

**HAND-ASSISTED LAPAROSCOPIC RADICAL NEPHRECTOMY
TUFTS-NEW ENGLAND MEDICAL CENTER
BOSTON, MASSACHUSETTS
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NARRATOR: Welcome to Tufts-New England Medical Center in Boston, Massachusetts. Over the next hour see a hand-assisted laparoscopic radical nephrectomy. In the past, when patients with renal tumors needed surgery to remove a kidney, an open surgical approach with a large incisions was used. Today, the innovative hand access process allows surgeons to view, cut and remove the kidney through a significantly smaller incision. The approach allows doctors to identify anatomical landmarks by placing the surgeons own hand through an access device in the lower abdomen. The kidney can then be freed and channeled out of the body through the same incisions. OR-Live makes it easy for you to learn more. Just click on the Request Information button on your webcast screen and open the door to informed medical care. Now let's join the doctors.

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MARTIN D. GOODMAN, MD, FACS: Here we are at Tufts-New England Medical Center in Boston, Massachusetts. We're about to watch an amazing procedure of a hand-assisted laparoscopic racial nephrectomy. We're...In a... In a minute we're gonna intro...be introduced to Dr. Gennaro Carpinito, who will be produce...be producing this procedure. I just want to explain the procedure a little bit. He's gonna be making small incisions, as well as using his hand to dissect as well as remove a kidney that has a tumor in it. Uh, if at all during the...during the procedure if you have any questions, please just push the button on...on the screen and we'll be able to answer your questions. Why don't we come on in. Hey, Gennaro, how are we doing?

00:01:46

GENNARO CARPINITO, MD: Hi, Martin. Listen, before we get started let me take a moment to welcome our viewing audience and to here at New England Medical Center...uh, Tufts-New England Medical Center to...to view a live broadcast of a...a hand-assisted laparoscopic nephrectomy.

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MARTIN D. GOODMAN, MD, FACS: Great. Thanks...thanks for allowing us to be here. Can you tell us a little bit about this patient and what you're gonna be doing?

00:02:10

GENNARO CARPINITO, MD: Sure. This is a...a sixty-two year old female with a rather complex medical history hat we are managing jointly with several other services. Intimately involved in her care is the Renal Department here and the Cardiology Service as well. During a routine evaluation, we did discover that she has a relatively large tumor in her left kidney, which is most compatible with a...a cancerous growth. Today, we're going to remove this kidney and tumor through a minimally invasive approach. As you can see, I have the markings here on the patient. Let me orient you a little bit. The patient's head is to my left and her feet are to my right. Her left side is towards you and her right side is towards me. You can see from the markings on the abdomen here where we're gonna be placing our incisions. There are three incisions – two small incisions the size

of my pinky and a...a larger incision, which is about three inches, just above the umbilicus, or the bellybutton.

Through this rather larger incision, I'll be able to place my hand in there, as well as other instruments that I will need. And through the other ports I'll be able to place working tools and also the camera so that I can view what's going on in there. Briefly, the patient has been placed in a traditional left lateral cubitus position. She's pretty... pretty much on her right side, with the left side up. And this is not that different from the traditional positioning for a so called radical open nephrectomy. I think that before we start, I just want to tell you a little bit about this particular procedure. It's been around about fifteen years now. The first reported case was in 1991, and since then the... the procedure's evolved to pretty much a...I believe a standard of care at most...at the most centers of excellence around the...the world. The procedure has evolved since the first case that we performed. The first case we did was approximately fourteen hours long. Through innovations and technique and instruments, we're now able to do this procedure on a routine basis around an hour. So, let's get started here and, Andre, why don't you come on over here and let's make the incision, please. We're about to make the incision now, extending from the bellybutton...towards the xiphoid process. Again, it's about three inches long. Okay? Let's have the [word?] Please. Okay. Martin, do you have any questions at all for us?

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MARTIN D. GOODMAN, MD, FACS: No. I'm...I'm interested in how the special port that you have there, that you put your hands so the insufflation of the CO2 doesn't come out?

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GENNARO CARPINITO, MD: Well, this is a rather innovative...Cut...device. It's a third generation device that's produced and provided to us by Ethicon, which makes a lot of our minimally invasive laparoscopic equipment. It's one...There are several others on the market, but I prefer this one. And the primary reason I like is because it's rather small, does not require any...assembly.

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MARTIN D. GOODMAN, MD, FACS: I have one right here, actually, that I'd like to show the audience.

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GENNARO CARPINITO, MD: Yeah. You can see that it...it has a very low profile. It's about one centimeter tall and about eight centimeters across. And...and that's important for us, because it really...allows us to...use it without having it interfere with our other ports and our other instruments.

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MARTIN D. GOODMAN, MD, FACS: You know what I kind of like about this is that you can actually adjust the diameter of this, depending on how big your hand is. Or, if you want to just use it for a port, you can use that as well.

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GENNARO CARPINITO, MD: That's right. You...You'll see as...when we get started here that not only will I be able to put my hand in here, but I'm also gonna be able to introduce the port and even the camera itself without any special equipment and...and...and maintain the...insufflation in the abdomen. Okay, a little more here. Enter.

MARTIN D. GOODMAN, MD, FACS: So these are the...these are the ports that you'll be using?

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GENNARO CARPINITO, MD: Yeah. These...I'm only gonna use two of those. We've actually managed to sort of modify the procedure where...we used to use about four of them and I'm just down to using two.

MARTIN D. GOODMAN, MD, FACS: When you use---

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GENNARO CARPINITO, MD: This will...this will save in cost as well.

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MARTIN D. GOODMAN, MD, FACS: And you use special instruments, obviously to be able to do the dissection through these.

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GENNARO CARPINITO, MD: That's correct.

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MARTIN D. GOODMAN, MD, FACS: What...what type of instruments will you be using?

