tip, we're going to have the assistant on the patient's left side. We really want them taking that gastric tip, and pushing it as far as you can into that left-upper quadrant, up under that diaphragm, to elongate the stomach, and elongate the line of the short gastrics. But at the same time that's happening, we've got an assistant with a grasper on the antrum pulling downward. So we're doing this, and we're stretching it. And then you've got the surgeon's left hand that's on, sort of, the specimen side, on the lesser curve, pulling up this way.

So two people are going this way. And the surgeon is going this way. And what you get is, that V, kind of, does this. And just like when you're doing a collis gastroplasty, you don't want to tear that V, and tear that staple line, so it's very important to keep an eye on the vectors and the forces of who's pulling where.

Spiraling of the conduit, Dr. Hofstetter talked about this. And that's that haircut maneuver. You got to keep the line of the short gastrics in view. And you got to keep them oriented, otherwise, you'll end up with a spiral tube. And you'll end up with a blue tip that you, again, gives you that sickened feeling that you don't want to be looking at in the chest.

We try to make it so that the staple lines are consistent, and you're not having this constant ridge effect. We don't want ripples. We don't want, like, a ruffled edge, or a sawtooth edge of the staple line. It should be a nice, one-- look like one continuous line, almost like you fired it all in one at the end. It shouldn't be all jagged and sawtooth.

And one of the other mistakes that I think people make a lot, especially when they're starting out, is you get a little nervous, and you start that staple line above the inside [INAUDIBLE]. And if you do that, you're going to have a very short tube that you're not going to be able to reach. So it might look like it's OK to start above, but if you start above, you're going to end up with this big reservoir and this short tube. And then when you pull it up, you're going to end up with an antral reservoir sitting in your lower mediastinum, which we know is not great for reflux and regurgitation.

So these are some of the points that we just went over-- elongating the tube as you make it, using the length of the greater curve to your advantage, setting it up with your left hand and your assistants, and don't lose sight of the line in the short gastrics. So this is just the schematic. And again, this is, sort of, what I was showing you, in terms of the tip-- the assistant on the patient's left side, on the gastric tip, going up into the left-upper quadrant, the second assistant pulling down towards the right foot, and the surgeon lifting along the lesser curve. And we're trying to keep it straight, so that we staple straight and don't spiral.

One of the underestimated steps of the operation is, we've made our tube, and things look good. And now we're getting ready to prepare to be-- to start turning. And this suture-- the stitch that holds the conduit to the specimen needs to be oriented appropriately. If you don't line up greater curve to greater curve side, lesser curve to lesser curve side, when you pull it up, it will twist.

And it's very hard in the chest, once you've pulled it up, to decide which is the right way. So if you sew it lesser curve to lesser curve, greater curve to greater curve, the orientation will be preserved. And you won't be guessing when you're in the chest. It's a very disconcerting feeling when you pull it up, and you're not sure if it's spiraled or not, so you want to try to avoid that.

The other thing we'll do is, if we've made a flap, we'll secure the flap as well, so that when it comes up, it, kind of, comes up as a unit, and you're not having to reach down through the hiatus to pull that flap up and exert tension on these vessels. So we'll, just like we secure the tube to the specimen, we'll secure the flap to the specimen.

So in terms of the final steps, a gentle push from the belly into the mediastinum, just so that enough of it's up there that it's easy to retrieve. It's very important to do some mediastinal mobilization from the abdomen to have room to get it up there. If you don't do any, minimally invasively, it's hard to shove it up there. And then you're in the chest, and you're trying to retrieve it through the axis incision, and you're struggling. So a little bit of mediastinal work from the belly side is very helpful.

We always want to check the lesser curve for hemostasis before we turn. They'll be-- often be little bleeders that you can either bovie or clip. And then, as I said, I always make a mental note of where I want to spike, that anvil, to be deployed before I go to the chest, so that I, kind of, have a spot in mind of where I'd like to anastomose.

And the last thing, which we've started to do in the last couple of years, that Jim thought of, which I think is very helpful, is putting a marking stitch, kind of, right where that conduit starts to widen on the lesser curve staple line, so that when you pull it up into the chest, you have a mark, where you say, OK, I don't want to be above this. I don't want to pull up more than this. Because then you're going to be pulling antral reservoir into the chest, and we're going to have a set up for a conduit-- a redundant conduit that's not going to drain well, when the patient's going to be complaining of reflux and regurgitation. So that's one of those functional things, where we have-- we put this stitch in, and mark it, so that we see it.

So this is what I was, kind of, talking about. And I think Nick is going to go over this when he does the anastomosis, but picking your spot, and try to be within a couple centimeters of that last insertion of the vessel can really help, in terms of preventing tip ischemia.

And that little lightning bolt-- this would be where the stitch would be. It's right where that angle is, so that this is below the diaphragm. And only the tube part is up above. So I found the stitch to be helpful, actually. Thanks a lot.