

**ABDOMINAL HYSTERECTOMY WITH HARMONIC WAVE COAGULATING SHEARS  
BAYLOR COLLEGE OF MEDICINE  
HOUSTON, TEXAS  
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ANNOUNCER: Welcome to Baylor College of Medicine in Houston, Texas. Over the next hour, see an expert discussion of an abdominal hysterectomy with Harmonic WAVE coagulating shears. During the presentation, surgeons Carl Giesler, Daniel Tobias, and Marsha C. Bowling will engage in a round table presentation on the technical aspects of Harmonic technology in performing an abdominal hysterectomy. You'll also see the removal of an 18-centimeter ovarian mass. 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.

00:01:05

CARL GIESLER, MD: Hi, I'm Dr. Carl Giesler, an associate professor at Baylor College of Medicine in the Department of Obstetrics and Gynecology, and I have the pleasure during the next hour to share this hour with a distinguished panel of gynecologic surgeons, Dr. Daniel Tobias from Morristown, New Jersey, and Dr. Marcia Bowling from Cincinnati. I've had the privilege of working with the Harmonic technology for more than 12 years. I've been a practicing OB/GYN for more than 20 years and now have a practice limited to gynecology, and technology for traditional surgery is where my practice is located today. Daniel, would you tell us a little bit more about how you came to be here this afternoon?

00:01:50

DANIEL TOBIAS, MD: Sure. I'm a GYN oncologist. I've been in practice now for eight years, and I work in Morristown, New Jersey, in Overlook, New Jersey, in Summit, and I'm the Director of the Women's Cancer Center, and I've been using Harmonic technology now for about three years I've been using the WAVE Harmonic scalpel on abdominal hysterectomies for the last year.

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CARL GIESLER, MD: Okay, thank you. Marcia, tell us a little bit more about your practice.

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MARCIA C. BOWLING, MD: My practice is in Cincinnati, Ohio, and I have a practice that includes women with cancers of the female organs and complex gynecologic problems. I've been using Harmonic technology for approximately two years, and I'm involved in teaching residents at University of Cincinnati and the Christ Hospital.

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CARL GIESLER, MD: Okay, so during the next hour we're going to talk about specifically abdominal hysterectomy with the Harmonic WAVE coagulating shears. We're going to show a demonstration of surgery during this program that is done by myself some months ago, and then we're going to talk about some of the things that make Harmonic energy work as a new technology. Harmonic energy is actually the conversion of electricity to mechanical energy. It goes through a handpiece and then is transferred to an instrument. And the instrument allows this multiplication of the energy to be affected at the endpoint in the tissue. During the next slide we're going to have a demonstration of animation of what

happens as this electrical energy converts to mechanical energy at the tissue within the body.

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ANNOUNCER: In the Harmonic system, an ultrasonic wave operating at a frequency of 55,500 cycles per second causes the active blade to vibrate, creating excursion of the blade tip from 50 microns at power level one to 100 microns at level five. The transducer, housed in the Harmonic handpiece, converts electrical energy to mechanical energy. It consists of a stack of piezoelectric ceramics sandwiched under high pressure between two metal cylinders. When pulsed with a high-voltage electrical signal from the generator at the resonant Harmonic frequency of the ultrasound acoustic system of 55,500 hz, the transducer, blade extender, and blade expand and contract with each wavelength along the entire length of the device. Longitudinal expansion and contraction increases from just a few microns of longitudinal motion at the transducer to 50 to 100 microns at the blade tip, where maximum motion occurs.

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CARL GIESLER, MD: Now we've seen how the mechanical energy animation is [converted] to mechanical energy. Now what we want to do is we want to show animation of what happens when the blade comes in contact with tissue. It's very important that as we look and understand what this equipment is doing inside, we want to understand how this protein is changed to coagulum and then allows the tissue to fuse together.

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ANNOUNCER: Ultrasonic coagulation is due to friction within high-protein content tissue. Mechanical friction breaks hydrogen bonds to disorganize, or denature, protein. As proteins are denature, a sticky coagulum forms and seals the small vessel at a temperature under 100 degrees Celsius, minimizing smoke. Deep coagulation of larger vessels occurs when the effect is prolonged.

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CARL GIESLER, MD: We find that the mechanical energy also creates a temperature because of friction. During this change in temperature we see temperatures between 50 degrees Centigrade and 100 degrees Centigrade, and this protein coagulation fuses or welds the tissue together. This is significantly different than traditional electrosurgery or laser surgery that work at higher temperatures. Tissue desiccation occurs where water vapor evaporates from the tissue with electrosurgery and laser surgery at a much higher tissue cause oxidation or charring of the tissue that sometimes can end up in adhesion formation.

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The patient that we're discussing today and we're going to see the surgery of in video is a 41-year-old woman who had a normal exam by myself some three months prior to her surgery. She had a two-month history of a swelling abdomen with clothes fitting tight and she had a two-week history of acute left lower abdominal pain. While it was initially felt to be a urinary tract infection, a urologist was subsequently consulted when the infection failed to respond, and on determining there was a pelvic mass, she was referred for gynecologic examination. Her examination really revealed minimal changes except in the pelvis when she had a mass palpable at the umbilicus and no adenopathy. She had some pain in the lower quadrant on the left and by manual examination showed a uterine mass the size of a 20-week pregnancy. Her laboratory findings were essentially normal except for a Ca 125 of 16.7 and a 15 cm mass cystic with a solid component in ultrasound examination. At surgery we found this adnexal mass with a smooth capsule, chocolate brown cystic fluid inside, and a solid mass with papillary surface. No intraperitoneal disease was otherwise found.

