

**DR. BLEDAY:** Good morning. I'm Dr. Ronald Bleday. I'm working with Dr. Melissa Murphy to do a laparoscopically assisted total colectomy for a young gentleman with severe ulcerative colitis. He's had the colitis for about two years, but it's become very severe since the summer, over the past several months. He's tried a lot of very strong immunosuppressive agents and none of them have worked. And so we're now doing the surgery.

Eventually we'll be able to take out all of the colon, all of the rectum, and rebuild the rectum so he goes to the bathroom the normal way. But right now he's on intravenous nutrition because of his malnutrition and is getting high-dose steroids. So today we're just going to take out the colon and leave the rectum, and create a temporary ileostomy

And once he recovers, and is eating, and is off all of his immunosuppression, then we'll come back, probably in about three months, and then do the reconstructive surgery.

So we open-- we get air into the abdomen, or CO2, with what's called a Veress needle technique. We go into the left upper quadrant, which is an area that has very few organs, and this is a blunt tipped needle that oftentimes can get in without any injury to the-- perfect-- without any injury to the bowel. We then-- put the gas on-- we then insufflate CO2 to distend up the abdomen. Opening pressure is, was eight.

So today we're going to use a technique called a hand assist technique. What one does is that-- one has to make an incision in order to get the colon out of the abdomen, so one utilizes that small incision with what's called a gel port-- why don't we go from about here to there-- with what's called a gel port, and I'll put my hand actually through the gel port and it will make a seal to keep the air in around my wrist.

And I will be doing that procedure while Dr. Murphy's holding the camera, and also another instrument in order to take the colon-- disconnect the colon and take it out. Yeah, looks pretty good in here. Here's his liver. Looks OK. Colon externally doesn't look inflamed, which is good. We'll look at the small bowel. Some adhesions up here. It's going to be really [INAUDIBLE].

So what's interesting here is that the bowel on the outside, externally, looks totally normal. You can see that this is the proximal colon, and then the bowel-- we're going to look at it more specifically-- but this looks like the distal small intestine, which looks totally normal. So this is a good indication that this is colitis and not Crohn's disease.

One would not necessarily want to do reconstruction, reconstructive J-pouch with Crohn's disease.

All right, great. Now let's get the hand port. So go from just above there. Yup, perfect.

Now we're going to put what's called the hand port in. And one has to make an incision anyways, and so this utilizes that incision, with a really kind of a unique instrument that allows for a seal around the wrist so you get your hand in the abdomen and use it as an instrument.

So what you have over here is the stomach and what's called the duodenum. And this is what we're going to do now is separate the colon away from the structures. Awesome. You can see he has a normal gallbladder and normal appearing liver. And what happens here is that, as we get into these planes, the air from the insufflator will actually help do a little bit of the dissection.

So this instrument called the LigaSure is what we use. There's a couple other competing-- we call them energy instruments. So what does it do? It seals the vessels, sort of melts the connective tissue together-- good, right there-- so we don't have to do a bunch of cutting and tying. Saves a lot of time.

So essentially, for the next probably hour and a half, we're going to be taking down all the various connections. First we mobilize up these lateral connections that will go to what's called the mesentery where the blood vessels are, and we'll do everything with either a cautery or this LigaSure.

So my job is to create the plane and to keep the other sort of the bowel and the organs that we don't want to injure out of the way. And Dr. Murphy will then come in and grab the tissue and-- we're doing a little bit [INAUDIBLE] with what we call blunt dissection. If the tissues separate with us just tugging on them then we'll do that. You don't want to do too much of that, since it could lead to bleeding.

So why don't you come up here.

So we're coming down to what's called the cecum, which is the base of the lowest part of the right colon. And off the cecum is the appendix. Let's get this stuff down.

So this is-- again, I'm just mobilizing up the right colon. It can be done in two parts. It's attachments and then it's mesentery. Again, a mesentery is the attachments that carry all the blood vessels. Now we're right down near my hand, so we actually can do, utilize, towards the end of the case, the small incision to get a lot of these attachments.

So we're getting now to the junction between the small bowel and the large bowel. Again, it feels normal, which is important to distinguish small bowel Crohn's disease. We want to make sure we identify Crohn's disease from colitis. Not so much at this operation, but we certainly need to know it before we do the next operation, which will be a-- proctectomy.