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GENNARO CARPINITO, MD: Well, today I'm...Martin, I'm gonna be using just...almost...I think just about three various instruments. You know, when I first started doing these several years ago we had a long laundry list of...instruments that covered about three pages. I'm gonna bring the light in, if that's okay with you. Okay. Can I have...a retractor, please? And, since the first couple of cases that we did, we've actually managed to bring it down to just three instruments. So the main one I'm gonna be using is...is called the Harmonic Scalpel. Cut this. And I'll do most of my dissection and cutting with that instrument. It is truly a wonderful device...that is also made by Ethicon. In fact, I was involved in the development of that instrument several years ago. I contributed a little bit to its production; not a whole lot, but a little bit. Okay. Punch through. Right here. Good.

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MARTIN D. GOODMAN, MD, FACS: Now, usually you have something...someone helping you doing these procedures?

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GENNARO CARPINITO, MD: The only...Yeah, one assistant is to hold the camera, pretty much. And it is, in fact, a teaching institution and often we...train a lot of doctors to do this procedure. Okay. A little more. Go ahead.

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MARTIN D. GOODMAN, MD, FACS: So what's the advantage of doing this over, let's say, the usual open procedure.

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GENNARO CARPINITO, MD: Okay. Well, the procedure is minimally invasive. It has...evolved to the point now that, as you recall, I said the first couple of ones took well over twelve, thirteen, fourteen hours in some cases, to the point where doing these really minimally invasive and we're taking a...a lot less time. So an...an open approach would take an average of three hours, depending, of course, on the skill of the surgeon. Pick that up, please. On the skill of the surgeon and...and...we've found now, because of the minimally invasive approach and because we don't cut any muscle...any muscle at all, the complication rate is reduced significantly, blood loss is negligible. For instance, in some of our cases it's not unusual for me to average an ounce or maybe two ounces of blood, which translates to about between forty or fifty, sixty cc's of...of blood. Now, the average blood loss with an open procedure would...would not be unusual to...Go ahead, put your finger in. Let's go. To be about four to five hundred cc's, and sometimes more. Go ahead. The other thing about this too is that because we don't cut any muscle and the incisions are...are minimized...Keep going. Okay. A little more. The recovery period is much, much better than it is with an open approach. Often we...Let me have some lubricant, please. We can keep our patients in about two days compared to five or seven days in a traditional approach. The convalescence...We're gonna fix that. It's just a little bit more. Let's go over here.

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MARTIN D. GOODMAN, MD, FACS: You know, we...we do have a question that kind of relates to this. The...the question is, how many cc's of blood do you lose in this surgery?

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GENNARO CARPINITO, MD: In...in our experience, we're down to about forty to fifty, sixty cc's on...on...on average right now. Again, for the open approach, it's considerably higher than that – between four and six hundred cc's. Okay, very good.

MARTIN D. GOODMAN, MD, FACS: Well, that's pretty amazing.

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GENNARO CARPINITO, MD: It is. The other thing...the other advantage over open surgery with this is that the recovery period, the convalescence period is significantly reduced down to about seven day to fourteen days and patients are basically back to their normal activities within that period of time, as opposed to say up to three months with the open approach. And...and another added benefit and bonus to this is the cosmetic result. The...the incisions, after a few months of healing, are barely noticeable. Okay. Now let's put this in. Now let me just take an opportunity...I'm about to put the...import the device in here. This is, again, very low profile. It has no assembly required. It's one piece. In fact, that's what it looks like when it's in. We just flip the...the lid in. This allow a better positioning for us. There you go, Andre. And, again, I remember when we first started putting these in, the first generation, used to take us anywhere from twenty minutes to thirty minutes to place. And you'll see here, from this particular maneuver...Go ahead....it's in before you can say...Jack Frost is it? [Chuckles.] Alright, so that's it. So we're in. And now let me show you some of the advantages of having this particular...port. Again, it's very small, low profile. It doesn't interfere with us placing the other ports, well away from the other ones. And when we put these ports in, it's important to keep them separated, because if you put them too close to each other, you're gonna start dueling with yourself and the...the instruments are gonna crisscross and they're gonna interfere with your...with your approach. Let's have a port please. Okay. Gas. As you can see, I can put it right through the middle of the diaphragm here. And I can reuse this for economy purposes. Now I'm insufflating with carbon dioxide. This is a nontoxic gas to the body. Even if it's absorbed, it's absorbed quite nicely and without any toxicity. And here we are. So I'm...I'm through the port. I'm actually inside the abdomen right now. It will take us a few minutes for the temperature to equilibrate on the camera. It's gonna cause a little condensation right now. Hence the fogging.

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MARTIN D. GOODMAN, MD, FACS: So...so what are we looking at right now?

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GENNARO CARPINITO, MD: Well, we're inside the abdomen and we're looking at the...spleen right here in the left upper quadrant. The diaphragm is right there. And, in fact, you can see the heart beating right through the diaphragm there. Okay? And here, the big sort of purplish structure here is the liver, which goes from the midline all the way to the...the right side. And we're, obviously, interested in looking at that to make sure there aren't any metastases. There's some scar tissue that's formed between the liver and the abdominal wall. Okay. So this is beautiful. I don't see any major adhesions here. The...Again, we always want to keep an eye out for adhesions because when we place our ports, we don't want to be perforating any viscous or any bowel, or any other structure for that matter. So this...And now I'm convinced everything is clear, my one port is gonna go in this area right there and the other one is gonna there, well away from the bowel below. Okay? So now that I'm satisfied, I'm gonna take this out. I'm gonna use that port again, for economy. Okay. and can I have a dry lap pad please? Clean. Okay. Alright.

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MARTIN D. GOODMAN, MD, FACS: You know, one of the other advantages of doing these laparoscopically is actually economics.

GENNARO CARPINITO, MD: Yes....

MARTIN D. GOODMAN, MD, FACS: You know, these patients get back to work, I think soon, don't they?

