LAPAROSCOPIC COLECTOMY
UAB HOSPITAL
UNIVERSITY OF ALABAMA, BIRMINGHAM, ALABAMA
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NARRATOR

Until recently, colorectal surgery required a long incision, which required an extended recovery period. Now, surgeons at the University of Alabama, Birmingham, are using a minimally invasive procedure which can be used for a wide range of colorectal diseases. The key to the procedure is the use of smaller incisions through which the endoscope and other instruments are placed.

PABLO ARNOLETTI, M.D.

The use of smaller incisions results in less postoperative pain. Patients require less postoperative analgesia. They’re able to go home earlier. Hospital stays are shorter. They’re also able to return to work faster and return to their everyday activities.

NARRATOR

During the next hour, you will see physicians at UAB in Birmingham, Alabama, perform a laparoscopic colectomy. You may email questions to the physicians in the OR by clicking the MDirectAccess button at any time. This program represents the Medical Center’s ongoing efforts to bring the latest developments in health care to the community.

PABLO ARNOLETTI, M.D.

Welcome to the University of Alabama, Birmingham, in Birmingham, Alabama. We are in the main operating room, live, to perform a laparoscopic right hemicolecetomy in a patient with a large right-sided colon polyp. Good afternoon. My name is Pablo Arnoletti. I’m in the Department of Surgery, Section of Surgical Oncology at UAB. Let me remind you, for the people who obtain CME credit for this procedure, that you can take the evaluation at the conclusion of the webcast. I would also like to encourage viewers to submit questions via email at any time during the procedure by clicking on the MDirectAccess button on the screen.

Today we will discuss the fundamentals of minimally invasive colon surgery, including patient selection criteria and technical aspects, since we believe that this results in smaller incisions, faster recovery time, and faster return to everyday activities. First, let me
introduce you to my colleague, Dr. Marty Heslin, who is performing this procedure today. Marty?

MARTY HESLIN, M.D.

Hey, Pablo. Thanks for that introduction. Why don’t we just take a minute to orient the audience to the position of the patient, where we set the ports and how to optimize the setup so that we can perform this surgery safely and efficiently. What you can see here is this is the foot, this is the head. We’ve organized our ports into three ports in the center so that we can get full access to the patient’s right side, where that portion of the colon can be removed. You’ll notice, and I’m not sure whether the screen shows this, but the patient is in fairly steep head-down position to allow gravity to work to pull the colon for us, and you will also notice that the patient is tilted toward me, again utilizing gravity. One of the key principles of the minimally invasive approach is using gravity to help the organs, make it easier to dissect them and make it easier for the other things that we don’t want in the way to move out of the way.

PABLO ARNOLETTI, M.D.

Marty, can you please show us where you place your ports, your instruments, and what size they are?

MARTY HESLIN, M.D.

Sure. The central port is just above the umbilicus. That’s a 10-11 mm port that allows us to not only put a stapler in, but also any of the other access devices. The two other ports at the top and the bottom represent 5 mm ports. There’s a number of different ways that this has been done, both laparoscopically; hand-assisted, which maybe you can talk about later; and intracorporeally, which means completely done inside the abdomen. Today, with this patient, I think the optimum technique is going to be to dissect the whole colon out intracorporeally and then bring it out by connecting two of these ports at the end of the procedure to perform an extracorporeal or anastomosis outside the abdomen.

PABLO ARNOLETTI, M.D.

So you’ve placed your ports already and pneumoperitoneum has been established. Why don’t we go to the laparoscopic camera, then, and see what we have inside the abdomen.

MARTY HESLIN, M.D.

Sure. Let me orient you to inside the abdomen. We’ll pan back just a little bit to allow the abdominal exploration. What you can see here is the liver, so the upper part of the abdomen. That’s the stomach here. Liver in the central portion of your screen. You can see the transverse colon, which is here, and then hepatic flexure, ascending colon, cecum, and what you’ll see is I have the appendix grasped here, which makes a useful tool for mobilization of the colon. This is the pelvis, where you can see small bowel resting in the
pelvis. Just to re-emphasize the point to let gravity help you, you can see that the right colon is attached to the right abdominal side wall. The small bowel falls away, which allows us the ability to dissect behind there.

PABLO ARNOLETTI, M.D.

Let me point to the fact, Marty, that adequate patient position and trochar placement are key factors in allowing you to perform an adequate abdominal exploration because with the approach you currently have, you can explore the entire abdomen and then go ahead with your procedure.

MARTY HESLIN, M.D.

