

**LAPAROSCOPIC ADRENALECTOMY
SHAWNEE MISSION MEDICAL CENTER
SHAWNEE MISSION, KANSAS
December 13, 2007**

00:00:12

ANNOUNCER: Welcome to Shawnee Mission Medical Center in Shawnee Mission, Kansas. Over the next hour, you'll see a laparoscopic adrenalectomy performed by Dr. Joseph Petelin. While they are generally benign, adrenal tumors can secrete abnormal levels of hormones that affect body systems. Patients with adrenal tumors could have symptoms as simple as high blood pressure or weight gain. During the surgery, doctors make a series of small incisions in the abdomen, and a camera is placed into the abdominal cavity. The adrenal gland is dissected off of the kidney and then removed. The adrenal tumor is placed into a small bag, which makes it easier to remove through the relatively small skin incisions and ports. 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 go live to the operating room.

00:01:12

LISA R. HAYS, MD: Hi. Welcome to the live webcast of an adrenalectomy, laparoscopically performed here at Shawnee Mission Medical Center. My name is Dr. Lisa Hays. I'm an endocrinologist here and am part of the Diabetes and Endocrinology Associates here at Shawnee Mission Medical Center. Today we're joined by Dr. Joseph Petelin, who is a world renowned surgeon specializing in minimally invasive laparoscopic surgery. We're also joined today by my colleague, Dr. Brad Silver, who is also an endocrinologist and a member of the Diabetes and Endocrinology Associates here at Shawnee Mission Medical Center. I'd like to welcome everyone and remind them that they can e-mail in questions by pushing the MDirectAccess button on their screen and we'll answer those questions as we can throughout the broadcast. I'd also like to remind you that this webcast will be archived on the Internet and you can share it with your friends and family in the future. We'll now go to...go to Dr. Petelin.

00:02:12

JOSEPH B. PETELIN, MD, FACS: Thanks, Dr. Hays. Welcome to Room Nine at Shawnee Mission Medical Center. I'm Dr. Joseph B. Petelin. I'd like to introduce the other members of the team that are helping us perform this laparoscopic adrenalectomy today. Our nurse anesthetist is Miss Carolyn Hogan. Robin Sangeta[?] is one of our nurses and Sherri Vatali[?], and our circulating nurse is Karen Wells. The team has helped us get through a number of these things. As you may or may not know, we performed one of the first laparoscopic adrenalectomy in the world in... actually, in this room in 1991. And it's now become the standard of care for performing adrenalectomy for most particular tumors. We've gotten started just a little bit before you've all logged on here and I can show you a little bit about what we've done so far and tell you a little bit more about the anatomy, but I think at this time what I'd like to do is have Dr. Hays indicate what the adrenal glands are, where they're located and some of the...some of the functions that the adrenal glands have and why we might be here taking this particular adrenal gland out. Dr. Hays?

00:03:19

LISA R. HAYS, MD: Thank you, Dr. Petelin. So, the adrenal glands are two glands that sit on top of the kidneys. As you can see in this slide here, there's one on both sides of the kidneys and they're towards the back part of the abdomen. The adrenal gland's purpose is to make hormones. They make a very...various different hormones including epinephrine and norepinephrine, which many people may know as adrenalin. That hormone helps to control blood pressure and heart rate, and many other functions in the body. Cortisol is another hormone that the adrenals make. Cortisol's function is increase blood sugar levels. It also helps to control blood pressure and controls inflammation in the body. Aldosterone is another hormone made by the adrenal glands. That hormone helps control blood pressure as well, and it also has a part in electrolyte levels, sodium and potassium levels. And finally, the adrenal glands also make androgens with our...which are types of male hormones. Both women and men both have androgens in their body. Some people might wonder what an endocrinologist is and who treats adrenal problems. Well, an endocrinologist is an internal medicine doctor who's completed medical school, who's done a residency which is typically three years in internal medicine and then they've done a fellowship in endocrinology, which is typically two or three years of extra training. By endocrinology they specialize in hormone problems. Other hormone problems the endocrinologist treat include diabetes, thyroid problems, pituitary problems, osteoporosis and a myriad of other hormone problems. Adrenal problems are also treated by surgeons, like Dr. Petelin, who specialize in adrenal gland surgeries. The unique thing about Shawnee Mission Medical Center is here we have a unique combination of endocrinologists and surgeons who can work together as a team to identify and appropriately treat endocrine problems. And now we'll go back to Dr. Petelin.

00:05:26

JOSEPH B. PETELIN, MD, FACS: Okay. As I mentioned, we got started just a little bit before you all logged on and I just want to explain a little bit about how the setup works here. We have the pat....we're going to take out this patient's left adrenal gland, so since the left adrenal gland actually sits way up in the upper abdomen we've got the patient with the patient's right side down. So the left side of the abdomen is up. And I don't know if you can see it well or not, but we have three puncture sites in the abdomen. Now prior to 1991, when we did the first one of these, we used to make about a six to ten inch incision in the upper abdomen just below the rib cage. Nowadays we've got just these three puncture sites. And with these three puncture sites we should be able to...to dissect out the adrenal gland, place it in the bag and then remove it from the abdomen. But a little bit more about why we're here and we'll have Dr. Hays tell you about that. Dr. Hays?

00:06:16

LISA R. HAYS, MD: So, I thought I'd let you guys know a little bit about this particular patient. She is a seventy-three year old female who had a chest x-ray that was done for another reason. And on the chest x-ray...excuse me, chest x-ray they found a spot, or a granuloma, which led her primary care doctor then to do a CAT Scan. And the CAT Scan showed that she actually had a nodule on the left adrenal gland. And then she was referred to Dr. Petelin for evaluation, and Dr. Petelin actually referred her here to Diabetes & Endocrinology Associates, myself and Dr. Silver. And we did a hormone evaluation on her. We actually found that that nodule was not making an excessive amount of hormone. And because the radiologist had seen some concerning signs on the CAT Scan, we referred her back to Dr. Petelin for the surgery. So, I thought we'd look at the CAT Scan of this particular patient now. For so just for a little orientation here, this is a cross section of the abdomen. This is the right side of the body and here's the left side. This is the front and the back. There's the vertebrae in the back. This big organ right here is the liver. Other things to note: These are the kidneys. And you can see how they're in the back part of the abdomen. And right here is our left adrenal nodule that we're concerned about. And as you can see, it's not very big. It's only 1.7 centimeters. And then there's the aorta as well. All right.