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GENNARO CARPINITO, MD: Oh, much, much sooner. Patients, like I said, I've had several of my patients have gone back to work within two weeks, even blue collar patients who work with their hands and do physical labor. So...Let's mark that spot. So they...they do quite, quite nicely. Now, this...you know, we also can...This particular procedure also lends itself to...to... kidney donation for transplantation. You know, when I was doing these earlier...we, in fact, were the first group in Boston to perform donor nephrectomies with quite a large series. We found that our...number of nephrectomies almost tripled, because of the reduced convalescence and the quicker recovery. You know, most of the patients who donate, or tended to donate, were younger patients and couldn't really afford to be out of work for more than a few weeks. Or, for that matter, three months with the open approach. And, of course, the cosmetic results were so much better that it wasn't...it was hands down the...the preferred method. Okay. So that's one port that's in. It's, as you can see, was relatively easy. I protected the underside of the...abdomen with my hand, so if I slipped or made an...an abnormal room or somebody coughed in the room or drops a tray, I don't perforate the bowel or injure any of the... of the organs.

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MARTIN D. GOODMAN, MD, FACS: You know, I think...I think that's a great point that, you know, you could do this not only for cancer, for tumor removal, but also for...for donor nephrectomies. Are we doing a lot of those here at Tuft's-New England Medical Center?

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GENNARO CARPINITO, MD: Yes, we are. At...at...I'm happy to say that we have one of... one of...world class departments at Tufts-New England Medical Center in...in both kidney and...Well, actually, in both...I should say triple, kidney, livers and heart. Just a little. That's good. Okay. great. And since we're on the subject, let me just mention that I'm very, very pleased with many of the departments in this hospital. I...I feel that we have several world class departments here, starting with...with the transplant service – cardiology, cardiothoracic, transplant, renal and medicine department. And the surgical department is superb. Will you rotate the table towards me, please. And we work quite closely together, obviously. Rotate the table, please. Keep coming. All the way. To help to take care of our patients, which brings us back to this patient. She's sixty-two years old, as I said, with a relatively large tumor. And raise the table, please, to about here. And she has several other medical problems, which co-manage with the medical service here, the Renal Department. Good. Cardiology Department. And, this is really...they really have allowed us to...to...to operate on this...on this patient without much fuss. Okay. Let's put the camera in. Gas please.

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MARTIN D. GOODMAN, MD, FACS: What are the contraindications to doing this? Because a lot of times you hear people saying, well, I've had other abdominal surgery. I have a lot of scars on my belly. What are the...When can you not do this procedure?

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GENNARO CARPINITO, MD: Well, I've got to tell you, there are no real contraindications to this surgery, as far as I'm concerned. There are some relative contraindications; mainly for starters, people who are beginning to learn the procedure. Those would be morbid obesity. People who have multiple surgeries. But I think with the...as we gain more and more experience as surgeons, those issues become less and less of a problem. And I can honestly tell you that...for us here in New England Medical Center the contraindication are really, really limited. I...I...To be honest with you, I can't even think of one off hand right now. The only thing that would probably prevent us from operating on anybody would be, you know, medical issues or heart issues. Okay. Let me have the Harmonic, please.

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MARTIN D. GOODMAN, MD, FACS: So...so what re you actually doing right here?

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GENNARO CARPINITO, MD: Well, I'm in the...Let's reoriented every...reorient everybody. The spleen is here. I've...I'm gonna palpate the liver here. Let's show the liver. Okay? And as you can see, it's pristine. I don't see any lesions here, any metastases. Come over to the other side, please.

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MARTIN D. GOODMAN, MD, FACS: Gino, your hands look huge.

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GENNARO CARPINITO, MD: Don't they? You know one thing I...that I've got to show you too is...before I start cutting here, is the asymmetry of my...of my gloves. I don't know if you can see it here, but my glove is brown with the hand inside and it has a brown sleeve on the outside. And my other hand is white. And the reason for that is that we...we use the brown color to cut down on the glare inside. Because we, in fact, have a camera with a light source on it. And the sleeve serves two purposes. Same thing in...in terms of cutting down on the glare, and also it allows me to slide in and out of the port much, much easier. So, let me again...spleen is over here. Obviously, we have to be very, very careful on this. And now...I'd prefer to have my hand in here than let's say another instrument, primarily because I get a lot of tactile feedback from the...from my hand. I know how much I can squeeze, how... how little I need to squeeze, how hard I need to squeeze and I can be...you know, quite cognizant of things like this structure here, the spleen. It's very, very delicate and you have to really avoid injuring this. Because if you do injure it, you might have to take it out. Okay. So let me orient everybody again. We have the kidney directly underneath my hand here. I can feel it through the bowel. This is the large bowel. This is the so called descending colon, going all the way down here to...to the sigmoid and eventually to the rectum and the anus. Okay. Come back up. And so what I have to do now is I have to disconnect this through this... tissue here, which we refer to as the line of Tolt, the white line of Tolt. It's a relatively avascular ...tissue. And, by doing this, I'll disconnect the bowel from the lateral wall of the abdomen and then mobilize the...the bowel away from the kidney, which will allow me to work on the kidney itself.

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MARTIN D. GOODMAN, MD, FACS: Now, do we have a video of this as well?

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GENNARO CARPINITO, MD: Yes, we do. You know what I'm gonna do? I'm gonna start here just to show you and talk a little bit about the Harmonic scalpel that I'm using right now. Again, also made by Ethicon. As you can see, they have strategically put...placed their name on the instrument here. But this is a truly wonderful instrument. It sort of replaces the cautery device we've been using for so, you know, for many years now. It works a little slower, but works much more effectively. It works by vibration, high frequency vibration. It heats up, it cuts and seals at the same time. And you can see this vessel right here. I'm allowed to actually come across that and cut and seal it in one stroke. And I think that's truly a wonderful device to have. And you can see there's absolutely no bleeding in there. Okay, so why don't we cue to the...to the video. This is a video of a...a radical nephrectomy that I did several years ago when we first started doing them. And I want to show you this... just to show...just to...to show the audience what's in store here as, you know, we can cover some of the dull spots. But...why I...I tell you...[chuckles]...it looks exactly like what I'm doing now. But, anyway...[chuckles]...we'd cut through the mesentery. We've pulled the bowel back immediately away from the kidney. And as you can see, now I have the kidney in my hand and I'm dissecting in the back of the kidney to expose the pedicle of the kidney, which includes the renal artery and the renal vein. Now I prefer to approach those vessels from the posterior because the first vessel we encounter there is gonna be the...the renal artery. And by controlling the renal

artery first, it really cuts down on the potential complications. Because one we cut the main blood supply to the kidney, we can actually make mistakes in...and...and maybe...