Correct. Just like anything else, the set-up becomes the most important part of the operation. That helps guide you through the rest of it. Let’s just start. One of the aspects of the operation that I like to do first is to identify the retroperitoneum and separate it from the small bowel mesentery. The small bowel mesentery is here. You can see the cecum. Right in here is the terminal ileum as it enters into the cecum, right over here. What we’ve done is started by separating the small bowel mesentery from the retroperitoneum. This helps avoid the complications associated with involvement of the retroperitoneum, such as injuring the ureter, the gonadal vessels, duodenum, inferior vena cava, and some of the great vessels. Early identification of this plane allows us to completely stay out of it, again preventing any type of complication or injury.

PABLO ARNOLETTI, M.D.

Marty, typically in an open colon resection you would start on the right side along Toltz line. I noticed you started a little bit lower, at the ileocecal junction, and then you plan to work your way upwards.

MARTY HESLIN, M.D.

Correct. Medial and inferior, as opposed to fully lateral, I think, in a laparoscopic technique allows entry into that correct plane early on. What you see here, if we pan the camera in just a little bit, you can see that the cecum or the retroperitoneal portion of the colon is being separated from the true retroperitoneum. What I’ll do is I’ll start here. This is a harmonic scalpel, which allows us to coagulate intra-abdominally. You’ll see it separate the colon inferiorly first, because I’ve done part of that dissection already, and then move superiorly. What you see there, coming up on your screen, is actually not smoke. As you know, it represents just condensation, really water vapor more than anything else.

PABLO ARNOLETTI, M.D.

You are now placing traction on the colon medially by grabbing the appendix and working on the right colonic gutter. Correct?
MARTY HESLIN, M.D.

Right. What you see here, if you look over, the color of this fat represents the retroperitoneum. If you look over here, you can see the colon is being moved medially as we dissect it off the retroperitoneum, for example here, grasp. The different tones that you hear are just different cutting rates, depending on how much coagulation that you need. What you’ll notice now, I’ve gotten to the point where I can’t put any more traction on the retroperitoneum here because I’m being held up by adhesions.

PABLO ARNOLETTI, M.D.

That’s what I was just looking at. It seems that there are some adhesions from prior operations?

MARTY HESLIN, M.D.

Yes. This patient underwent a laparoscopic cholecystectomy about 7 years ago and then a laparoscopic exploration for infertility about 20 years ago, so one of the questions that the viewers might have is is prior surgery a contraindication to operation? Actually not. I think it’s variable and certainly it’s worth doing a laparoscopic exploration to see if you can remove it because, again, a lot of these adhesions can be effectively lysed and you can go on with your regular operation.

PABLO ARNOLETTI, M.D.

So you’re now taking down the hepatic flexure from those adhesions, Marty?

MARTY HESLIN, M.D.

We’re working up toward that. These are truly still lateral. The hepatic flexure is up further. You’ll notice here that we’re trying to stay in the appropriate plane that we started down below. One of the pitfalls or traps is to get too far lateral up over here. That brings you in behind Gerota’s fascia, so one of the things is once we’ve identified this inferolateral appropriate plane, really make an effort to stay right in it.

PABLO ARNOLETTI, M.D.

While you’re taking those adhesions down, maybe point out that one of the advantages of this technique is that Marty is now doing it completely laparoscopically by placing 3 ports, like we described. There are alternatives and one of the main ones is to use hand assistance. In that procedure, a hand assist device is placed in the abdomen and that allows the surgeon to introduce one of his hands into the peritoneal cavity and it provides tactile feedback, which can be important in these operations. These two techniques are not exclusive; quite on the contrary, they supplement each other and, dependent on the
patient, the indication, and the surgeon’s expertise, they provide all the versatility of minimally invasive colon resections.

While Marty continues to take those adhesions down and work along the colonic gutter, we have a previously recorded tape from placement of the hand assist device that I would like to share with you.

MARTY HESLIN, M.D.

Great, Pablo. This is a perfect time for that.

PABLO ARNOLETTI, M.D.

What we see now is we are making a midline incision just below the umbilicus. Usually this is 1 cm less than the glove size. I wear a #7 glove, so this is a 6 cm incision that’s done in the midline right below the umbilicus. This will allow for the placement of a hand-assist device, again with the purpose of placing a surgeon’s hand inside. We are infiltrating the incision with Marcaine preoperatively because this does help with postoperative pain. We then make a short incision and we’re going to go through all layers of the abdominal wall. Again, the purpose of showing this is to illustrate that there are several different approaches to the peritoneal cavity and placement of one of the surgeon’s hands inside can certainly be helpful. We’re now incising the skin and the subcutaneous tissues and we will show you how that device is placed and how that can be then employed to place the remainder of the ports. The placement or location of this incision in the abdomen varies, depending on the area of the colon to be resected. We will address that later in a brief PowerPoint presentation. We’re now going through the subcutaneous tissues and incising the fascia and the peritoneum. Two clamps are placed in the fascia and upward traction is done. There we are incising the peritoneum and entering the peritoneal cavity.