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Now, traditional abdominal hysterectomy techniques will involve clamp, cut and tie. The novice that's watching this evening will say, "Well, that's what I'm most familiar with. Why do I want to work with technology?" You'll find that traditionally we have multiple instrument exchanges, we have tension on the tissue, and we have an increased risk of

needle injury because of the multiple times we have to suture tissue. With Harmonic wave technology, it's considerably different. We use a single instrument, and with that single instrument we're able to coagulate, cut, and separate tissue. We have no instrument exchanges, and so we're able to focus our instrument on the tissue as we're progressing during the surgical procedure. Whenever we use tension on the tissue, we end up having sometimes trouble, otherwise known as bleeding, when we have minimal risk of needle injury, because we're just not suturing the tension all the way along.

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Dr. William Saye is a well known expert and laparoscopic surgeon, and when he talked he talked about what does it take to move from novice to experience. And the very thing is that when you're learning a technique, you have to do 10 cases just to figure out what's happening with the instrumentation. Sooner than later you're going to get to 25 cases and you're going to find yourself very comfortable with that technique, and by the time you get to 50 cases, you're pretty much as good as you're going to get. Now, during the next few minutes we're going to actually find that we'll see the video and the video is going to actually show the surgical case we just described. And we're going to show initially the opening of the abdomen as we open up to explore the abdomen and expose the ovarian mass. And here we're using electro-surgery to go through the abdominal wall fat. The electro-surgery coagulates and cuts the vessel so there's minimal bleeding as we go through the abdominal incision. And Marcie, have you had any different or things to approach as we're looking at the surgery as it progresses?

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MARCIA C. BOWLING, MD: I just want to tell you how pleased I am that you've made a generous vertical incision and that that will give us plenty of access to the pelvis and upper abdomen if we need it. And opening carefully in layers, taking care not to get into the cyst in the process of opening the abdomen.

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CARL GIESLER, MD: Why is it so important to not do the transverse incision? What does -- how does that handicap us?

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MARCIA C. BOWLING, MD: Well, we want to remove this ovary intact. We don't know what the pathology is, so the easiest way to slide it out at this size of 20 cm is to have plenty of room. And if this is malignant and we need to evaluate the upper abdomen or lymph nodes, it's very difficult to do through a transverse incision, so this is the perfect incision for this mass.

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DANIEL TOBIAS, MD: I agree with Marcie, and I've been involved where I'm asked to come into the operating room after a mass has been removed that's malignant and you have a very small transverse incision, and then we're in the situation where we like to do a staging, and it can be very difficult and challenging with the -- without having the proper incision, so I agree that making this vertical incision really is in this patient's best interest.

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CARL GIESLER, MD: Now, one of the things you just saw me do is you saw me pour some fluid into the abdomen before I really got the ovary out. And the importance of when there's consideration for malignancy, pelvic washings. And is that something that, again, we should always be thinking about when we have adnexal disease?

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MARCIA C. BOWLING, MD: I think that's a great idea. That way you don't make any mistake by not having that information up front. If there is fluid present, I'll just aspirate that, and if there isn't fluid, then I'll do washings.

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DANIEL TOBIAS, MD: I agree, and I think also it's important to do it as you did, prior to removing the mass, because I think it's not unusual, we've all had large masses that we've

removed that do rupture in the process of removing them, either because they're very thin-walled or because there may be some adhesions which are hard to identify in the process of removing the mass. So I agree.

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CARL GIESLER, MD: And one of the things that I try and do is I try and get the pelvic washings before I have blood so that I don't have blood kind of mixed in with the washings for cytology. It makes at least conceptually more difficult to get good cytology results back. Now here we're trying to deliver this mass through the incision, and we've been generous in the making of the incision, but it's still popping up with difficulty. Any suggestions on how to make it easier?

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MARCIA C. BOWLING, MD: Sometimes manipulating the abdominal wall, compressing it down around the ovary allows it to come out, and otherwise just gentle persistence, just like you did.

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CARL GIESLER, MD: Now, notice that the vascular bundle on the ovarian mass was twisted. Would that have been part of her pain as part of a torsion? Is that one of the reasons we might have examined or found her pain?

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DANIEL TOBIAS, MD: I think so. I mean, I think a twisted ovary can definitely cause pain. There's patient where it twists and untwists and it can lead to this intermittent type of pain syndrome. So I think it's not unlikely.

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MARCIA C. BOWLING, MD: That ovary's pretty dusky looking. I think it probably was ischemic, so I'm sure it contributed to her pain.

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CARL GIESLER, MD: Now here we're using the Harmonic WAVE to go across the vascular pedicle for this ovarian mass, and when we started using the ovarian -- or the Harmonic technology, we started using it at level three but dropped down to level two because of our concern for bleeding. And at this point I wanted to have the least amount of bleeding, and so I left with level two as the energy across this bundle. Dan, have you had experience with the different levels going across vascular structures?

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DANIEL TOBIAS, MD: I have. I think it's been similar to yours. When I first started using Harmonic I was using a level three since that's what was recommended, but I found that I did have a higher incidence of bleeding from the pedicle that was coagulated and cut. Since I've gone down to level two, I seem to have much less of that, and it's infrequent now that I have bleeding from the ovarian vessel. And I also find one of the key points that took me a while to learn was to limit the tension. I think we're all so used with the open surgery especially to have lots of tension on the tissue, and I think minimizing or having as little tension as possible makes all the difference in terms of not getting bleeding.