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MARTIN D. GOODMAN, MD, FACS: So this is a little---

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GENNARO CARPINITO, MD: You know, may...and maybe get into a vein and...and blood loss at that point would be really truly minimal.

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MARTIN D. GOODMAN, MD, FACS: So this is a little different than the open procedure where you would normally approach it anteriorly, or from the...from the top.

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GENNARO CARPINITO, MD: That's right. Now, as you can see, I've dissected out the artery all...already. That took a few minutes. It's a...It's, again, by approaching the kidney from the back this is the first structure we encounter. And as you can see, once I've dissected out about three or four centimeters...In this case, I've put a Hemolock clip, which is a little plastic clip, on it first, just for a safety device. And then what I did is I used another Ethicon clip. Why don't we just stop the...the video there, for a minute. It's called the linear stapler. And that device, when...when we cut across the artery, basically, is a two in one instrument that throws down six rows of staples – three on one side and three on the other side – and then allows us to cut it right in the middle, all in one...one throw. And it really makes it truly efficient and it's very, very reliable.

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MARTIN D. GOODMAN, MD, FACS: While you're working here, I have a question from the audience. Is there any advantage or disadvantage in determining if a tumor has infiltrated into other tissue, besides the kidney, with a hand-assisted laparoscopic procedure?

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GENNARO CARPINITO, MD: Well...I've got to tell you that even in those settings it...it is advantageous to go in and remove the...the primary tumor. Because we've demonstrated clearly over the years that people who've had their primary cancer removed, i.e. the kidney, tend to respond better to chemotherapy or immunotherapy. And even if the tumor has, in fact, infiltrated to adjacent organs...Come down a little bit and clean the camera. Even if it has, the particular minimally invasive approach with the camera in there, and because we lose a lot less blood, the visibility is better, we can see planes better. So we can more effectively take tissue and tumors out of the body...I'm just concentrating a little bit on one little piece of tissue. And, what I'm doing now is I'm in essence mobilizing...Up here...Mobilizing the...the descending colon, immediately. And I'm trying to develop right now a plane between the kidney here on my right and the bowel on my left. And...the bowel is in my hands right here, and I'm lifting it up here. And, there is a little bit of an attachment here, which I'm gonna take. Now I want to draw your attention to this spot right here. You see it here? This is a curtain of peritoneum here. I'm gonna maybe take it down just a little more to mobilize that bowel a little bit, but I'm not gonna take it all the way down. And let me tell you why. The...Two reasons. One, if I keep going too far north over here, the lung itself goes from this point down in here. The lower lip of the lung comes down here. And if I go too far up here, I can actually get into the peritoneum and cause a pneumoperitoneum. I don't want to do that. Now what I'm gonna do is I'm just gonna separate this a little bit here. Okay, pull it away from the spleen. Protect that with my finger. That's another thing that my hand does. It really...I've got five fingers in there and I can almost use every single one of them to protect other structures in the...in the body. There's yet to be made an instrument that's as...as efficient and as good as the hand. When that happens, I guess I might consider using something different. But, right now, this is by far the best way to go.

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MARTIN D. GOODMAN, MD, FACS: Now you're really doing a great dissection over here on the left. What...what's the difference between a left sided nephrectomy and a right sided nephrectomy using this...this type of technique?

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GENNARO CARPINITO, MD: Well, I got to...You know, the...the main difference is...is...is the...the adjacent structures. Of course, on this side you worry about the spleen. And on the right side you worry more about the liver. The problem on...on the...on the left side is...is the spleen is a very delicate organ. You've really got to pay attention not to injure it. On the...on the right side the...the spleen, not only do have to pay attention, it's a little more resilient than the spleen is, but the problem is it's big and it tends to cover the...it tends to cover the...the kidney a little bit. And sometimes you have to use a...maybe a third port in there in order to...to retract the kidney away from the upper pole of the kidney, especially if you have...large upper pole tumors. And, I'm almost done with the dissection here. Come up here and you can see I haven't changed instruments yet. And...and let me get back to the point I was trying to make earlier about...the tissue up here at the upper pole of the kidney. The key here is to preserve this part, because this curtain will actually protect the spleen. If I leave it intact, all the dissection will occur away from the spleen. And, of course, the hilum of the spleen is very close. And by keeping this curtain in place, see when I run my hand across it, it will prevent me from getting into those structures. So less chance of injury to that very delicate structure.

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MARTIN D. GOODMAN, MD, FACS: Now where is the adrenal gland in all of this?

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GENNARO CARPINITO, MD: Well, I'll show you that in a minute. Let me just free up the...the upper pole. And as I do that, why don't we go back to the video and I'll show you the vein. We had taken down the artery already. Okay. Okay. I'm just freeing up the splenic renal ligament here little by little. Okay. I've got a little bit more work to do right up here in this corner here. Okay. Great. As soon as I've come up, Martin let me know and I'll...

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MARTIN D. GOODMAN, MD, FACS: Okay.

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GENNARO CARPINITO, MD: ...give you a little bit of information about that.

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MARTIN D. GOODMAN, MD, FACS: Alright. So here's the vein.

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GENNARO CARPINITO, MD: Okay. And this is the vein. And...and you can see now it's...the vein has been decompressed. A lot easier to work with. You know, the analogy I like to use is that it's kind of like working on a balloon that's inflated. The walls of the balloon have stretched out when it's inflated. And it's easy to pop if you have something sharp next to it. So...with the...with the artery taken, the vein is deflated, it's thicker and it's a lot easier to work with. As you can see, once I've got it...dissected and mobilized...Again, all I need is that anastomotic stapler, the one that throws the three rows of staples. I throw them across. Boom, boom. And you'll see in a second that...it's done. And you can see the staples if you look closely enough. Okay. Bring the sponge up here. A little oozing. Okay. Now everything seems to be magnified a little bit in this case, because of the scope.