After the peritoneum has been entered, two traction sutures are placed on both edges of the fascia to allow for adequate traction. The advantage of having the hand in is, again, that it provides tactile feedback and is sometimes easier to provide adequate traction than counter-traction, particularly in colon resection. We’re now seeing how the two traction sutures are placed in both edges of the fascia. Let me just say there are two devices that we currently use to place in hand-assisted procedures. One of them is the gel port that we’re going to use today and the other one is the lap disc, which is also very effective. We have used both. The advantage to the gel port is that it maintains the pneumoperitoneum when the hand is taken in and out of the peritoneum, so once the 6 cm incision has been completed, here we are opening the gel port. It has an inner ring with a sleeve. This is going to be placed inside the peritoneum. It is very easy to place. We put traction on the stay sutures and that flexible ring slips in. We deploy the sleeve and hook it to the plastic ring and that’s what we’re about to do right there. Then the edges of the sleeve are placed around that ring. This is effective not only for enabling us to place our hand inside, but also for protecting the wound edges when the bowel is exteriorized to perform an anastomosis.
That’s the gel port device itself that is clicked on the ring. Then the left hand of the surgeon, in this case – the surgeon is standing on the left side of the table for also a right colon resection – KY lubrication is placed and the surgeon’s left hand is then introduced into the peritoneum. We have not insufflated pneumoperitoneum yet. We’re going to place a port, a 5 mm port, in the epigastrium. Under direct palpation from the left hand, which is placed inside, we used bladeless trochars so that the surgeon’s hand is not harmed in any way. We do it under direct palpation from the hand that is placed inside the peritoneum so that no pneumoperitoneum has been established yet.

MARTY HESLIN, M.D.

Pablo, why don’t we pan back to the camera and I can just make a point about the hand port versus doing it laparoscopically. When we look inside now at the operation, what I’ve done is separate the retroperitoneum. What the viewers will notice is that I keep working the colon and the mesentery toward the medial aspect. One of the benefits, if there was a hand port here, would be that you could just lift up on this with your hand, as opposed to utilizing gravity. It gives you, like you said, a little more tactile feel when you’re doing your mobilization. The benefit is that you can feel it. The deficit is that you have a little bit bigger incision right from the beginning. I think that ultimately you end up using that incision anyway, so I don’t think it’s a detriment either way.

PABLO ARNOLETTI, M.D.

I think that’s one of the important aspects, again, that this is a versatile technique that allows for different options. Surgeon preference and certainly patient selection are key, but as we mentioned, there are several options.

Let me just go back to the end of that tape, just to show that the ports can then be placed under direct palpation. Again, we are infiltrating the epigastrium here, where the 5 mm port that’s going to be the camera port is going to be placed. The hand that’s inside is feeling the peritoneum. We make the small incision and then place the port directly over my fingers. Again, this is a bladeless port and the key here is pressure and adequate rotation. There it is. The port goes in without any difficulty. That’s the port we then use to insufflate the pneumoperitoneum, to put our camera in and complete our abdominal exploration.

Let’s go back to the camera inside and let’s see what stage of the procedure we’re at.

MARTY HESLIN, M.D.

I’m just cleaning the camera off to give you a little bit better picture. What we’ve done, one of the issues here is making sure our camera is clean so we can see adequately.

PABLO ARNOLETTI, M.D.
Marty, the patient is still in Trendelenberg position with the left side down, correct?

MARTY HESLIN, M.D.

Correct.

PABLO ARNOLETTI, M.D.

So that we try to get all the small bowel and the right colon toward the left so that you have adequate exposure in the right upper quadrant.

MARTY HESLIN, M.D.

Right. First of all, we’re finishing off the cecum and what you’ll recognize is that we’ve separated it from the retroperitoneum. This is Gerota’s fascia here. That’s what contains the ureter and those structures that I was saying to stay away from. You can see there is a separation plane there and we’ve maintained it utilizing gravity to pull it over. Now, what’s holding us is really the hepatic flexure of the colon, which is up by the liver, and that hasn’t been adequately dissected. In order to utilize gravity, we’re going to place the patient in reverse Trendelenberg, or head up, although we will maintain the tilt of the patient so that they lean toward us. The patient is now tilted so their head is up. She had a little bit of adhesions to the gallbladder. You can see where the gallbladder bed was here. One of the classic landmarks that we utilize to dissect the right colon out is the duodenum. What you can see here, again, just to orient everybody in the audience, there’s the stomach. The stomach is right over here. The duodenum wraps around and passes underneath and separates from the right colon. If you look inside here, there’s the duodenum, this little bluish structure right there. Our target is Gerota’s fascia, or where the kidney is contained. What you’ll see is that we’ve mobilized most of this from the underside. There’s the hepatic flexure. Most of that is already mobilized.