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CARL GIESLER, MD: Okay. One of the things that we're doing right now is that there is some oozing from where we cut the vessels along the uterine sides, and we're just cleaning that up while we're waiting to make sure that when we put the uterus back in the abdomen before we examine the ovarian mass. I'm using primarily power level two, and I'm using it applied for several seconds. I'm not clicking the jaws together because I don't want to cut and create new bleeding sources. I'm just gently pushing it together so I have energy across the oozing surfaces.

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MARCIA C. BOWLING, MD: I think that's one of the advantages of this piece of equipment is you can use it to divide tissue and to control bleeding.

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CARL GIESLER, MD: Now, one of the things that I wanted to look at before I sent the mass for pathology is that ultrasound had shown a solid mass, and I wanted to examine whether this was a possibility just an endometrioma or if this was really something that was more significant. And the chocolate-colored fluid normal suggests to me endometrioma. My practice does not have a lot of cancer of the ovary in it, but would you think that bleeding or the bloody fluid was suggestive as much of cancer or would you go on the ultrasound for that?

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DANIEL TOBIAS, MD: I think I would have done what you did. Although clinically looking at this, this looks very consistent with an endometrioma, I think it's very smart that you opened it and looked at that solid mass. And so generally speaking in my practice, most of these specimens go for frozen, but again, it's a GYN/Oncology practice, so most of the patients are being sent to me because there's a high index and suspicion.

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CARL GIESLER, MD: Well, particularly with our Ca 125 of 16 and the solid mass, I kind of had mixed feelings about what to do with this patient pre-pathology. But once I saw the solid mass inside, there was no question that I was probably going to finish the surgery. One of the things that this program allows us to do is to have Internet access to questions, and so there's a button on your screen that you can push and create an email so that you can send questions to the panel that will be answered as the program goes along. And I think one of the things that we want to do is to have participation. We have the opportunity to share our knowledge sitting on the panel which is quite considerable with Harmonic experience.

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The next part of the program is going to be the actual surgical procedure where we're going to first see the abdominal hysterectomy as it was performed using the Harmonic WAVE. And with the Harmonic WAVE, or the pictures that you're seeing, we had a laparoscope with a 45-degree lens and a laparoscopic camera positioned right above the surgical field so that we could then observe the technique that we're using today. We're now going to run the video and we're going to comment on the video as we go through the next case. You can start the video. Now, we've already taken the ovary out and sent it to pathology. Because of the solid tumor that was inside, made the decision to proceed with the hysterectomy. The patient had agreed previously is there was any concern, hysterectomy was an appropriate decision that she was ready to proceed with. And so now we're just starting getting set to finish the rest of the surgical procedure.

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MARCIA C. BOWLING, MD: I noticed that after that -- at the end of that last clip, you were exploring the upper abdomen, which of course would be important to evaluate the diaphragm, the liver, stomach, spleen, kidneys, and feel along the aorta for retroperitoneal lymph nodes.

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CARL GIESLER, MD: I was exploring it to see if there's any palpable or visible lesions. There were none in the patient at this time, so she was remarkably thin. There were actually windows of peritoneum in the omentum.

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MARCIA C. BOWLING, MD: I see you're generating a lot of steam here, which is -- can be a problem deep in the pelvis and certainly deep in the pelvis of a heavy patient, which is more typical of what my patients look like. I don't see a nice pelvis like this all the time. So how do you handle that?

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CARL GIESLER, MD: Well, one of the things that I do is I use the suction just to keep a visible field in the open case, just as I do in the laparoscopic cases vent the steam out of the abdomen from the Harmonic that I'm using intraabdominally. What we're doing here is

we're creating -- going across the vascular bundle in a place that is similar to what we would do with standard technique, and we're creating, again, the bladder flap. Again, similar to what we would use with Metzenbaum shears against lower uterine segment, staying close to the uterus rather than elevating close to the bladder.

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DANIEL TOBIAS, MD: I think one point that we just may want to mention for people that are first using this is that the active blade does get very hot and does take several seconds to cool down, so surgeons just want to be aware of that in terms of not touching the patient's skin or touching other people's hands that are working.

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CARL GIESLER, MD: I think that's a very important part, because when I'm using the Harmonic WAVE in abdominal cases, I actually have a wet towel that sits on the top of the abdomen. So I have a place that will protect the patient from the heat in the blade while it is quickly dissipated when it's in touch with the towel. It's something, again, I use to add additional patient safety from that respect. Now here you're seeing a vascular pedicle that's oozing a little bit. It's off the ascending branch of the uterine artery. And instead of closing the clamp completely to get the click that the Harmonic WAVE has, I just close it for a short period of time to coagulate the tip of the vessel. Here we're going across the vessels to infundibulopelvic pedicle on the left -- or on the right. And notice we're close to the ovary but not at the ovary. Try and stay away from the ovary to avoid having ovarian remnant. Notice how we've left the vessels in the infundibulopelvic ligament relaxed so we don't cut before we totally coagulate. We're going to cross the round ligament, and again, putting pressure on the uterus so we can provide exposure.

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MARCIA C. BOWLING, MD: Am I correct that you used the minimum technique on the infundibulopelvic ligament and then switched to maximum current on the rest of this dissection?

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CARL GIESLER, MD: Right. When I go across the broad ligament, definitely use max current. It improves its quickness of cutting.

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DANIEL TOBIAS, MD: I always emphasize to people that are using this when -- basically I use maximum on everything except for the larger vessels, which in my cases would typically be the IP and the uterine artery and vein.

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MARCIA C. BOWLING, MD: Right.