Yup, good.

So now we're back up. We're going to go to the next layer, this is the transverse colon. And he has a little bit of omentum. Omentum's a fatty apron off the stomach that drapes over the colon, and can be very generous in some people. It's-- he's lost a lot of weight because of the colitis, so it's an energy source. So it's pretty much gone. Makes our job much easier.

Yes. When we go take the left colon down we'll see it. Now this is what's called the duodenum, right at the tip of my finger. And we want to stay away from that. And see how close it is to our dissection. So we don't want to touch it with the hot instrument.

It looks like the omentum and the mesentery are still kind of plastered together or sealed together. They'll separate into what's called the lesser sac as we go from the proximal transverse colon, which I'm touching with my finger, to the distal transverse colon, which is almost behind, underneath our camera right now. So we're just trying to separate this, again the small membrane of omentum, because then when we get to the mesentery we really have to concentrate on getting the main blood vessels that--

OK, perfect. And then we'll-- because you're right about in the center here, so we want to now-- yeah, OK. Let me just-- [INAUDIBLE]. All right, [INAUDIBLE]. Just to the side there. Yup, perfect.

All right, so what she just did is she just poked into a little clear area on the mesentery. And now we're going to use that window in order to get our mesentery down. Now, in doing a cancer operation, need to get the mesentery deep in-- at its root. For the benign disease, you don't have to necessarily take it deep.

Yup, go ahead.

We can now see through the mesentery to the other side, and we'll make the window bigger and bigger and bigger until the whole right colon is essentially removed. So what she did there is she fired the device twice, once right after another. And what that does is it makes the area that's being sealed essentially longer, allows for better hemostasis.

OK, we can look at the duodenum next.

So the duodenum is right here. We're well-- far away from it, which is key.

I think this is the right middle colic here, so get that. Make sure you do the duodenum before you do that. Good, perfect. You're far away from it, great. And once more, because I'm nervous. I'm a nervous guy. Probably one's enough, but we feel better.

So we just took the left branch of the middle colic, and now we're going to come down, get the right colon mesentery- I'm sorry, the right branch of the middle colic. And now we're going to get the right colon mesentery. Yeah.

Like all the videos, we've chosen a very good candidate, because he has nice anatomy.

So the thing we want to avoid on this side of the abdomen-- we're over on the left transverse colon-- just want to avoid injuring the stomach and the spleen. So we still haven't seen a separation of the omentum and the mesentery. Terry Actually, after I divide the mesentery here we'll actually go and see if we can get into what's called the lesser sac, and then we'll take the attachments in two layers.

So the colon is going to be about three or four feet long. So it's nice, if you can, to do all this mobilization with the laparoscopic instruments in the hand port so that you don't have to make a huge incision.

It a little bit controversial whether it makes a big difference in length of stay in the hospital. Probably for this particular operation it does not. People will be able to go home in, fastest would be three days but typically is four or five days. The main thing is to make sure that he is drinking really well, he's eating some, that he's got good pain control, that his ostomy is working properly.

Sometimes it functions almost too properly, that you get a high output. You don't want that. You just want a, sort of a normal amount of fluid coming out the ileostomy. And then you're able to go home. It certainly does decrease the amount of pain medicine that's needed when you can do it laparoscopically. And a lot of the recovery is dependent upon not so much the size of the incision, but all this work that we're doing inside.

So in this case, I'm getting what's called the mesentery and the omentum all in one bite. We did a man last week where he had a much more generous omentum. And so we had to take it separately, and then we took the mesentery separately.

So you can see the tip of the spleen in the distance on the left there. You see, this is called the splenic flexure. So the other part of the colon, that we've already sort of mobilized, is called the hepatic flexure, near the liver. And this is called the splenic flexure. And we're taking the attachments down.

There's-- this device can get vessels that are several millimeters in diameter. So for large vessels that are extremely large, or if they have a lot of calcium in them, which is usually not an issue with a man in his mid-'20s, is that we'll take them with a endoscopic stapler. And there's a thing called a vascular stapler that can be used in order to come across an artery and seal it.

But with the smaller vessels in a young man where there's not a lot of calcium in them, I find that this LigaSure works well.