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MARTIN D. GOODMAN, MD, FACS: So what...what is this we're coming through here on the video?

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GENNARO CARPINITO, MD: That's the ureter now and that's the last real attachment that we have to deal with. And now normally I just put a couple of clips across it. There were two different types of clips, as you can see from that video. There's a plastic clip on the bottom and a metal clip on the bot...on the top. I prefer the plastic ones, because they

don't interfere with CAT Scans later on. So...And then we just simply take the...the ureter between those to prevent any spillage. Okay. So we're back. And, I'm about to mobilize the kidney now...medially, to expose...Come on, show me the back side here. To expose the vessels. And here we are. And pretty soon I use...Now, again, this is another huge advantage of having a hand here. I can actually feel the pulsations and...and that's a huge advantage over having, let's say, a...you know, using the pure laparoscopic approach. Now, this is the upper pole. I haven't completely freed up the splenal renal ligament yet. And there's always a little vein in this area right in here. So what I'm gonna do is I'm gonna use the angial stapler here, just in case, because I'm not sure. I see something...I actually feel something in there. Okay. And this is the angial stapler that you saw earlier in the video. I'm gonna go across that. And, one huge advantage of this is it's a one hand operation.

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MARTIN D. GOODMAN, MD, FACS: That's a great instrument.

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GENNARO CARPINITO, MD: It truly is. And I use it even when I...Okay, let's have another one, please. Even in open cases, when I have to do them, like I said, it's a...it's a rare occasion that I have to do that, but I do use it.

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MARTIN D. GOODMAN, MD, FACS: Now you do this almost the same thing when you do the donor nephrectomies?

00:31:24
GENNARO CARPINITO, MD: Yeah, exactly. The only...Except...You know, dissection is pretty much the same. One more, please. Except that instead of leaving the envelope on the kidney here. This is what we call Gerota's fascia. Now, in cancer surgery, it's essential to keep that intact, because you don't want to spill any cancer from the tumor. That's an age old principle of cancer surgery. But when we do a donor nephrectomy, we...we take that down. And we expose the entire kidney. Okay. I'm on it. Now, as you can see...Okay...the adrenal is coming with this...with this kidney. Okay. And, again, I don't have to take the adrenal, but the...the classic description of a radical nephrectomy describes taking the adrenal gland. Okay. So we'll dry that out. And, I think all we've got left to do now is to identify the artery. Come on down here. And I feel right through this fat. That's another huge advantage. Look at that. I mean, it's...it's right there. Huge advantage of having your hand in here as opposed to having the pure laparoscopes. Now let me have the Harmonic...

00:32:44
MARTIN D. GOODMAN, MD, FACS: You know, as we have more participants in our audience, can you just describe the hand port once again for us?

00:32:52
GENNARO CARPINITO, MD: Sure.

00:32:53
MARTIN D. GOODMAN, MD, FACS: And I can actually show it again, if you'd like.

00:32:55
GENNARO CARPINITO, MD: Yeah. Yeah, the hand port is, again, made...made by Ethicon. Let me actually get back to the artery, because I think this is a crucial point here. And as you can see, I'm using a Harmonic scalpel here; I'm not using a right angle retractor. You notice now instead of having a continuous action on the Harmonic, I'm sort of buzzing one...one thing at a time, because I can get very, very close to the side with this Harmonic Scalpel. It dissipates very little heat. In fact, I can get my hand almost very close, within a millimeter and I don't feel the heat. But just in case I...I don't take any chances around the artery. And---

ANDRE: Let me hold that.

00:33:29

GENNARO CARPINITO, MD: And what I do is...because there is blood flowing through this artery here, it acts as a heat safe. So it allows me to get really aggressive around it with...Okay. Clean the camera, please. Okay. Hold on. I'm gonna change my...

ANDRE: All right.

00:33:51

GENNARO CARPINITO, MD: Let's have another sponge, please.

00:33:54

MARTIN D. GOODMAN, MD, FACS: So while you're cleaning that, I just want to show that hand port, because it really is an amazing device that you're able to keep the abdomen insufflated with CO2. And the aperture, you can actually change to adjust for hand size, or if you just want to put a port in it.

00:34:11

GENNARO CARPINITO, MD: That's right. Again, it's...it's...it's truly an amazing device. I mean, it most mimics a lot of...you know, the structure in the...in the body. Like the sphincters in the rectum or the sphincters in the urethra. I mean, you think about it, it...it allows...it's very versatile. Come on. Focus. Clean and then focus it.

00:34:36

MARTIN D. GOODMAN, MD, FACS: Now, as you can see, your hand is in the port, so that really keeps the abdomen well insufflated and...and so you can visualize what you're doing.

00:34:46

GENNARO CARPINITO, MD: Yeah. Some reason you're not focused there. Hold on. There you go. What did you do? That was good. Okay. Let me bring the kidney back. Okay. Over here...Let's get back to the artery here. As you can see, I've got it partially cleaned off. Okay, there we go. Now you notice, again, I'm just using this particular instrument. What's happening here. Okay. [Inaudible.] Come on back up here now. Come in. Okay. There's the artery again. It's...Again, you have to be cognizant that...that where this artery is, the vein is in close proximity and you have to be very, very careful not to injure that. So you have to really pay attention. I'm gonna take some of this tissue out of here. And, again, I'm...with experiences, as...as you use this instrument more and more, you're able to do more and more with it. And it really saves me a lot of time because, you know what, I don't have to keep changing instruments...to do the same work. Okay, that's great. Alright, let me just pop it up over here.

00:35:56

MARTIN D. GOODMAN, MD, FACS: What can you do if you do get some bleeding in that instance? I mean, the advantage of having an open procedure is that you're able to see it very easily and quickly. Can you do this as well as when you do the hand assisted laparoscopic procedure?