PABLO ARNOLETTI, M.D.

While you wipe the camera, Marty, let me answer one of the questions from the viewers. It says how much of the largest intestine is typically removed with this procedure and will the patient require a stoma? What we’re performing today is a typical right hemicolectomy so that all the cecum, ascending colon, and part of the transverse colon to the proximal branch of the middle colic artery will be removed. To the second question, the answer is no. We’re going to reestablish bowel continuity by doing an ileocolic anastomosis, as we will see later in this procedure. The steps of the procedure are very similar to what is done open and the only difference is that all this is done laparoscopically with very small incisions. We will then, as Marty will show you, bring the specimen out through a small incision, resect it, and perform the anastomosis.

I encourage viewers once again to submit their questions at any time through the MDirectAccess button on their screen. Let’s go back to the laparoscopic camera, then, and see what’s going on. Marty?
MARTY HESLIN, M.D.

Again you see just a little bit of condensation here. What we’re doing is dividing the vessels that go from the right gastroepiploic artery to the colon itself. We’re going to connect those two places that I talked about, so from the duodenum to Gerota’s fascia, you can see over here, we’re going to dissect it all the way over and connect those two places that we’ve already dissected from below. There are some epiploic branches in here and you’ll notice that there is a little bit of bleeding. The harmonic scalpel functions as the dissector as well as a coagulating tool.

PABLO ARNOLETTI, M.D.

So which are the main instruments that you’d say you need for this procedure?

MARTY HESLIN, M.D.

Really, we’re going to end up stapling the bowel to divide it, so you need a series of staplers, but actually doing the endoscopic or the laparoscopic part of it, a grasper, some form of harmonic scalpel to help with your dissection and intra-abdominal coagulation. In fact, one of the greatest technological advances, besides the scope itself and microchips to be able to see inside, has been the ability to coagulate without causing smoke. Up here in the corners, you can see this condensation just goes away as it’s evacuated from the abdomen and allows us to really work somewhat smoke-free.

PABLO ARNOLETTI, M.D.

Great. Well, we have a brief PowerPoint presentation that we want to share with you while Marty continues to mobilize the right colon. It discusses briefly the objectives of this webcast, as well as the main technical aspects and indications of laparoscopic colon resection.

MARTY HESLIN, M.D.

That would be terrific. If I run into something interesting, I’ll let you know, but otherwise just give me a yell when you’re ready to come back.

PABLO ARNOLETTI, M.D.

Great. We’ll go, then, to our brief PowerPoint slide presentation and we will be discussing further some of the aspects we just mentioned.

MARTY HESLIN, M.D.

Are we still on the intra-abdominal portion, Pablo? Just one quick look, just to show you that we have connected from what was underneath, which was over here, the
retroperitoneum, to the retroperitoneum up by the duodenum. You can see that we’ve now gone all the way through. You can just barely make it out, but we’ve connected those two dots, so an excellent time for the PowerPoint presentation.

PABLO ARNOLETTI, M.D.

The main objectives of our webcast today were to identify the techniques and patient selection criteria for the minimally invasive treatment of benign and malignant colon diseases and also to recognize the potential advantages of these techniques in reducing hospital stay and improving subjective patient outcome measures. Just a brief historical perspective on laparoscopically, it was first performed in Germany by Kelling at the beginning of the 20th century, but it was Jacobau in Sweden in 1910 who first recorded it. As early as 1911, a surgeon by the name of Birmingham was performing it in the United States. Throughout the years, several technologic improvements, such as the ones introduced by Saman Hassan – he was a gynecologist – developed this technique and it was in 1987 in France that Moret performed the first laparoscopic cholecystectomy.

Quickly thereafter, in 1991, laparoscopic cholecystectomy was adopted as the standard of care for that kind of operation. Several minimally invasive approaches were developed, not only for gallbladder disease, but also for morbid obesity, gastroesophageal reflux disease, and tumor staging procedures. However, laparoscopic colon resections evolved at a slower pace. The reason for that was that there were several concerns. The quality of resection was questioned. The quality of abdominal exploration that could be performed. The number of lymph nodes removed when dealing with colon malignancies. Concern about tumor cell implants in port sites. The uncertainty of long-term outcome when this operation was performed in patients with colon cancer, and certainly the technical challenges involved with this kind of procedure.