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CARL GIESLER, MD: Again, we're going across the vascular bundle, and as we're going across the vascular bundle, let the instrument do its work. And notice we're going perpendicular, just as we would do with standard technique, having an open clamp across the lower uterine segment and then closing the clamp as it comes and rolls off the lower uterine segment. That gives the best opportunity to include the vessels within the clamp and coagulate. Once we've crossed the vessels, then we're going inside the vascular ascending bundle and the vessels inside are smaller in diameter, easier to cut. Generally, if I'm inside that vascular bundle, I'll be using power level five. One of the things that we're doing, again, is just going from side to side as we dissect our way down to where the cervix meets the vagina and going around the posterior portion of the cervix separating the peritoneum from the cervix to maintain some of the support to the vagina with the uterosacral attachments.

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DANIEL TOBIAS, MD: The other point I was going to make is I know when I first started using this, because you're hearing a beeping sound as you're coagulating and cutting, it seems like it's taking a long time. But because you don't have all the instrument changing

hands like you do with a typical clamp, cut, and tie, you really are moving much faster. It just -- when you first start using it, it doesn't seem like you're moving as fast.

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CARL GIESLER, MD: Well, I think what you're seeing now is where we're placing the clamp, because I tend to like to have a blended technique of standard instruments when I'm separating the cervix from the vagina. The Harmonic WAVE is somewhat awkward from my standpoint to go all the way around the cervix in an abdominal case. This patient, it could have been done, but I just try and emphasize the things that are easiest for me to use and get the good results for hemostasis and control. And the blood loss here has not been edited for blood loss. This is strictly for demonstration of the technique. And I think, again, you've seen very little blood loss during this procedure.

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MARCIA C. BOWLING, MD: One of the difficulties is the length of the piece of equipment, of the shaft and the fact that it's straight. So it is sometimes hard to sever the attachments of the cervix from the vagina, but I can do -- use the WAVE throughout the case unless the patient is very deep or very obese, making the angle awkward.

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CARL GIESLER, MD: One -- and again, the thing that we're seeing here is the closure of the case, and now we see a traditional appearance to the vaginal cuff as we're placing the stitches. And this is what it looks like at the very end. We've got good hemostasis, we've left minimal amount of vaginal tissue on the cervix as we've taken the uterus out, and we're now closing the vaginal cuff. Again, I think the issues that are most important is that by using the technology, understanding how it works, we're able to minimize our bleeding and focus strictly on the steps as our eyes continually stay on the anatomy at hand rather than going every other step back to our surgical assistant or a tech handing us instruments. I think the multiple instrument exchanges, we have to refocus a different picture each time, and that tends to take our attention away from the surgical field. Momentarily, and we all learn how to handle it, but now when we've got one instrument that clamps, cuts and coagulates all in one instance, we're able to do it and do it with efficiency.

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MARCIA C. BOWLING, MD: It actually takes -- I counted six steps to clamp, cut, and sew a pedicle, and four instruments. And we've been able to do it in one, with one instrument.

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CARL GIESLER, MD: One of the most important things we have as novices learn technology, or what keeps new physicians or experienced physicians from having technology, is basically the problem of bleeding. And the problem of bleeding, realistically, as I've looked back on my own experience, comes from three different areas. And what I'd like to do now is use this surgical case and the video footage, along with some anatomy, to explore and understand why we can prevent bleeding using the Harmonic technology. So if we look at prevention of bleeding, the first thing we do is we look at the utero-ovarian ligament. And Daniel, when you'd look at the utero-ovarian ligament, what are the things that you think about as far as why bleeding occurs?

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DANIEL TOBIAS, MD: Well, I think the most common reason to get bleeding in that area using the Harmonic is if you are too close to the uterus or actually dig into the uterine wall, you're going to have bleeding, which can be difficult to control, especially using the Harmonic. In many cases, you need to put a stitch and/or a clamp to control that type of bleeding, so I think you want to be aware of that. Unlike using a traditional clamp, cut and tie technique, you want to have a little distance from the uterus and be aware that the active blade will sort of cut into whatever it's adjacent to.

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CARL GIESLER, MD: Okay. Marcie, have you solved that problem with your residents? I know it's one of those fun things that we do is, okay, now how are we going to solve the

problem of bleeding? When we walk away we want to not have to go back to the operating room on a Friday night.

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MARCIA C. BOWLING, MD: Well, I think letting the WAVE do its job, which is not to try to rush it through the pedicle and not to put too much tension is the best way to avoid bleeding. And of course, being aware of the size vessel that the WAVE is designed to handle and not overly challenging it, or if you're going to do it on a larger vessel, try to do it from opposite sides perhaps so that you can coagulate across it ultimately.

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CARL GIESLER, MD: Okay. One of the things that I've found is that when we're first starting to experience the new technology is that we want to use the same techniques getting close to the uterus. And so if we get too close to the uterus, we actually cut across with the Harmonic WAVE at a coil in the vessel, and that leads to incomplete coagulation. And so I emphasize understand where to place it, and that means somewhere a little bit further away, and that was we can get the benefits of the Harmonic as an energy source in a single instrument instead of having to use the clamp and go back with sutures.

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MARCIA C. BOWLING, MD: Just have to remember when we place it further away that we're a little bit closer to the ureter and have to know where it is because it's right underneath the vessels and a little off from the uterus at the level [unintelligible]. It's there.