00:36:10

GENNARO CARPINITO, MD: Well, those same things you just said apply to this procedure. In fact, you can probably see it even more quickly....because the camera's right on top of there and you can get as close as you need to get. And, you can recognize it a lot earlier. And because visibility is good, you can find it and grab it with your thumb and...and index finger. So, hold on just one second. Let me just orient myself a little bit better here. Okay, come on down. Let's get this...this artery cleaned off. Okay.

00:36:46

MARTIN D. GOODMAN, MD, FACS: Now that artery looks huge to me.

00:36:48

GENNARO CARPINITO, MD: Well, it's not as big as it looks, because you get a lot of magnification with this. In fact, I can control the amount of magnification...with the camera. Let me just grab a little bit of this. We need some of this off. Alright. Good. Now the key portion of this operation is right here. And, again, once I get control of this...this artery, I can... and get to the vein and...Let me just get right close, right in here. See these...these

little lymphatic vessels? That's the other thing I want to talk about here and this particular instrument. These lymphatics, you know, for the surgeons out there who are used to using a cautery, they know that they really can't use cautery to seal lymphatic channels. It's kind of like plumbing. You know, when you try to solder a pipe with water in it, it's impossible. You can never get it hot enough to...to do the soldering. But with the Harmonic scalpel, you can actually seal these...these lymphatics. In fact, on another video that I'm gonna cue up shortly, I'll actually show you some rather large lymphatics...that we can actually...that we actually sealed with the...with the Harmonic scalpel.

00:38:17

MARTIN D. GOODMAN, MD, FACS: Now do you have to go through all this dissection? Can you take the artery and the vein at the same time?

00:38:22

GENNARO CARPINITO, MD: Well, You know, it's an interesting question. I was...You know, the...the classic teaching is that you don't want to do that. And the main reason that they give is that...Let me just go in through that...is that there is a possibility that you could create a fistula between the artery and the vein, and thereby dumping the pressure of the arterial supply directly into a vein, which could put a lot of strain on the...on the heart later on. But, you know, you read a lot of reports...in the literature, in the old days when people used to put a so called pedicle clamp on the entire pedicle, if they couldn't dissect out the vessels. And they seemed to have gotten away with it pretty well. And there have been several studies recently where they reported taking both the artery and the vein together without any...adverse effects, so...But, you know, I'm from the old school and I've got to tell you...Okay, there's the artery. It's been cleaned up pretty well. And, because...I'm being a little bit cautious today because we're on the video; not that I'm always...not always cautious. I'm gonna put a little Hemolock clip on this. You know what? I think I'm not...it's rather thick. Probably not. I'm not gonna do that. The...the...You know, if there are some calcifications...Let's switch, please. If there are some calcifications in the artery, especially in older patients, and in this patient not surprising since she has a history of peripheral vascular disease. I don't want to put a clip across it and cut across it by accident. Why don't you clean that off for me. I'm about to actually put the stapler on it. I'm gonna leave myself a lot of room. Just in case we do get some bleeding, I can always put the clip on it later. Okay. See it there? Alright? Great. Now you see I'm guiding the...the artery in this instrument. And I'm also taking the...the opportunity now to...Let me do this. Okay. To make sure nothing else is in that instrument. Okay. And, again, one hand operation. Wonderful tool. And bingo. Look at that. There's the artery. I've got a little bit of room in there, and there's the vein right underneath it. As I was dissecting out the artery, I really did a lot of my dissection for the vein. Look at that. Okay. Okay, switch for me, please.

00:41:03

MARTIN D. GOODMAN, MD, FACS: Do you do any preoperative testing or imaging of the vessels before you do this, so you know where they're---

00:41:07

GENNARO CARPINITO, MD: Yeah. It's always a good idea to get a map, a roadmap of the vessels before you do this operation. Can I have a clip, please. A Hemolock. Always a good idea. But I've got to tell you, in the...when I first started doing these we...we were much more meticulous about...about getting those images. I don't feel that we really need to do that now. I rely primarily on...on the standard routine CAT Scans now to see if there are multiple vessels. And, of course, you know, multiple vessels can involve up to a quarter of our patients. And you can have really major anomalous vessels in one out of...ten patients. Actually, one out of nine patients. And here's the vein. Believe it or not, it's almost a hundred percent dissected. There's only a little bit of tissue on here. Look at that. There's the edge right there. All I've got to do is really get on this edge here. Now, one thing I want to bring your attention to is as I'm doing this dissection...is that the adrenal artery...I mean, vein comes off of the...of the vein in this direction. It looks like it's lateral

because I flipped the kidney towards me. But the adrenal vein is right here and the gonadal vein comes out here. You can see it right here. I don't have to take those now. When I do a donor nephrectomy, I do. I have to take them because I need length on the vein. But here I don't have to bother with that. And it really cuts down on the time and also the potential problems. You can this vein now is very, very thick. It's decompressed. It feels like a balloon that's been deflated. A lot easier to work with. I can actually puncture this and lose very little blood, because there's very little pressure left in here. Switch please. Andre? Clear. Hold that for me please, Bill. Okay. This is a so called reticulating...Come on Andre. Twist. Twist, twist, twist, twist. Let it go. There you go. Clean it. Okay. Now be careful. You've got to go up first. There you go. And then down. Otherwise you're gonna hit...Okay, there's the vein. I've got my finger around it. And, here comes my...angial stapler. Again, I've got it in. I look for...make sure that nothing else is in my instrument. Pop. Count to three – one, two, three – as we...I just threw my staples down and cut at the same time, release and there it is. Okay.

00:43:40

MARTIN D. GOODMAN, MD, FACS: That was great.

00:43:42

GENNARO CARPINITO, MD: Yeah. It's...Again, it's truly, truly an amazing, amazing instrument. Now you notice I...I used a total of three instruments here. The only thing that's really holding me up right now is the ureter. And I'm doing a lot of the dissection...As you can see, my...my assistant here is now following me very well and I'm doing it with my hand. Okay. There you go.