In 1994, a report was published in Lancet where 3 out of 14 patients were described to have trochar site recurrence of colon cancer following laparoscopic colon resection. Since then, the reported incidence of trochar site implants with malignancy has ranged anywhere from 1 to 21%, so that raised the question whether laparoscopic colectomy was certainly feasible from the oncologic standpoint. There was clearly a need at that point for a controlled randomized study that would address all of these issues. Such study was published last year in the New England Journal of Medicine, with clinical outcomes of surgical therapy study group which randomized 872 patients at 48 institutions to open versus laparoscopically-assisted colon resections for colon cancer. With a median follow-up of 4.4 years, the study was carried out between 1994 and 2001.

In this graph, we are briefly showing what the survival occurrence for different stages was for patients who underwent laparoscopic versus open colectomy. As you can see, there’s no difference in survival with median follow-up of 4.4 years. The hospital stay was 1 day shorter for laparoscopic versus open procedures and that was statistically significance. There was no difference in morbidity or recurrence rates, with only a 0.3% trochar site recurrence, certainly much lower than the starting 21% that had been reported.
So that clearly established an equivalence, at least, between laparoscopic and open colon resections for patients with colon cancer. So, when considering performing a laparoscopic colectomy, patient selection is key. There are several options for the treating surgeon. As we mentioned and described earlier, it can be done with or without hand assistance, right- or left-sided. There are currently no clear guidelines for training or credentialing. Certainly the surgeons perform few procedures during residency and that’s a down side of this procedure that is currently being addressed.

What are the main indications? Well, it can certainly be performed for any benign colon disease. Patients with benign polyps, diverticulosis, can certainly be treated with a minimally invasive approach. Patients with colon cancer are now candidates for this kind of treatment as well, mainly based on the study we mentioned earlier, the Koch study that showed equivalence between open and laparoscopic procedures. The absence of prior surgeries is a factor to be taken into consideration. Prior operations that are relative contraindications, as Marty was mentioning earlier, the patient we’re operating on today has had prior laparoscopies and surgeries, but that does not prevent the surgeon from doing a successful laparoscopic colon resection. Certainly comorbid conditions of the patient should be taken into account. Patients with severe COPD or congestive heart failure may not tolerate the pneumoperitoneum. Technical expertise and available equipment are to be considered as well. The stages of the laparoscopic cholecystectomy, as we described earlier, are patient position. That’s very important. We usually have patients with both arms tucked in the operating table. Trocar placement varies, depending on the area of the colon to be removed. As Marty was mentioning earlier, for right-sided resections, as we will go there in a minute, three ports are placed in the midline and laparoscopic abdominal exploration is then performed. The rest of the steps are very similar to what was done in the open procedures, with traction, mobilization, resection, and anastomosis.

The instruments, you’ve seen some of those already. We employ bladeless trochars, a 5 mm either 0° or 30° camera, the harmonic scalpel or similar device to transect the vessels. We sometimes use the laparoscopic linear stapler, especially when the resection has been done intracorporeally. The anastomosis we usually do outside the abdomen using standard longitudinal staplers. The mesenteric defect we usually do not close when doing this laparoscopically.

This is a diagram just to illustrate where the ports are placed. In the procedure that Marty’s performing today, a 5 mm port and a Hassan was placed today. Another 5 mm placed will be placed here. A camera port could be either here or in the middle, depending on surgeon’s preference and approach. An alternative it to do this with the hand-assist device that we showed earlier, where the hand is placed below the umbilicus. A 12 mm working port is placed here and a camera port, 5 mm, is placed in the epigastrum. The hand-assist devices that we mentioned earlier, this is a diagram of the gel port. There’s another device called the lap disc that is also very effective and either one of them is very useful.
This is just a general view of the operating room we’re using today, with flat screen monitors hanging from the ceiling. One of the legitimate questions when performing this kind of procedure is, well, is it cost-effective? Certainly the equipment is expensive and the surgical procedure itself is more costly than open colon resection. However, as mentioned, this procedure results in shorter hospital stay and faster recovery time for the patient, so the cost is certainly compensated by that. Overall, patients subjectively recover faster and feel better after minimally invasive colon resection. There are other steps that still need to be clarified, such as training and credentialing requirements and obviously additional control studies are necessary to clarify the role of laparoscopic colon resection and the different indications, but definitely this kind of procedure is here to stay.