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CARL GIESLER, MD: Okay. The second place where we have bleeding or we need to be aware of it is where the blood vessels come into the infundibulopelvic ligament as it feeds the blood supply to the ovary. Now, one of the things that when we are accustomed to the traditional technique is we'll clamp it and we'll put it on stretch and we'll put a second cut between it. Because we've got the clamp and it's on stretch, we know we can place the suture. But when we have the Harmonic WAVE, we can clamp, coagulate and cut all in one step. And so one of the secrets is where to place the Harmonic WAVE when you're doing it, and we discussed this a little bit earlier as to identifying the vessels. Can you talk about it a little bit Daniel, as far as why we want to place the Harmonic WAVE at a specific point?

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DANIEL TOBIAS, MD: Well, you'd like if possible to get across the entire IP. If you only partially transect it, you're at risk for bleeding. I think your point about tension is critical, especially with the IP. If there's too much tension, you're definitely going to have bleeding, and I think it's important to recognize that you may not be controlling that tension alone. If you have an assistant holding the uterus, if they're applying too much tension, you're at risk for having bleeding as well.

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CARL GIESLER, MD: There's no question that we have to educate our assistants if they're going to have the help in using technology. And that's one of the things that we have to take away from the vessel. Now, what I want to show here is how we handled the infundibulopelvic ligament with a short clip of the video that you just saw so that you can start to understand what to do. If you'll roll the next video, please.

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Now notice that we're placing the Harmonic across the IP ligament, and we've got some distance. It's close to the ovary but not right on the ovary. And we're using power level two to go across. And again, notice that we've got the vessels with no bleeding occurred here. And I think that's the critical issue is that I think we can see appropriate application of the instrument across the vessels will actually make the instrument do the job that we want it to do.

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Now the final part where we have problems is deep in the pelvis where we go across the vascular bundle. And when we go across the vascular bundle we have to recognize we're

really doing the same thing as we do traditional instruments. And when we're doing things traditionally, we go across with a clamp and we roll it off the lower uterine segment. And we roll it off and we don't completely close it until it meets the edge -- the tip of the instrument meets the edge of the uterus. Well, this is what we're doing with the Harmonic WAVE, and when we do this with the Harmonic WAVE, we really get good application of the energy. But we have to remember that there's also perforating vessels, and those perforating vessels can be extended on either side of the vascular bundle. And so what we're looking at is we have to take into account of the perforators and also go a little bit wider with our application. Once we've crossed the vessels, then we can go down the next step and we can go across the perforators. This is something that we would do traditional with a straight clamp and then cut with a scalpel or scissors between the clamp and then suture. And we can extend this process all the way down to the cervix where it meets the vagina. And now what we're going to see is we're going to see a short video clip on the previous surgical case where we actually saw the vascular bundle handled in this fashion. And so we're going to watch this, again, paying more attention, going perpendicular to the lower uterine segment. See here, letting the instrument do its work. We don't have to be as concerned about tension on the vessels because all of the vessels are attached to the uterus with a reeler tissue. So tension on the uterus is not going to stretch those vessels; only making the uterus bigger like in pregnancy is going to stretch those coils and straighten them out. Once we've gone across the vessels, now we can show that we're going down around the peripherals, across the peripherals, between the vascular bundle. And you notice that tension on the uterus allows the bundle, the vascular bundle, to evert, much like a rose petal opens up from a bud.

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MARCIA C. BOWLING, MD: I'd like to just say look how clean that is. There's not a lot of char that's there, not a lot of cut suture material. It's a nice, clean pelvis because it's a coagulum that's controlling the pedicles and not a charred piece of cauterized tissue.

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CARL GIESLER, MD: Well, again, I think that this is what we have found that when we're doing the Harmonic and we see less char, we're actually seeing less chance of potential adhesions forming because there's nothing to create inflammation at that point. Again, we're seeing the development of the vascular bundle, and the cord for the Harmonic is right in front of the camera there. But we're looking at developing this bladder flap down to the end of the cervical-vaginal junction.

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DANIEL TOBIAS, MD: I think another benefit which the viewers may notice is that you don't see the Harmonic sticking to the tissue, which a lot of us have experienced using electrical energy, which I think is another significant benefit.

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CARL GIESLER, MD: Well, I think that this is one of the things that we really have found with Harmonic technology is that it really does make a difference in how quickly we can get something done. This surgical procedure, including the time for the pathology, was still done in just at an hour's time with a large mass and the time that was taken to close the abdomen with an incision. So that we significantly shortened, but we didn't significantly increase the risks. Now, one of the things that we'd like to do is to show closure of the technique -- of the vaginal cuff, because one of the questions that we have is, you know, "Do we have to use them?" We partly talked about it before, but notice here we're using instruments, the same instruments we use in the standard cut, clamp, and tie. And I know that Marcie, you've talked a little bit about the instruments in separating the vagina from the cervix. Can we expand that a little bit more?

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MARCIA C. BOWLING, MD: Well, I think you have to do what's best for the patient in the particular clinical situation. I usually find that the WAVE works in most applications;

however, I find that there are times when I have no choice but to resort to a traditional technique, and one has to be flexible with the situation.

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CARL GIESLER, MD: Okay. Daniel?

00:35:34

DANIEL TOBIAS, MD: I found the same thing, that over time I started out using the blended technique. Over time I found that in certain cases I'm able to do the entire case really using just the Harmonic WAVE. I'm able to take the uterosacrals, enter the vagina anteriorly and posteriorly using the Harmonic, and then suture ligate the vagina. I think a key point that people should realize, especially when you're first starting, is you should not be afraid to resort to using other instruments if necessary. So if you get some bleeding, and invariably when you first start using this instrument, you will, it's okay then to use some clamps. It doesn't mean the case is over, it doesn't mean you can't reintroduce the Harmonic later in the case.