00:44:02

MARTIN D. GOODMAN, MD, FACS: Would this be a good time for us to see Dr. Perrone, who is the Associate Chief, Division of Nephrology here at Tufts-New England Medical Center?

00:44:10

GENNARO CARPINITO, MD: Sure. Sure, let's talk to Ron. Let's see what he has to say. Let me have a Hemolock. Thank you. Yes. Shift.

00:44:18

RONALD D. PERRONE, MD: Very well integrated with other specialties. We call that multidisciplinary, but, in fact, it's...it's something that we do as part of our routine practice; not something we've added on as a marketing tactic. For example, we share clinic space with transplant surgery, which is part of our multidisciplinary transplant clinic. And we work closely with them both during that clinic time and during regular working meetings with the transplant surgery team. We have a close relationship with urology in our kidney stone program. And, that not only includes urology, but also includes interventional radiology for other interventions in dealing with kidney stones. We also have assembled a polycystic kidney disease center, which includes nephrologists, surgeons, geneticists, urologists and neurosurgeons to deal with all of the different aspects affecting people who have polycystic kidney disease. And, in addition, during our inpatient care and out outpatient care, we interact closely with specialists and generalists of all disciplines to try and provide the best care that we can.

00:45:35

GENNARO CARPINITO, MD: Well, thank you, Ron. You know, I...I...We work very, very closely with renal. In fact, this patient was referred to us by the renal service. She's on chronic hemodialysis. She has end-stage renal disease, among many other problems. Okay. Well, the kidney here is...Let's go back to...The thing is, we've been totally disconnected right now. All I've got to do is remove it. As you can see, we've adhered to the classic cancer principles. It's completely enveloped and encased in Gerota's fascia. It's completely disconnected from the vessels. There's very little bleeding, as you can see. Let's have the...the Endocatch bag and a grasper, please. And I'll take...Okay, thank you. Which is up? Okay, here. The [word?] is done. Okay. Now, again, I've...I'm putting the

Endocatch bag here through the port and I'm able to dial it up so it...it seals it. And I can maintain [neumo?] at the same time. Okay, come on in.

00:46:34

MARTIN D. GOODMAN, MD, FACS: What...what actually is that device?

00:46:37

GENNARO CARPINITO, MD: This is a...It's basically a bag that...I'm upside down. There you go. This way. No, that's right. Oops. Okay.

00:46:48

MARTIN D. GOODMAN, MD, FACS: I just want to remind the audience, as we're doing this you can ask questions by touch...by on the screen, by just touching the button and we'll get back...We'll give you answers to those questions as soon as we get...get the information to us.

00:47:04

GENNARO CARPINITO, MD: Yeah. Now just getting back to...to Ron, you know, with the Renal Department here, again, truly a world...world class department. Some of the best physicians in...in the world work here at New England Medical Center. We work very closely with them; not just in cancer and...stone disease, but we also work closely with them with cystic disease of the kidneys, which include things like polycystic kidneys. And that particular procedure lends itself quite nicely to the...to this approach. As you can see now, I've put the entire specimen in the bag. This is a rather important part of the procedure here, because one of the things early on we had trouble with was when we did these purely laparoscopic was that we used to actually put the specimen in the...in the bag here and then bring it out to...through one of the ports, because we didn't make the three inch incision. And we used to morselize the...the kidney. And that had several disadvantages. The biggest one, of course, let...it let the spilling of the cancer outside the bag and let the seeding of cancer in several reported cases. And the other thing is it didn't give us an intact specimen, so we really couldn't analyze this thing to see how extensive the tumor was. And we couldn't basically judge how to...treat the patients post-op. And so we've gotten away from that. So even the people who do a purely laparoscopic approach, which by the way takes about an hour longer on average, because at the end of the case they've got to make the three inch incision to take the specimen out, just like I'm doing right now. And as you can see now, I'm sealing this in the bag. And now I'm gonna bring it out and... anybody? You want to switch. You got it? Okay, there it is. And there's your specimen. Okay. There you go. Thank you.

00:48:53

MARTIN D. GOODMAN, MD, FACS: Wow, that's great.

00:48:54

GENNARO CARPINITO, MD: Okay. That pretty much concludes our approach. I'm just gonna have a quick look. Can I have some lubrica...lubricant, please? I'm gonna have a quick look at the...at the bed here and make sure that we haven't left any significant bleeders behind. I've got one more sponge in here that I've got to take out. I'm sure Bill would have reminded me, had I not...set it. Okay. Oh, yeah, we've got the transplant. Alright. Well, as I'm doing this, let's cue that up. The reason why I want to show you that particular...Can you rotate the patient towards me some more, please? Okay. Well...why don't you let...Go back and cut through that part. That's where we were taking down the line of Tolt. And, again, this is the part where I...This is...It happens to be a left kidney. Okay, go back in. Can you rotate the patient? Okay. All the way towards me, please. There you go. Perfect. Okay. Well, I'm just drying things up here, and not that we lost a lot of blood. I think we have one sponge full. Okay. Beautiful. Well, we have...With the transplant approach, we...we do this on an anterior approach. We...we go after the vein first, because we need the length from the vein. As you can see, I have the vein in my hand. I'm pulling it up. There are several structures that I have to deal with in this particular approach that I don't deal with when I do the...the don...the

radical nephrectomy. There's, of course, the adrenal vein above the gonadal vein below, which I already took. And this is a so called lumbar vein. And you can tell it's a rather small vein. Look at these...at its size relative to my thumb in there. And these often get ripped during the open approach, because people can't see them. You can't look underneath the vein. So...in this case, yeah, this is one of the early tapes I made several years ago and we used a lot of clips, so you didn't see me use this instrument in my case today. And we were a lot more cautious then because we just didn't...you know, the case...the particular technique hadn't evolved enough. But now we know that we can take a lot of these veins now with the Harmonic scalpel without putting these clips on here. Now, of course, once that's happened we are...you know, we're taking as much length from the vein as possible, because we have to use it in the transplant. And now once we've done that, we can go after the ureter. Okay. Can I have the flow seal, please? Okay. Show me. Show me it here. Come in here. Okay.