00:07:48

JOSEPH B. PETELIN, MD, FACS: Okay. Well, that's a nice explanation. We're doing laparoscopy, and that means we're using a scope to look into the abdomen. This is the scope. It's a ten millimeter, or possibly a half inch diameter scope. You can see it's got a light source, and we have a camera on the end of that. And we'll show you a little bit inside the abdomen. Now the scope may fog a little bit, but this is the liver. The first thing we're looking at is the liver. A Dr. Hays showed you on the CAT Scan, the liver is quite large. We're looking toward the upper part of the abdomen. And if you look up in here, you can see the diaphragm and you can actually see the heart beating through...through that area. Now, the adrenal gland sits way, way back here. As I mentioned earlier, we have done some of the dissection already. This organ is the spleen. We've had to move the spleen out of the way, and we'll show you that in just a few minutes. And you can see where we've done some dissection here. Now, in this area here, the colon, this is the left part of the colon. And this part of the colon that comes close to the spleen, we call the splenic flexure. So we've freed that up from its attachments here laterally and depressed it out of the way. We've also freed up what we call the lienorenal ligament, which dissects all the way up this way. And if Carolyn can rotate the table toward me a bit, we'll get the spleen. We'll show you a little bit about what we've done. We'll get the...that's good. We'll get the spleen to slide out of the way here and show you what's in the back. Now, this area here, as you can see, is the outline of the left kidney, which also showed up on the CAT Scan. This is the vein leading to the kidney; we call it the renal vein. So this is the left renal vein, going to the left kidney, and the organ above it here is the adrenal gland. Now, obviously, we've done some dissection and we've freed that up a bit. And we'll show you a little bit more about that as we go. I've got a special holder here that will hold the laparoscope in place so that I can use the other two instruments to be able to do the dissection and to show you what's going on. As Dr. Hays mentioned earlier, the adrenal gland sits next to the kidney. And one of the things about the adrenal gland is that it has a very rich blood supply. Endocrinologists deal with organs that secrete hormones into the blood stream. Since that's their main function, they have a very rich blood supply, so even very small vessels can ooze quite a bit. And the adrenal gland, as you may be able to tell here, looks quite yellow. It looks almost like the fat that surrounds it. As far as being able to define this, you see this fatty tissue here, it looks kind of a pale yellow, and this is a little bit more of a golden yellow. The nodule that we have seen on the CAT Scan is this nodule up in here. So we've freed the spleen out of the way, we've dissected part of this out. The...as far as the anatomy to the...the blood supply to the adrenal gland, there are a number of arteries that come...There are three basic sets of arteries. One set of arteries comes from the infradiaphragmatic phrenic area. The other set of arteries comes from the aorta. And, I'll show you here a little bit better picture of the aorta. Between my two instruments, you can see the aorta pulsates. We're very close to the...what we call the great vessels, or the aorta. The...The vein, there's one primary vein that leads from the adrenal gland, and on the left side this is that vein right there coming down into the left renal vein. Our job is to dissect all the way around this, clip that vein, cauterize or clip the small arteries and then take the adrenal gland out. And while that may sound quite simple, it's usually a very touchy sort of dissection, just because of the vascularity, or the very rich blood supply of the adrenal gland itself. Now the instrument that I have in my right hand is a special cautery type instrument. It's what we call a bipolar cautery. And between the two jaws of this instrument, there are electrodes. And the current passes between those two electrodes to allow us to cauterize small vessels. And that's what we're doing here on the lateral, or the outside aspect of the adrenal gland. We tend to work in this area to get the gland somewhat more mobile. And as we get it mobile enough, we'll ultimately come across this vein here, obviously, trying to preserve the left renal vein. So that's what we're doing. The...the dissection quite tedious, because as you can see I really can't grab the adrenal gland itself. I have to push it out of the way, more or less as if you might do if you were

using chopsticks. So, we're dissecting this part laterally. Again, we're going to be careful not to injure the surrounding tissue. And, back in here you see some more pulsation. You see some pulsation behind this piece of fat here. That's actually a branch of the left renal artery; the artery that goes to the left kidney. The branches...the arterial branches to the adrenal gland come off of that vessel. We want to make sure that we basically control those vessels and not injure the left renal arteries. So, very important to understand the anatomy as we're going through here. Generally this area out here is one of the safest areas that we can be....that we can be dissecting in.

00:13:11

LISA R. HAYS, MD: Dr. Petelin, can you talk about how big the instruments are that we're seeing on the screen?

00:13:16

JOSEPH B. PETELIN, MD, FACS: That's a good point, Dr. Hays. For those in the audience who haven't seen much surgery, when we do laparoscopy, often it looks like just this small amount of blood that's here looks like a lot. But, we judge things by the basic size of the instruments. This instrument in my left hand here, that the scissors are touching, is about five millimeters, or a little bit less than a quarter of an inch in diameter. So, we judge distances and sizes by that. So you can see that this gland here is approximately maybe three centimeters across and this nodule that we saw on the CAT Scan was documented to be about 1.7 centimeters, so that's a little bit less than an inch in diameter. So it kind of gives you a feel for how big...big things are here. So that's a really good point, Dr. Hays. So, this is the dissection of the posterior aspect of the gland. We'll kind of work around the gland and get it somewhat more mobile so that we can deal with the central vein.

00:14:19

LISA R. HAYS, MD: We already have a question from the audience. This is from Sandra. She wanted to know what the rate of infection is in patients who undergo laparoscopic surgery versus traditional open surgeries.