As a brief conclusion, we would like to state that laparoscopic colectomy is safe and feasible for both benign and malignant colon diseases. It is at least comparable to open resections as far as outcome goes for colon cancer. As mentioned, many challenges remain, certainly the application of minimally invasive procedures to other digestive procedures. We always keep in mind that technical feasibility does not necessarily mean better outcome. In the case of colon resection, though, it does seem to be associated with faster recovery, smaller incisions, and possibly better outcome. Let’s go back to Marty and see what stage of the procedure we’re in now. Marty?

MARTY HESLIN, M.D.

Great. Thanks, Pablo. Looking inside now, inside the abdomen, what you’ll see is that we’ve completely mobilized the right colon essentially to the midline from both the hepatic flexure, which was here. This is our mobilization plane. The kidney is underneath here. Here’s the duodenum, so the colon and its mesentery is completely to the midline.

At this point, the variation in technique, depending on hand port or not, is where you see the most variability in what happens next. For me, I find that just making a small incision by grasping the appendix, which is what’s going to be the lead point which is removed through the incision, grasping the appendix, connecting the two ports together on the outside of the abdomen, desufflating to allow the abdominal wall to fall back against the colon, and then bringing out that portion of the colon to be removed, performing a standard resection, which we’re going to do now, so what’s going to happen is we’re going to just keep our camera inside. We’re going to flatten the table out so that it’s a little bit more up and down, like a standard operation. Then, with luck, everything will just fall out.

PABLO ARNOLETTI, M.D.

So Marty, you’ve mobilized the colon completely now and you’re ready to bring it out?

MARTY HESLIN, M.D.
Correct. What you can see here on the screen is the cecum. That’s the appendix. You have the terminal ileum, which is over here, and then you have the rest of the colon, which has been completely mobilized all the way up to the middle colic vessels, which you can’t see there, but it comes all the way to the midline, so by making a relatively small incision, we’ll lose our pneumoperitoneum but we should be able to bring out the colon and just take it out through a relatively small incision, an incision big enough to simply get the colon out.

PABLO ARNOLETTI, M.D.

So Marty, while you do that, let me answer another of the email questions. It says when comparing laparoscopic versus open, from an oncologic level, are there risks of less accurate harvesting of lymph nodes? The answer is no. The studies that have been published, there’s another study from an author by the name of Lacy from Spain that was published in Lancet in 2002 and the number of lymph nodes that are harvested in laparoscopic and open procedures is similar. The outcome of patients, when followed long-term, seems to be at least comparable, if not better, for laparoscopic procedures. Traditionally it has been maintained that this kind of surgery causes less stress for the patient and less decrease or inhibition of the immune function, so there are some claims that outcome for patients with colon malignancies may actually be better when resected laparoscopically. Clearly this needs to be confirmed or denied by adequate randomized studies with longer follow-up.

Marty, let us see now. You’ve brought out the colon through the supraumbilical incision, is that correct?

MARTY HESLIN, M.D.

Yup. We connected the two ports that were on top here, separated by about 6 cm, and just simply connected those two ports up, brought out the area of interest. There’s a large polyp, which is hard to show but I can feel, inside the colon right around where the colon connects to the ileocecal valve. As you can see, we get a complete mobilization, just like we would with a regular open operation. We’re also able to mobilize all the way to the middle colic vessels, which you can see here. What I find easiest at this point is just to simply do our standard operation, which would involve dividing the mesentery, dividing the bowel, and performing our anastomosis, which we will end up doing right now.

PABLO ARNOLETTI, M.D.

So Marty, you have completely mobilized and exteriorized the right colon without the need of any retractors and we can see that you have excellent exposure of the mesentery without any tension.

MARTY HESLIN, M.D.
Correct. What we’re able to do then, by using transillumination, we make some holes in the mesentery. Again, this was done mostly, as best as we can tell, for benign disease. Because it’s a large polyp, we always worry that there could be cancer harbored inside, so we’ll do an appropriate cancer operation, but we won’t go so far as to put the patient at any risk of vascular compromise in an effort to achieve more vascular...

PABLO ARNOLETTI, M.D.

Marty, we’ve described so far mostly right-sided colon resections. Can this be done for tumors in other locations of the colon?

MARTY HESLIN, M.D.

Sure. Sigmoid colectomy is very accessible. I think that once people get used to the harmonic scalpel and the hand port, they become very accessible through a laparoscopic approach and, in fact, what you’ll find is that it becomes even easier over time. This is what you’ll see as I’m stapling the ileocolic vessels, which is the main blood supply to this portion of the colon.

PABLO ARNOLETTI, M.D.

Again, Marty, we’ve discussed that this part could also be performed with the specimen inside the abdomen, correct?