00:51:20

MARTIN D. GOODMAN, MD, FACS: So this is the ureter? Or, no.

00:51:24

GENNARO CARPINITO, MD: That was the...Yeah, that is the...That was the ureter we...we dissected out. And I'll take it later. Now we're after the artery here. As you...This is very similar to what I did in my case here. Can I have a syringe with a...Yeah. Can you take that? Oh, this is...We're taking the artery now posteriorly. And remember I told you about the lymphatic? This is a big lymphatic channel. Now, I cut it at an angle just to show you here on the...the...the lumen of...of the...of the lymphatic. You see what's coming out of this. Clear. It's lymph. But you...you can see with the Harmonic scalpel here, I'm actually able to seal that, which is something you could never do with the cautery. Absolutely cannot do it. And as I dissect the tissue away from the outer...you notice that the dissection is a lot more meticulous. And as you can see...we're dissecting part of the aorta out, because we have to get as much length on the artery on the left side as possible, because it tends to be shorter. And as we do that dissection...Let me come up here. Okay. Okay, show me the adrenal here.

00:52:30

MARTIN D. GOODMAN, MD, FACS: So the importance of needing the longer length on the vessels is because you need to...basically suture these to the recipient.

00:52:41

GENNARO CARPINITO, MD: That's correct. So you need as much length now...There I took the...the ureter. It's okay to allow some of the...Can I have an angial stapler, please? Some of the urine to float, it's...it's sterile, so it should be okay. And often we do...And here instead of using the angial stapler on the...on the artery, we use two Hemolock clips because it gives us a little bit more length. Okay.

00:53:10

MARTIN D. GOODMAN, MD, FACS: You wanted to do the donor nephrectomies very quickly, because you want the viability of the tumor itself.

00:53:15

GENNARO CARPINITO, MD: That's right.

00:53:16

MARTIN D. GOODMAN, MD, FACS: Of the kidney itself.

00:53:17

GENNARO CARPINITO, MD: Although it 's not as quick as the case we just did, in fact, from skin to skin here we're probably gonna be under an hour. That takes about hour...approximately a half an hour longer, because we have to do that extra dissection. And...getting back to the clips, that gives a little bit more length on the artery. And those clips work as well, I think. The only drawback with those is that you've got to be careful not to let the sponge catch on them. You can pull them off accidentally, so you've got to be very, very careful. Okay. So let me come over here, over here, over here. Let's see what is

the...a fat globule. Okay, so that's pretty dry in there. Let...let's come out of that video and let's go back in here. You can see the spleen is intact. We haven't done any major injuries or damage to any organ here and that's the goal. And we've taken the entire specimen out. I don't see any bleeding. Let's look at each one of these ports now, Andre. Let's make sure we don't have any bleeding. Okay. Let's look here. Okay. There's one of the ports. I'm gonna pull it out temporarily and make sure there's no bleeding. There is a small chance that we can come to a small artery through the abdominal wall when we put the ports in. We always check to make sure. One of the things that we've been able to eliminate...almost eliminate; not quite a hundred percent, is by using these so called bladeless ports. Come through here now. So this particular...port that I'm using, also from Ethicon...It sounds like I'm working for them, but I'm not. Maybe they'll come calling after this case. That's...that's it. That's the other port. Alright. Beautiful. No bleeding. Okay. Let me get the two sponges out and we're done. Okay. Great. There's one. And two sponges.

00:55:07

MARTIN D. GOODMAN, MD, FACS: So this is the actual trocar that we used. It's a bladeless trocar, as Doctor Carpinito was talking about.

00:55:16

GENNARO CARPINITO, MD: And it's also very...That's evolved quite a bit since the...the first instruments we were using. Can you rotate the patient all the way over to her left, please? Okay.

00:55:28

MARTIN D. GOODMAN, MD, FACS: So what did you just do here?

00:55:30

GENNARO CARPINITO, MD: Well, I took the...all the ports out, including the hand port, and I'm about to close the fascia. And once that happens, we're done. So...Okay, rotate the patient some more towards the left and then lower the table, please. And I'll take the Number One PDS.

00:55:53

Now, of course, because the...the incision is so much smaller, closing is much...Table now, please. And rotate her all the way to the left. Okay. So closing the...the incision is...is...takes much less time. Hold on one second. Pick-ups. Let me just make sure here. Busby, please. So that adds all...Okay. Give me a spoon pick-ups, please.

00:56:20

MARTIN D. GOODMAN, MD, FACS: So do you have anything...any other closing comments for the audience as you're closing here?

00:56:26

GENNARO CARPINITO, MD: Well...One second. Let me just pay attention here. Okay. So, in closing, I think that, you know, with...as we get better and better at doing this minimally invasive procedure, I think that the patients benefit a great deal. This patient will...will be home...What's today? Wednesday? She'll be home Friday. And she'll be back in my clinic in about ten days for a follow-up. And more often than not, to be honest with you, my staff can't even tell they've had surgery. Pick-ups. Can I...I'll take this back here. Okay. Lift up, please? That a boy.

00:57:13

MARTIN D. GOODMAN, MD, FACS: Well, thank you, Doctor Gennaro Carpinito. And I am Martin Goodman. And I'd like to thank you for joining us tonight and good evening.

00:57:20

GENNARO CARPINITO, MD: Well, let me just say one more thing, Martin. I just want to thank my entire staff here for staying late tonight and helping us out with this broadcast. Bill, Sandy, Andre, the entire anesthesia staff. And the camera staff. Thank you very much. Hopefully we'll see you again soon. Thank you to the viewing audience too. Please come back.

00:57:46

NARRATOR: This has been a hand-assisted laparoscopic radical nephrectomy performed from Tufts-New England Medical Center in Boston, Massachusetts. OR-Live makes it easy for you to learn more. Just click on the Request Information button on your webcast screen and open the door to informed medical care.

00:58:14

[END OF WEBCAST]