00:14:32

JOSEPH B. PETELIN, MD, FACS: Well, that's a good question. The...When patients have laparoscopic surgery, especially if it's for a clean case like the adrenal gland, the rate of infection is almost zero. And part of the reason is that, as you can see, no instruments are actually touching the skin. And so, instead of having a large wound that's open, that could get infected, it's basically a closed system. So, for clean surgery, as we call this, the rate of infection is essentially almost zero. As...as the public should probably also figure out, the...because the incisions are so small the amount of pain that people have after a laparoscopic surgery is usually a lot less because the incisions are so small.

00:15:27

BRADD J. SILVER, MD: Well, Dr. Petelin, I'm older, of course, and I recall when all these procedures were done open. And, what was your estimate...what would be your estimate of how long these patients were in the hospital after an open procedure?

00:15:39

JOSEPH B. PETELIN, MD, FACS: Well, as you know, Dr. Silver, the...with open surgery the patients were very often in the hospital for seven to ten days.

00:15:47

BRADD J. SILVER, MD: Right. Right, for adrenalectomy they sure were.

00:15:49

JOSEPH B. PETELIN, MD, FACS: Correct.

00:15:50

BRADD J. SILVER, MD: And it was pretty...it was a pretty tough operation on people. And how long do they stay in now?

00:15:54

JOSEPH B. PETELIN, MD, FACS: Well, this particular patient will most likely leave the hospital tomorrow.

00:15:58
BRADD J. SILVER, MD: Right.

00:15:58
JOSEPH B. PETELIN, MD, FACS: So usually less than a day.

00:15:59
BRADD J. SILVER, MD: Right. Quite a change and....

00:16:01
JOSEPH B. PETELIN, MD, FACS: A huge change.

00:16:02
BRADD J. SILVER, MD: Right.

00:16:04
JOSEPH B. PETELIN, MD, FACS: That's been one of the nicest things about minimally invasive surgery is that it causes a lot less pain for patients.

00:16:12
LISA R. HAYS, MD: Yeah.

00:16:13
BRADD J. SILVER, MD: Right. Right.

00:16:15
JOSEPH B. PETELIN, MD, FACS: And as you know, we were talking earlier before we went live with this, the view that I have on these twenty inch monitors magnifies what would otherwise be a two to three inch field. In other words, what we're looking at now in dissecting the adrenal glands, for example, that would be basically about two or three inches deep in an open incision in the abdomen that would be about ten inches long. This view is much more pronounced and much larger than the view that we get from an open case.

00:16:54
BRADD J. SILVER, MD: Well, we all know that in the old days when a patient required an adrenalectomy we sent them to the surgeon and keep our fingers crossed because we knew the patient would become quite ill afterwards and there would be a long postoperative course. And we sent them anyway, but this has changed the adrenal disease completely. Because now if a patient needs an adrenal... adrenalectomy, we feel pretty comfortable that this patient will get better very quickly. So it's really changed our approach, dramatically.

00:17:21
JOSEPH B. PETELIN, MD, FACS: Yeah, that's...it's been a great...a great boon for patients.

00:17:24
BRADD J. SILVER, MD: Absolutely.

00:17:28
JOSEPH B. PETELIN, MD, FACS: It's just more accurate surgery because of the magnification and the special tools that we have nowadays. Because this area that I'm dissecting in now is a pretty touchy area. It's right next to the aorta. I can't really grasp the actual adrenal tissue itself, so we're working within a few millimeters of very fragile tissue. So....

00:17:52
LISA R. HAYS, MD: Now, another question we've gotten from the audience is, how many laparoscopic adrenalectomies should we expect the...our surgeon has done?

00:18:01
JOSEPH B. PETELIN, MD, FACS: Well, obviously, that will...that will be a function to some extent of how old the surgeon is. And, how much training he has. Typically, when we talk about learning curves for learning to be able to do this, most people feel that it takes at least twenty to thirty laparoscopic adrenalectomies under some sort of supervision to become proficient at the operation. That doesn't mean that someone can't perform a safe and effective adrenalectomy before that time, but it's just something that the public needs

to ask. And it's a very good question to ask your surgeon is how much training have they had for this particular operation.

00:18:53

BRADD J. SILVER, MD: One of the questions we've had is, is a left side adrenalectomy more common than the right side? What's your experience, Dr. Petelin?

00:19:00

JOSEPH B. PETELIN, MD, FACS: It's really been about half and half, as it turns out. As you know, the patient has two adrenal glands...

00:19:04

BRADD J. SILVER, MD: Right.

00:19:05

JOSEPH B. PETELIN, MD, FACS: ...and I think over the past seventeen years I've done about the same number of laparoscopic right adrenalectomies as left. So, it's really about half and half in my experience. What is it in terms of diseases that you see when somebody has a focal disease? Do you have any lateralization as to who has more problems on the right or the left?

00:19:34

BRADD J. SILVER, MD: I don't think so.

00:19:35

LISA R. HAYS, MD: Not at all.

00:19:36

BRADD J. SILVER, MD: Dr. Hays, do you have any opinion? No, I don't think so.

00:19:37

LISA R. HAYS, MD: I don't think so.

00:19:37

BRADD J. SILVER, MD: I think it's pretty even.

LISA R. HAYS, MD: Mm-hmm.

00:19:39

BRADD J. SILVER, MD: Pretty even. There's a question that we've had about...about removing the adrenal like you're doing in this case and will the patient need to be on medication afterwards to make up for this removal of this one adrenal gland? Dr. Hays, do you want to talk about that?

00:19:56

LISA R. HAYS, MD: Sure. Most of the time, because people do have two adrenal glands, the other one is able to function perfectly well on its own. However, if the adrenal nodule has been making a large amount of hormone, it could be suppressing the other adrenal gland from making the hormones that the body needs. So sometimes people do need to go on hormones around the time of their surgery, if we suspect that the other adrenal gland maybe is not doing its job and won't be able to pick up the pace, so to say, after the surgery.