So one little technical issue, is the reason why I stopped what I was doing in terms of the mesentery is that-- you have to pull down on the mesentery a little bit. And what you want to do is you get these attachments from the spleen taken down first, so that actually you don't cause a little bleeding on the spleen. A little bleeding you can repair. A lot of bleeding leads to removal of the spleen.

So we're just going to take this down, here.

In this part of the mesentery, the vessels tend to have, it's called the bare area of the mesentery, and that there can be a decreased number of vessels. Not an issue if you're young and healthy, but if you get vascular disease, on rare occasions this part of the colon can get ischemic, which means that you have a lack of blood supply.

So now we've got around the splenic flexure, and we're now heading to the descending colon. This is sort of the mid-descending colon. Again, just like on the right colon, which is called the ascending colon, this is called the descending, or the left, colon.

We're going to be taking the lateral attachments first-- it's called the white line of Toldt. And then what we're going to do is, we're going to then take the mesenteric attachments where the blood vessels are.

After the left colon, we then get to a part of the colon called the sigmoid which is, as you would expect, s-shaped. And that's really the last part of the colon. And then after that it's the rectum. We're going to leave the rectum. What we'll do is we'll used a stapling device to come across the top of the rectum, clamp the colon, and then send it off to our pathologist to get a look at it.

So we're looking down towards the pelvic brim. We've gotten all the way around the abdomen. This is some vessels going to the gonadal vessels, and then the ureter, which we'll look at.

Yeah, why don't you take that, and--

It is going to be also just medial towards the center line of the patient. Basically, stay away from those structures.

**DR. MURPHY:** Lights off on the camera, please.

**DR. BLEDAY:** So we still have a little bit more work to do.

**DR. MURPHY:** And I'll take a [INAUDIBLE]. Great. Thank you.

**DR. BLEDAY:** So this is most of the colon. Let's take out the bloodless fold of Treves with the cautery.

GIA, please.

So this is an instrument that fires two rows of staples, and then cuts in between. So we're going to, we've got a little space below the bowel, and space above the bowel. So We then clamp it down, like that. And then we-- as I fire, two rows of staples are put on either side and it cuts in between. One, one step.

So we're going to go down to the top of the rectum, what's called the, right at the sacral promontory. And then that will be it. And then we'll take the colon out. [INAUDIBLE] over here.

So we're looking directly down.

You're going to have to get the superior hemorrhoidal.

So there's an artery called the superior hemorrhoidal that you can divide if you like. So this is a sigmoid vessel. We've clamped it.

I'm going to go through the hole, yeah. Tie, please?

The last attachments of the sigmoid colon, both with a combination of clamps and ties. What we're doing, what we're making sure we do, is stay away from-- this is a good look at the pelvis. You can see where the, that defect on the right side is where the appendiceal abscess was, which had stuck to the right pelvis.

Great camera work.

We're just going to go down about another probably inch, and then we'll come across the colon and that's it, essentially. With the abscess, with the steroids, we're not going to try to do a complicated reconstruction, because the rate of failure goes way up.

So this is our sacral promontory, right where my finger is. And that's where we want to stop. We don't want to go any lower.

This is the last little bit of-- the top, or the very top of the mesorectum or last part of the mesocolon, and it is surrounding the part of the colon that we want to divide. And so what we're going to do is we're just going to-- some big veins down here that we'll preserve.

We'll need a TA60 with a green staple load.

We use a different kind of stapler that really only fires on one side. The staples will be a little longer, since the rectum is quite a bit thicker than the colon or the small bowel. So the staples have a longer shoulder length-- arm length, rather. And then when they are closed they can get through thicker tissue.

**SPEAKER 1:** OK, lights back on [INAUDIBLE].

**DR. BLEDAY:** So we put the stapler on, and we-- we need a scudder clamp. Let's go a little lower. So we're going to go into the abdomen. We'll get a little bit lower. Hold this here. Yeah. Just got to get the pin down.

**DR. MURPHY:** [INAUDIBLE]. Your pin's down, so you couldn't get out.

**DR. BLEDAY:** OK, you can come up. Fell down on its own. I didn't-- all right, great, there we go. Slide this in. That's it. Perfect. Great. Hold that up.

We squeeze once, make sure that everything's clear, and squeeze again.