00:36:10

CARL GIESLER, MD: Now, I'd like to take this minute to say that we are ready to accept more email questions. We've had several that have come in. And we're going to start to address those questions, but certainly as we have viewers that are looking at the program live this evening, your email questions are important to us. And I'd like to start with one of the questions to Daniel that came out. Are there situations even today where even though you've got knowledge and used the Harmonic technique where you still feel that traditional clamp, cut and sew is the important thing?

00:36:49

DANIEL TOBIAS, MD: There definitely are. I think there are cases when premenopausal women have very large vessels. Generally speaking, the Harmonic's approved for vessels that are 5 mm in diameter, so there are cases either in a premenopausal patient or in a patient with a very large mass that has very large vessel where I feel more comfortable clamping those vessels. In addition, there are cases where I'm very close, in patients with severe endometriosis or malignancy in their bowel in their ureter, and I may be concerned that the active blade may have too much heat to be too close to those structures, and I'll use traditional clamps in those situations.

00:37:22

CARL GIESLER, MD: Okay. Marcie, have you had opportunities where you would say, "I like the Harmonic WAVE, but this patient is someone I really feel safer doing standard technique?"

00:37:34

MARCIA C. BOWLING, MD: Well, I absolutely agree with all the points that you made. And I think also when we're working in the retroperitoneal space and taking lymph nodes, it's not the right shape and not delicate enough for a lymph node dissection. So I'll resort either to standard technique or I'll use a different Harmonic instrument -- for example, use the ACE.

00:37:57

CARL GIESLER, MD: Okay. Marcie, one of the things that we look at is also the ability of heat to cause problems. You know, and it's great to have this wonderful instrument that doesn't take electricity from out of the body and into the body where we have risk of electrical injuries, but what about some of the other issues? We've talked a little bit about steam and heat. Can you expand it a little bit more about what do you do separately or distinctly to prevent injuries from occurring when you're using the Harmonic WAVE?

00:38:33

MARCIA C. BOWLING, MD: Well, sure. Sometimes I will use my hand, and then when it gets too hot I'll take my hand out and put in a ribbon or a folded wet lap pad and/or drape the ribbon in a lap pad and use that to protect the bowel. That's where I have most of my concerns about the heat that's being released. And when I'm not operating, we keep a metal pitcher with a moist lap pad attached to the drape, and we let it sit in there.

00:39:00

CARL GIESLER, MD: Okay. Daniel, have you had some things that you use to handle the heat or other issues when you're in the abdomen with the WAVE/

00:39:09

DANIEL TOBIAS, MD: Yes, I do. Like you had mentioned earlier, I usually have a moist lap pad on the field and I make sure that the scrub nurse and the resident assisting understand that it does retain its heat for some time, they need to be wearing about burning other people in the operating room or the patient's skin. And I think that as you illustrated in the video, you just have to be sure that you're not adjacent to any other structures with your active blade, because if your active blade -- which through most of the video was in the posterior surface -- is against anything else, it's going to burn whatever it's up against. So you can't have it against the ureter, the bowel, or any other vital structure like you can with a clamp. I think that's an important point.

00:39:45

CARL GIESLER, MD: Okay. One of our email questions that came in while we were watching the video said, "I've had trouble with bleeding occurring while I was dealing with the uterine arteries. Once I get away with bleeding, is there a way that I can recover using a Harmonic or do I have to use something else?" Marcie, if this happened to you, what would you tell this surgeon? That you've got bleeding after you've gone across the uterine arteries. How do you recover it?

00:40:13

MARCIA C. BOWLING, MD: Well, if I can apply the WAVE, not clamping it down completely as you've showed and use it on minimal energy level, and I usually count to 1-1,000, 2-1,000, 3-1,000 and then release it while the blade is still active. Often that will control the bleeding. If it doesn't, then sew it and move on and go back to the WAVE for your next pedicle.

00:40:40

CARL GIESLER, MD: Okay. Daniel, how do you handle the bleeding exercise -- or excess that occurs when you've gone across the uterine vessels?

00:40:47

DANIEL TOBIAS, MD: Essentially, just as Marcie described. I think the benefit which everyone needs to realize is when we do these cases laparoscopically, we're able to control things in most cases using the Harmonic, as painful as it may be, if you have significant bleeding. But the benefit of abdominal is you can always just put your finger on it and stop the bleeding and kind of think about what you want to use or just resort to traditional instruments and then continue to move on. And I think that's really one of the big advantages of learning this in the open field as opposed to laparoscopically.

00:41:15

CARL GIESLER, MD: Well, I want to emphasize statements that both Marcie and Dan made is resort to traditional instruments, clamp and suture, and then go on and use the WAVE. Because I think one of the things that sometimes novice users, new users find is that when you're doing the surgical cases, you're committed to just one instrument because you've failed if you have to go back to old technique. And I don't think that's the case. I think what we really have to do is we have to find where the instrument really works for us, how the technology works, and then we can go on and apply it more and more effectively as our learning curve advances.

00:41:59

What's the largest size uterus you're comfortable using the WAVE with, Daniel?

00:42:05

DANIEL TOBIAS, MD: Um, I don't think there's necessarily a limit in my experience. You know, I've taken a 20 cm fibroid uteri with the WAVE. I don't think there's really a limit to the uterine size, I think it's really more the size of the vessels in the patient's anatomy as opposed to the absolute size of the uterus.

00:42:24

CARL GIESLER, MD: Marcie, do you have a size limit that you would consider, where you'd say, "No, I'm going to use the traditional technique here because I just want to get it done right?"