00:20:29

BRADD J. SILVER, MD: I also think that's why when individuals have an adrenal problems they really need to have an evaluation by a physician about how these adrenal glands are working, how they're functioning. It's not...I mean, Dr. Petelin clearly worked with Dr. Hays to get this case coordinated. I don't think a surgeon would feel very comfortable doing an adrenalectomy not knowing how these adrenals are working. Because as Dr. Hays just indicated, if one adrenal is working overtime, Dr. Petelin sure would like to know that when he's operating on a patient and we would like to know it for postoperative management.

00:21:00

LISA R. HAYS, MD: That's an---

00:21:01

JOSEPH B. PETELIN, MD, FACS: The other thing that...If I could interject, anesthesia really likes to know something about what the adrenal gland has been doing also. One of the

things that you mentioned earlier about excess hormone production, like adrenalin, some of those patients have really high blood pressures and the anesthesia people really need to know about that pre-op, because as we manipulate the tissues around this gland, the gland can secrete more hormone into the bloodstream causing the blood pressure to be elevated. And if anesthesia knows about that and if...and if the patient has been treated preoperatively, it's a much safer operation for the patient.

00:21:43

BRADD J. SILVER, MD: Absolutely.

00:21:45

LISA R. HAYS, MD: I think that's kind of a good segue into the next slide I have about signs of an adrenal problem. Many patients may wonder, out in the audience, how do they know if they have an adrenal problem. And most patients that we see are sent to us by primary care doctors who have identified that the patient has either an uncontrolled high blood pressure or they have an electrolyte problem, or their sodium and potassium levels are off. They may have some rapid weight gain or excess fat in the midsection of their belly, which may be a sign of excess cortisol. Other signs of an adrenal problem can include diabetes, or if they're a woman and they've having male pattern hair growth like you would see on a guy, but not expect in a female, that could be another sign that there's an adrenal problem. But, a lot of patients that we see are patients that have had a CAT Scan or an MRI done of the abdomen for another reason and then are found to have an adrenal nodule that wasn't expected to be there. And, then they're usually sent to an endocrinologist for a hormone evaluation to see if that nodule is making excess hormone.

There's some series of testing then that the endocrinologist will do to see whether or not this nodule is making an excess amount of hormone. And they may draw blood to check electroite... electrolyte levels, sodium and potassium levels. They may also check some of the other hormone levels, like we talked about. They may even have the patient collect their urine in a... basically just like a milk carton for twenty-four hours and then have the lab analyze that urine to see how much hormones are being excreted by the kidneys over the day. And if there's a high amount of those hormones in the urine, that could be a sign that there's a...that that nodule is making adrenal hormone. They may also give the patient a medicine to try and...what we call suppress or kind of shut down that adrenal gland from making hormone. And if that adrenal gland doesn't suppress, that could be a sign that the nodule is out of control and needs to be taken out. We call that a dexamethasone suppression test.

00:23:51

BRADD J. SILVER, MD: There's no doubt in my mind that anybody with an adrenal nodule who...in whom we're considering surgery needs to have these tests that Dr. Hays talked about, because as we said a few minutes ago, certainly, we need to know and the surgeon needs to know if this adrenal gland is acting normally or acting abnormally, because that will make a big difference in how the patient does. So, we think that everybody who is going to be having an adrenalectomy needs an evaluation. Even if they look relatively healthy, it might be just the beginning of the adrenal gland problem. So these patients all need diagnostic testing, as Dr. Hays discussed.

00:24:25

JOSEPH B. PETELIN, MD, FACS: Okay. So, we have...we have actually reached a very important of the procedure. Again, we've got the renal vein, the left renal vein going to the kidney. We've got the gland mostly dissected out and we still have this central vein, so we have to clip it. What I have inside here is an automatic clip applier. It has metal clips and this is more or less one of the moments of truth for us to come around this central vein and place clips on it. And then the real moment of truth is when you cut through the vein, hoping that you have it adequately clipped. And that's...that let's the surgeon's level of adrenal go down a bit.

00:25:21

BRADD J. SILVER, MD: Right.

00:25:25

JOSEPH B. PETELIN, MD, FACS: So now, we've got the...We've really got this thing quite well mobilized. And the last little bit of this we're going to be able to do with the ligature device. That's this bipolar instrument. And I suspect one of the questions that some of the lay audience may have is, well, you've just got those five millimeter puncture sites and that one ten millimeter site for the scope, so how are we going to get this out of here? Well, there's a special bag that we'll catch this in. We'll show that to you momentarily, as soon as we get this dissected out. And then that will be brought to one of the port sites here. And that port site will be extended just enough to allow us to get the adrenal gland in the bag out of here. One of the questions that Dr. Silver...or, one of the items that he brought up earlier was how this compares to open surgery. And, for those who aren't here in the operating room, the total blood loss for this case would fit in a thimble, so that's...there's a lot less blood loss. And, in fact, the surgical literature supports the fact that there is a lot less blood loss, a lot less trauma to the tissues.

00:27:08

LISA R. HAYS, MD: What would be some concerning signs when you got into this phase if you saw something worrisome, as far as the nodule's appearance?

00:27:18

JOSEPH B. PETELIN, MD, FACS: Well, the...If the nodule were malignant, and as you mentioned earlier, the nodules on the adrenal gland are largely over...well over ninety percent of the time not malignant. But if the gland were really densely adherent to all the surrounding tissues, if it just looked like somebody poured glue over all this tissue back here, that would be a concerning sign. The other concerning sign is that if an adrenal mass is larger than six centimeters. Basically, almost three inches in diameter. If they're that big, there's a higher incidence of malignancy when you take it out. So, those are the things we look at. As you can see here, this is a well demarcated, well circumscribed, as we would call it, adrenal nodule. So although it's possible this could be a malignancy, it seems quite unlikely.

00:28:18

BRADD J. SILVER, MD: Well, Dr. Petelin, we've had a...we just got another very good question. And that is, why take out the whole adrenal gland? Why not just take out that little nodule? Why not...why take out the whole thing?