All right, could I have a scudder.

So what we're going to do here is put a separate clamp upstream so no stool comes out.

And a knife, please? Ten blade.

And then we'll--

Ten blade back. Great, thanks.

All right, and then we just let this go, and the rectum goes away. So we have, looking into the pelvis, this is the sacral promontory, top of the rectum. This is actually a ureter on the right side over here. This is our rectal stump. We'll clean up a little bit of the oozing there so it doesn't ooze going forward.

And then over on the left side we have a nice clean pelvis, which we-- on the right side here, this area, which we usually wouldn't enter, was where the appendix-- or actually, the appendix was stuck over here, deep into the-- right back here.

So this is the colon. As you can see, it's very long. We will actually now have the pathologist open it and take a look at it. So the right side, the end of the sigmoid colon here.

So at this point, we've done-- leave that one in, just for now-- we're going to take the ports out. We'll look up underneath as well to make sure that there's no bleeding.

Long DeBakey to me please, and a long DeBakey to Dr. Murphy, with a 3-0 Prolene stitch.

When we come back in about three months we want to make sure that we can identify this part of the bowel. So we just put a blue Prolene stitch. Prolene won't melt away. And almost always it's not that hard to find, but it's always a nice little, we call it a tag. And that tag will be there, won't dissolve like some stitches. It will be there pretty much forever, until we come back to take out this part of the rectum.

So now what we're going to do is we're going to find the last part of the--

**DR. MURPHY:** Q lamps, out of the belly.

**DR. BLEDAY:** The last part of the small bowel, called the ileum, we're also going to take a look at it, make sure it doesn't show any evidence of inflammatory bowel disease. So here it is. And you can see that it looks very healthy. You can't see this on camera, but it's very soft so it doesn't have any inflammation. And what we have to do is that we have to make it so it tilts up, so it can come out as an ileostomy.

Just take your LigaSure down.

So what we're going to do now is stay about a quarter of an inch to a half an inch away. And we're going to take down some of the attachments so that we preserve the blood supply along the small intestine, but then allow this to tilt up so that it can come straight up out through the abdomen.

His quality of life will really be dependent upon having an ileostomy that he can get his appliance on. And if we construct it well, and if we put it at the spot that's best for him-- which has already been marked-- then oftentimes they have no issues with, again, quality of life and being able to eat what they want and do what they want.

So it's important to, number one, see an ostomy nurse-- that's perfect-- before surgery.

Can I have a Babcock. And then, that person, the ostomy nurse-- yup, go ahead, I'll put my hand underneath-- the ostomy nurse will see where a person has creases and indentations. And you don't want to put your-- marking pen to me? You don't want to put your ostomy at that spot. You want to put it on a nice flat area where the appliance can sit.

He's a little bit bigger than [INAUDIBLE] normal.

And the other end here. I'm going to give that to her with an instrument called a Babcock. Sort of grasps the bowel but doesn't injure it. And we bring it up through. And again, that work to make it-- leave it on there. Leave the Babcock on there.

So that work to make it straight, it really helps out, so that we want to bring it up about an inch, inch and a half, and then we're going to roll it back on itself in order to make the ostomy itself.

So what we're doing now is we're making the ostomy. So we're taking off the staple line that we had put on there about an hour or so now. What that does is it outpouches the opening, so that a patient can get the appliance around it and make a nice collar around the actual outpouching.

So one, two.

**DR. MURPHY:** Snap, please.

**DR. BLEDAY:** So we put in three of these, or four of these stitches, they're called triangular stitches.

So we're finishing up on the case of a young gentlemen in his twenties with severe ulcerative colitis. What we found as a surprise in this case, which we usually don't see, is also a small, perforated-- walled-off perforation of the appendix, with a small abscess. The most remarkable thing was he had no symptoms from this infection.

So this is the first of three steps. We did it laparoscopically assisted using a hand port. And I think that makes for us to be sort of expeditious in getting it out, and also it allows for us to use the best instrument in the world, which is your hand, along with the laparoscope.

So we'll finish up here by creating his ileostomy. This will be temporary. But it will be about three months before we can come back. His nutrition will be better. He'll be off all his steroids. We'd like him to gain weight-- not a lot, but some. And then we know that they're fit and ready for the complex reconstruction.