MARTY HESLIN, M.D.

Correct. That would be not a problem at all if that’s what was needed. Intracorporeally as well, again, it’s just a different technique. We do it intra or extra. It simply depends on your preferences. I like to mobilize it and bring it all out and just do it outside the abdomen. There’s no issues related to doing it inside, either.

PABLO ARNOLETTI, M.D.

Marty, which patients would you tell that minimally invasive colon resections are just not an option for you?

MARTY HESLIN, M.D.

I think that those people are the people that have had multiple prior operations. Multiple prior operations is a major contraindication. I think the people that have very, very large tumors also become a contraindication because, just like anything else, what we’re trying to do is to make space by blowing up the abdomen and these very large tumors we can’t adequately assess where the proper planes are, the borders and things like that, because we’re unable to really see because the mass is so big. What we’re doing here is just dividing the mesentery going to the colon.
PABLO ARNOLETTI, M.D.

Again, what Marty is doing is clamping the mesenteric vessels high up so that an adequate resection with oncologic criteria is performed.

MARTY HESLIN, M.D.

Right. Again, it’s unclear, with something so big, whether or not there’s cancer present, so we always want to do the oncologically appropriate operation, not so much that it jeopardizes the patient.

PABLO ARNOLETTI, M.D.

Marty, how do you usually manage these patients postoperatively?

MARTY HESLIN, M.D.

Clear liquids on the first day and advance to regular as tolerated. I think, whether it’s because they need less narcotics or for whatever reason, they seem to get mobilized a little bit quicker and have return to bowel function, so I think clear liquids, mobilization, all of the things that help people get better.

PABLO ARNOLETTI, M.D.

The average length of stay in the reported studies is 5 days for these laparoscopic colon resections. Do you think that’s accurate?

MARTY HESLIN, M.D.

I would say that’s pretty close. I think it depends a little bit on the patient population, like anything else. For patients that are in pretty good shape, you tend to send them home a little bit sooner. What we’re doing here is just dividing the omentum. The next thing we’ll do is divide the mesentery to the small bowel.

PABLO ARNOLETTI, M.D.

So the resection is now almost complete.

MARTY HESLIN, M.D.

This just helps us speed along. We don’t have to tie the side that’s only got 30 seconds to live, so we’ll just separate this off, a little bit of the apparatus that goes with the appendix. This is a gastrointestinal anastomosis device.
This part of the procedure, Marty, doesn’t really defer much from what’s done open.

MARTY HESLIN, M.D.

No. That’s the nice thing about it. If you use the laparoscope for what’s really important, which is mobilization safely, and then you simply bring it out, I think that patient safety and getting it done expeditiously are two of the important points. I think early on we found that most of the studies that looked at colon resection laparoscopically had long times, but in fact, once you get used to it, it’s really not a big deal. That’s it. The specimen’s out. We’ll send that to pathology. What you can see here, we certainly have adequate bowel margins. There’s the terminal ileum. Let me make it so we can see that. Here’s your terminal ileum. This is the cecum. The polyp is sitting inside here. You can’t see that. You have your lymphovascular pedicle, which is where your lymph nodes will be, and then an adequate bowel margin on either side. Now, as far as the anastomosis, we’ll tie some of these things first to a Vicryl tie.

PABLO ARNOLETTI, M.D.

As Marty was mentioning, exposure with the laparoscopic approach is many times better than what you actually see when you do it open because you avoid the use of retractors and you have a better view of the planes. What do you think, Marty?

MARTY HESLIN, M.D.

I agree. Well, like anything else, you can have excellent exposure with a big incision, but it’s the balance between the appropriate cancer operation and the size of the incision, so our goal is to maximize exposure and minimize the size of the incision because the size of the incision is simply for access. It doesn’t help you necessarily to do a better cancer operation. I think that’s what was important about that study that you quoted earlier. We’re just going to tie off some of this mesentery, do the anastomosis, and I think that will be about all of our time.

PABLO ARNOLETTI, M.D.

Excellent. We’ll answer some more of the email questions in just a minute. Again, I remind you that you can obtain CME credit at the end of the procedure and I encourage you to submit more questions by clicking on the MDirectAccess button on your screen.

MARTY HESLIN, M.D.

Dr. Allen here is in training. She is going to do a laparoscopic fellowship next year, so one of the people that is going to become specialized in not only laparoscopic colon surgery, but all aspects of laparoscopic surgery. I think as people become more comfortable with laparoscopy, making sure we have experts in these fields will continue to be important.
PABLO ARNOLETTI, M.D.