00:28:26

JOSEPH B. PETELIN, MD, FACS: That's a good question. And the reason for that is the...the fragility of the adrenal gland itself. Cutting through the adrenal tissue causes a tremendous amount of bleeding. It's not massive bleeding like you have from the aorta, but it's almost impossible to control. So you can see we've got the adrenal gland free. You can see that it is... that is basically a completely bloodless field.

BRADD J. SILVER, MD: Right.

00:28:53

JOSEPH B. PETELIN, MD, FACS: So, now our job...We're going to leave that here for now. We're going to change the scope to a smaller scope and we're going to actually put the scope in through this port here and look back down here and capture this...capture this adrenal gland in a bag. So the...the scope has a light source that you can see here. This is the actual scope. And we're going to put the smaller scope...this is a five millimeter scope. We're going to put that on the...on the camera and insert that through this site here. You can see it that it looks a little bit different. We're up now above the liver. That's the adrenal gland that we've freed up. This is the bag. And, this is a very interesting little bag. It has a nice metal ring and we can actually scoop this thing up into the bag. Got that? And, we also have a nice little purse string device that allows us to capture it also. And now what we'll see is the bag is now down at this site here, that I've got. The bag is there. We're going to extend the site just enough to be able to get the adrenal gland in the bag

out of it. So, we'll have the knife. And, Carolyn, can you roll the patient back that way just a bit? Okay. You can let that relax here for a minute. So we can see the bag is here. We still have to get this out, so...Do you have another retractor? Okay. So we're just going to open this up just enough to be able to get this out. The white pencil-like device that I have in my hand is a cautery. It's a Unipolar cautery, so it works similar to how the other one worked. And it cauterizes the tissue as we cut through it. And it...So you can see the adrenal gland is in this bag. Do you have a...Just relax that for a minute. Can I have a blue towel and a scissors? I'll open the bag for you. And do you have a ruler by any chance? So, this is the adrenal gland. And it was lying in there pretty much like this. I've kind of made this...this cloth bloody. I'll lay it there here again like this and show you. So, this was lying inside the abdomen pretty much like this in the...in the upper abdomen. And you can see from the size of this, this is the...Well, you can't see it real well. I'm sorry. This is the two centimeter mark, so this nodule is about 1.7 centimeters, as advertised, and the whole gland is about six centimeters. As you can see, about two inches in length. This whole specimen will go to the lab. And you may be able to see the color a little bit better now. You see the bright yellow color of the normal adrenal gland. Okay, so we'll move that off. And we'll close up this wound, and then we're going to re-inflate the abdomen and just take a peek at...make sure everything is nice and dry on the inside. And so you can see from these small incisions here, this is a lot easier to recover from than a ten inch incision that would be up in this...basically connecting here to here. So, two very small little incisions to dissect this out.

00:33:10

BRADD J. SILVER, MD: Well, Dr. Petelin, someone's asked, you've moved things around in that abdomen an awful lot and put things where they weren't supposed to be. How are they going to get back where they're supposed to go? And what do they do about that?

00:33:18

JOSEPH B. PETELIN, MD, FACS: You know, that's...that's the most amazing thing is that the organs will...There's still enough attachments to the spleen and to the colon that they will naturally float back, more or less, to their original positions. And we'll show you that as we get back inside.

00:33:40

BRADD J. SILVER, MD: So your spleen will find its way home?

00:33:42

JOSEPH B. PETELIN, MD, FACS: It will find its way home.

00:33:44

BRADD J. SILVER, MD: Very good. Very good.

00:33:49

JOSEPH B. PETELIN, MD, FACS: So we're closing up this wound and we'll re-inflate the abdomen.

00:33:55

LISA R. HAYS, MD: What do you use to inflate the abdomen?

00:33:58

JOSEPH B. PETELIN, MD, FACS: That's a good question. We inflate the abdomen with CO2 because for the lay public CO2 is easy for the body to get rid of, basically by breathing. And that's what Miss Hogan is doing for the patient. The CO2 can be displaced from the abdomen. Okay. You can take those out.

00:34:23

BRADD J. SILVER, MD: We also have a question about the most common cause of adrenal problems. And...and at least in my experience, most of the time when we see these...these little nodules like this, they actually never figure out what they're due to. They are not cancerous, as Dr. Petelin indicated. They're not making too many hormones, as Dr. Hays was talking about earlier. And most of these are just little nodules that are benign, noncancerous little nodules. I don't think we have any idea what causes them. Frankly,

they cause us a lot of aggravation and they cause the patient a lot of aggravation. And most of the time they're not terribly serious. The problem is we don't know that they're not serious until patients go through an awful lot of evaluation. They have to go through the evaluation and often be operated before we feel totally comfortable that they're not of any concern.

00:35:07

JOSEPH B. PETELIN, MD, FACS: Well, and that's the nice thing about doing this laparoscopically is that the endocrinologist and the internist doesn't have to feel quiet as badly about sending someone off for a nonfunctioning mass to have a ten inch incision if they get these three punctures and go home in a day.

00:35:24

So what we're going to do now is this is the area where the adrenal gland was. You can see that that bed is nice...We call it the bed. It was nice and dry. There's no oozing from anything. The left kidney is still intact and you can see this is the top of the left kidney; it's still nice and pink. And we're going to have Carolyn go ahead and rotate the patient back to the left again and see if we can get these organs to go back where they're supposed to go. So, we're going to try and get this spleen back over there. Let me have a grasper. The blurriness on the screen is just the scope sometimes gets fogged. And we may have to actually move the scope to the other...to the other port. In fact, I'm going to do that right now. And, again, try to convince the spleen to go back where it was. It will naturally anyhow. I just...the spleen is very fragile as well. It's at least as fragile...go ahead and hold that for a second. It's at least as fragile, if not more so than the adrenal glands. And so...if I can get it convinced to come over there Carolyn, why don't you help us out a little bit more. Can you rotate her a little bit more to the left? Good. Good, good, good. Bring it up just...there you go. Now it's coming back over. Okay. So, again, it's a little bit different view than you had before. I'm going to switch back over to this. And just be careful with that. Okay. SO, we're in the upper abdomen here again. The liver is there. The spleen is back where it was when it...when we first got in here and the colon has shifted back over to where it normally is. And, those areas...Can we have the suction? Those areas will just naturally stick to each other. And that's...that's how things get back to normal. So you can rolltate...rotate her back to me and we'll close these wounds up.