00:42:33

MARCIA C. BOWLING, MD: Well, I do want to get it done right, but I don't think the size of the uterus is how I make that decision. It's access to the vessels and the size of the vessels, and that's how I'll decide what instrument to use.

00:42:42

CARL GIESLER, MD: One of the things that I've done occasionally on large vessels when I've been using the WAVE is to apply a clamp and then take the pressure off where I'm going across tissue and then take maybe several bites so that I have a coagulum without pressure against that. And I've been successful in using that, so I'm not afraid of the larger vessel. I've just used the additional technology instruments to give me a lower pressure head. Is that something you might consider doing and to extend your capabilities with the Harmonic WAVE?

00:43:22

DANIEL TOBIAS, MD: Definitely, as I've done it. I think earlier on when I was more tenuous about using the WAVE, I would do that not infrequently where I would clamp in two areas to not ligate but just slightly coagulate the vessels and then cut in the middle. Just like we do with regular clamps.

00:43:41

CARL GIESLER, MD: Okay. Marcie, would -- how would you handle the extra-large vessels if you wanted to use the WAVE? Would you consider the extra clamps?

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MARCIA C. BOWLING, MD: I think that's a great idea, and I think that's one of many ideas that you sort of pick up by working with it that you aren't taught when you first start using the device, and there are a lot of little tricks, and that's a great one.

00:44:02

CARL GIESLER, MD: So this would come down in one of those pearls from this afternoon's video conference. So we can mark that off. Okay. Now, one of the things that we'll all got experience with laparoscopic surgery and we've learned a lot of stuff with the Harmonic ACE laparoscopically. How does the ACE really different from the Harmonic WAVE? Because you've both used the other instruments, what kind of areas does that make a difference with your comfort with one type of instrument tip versus the other? Dan?

00:44:39

DANIEL TOBIAS, MD: I think the main differences are really the size. You know, the WAVE is 18 mm in length, the ACE is 15 mm in length, so the benefit I think of the WAVE is that it's a larger instrument and you can grasp thicker bundles of tissue. It retains its heat longer. I don't think it gets any hotter than the ACE does, but it does retain its heat longer just because I think it's a longer instrument. And I think as Marcie mentioned earlier, it's really straight, the WAVE, whereas the ACE has a little bit of some curvature, and that, depending on where you're working, can affect your ability to dissect, what you alluded to earlier. And I think those are the main differences that I find.

00:45:20

CARL GIESLER, MD: Marcie, you mentioned that the WAVE may not be the instrument for dissection of lymph nodes. Would you use the Harmonic ACE for lymph node dissection?

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MARCIA C. BOWLING, MD: I like the Harmonic ACE better for lymph node dissection because it's a finer tool, it does have the curve. What do you do, Dan, when you're taking lymph nodes?

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DANIEL TOBIAS, MD: I'm still in general not using the Harmonic for lymph nodes, but I agree with you. I think for finer dissection I feel comfortable -- and again, that's something that's grown over time -- using the ACE for finer dissection, taking down bowel adhesions, opening up the side wall and entering the retroperitoneum. So that's been my experience as well.

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CARL GIESLER, MD: I find that my comfort with adhesions and with retroperitoneal dissection is really with the sharper -- not sharper, but the thinner, finer point of the Harmonic ACE. I think that you're able to have that curve kind of work around some corners, and so having used it for more time, I'm much more comfortable with it when there's adhesions present or when I'm retroperitoneal, so I think for me if I start to see adhesions or I need to go retroperitoneal, I'll use the ACE as a different instrument.

00:46:42

What are some of the tricks that you've used that our Ethicon reps don't share with us when we start using the instrument? We've all -- we've learned one this afternoon. What are some of the other tricks that you've learned or things that you look for that say things aren't quite right that we need to be looking for? Marcie, have you got some tricks that weren't on the CD that you got from Ethicon?

00:47:03

MARCIA C. BOWLING, MD: Sure. When you're using the WAVE on more fibrous tissue, for example, down on the uterosacral ligaments or severing the cervicovaginal attachments, sometimes the WAVE wants to sort of pull back off the tissue, it retracts, so I've learned that to sort of pursue the bite that I've taken by moving forward with the wave so that the tissue doesn't retract out of the jaws. And I think that's pretty helpful. And I think we've discussed the situation with dealing with heat. One other thing we do is there are some times when you need a little bit of tension on the tissue, and as the nonvascular bundles are almost completely coagulated, a slight twist of the wrist just increases the tissue enough to complete the tissue separation.

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CARL GIESLER, MD: So twisting rather than lifting.

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MARCIA C. BOWLING, MD: Right. Very gentle, just a little twist.

00:47:55

CARL GIESLER, MD: All right. Daniel, some tricks that you've learned?

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DANIEL TOBIAS, MD: Um, one thing I've learned is always check the instrumentation before you start. You know, I find that a lot of people don't set it up properly, which wastes time. You have to make sure that it's ratcheted into the handpiece well, and also you have to test it before you start and make sure it's working. The other thing that I've found helpful in some cases if I'm doing a supracervical hysterectomy or at times entering the vagina is that if you use the WAVE just like you might the ACE open, you can use a drilling technique where you use the active plate either to enter the vagina or the cervix and then clamp it while it's active, and that enables you to very easily cut through a thicker tissue.

00:48:37

CARL GIESLER, MD: Okay. Now we've got the opportunity for some other discussion. Marcie, one of the things that you can take from your experience, where would you find the new user to go -- where -- what should they be looking for as they're looking at maybe adding the Harmonic technology to their armamentarium?