That’s an important issue that certainly is being addressed by the surgical community is the credentialing and expertise in this kind of procedure, but it certainly allows for a lot of options for the management of these patients and more and more surgeons are getting trained and qualified to do it.

MARTY HESLIN, M.D.

What we’ll do is check to make sure that there’s no twists in our mesentery. Most of the bowel can go back inside and then we’ll perform our anastomosis, which is putting these pieces of bowel back together again.

PABLO ARNOLETTI, M.D.

There’s another email question. This is a very general question that says does laparoscopy have applications for other surgical disciplines? It certainly does. There’s been an explosion of laparoscopic procedures in all surgical disciplines, without exception. Certainly minimally invasive surgery seems to be the way to go and the surgery of the future. I think more and more procedures in all surgical disciplines will be performed laparoscopically and the applications and indications are constantly being expanded. Marty, so you’ve done your anastomosis?

MARTY HESLIN, M.D.

No. I’m just about to do the anastomosis right now.

PABLO ARNOLETTI, M.D.

You place side to side terminal ileum with transverse colon?

MARTY HESLIN, M.D.

Correct. You have the terminal ileum here. You have the colon, which is here. What we’ll do is staple between the two of them, which allows us to have the chyme go from the small bowel into the large bowel and then out through the bottom. What we’ll do is we’ll take off the corner of this, a very small portion.

PABLO ARNOLETTI, M.D.

So you’re making two enterotomies to be able to slide your stapler in, just like we do in the open procedure, correct?

MARTY HESLIN, M.D.
Yeah, there’s not much different about this at this point, other than access and mobilization. What you’ll see is this goes in. We’re careful to make sure we go straight. Then over here, we put those together. The string helps us hold it. What you’ll see is that we make sure we have the anti-mesenteric surfaces together. We want to make sure that the blood supply is even to both portions. I don’t know if you can see inside there, but now you have the anastomosis where the bowel contents can come in here and go in there. Then what we do is simply close off the ends. We put our Alice clamps right along the staple line here, the other Alice clamp here.

PABLO ARNOLETTI, M.D.

While you finish stapling there, there’s another email question that says what is the cost to benefit ratio of this procedure compared to open colon resection? Like we mentioned earlier, the operating room costs are higher, but that is offset by the faster patient recovery time and the decreased length of stay so that it compensates for the increased cost of equipment in the operating room.

MARTY HESLIN, M.D.

We have yet to see whether that translates. I mean, society benefits, but it’s unclear whether that increased cost is for the health care system. That’s not clear yet. Now what we do is put our final stapler across the bottom, slowly squeeze them out. I’d like to take a minute to thank the staff that helped us here. We have Pam in anesthesia, Daniel who has been working as the scrub person, and Manesh and Sandy and Theresa helping us circulate and making sure everything gets done correctly.

PABLO ARNOLETTI, M.D.

I would like to remind our viewers to click on the CME button at the end of the webcast to obtain appropriate CME credit.

MARTY HESLIN, M.D.

I know Dr. Arnoletti said that you don’t always close that mesentery, but I tend to at least make an effort to get the bigger holes closed if I’m able to. Again, if we’re able, we’re able to simply put a few stitches to make sure that this doesn’t...

PABLO ARNOLETTI, M.D.

Marty, do you usually close your port sites?

MARTY HESLIN, M.D.

The 5 mm ports you don’t need to. The larger ones we’ve connected already, so it’s not an issue.
PABLO ARNOLETTI, M.D.

So you’re going to just close that short midline incision you have and that’s the end of the procedure, correct?

MARTY HESLIN, M.D.

Correct. We’ll reach down here and just simply put one more and then we’ll be done and I think with that we’ll probably be out of time.

PABLO ARNOLETTI, M.D.

Okay, Marty, as we’re about to end our webcast here, do you have any final comments?

MARTY HESLIN, M.D.

No. I’d just like to thank the folks for giving us the opportunity to perform this. You can see it just drops right back inside. The colon and small bowel, whole thing drops in and that’s the incision that we’re able to perform the whole surgery through, which is significantly less than was done previously. Thanks again for the opportunity to show this technique.

PABLO ARNOLETTI, M.D.

I would like to thank you for joining us here at University Hospital, the University of Alabama at Birmingham, for a laparoscopic colon resection. Thank you and have a good day.

NARRATOR

This has been a laparoscopic colectomy performed live from OR 702 at the University of Alabama at Birmingham in Birmingham, Alabama. The presentation is a continuing medical education program. For viewers who registered for CME, click on the slide in the window to your right to take the post-evaluation. To obtain more information or to make an appointment or make a referral, please click on the buttons on your screen.