00:37:57

LISA R. HAYS, MD: Are there...I'm sorry.

JOSEPH B. PETELIN, MD, FACS: Go ahead.

00:37:59

LISA R. HAYS, MD: Are there any contraindications to doing laparoscopic adrenalectomies? Reasons why you wouldn't want a surg...or, a patient to have that done, versus having an open procedure?

00:38:09

JOSEPH B. PETELIN, MD, FACS: That's a good question. The most important reason for a patient not to have a laparoscopic adrenalectomy is surgeon inexperience, which means that the surgeon has to be trained in...in laparoscopic surgery and in advanced laparoscopic surgery. The other patient related contraindications are those that might have to do with malignancy. If you know a patient has a large baseball size tumor that looks like it could be malignant, then that's a relative contraindication to doing this laparoscopically. If the...if the patient has had multiple prior operations, it's not a definite contraindication, but if their abdomen is really scarred then it can be a relative contraindication. But what we've shown you today is what we call the anterolateral approach to the spleen. Some surgeons, especially urologists, will attempt to take the adrenal out from a posterior aspect, from this area over here. And that's a very useful method as well. The problem with it is, is that the exposure is not quite as good. The field of view is not nearly as good as what we have from an anterior approach. So we're just closing up the layers of the abdominal wall here and we'll show you how this looks in just a little bit.

00:39:47

BRADD J. SILVER, MD: Dr. Petelin, how is...how's this woman going to feel tonight after having this surgery? When is she going to wake up and when is she going to be able to eat, and all those other important functions?

00:39:55

JOSEPH B. PETELIN, MD, FACS: Well, she told me preoperatively that she was very hungry.

BRADD J. SILVER, MD: Oh, good.

00:39:58

JOSEPH B. PETELIN, MD, FACS: So, I wouldn't be surprised if she tries to have some sips of liquids this evening. The...With these sizes of incisions here...These are about the same size as the incisions that we use to take out someone's gallbladder. And, most people know that gallbladder patients nowadays, laparoscopic gallbladder patients usually go home in two or three hours post-op, certainly within a day. So this young lady will actually be able to go home tomorrow.

00:40:30

BRADD J. SILVER, MD: And that's obviously remarkable. And she...she's seventy-three and she's gone through a relatively major procedure and be eating and drinking the same night and going home the next day, that's...that's pretty remarkable.

00:40:42

JOSEPH B. PETELIN, MD, FACS: It's just good for patients.

BRADD J. SILVER, MD: Yeah. Right. Right.

00:40:43

JOSEPH B. PETELIN, MD, FACS: It's...You know, the operation is technically a little bit more demanding, but if you look at all the tools that we've got now as surgeons, this is a much nicer way for the surgeon to do the operation than through making a big huge incision. It's...I can see better than I ever could doing these in an open fashion. And the dissection is a lot more precise, just because of the magnification. So, it's...Basically what we've done is use the...all the computer technology that's available nowadays to be able to do this; the computer and video technology.

00:41:22

BRADD J. SILVER, MD: Right. So as you said, you will send this off to the pathologist and they will give us an interpretation in a day or two as to what type of tumor this is. Dr. Hays, what kind of tumors do we...do we sometimes see?

00:41:39

LISA R. HAYS, MD: Well, most of them are benign. Like Dr. Petelin said, about ninety percent of the time, meaning that they're not cancerous. And, a majority are also not making excess of hormone either. And some words that you may hear in the literature, an adrenal producing tumor is what we call a pheochromocytoma. And those are the type of tumors that Dr. Petelin was talking about earlier that the anesthesiologist always wants to know about ahead of time. And symptoms of pheochromocytoma are high blood pressure, spells of fast heart rate or feeling sweaty and...along with the high blood pressure. Another term that you may hear is Cushing's Syndrome. And those are tumors that produce a high amount of cortisol. And another kind of common term is Conn Syndrome, and those are tumors that produce an excess amount of aldosterone. As I said earlier, most of these are benign and...and are not making any hormones, and they're not cancerous either.

00:42:40

BRADD J. SILVER, MD: I think it's important to point out that the pheochromocytoma one is the one that we all want to make absolutely certain about. That's the one that really can cause the very high blood pressure during the case. And I think when I was a resident, or an endocrinology fellow a long time ago, if a patient didn't have the symptoms that Dr. Hays talked about we didn't think too much about a pheochromocytoma. But the literature

not tells us, and we do see for ourselves, that many individuals with pheochromocytoma don't have all those symptoms initially. And so if you assume the patient doesn't have a pheochromocytoma and you take the patient to surgery without checking for that, the anesthesiologist might not be very happy with you later on if that patient's blood pressure goes very, very high during the case. So, we think it's important that...that in all these cases preoperatively you evaluate for all these different hormones so there are no surprises, even if there are no symptoms.

00:43:34

JOSEPH B. PETELIN, MD, FACS: So we're just cleaning up the abdominal wall here. This has been a very straightforward case. Obviously, the...the dissection could...could have been a lot more difficult, and that's something that a lot of times you just don't know before you...you get in the abdomen. So, this...this case, to me, felt quite...quite comfortable. Almost too comfortable. It almost looked like, well, there's nothing to it. But it's important that the...that... Karen, you can probably leave that. It's important to...to make sure that you have enough training before you attempt to do these sorts of things.