00:49:01

MARCIA C. BOWLING, MD: Well, I think to feel comfortable about it so you have a positive experience and realize that according to your statistics it's going to take some cases to feel a comfort level. So go ahead and be ready to use the technique that you usually would use -- prepare to clamp, cut, and stitch, and have the WAVE out and use it on something simple

like the round ligaments. It's not vascular, it's an easy structure to work with. And just start with that and then let it go if you're not comfortable doing all the vascular pedicles.

00:49:30

CARL GIESLER, MD: Daniel, what would you consider leaving the message with our audience as. They've got new users out there and they've got people that say, "Hey, this is a great technology," but what should I be looking at right off the bat?

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DANIEL TOBIAS, MD: I think everyone needs to realize that there is a learning curve with using this instrument. This is a great instrument, but it does take some time to get used to it. And the getting used to it is primarily getting a feel and not applying tension to something that's very counter-intuitive, I think, to most of us. I know it was for me. And I think you shouldn't go into a case, even with the WAVE, doing an open hysterectomy expecting just to do the whole case and for it to look like your video was today. I think that they should expect to take the round, like Marcie said, maybe take the IP, and more than likely when you start you're going to have bleeding at the uterines and you're going to have bleeding down near the cervicovaginal region. So they need to be patient and remember the slide you showed earlier about 10, 25, 50 cases. It does take some time.

00:50:30

CARL GIESLER, MD: Now, I think you both echoed that you're not going to start off being an expert, and if there's one thing we can leave today is we've just touched the tip of the iceberg with this new technology. And when I see new users and they come and watch me work and they say, "Gee, that's great, I can go home and do it," and then all they have coming back from their experience is, "I've got bleeding." And I think we've all really documented or said that bleeding can be controlled with our normal state. We need to know that we've got control. I have a saying that I teach doctors all the time: slow is fast. And realistically, when you get slow is fast, what you're doing is you're finding that if you're not having to deal with bleeding, you're actually speeding up your surgery. And so that's one of the things that I find most helpful. And that as doctors learn experience with this Harmonic technology, they're in a position to say, "Okay, we really have less bleeding in our instrumentation using this." I think one of the other things is that we've talked primarily hysterectomy. Are there other areas where you find the Harmonic is particularly useful? What about ovarian cystectomies? What's your experience with ovarian cystectomies and the Harmonic technology? Daniel?

00:51:57

DANIEL TOBIAS, MD: I haven't really utilized this very much for cystectomies, primarily because it's a thicker instrument and I find I need something that's finer. As an oncologist, though, I do find this very useful for big masses which we encounter a lot of bleeding very early on. I can work very rapidly. I have another hand now free which I can be using to retract and grab potentially a tumor or a large mass with. I use it on mesentery for bowel resections, we use it on the omentum. So it really becomes a very effective instrument which I can use in a lot of different areas.

00:52:29

CARL GIESLER, MD: Okay, Marcie?

00:52:32

MARCIA C. BOWLING, MD: I think it's very time-saving on an omentectomy and not having to clamp, cut and tie all the way across a large length of omentum. So -- and the more repeatedly you use it and the greater sequence that you use it, the faster that it works. And there are certainly tumors -- whether it's endometriosis or cancer -- that you can't get a stitch to stay in that the stitch just pulls through and then there's bleeding, and that's the perfect place for the WAVE because you can clamp and coagulate something that's hard to sew.

00:52:59

CARL GIESLER, MD: One of the instruments that is in the Harmonic family is a curved wand that's similar to the Harmonic ACE, and I use that a lot in developing cystectomies where I can get between the cyst wall and the cortex to make the-the development the plane, and it helps me take out the cyst intact that prevents from going in there. Have either of you done hysterectomy -- uh, appendectomies with Harmonic for part of your vascular control for the meso-appendix?

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DANIEL TOBIAS, MD: I think it's great on that. I mean, again, I use it on the mesentery, small bowel, large bowel, so it's perfect for the meso-appendix. I've used it that way both laparoscopically and open. So yes, I think -- and it works very well.

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MARCIA C. BOWLING, MD: Mm-hmm, I agree.

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CARL GIESLER, MD: So what would be your parting words for our patients -- or our patients -- our viewers. I'm getting into this educational concept talking to my patients and I'm talking to the viewers who are out there going to be operating or learning this technology. How would we take this technology to make things work? What would be the next step for them to do?

00:54:15

MARCIA C. BOWLING, MD: Well, pick a lovely case like you did. It was a pristine pelvis and a slender patient with no prior surgery. Make it simple and don't be afraid to revert back to a technique that you're comfortable with and keep at it. It's going to take a few backwards steps and forward steps, and in the end you'll make progress.

00:54:36

CARL GIESLER, MD: Daniel, what would you do to make things happen for us?

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DANIEL TOBIAS, MD: I agree. You know, my own experience was it was an instrument I began using reluctantly and would complain afterwards, "I'm not using this again, I'm not using this again," and now it's become a tool that I always want to have. And I'm using it really on the majority of my cases.

00:54:57

CARL GIESLER, MD: Okay. Well, I would like to thank Daniel and Marcie, participants from New Jersey and from Ohio, to come to Houston in this hot, humid weather we've got here and sharing your experience with us today on the use of Harmonic technology and would like to thank Ethicon Endo-surgery for providing this opportunity to share our experience about the coagulating shears. Have a good evening.

00:55:25

ANNOUNCER: This has been an expert discussion of an abdominal hysterectomy with the Harmonic WAVE coagulating shears from the Baylor College of Medicine in Houston, Texas. 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. The program is sponsored by Ethicon End-Surgery, Inc.

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[end of program]