00:44:22

LISA R. HAYS, MD: We do have a question, and it appears to be from a surgeon. And, they commented on the elegance with which you skeletonized the central vein with no traumatic handling of the gland, which is especially a must in pheochromocytoma's. And they want to know what special vascular laparoscopic instruments you keep for the procedures.

00:44:42

JOSEPH B. PETELIN, MD, FACS: And that's probably a good question. We can maybe review some of these instruments. This is the bipolar instrument. It's called a ligature device. And, basically, between the two jaws there's electrodes that cauterize the tissue that's between those two. And then by pulling this trigger here, there's actually a little...there's actually a little knife that comes out and cuts between the two sides that have been cauterized. So that's a very important device. The...This is a clip applier. And this...this clip applier makes...It basically allows us to...to clip blood vessels without...with little clips like that without having to tie. Now, we could have tied those vessels off laparoscopically, but this is much more efficient. And you can see this thing comes out, you get around the vessel and then this just clips the vessel closed like that. As far as the vascular dissectors, some of...Let's show the tow graspers here. These are the basically blunt grasping instruments that allow us to pull out the tissues. And as you know, we mentioned earlier many times I use both of these basically just as chopsticks to be able to move the gland around, because one thing you never saw us...you never saw us grab the gland itself. That would have caused a lot of bleeding, so we just use the blunt instruments to be able to do that. This is a somewhat larger grasper. And sometimes if we're doing another type of operation, such as a spleen or a colon, we use a grasper such as this to be able to grasp larger pieces of tissue. But, again, for the adrenal we don't necessarily need this. And then two other instruments. This...These are scissors and these are Unipolar scissors. This device connects just like the blue cord does. These tips act like the end of an electrode, so when we touch the tissue it goes through to the...to a base plate that the patient's on. So these are curved dissecting scissors and they allow us to dissect around those...around those vessels. And then finally the hook cautery. This is again a Unipolar device. This...this device fits on this pencil. This goes to the same plate that this green cord goes to. So this...this hook allows us to...to dissect vessels. Again, we wouldn't use this around the aorta or around any of the great vessels. We just would use this in...in tissues planes where...where there's not much risk of perforating something. So, there's...that's the basic sets of instruments that we use. There's...Oh, and then the bag. The bag's very...a very nice little situation. We have the metal ring, we have the serrated edge on that cuts the bag off. And then that purse string that allows to tighten the bag up. This allows us to get the gland out without having to mash it up, so very... very effective, so... So this is sort of a final look at the abdominal wall here. These are two five millimeter ports and this is

the extraction site. And you can see that the total length of that is just about three centimeters. Not quite three centimeters in length. So, just a little bit...about one and a quarter inches versus what would have been a ten inch incision up in the upper abdomen. So, obviously, the patient is going to...is going to get better a lot quicker from this sort of incision rather than a...than a larger one. So...

00:48:19

BRADD J. SILVER, MD: One of the questions that we received was about medical management of the patient after the...after the procedure. And once again I think that goes back to whether or not these...these...this evaluation we did preoperatively showed that this adrenal gland was overproducing hormones. If it's not overproducing hormones, then we don't need to do anything, generally, because the other adrenal gland just picks up and takes over. And the management at that point would just be the...the surgical management. Would you agree?

00:48:46

LISA R. HAYS, MD: I would agree.

00:48:47

BRADD J. SILVER, MD: Good.

00:48:48

JOSEPH B. PETELIN, MD, FACS: So if...Connie's asked a question of Dr. Hays. So if a patient has a CAT Scan and somebody says, like to this patient, you have a nodule on your adrenal gland. What should they do?

00:49:03

LISA R. HAYS, MD: I think that they should ask whatever physician ordered the CAT Scan to refer them on to an endocrinologist to have the full hormone evaluation, so that we can make sure that it's not producing hormones. And then also the endocrinologist can work with the radiologist to make sure that there aren't any concerning signs. If...that it is not making hormone, to make sure that it's not cancerous and...that's what I think is appropriate.

00:49:30

BRADD J. SILVER, MD: And some of these don't require this. We don't need a surgeon for some of these. If these are small and of no special concern, they don't look malignant, they're not making any hormones, we don't send them to Dr. Petelin and we don't take them out. We just follow them along with periodic x-rays to make sure they're not getting larger. The ones we take out are the ones where there's a suspicion of cancer or they're overproducing some type of hormone.

00:49:55

JOSEPH B. PETELIN, MD, FACS: So as far as taking care of this patient postoperatively, obviously she'll have an IV in this evening and she'll be able to start eating within three or four hours. And she'll most likely go home within twelve to fifteen hours from this time. As far as hormonal management, again I'd like to ask our endocrinologists what the...what should be done as far as any hormonal management at this point in time? Do we need to check hormone levels, or anything like that, for this patient?

00:50:26

BRADD J. SILVER, MD: Dr. Hays. You want to take that one?

00:50:27

LISA R. HAYS, MD: Sure. So overall, she won't need any hormone levels checked. We'll wait and see what the pathologist tells us that the...if the gland is cancerous or not, or if it looks like it's producing any...or, has any cells in it that could be producing excess hormone. But it's usually a communication between the surgeon and the nurses after surgery to see whether the patient's blood pressure is stable, you know, what their heart rate is doing and that gives us an idea of whether they need any further medication as well. And then typically, like you we said, no other hormone really is...are necessary to be given to the patient.

00:51:06

BRADD J. SILVER, MD: I would agree. Frankly, most of the time these patients are operated we never even...we find out later they were operated. We don't even see them when they're in the hospital, because we're not...we're not needed in that case. Unless it's some special hormone need, the patients do fine without us.

00:51:20

JOSEPH B. PETELIN, MD, FACS: As far as for the surgeons, I might...especially if there are any young surgeons out there who haven't had much laparoscopic experience yet, these same three puncture sites are very commonly what we would use to take out a spleen. As you know, we had the spleen sitting up in this same area. We would use the same sort of configuration to take out the...the spleen. So, this approach is very useful not only for the adrenal gland, but also for the...for the spleen, if we need to take the spleen out. In addition to that, you know, we only use three ports here, but there are times when you may need another, a fourth port over here, or a fifth port over here. Those are all possibilities. It doesn't have to be done with just three ports. It can be done with as many ports as you need, but in the...in the whole realm of minimally invasive surgery, I think we need to also make sure that we use a minimal number of ports, if we can get by with it, without stressing the patient. Obviously, if the surgeon doesn't have good exposure, you put in more ports to get that exposure. But, as you could see, you know, with the team that I've had here, we've been doing these for sixteen years now and it's...it's become a very reasonable, measured sort of operation. So we don't have to put in extra ports unless we just can't get exposure. This patient, obviously, is nice and thin. For patients that are much heavier, very commonly you'll need another port; either here in the upper abdomen or over here in the upper...upper back area. So, again, the surgeon uses the number of ports that he or she needs to use. It's also important the patient position. And, I guess I didn't mention that as much as I could have earlier. The patient is lying on her right side, so the left side is up. This is her left chest wall. This is her ribcage margin along here. The right side down. This is the umbilicus, or the navel. So, getting the...getting the patient in the right position is...is very important. And then the patient is...is flexed just every so slightly and we've tilted her head up just a little bit so that...so that we have better exposure for the upper abdomen. It...it just makes it look pretty straightforward.

00:53:27

LISA R. HAYS, MD: I have a question.

JOSEPH B. PETELIN, MD, FACS: Mm-hmm.

00:53:28

LISA R. HAYS, MD: How do you get the spleen out through a laparoscopic procedure?

00:53:32

JOSEPH B. PETELIN, MD, FACS: Well, that's a good...a good question. And, it's a very similar method to this. With the spleen, since it's much larger, we have a larger bag. So, we make the port a little bit bigger, we put in the larger bag and just the way that we picked up the... the adrenal gland, we pick up the spleen in the same way. What's interesting about the spleen is that most diseases in the spleen are not focal diseases. They're not just a nodule. Usually the spleen will be making excess antibodies, or something of that sort, and so in those cases the pathologists in the lab don't need the whole spleen to come to them in one piece. And so what we do is, actually, once we get the bag up to the abdominal wall, we do make the incision about this large, but then we actually break up the spleen in the bag and take out pieces of it and eventually get the whole thing out through a small incision. And the pathologists in the lab have the same results as if we had given them the whole spleen. The patient just doesn't have to suffer with a much larger incision. It's very, very useful for...for especially young people that may have a particular disease and don't want to have a lot of scars on their abdomen. And that's a...You know, the...the...It's the same thing that we do with a number of cases, whether it's a colon operation or a prostatectomy, or any other laparoscopic operation, if we can get things done

through smaller ports patients have less...less pain postoperatively. So, this is a...this has been a very nice, satisfying case, especially for this lady that, you know, probably has a nonfunctioning mass. The mass is now gone. At least grossly on the path...on the surgery here it did not look malignant, but we'll know more about that when we get the report back from the lab in a few days.

00:55:22

LISA R. HAYS, MD: Here's another question. Someone wanted you to comment on the...your preferred position for the patient in the right lateral supine versus the right side? I believe that's the question.

00:55:35

JOSEPH B. PETELIN, MD, FACS: Okay. The...Obviously, the...I think the question has to do with could we do this operation with the patient completely flat. Instead of having the patient flat like this versus having the left side up. The problem when the patient is completely flat is that a lot of the other organs, like the colon and the spleen, tend to not fall out of the way. They don't tend to move like we want them to, to get them away from the area that we're working on. So, the supine, or the flat position for the patient, is much more difficult to be able to do the operation. Again, it's just a series of little things that the surgeon can do to maximize the exposure and...and make the operation a lot easier for...for the surgeon, and for the patient obviously. The fewer ports you...you put in, the smaller the incisions, the better the patient does. So, most...most surgeons prefer this lateral type approach versus a supine approach. Although some people do use a posterior approach through the...through the flank area. Again, the...the difference with that is that it's just a little bit more difficult to get exposure. If this patient, for example, needed to have both adrenal glands out and we were using this approach for the left side, we would then have to position the patient on the other side to do the...the right side. It's the one potential disadvantage of using this approach. But, for unilateral disease, when there's only one adrenal gland that has to be removed, this is the preferred approach. So, again, this...this lady's done well. She's doing okay, right, from an anesthesia point of view? So, again, these are...these are her incisions. Were there any other questions that you all have?

00:57:19

BRADD J. SILVER, MD: Boy, I don't think so. I think that was...that was very nicely done and very nicely illustrated, and it was very good.

00:57:27

LISA R. HAYS, MD: Dr. Petelin, what other laparoscopic procedures do you do?

00:57:31

JOSEPH B. PETELIN, MD, FACS: Well, here at Shawnee Mission they...we have a whole host of procedures that are done with minimally invasive techniques, or laparoscopic techniques. Basically, anything in a body cavity. Most anything can be done using this technology. And it's not just a matter of using small ports; it's using the...the camera technology that we have to be able to...to put this on the end of a scope, to be able to look inside, display that on a monitor so we can see what we've...what we're looking at on the inside. And then use the magnification with this to be able to...to increase our...our delicacy of the operation. So, again, I'd like thank my colleagues for...for helping to moderate this session. I think the patient has done, you know, reasonably well...or, actually, quite well with the...with the surgery. I think postoperatively she's going to do quite well as well.

00:58:31

LISA R. HAYS, MD: I think we have some more questions coming in. On an obese patient, do you go through the fat or do you remove some of it?

00:58:54

JOSEPH B. PETELIN, MD, FACS: No, we'll just...We'll actually dissect through the fat. So, we actually just move it out of the way to get to where we're going. And it looks like we're probably getting close to...close to time, so I'll turn it back to Dr. Hays and Dr. Silver for the wrap-up.

00:59:12

LISA R. HAYS, MD: Great.

BRADD J. SILVER, MD: Good.

00:59:13

LISA R. HAYS, MD: Well, I'd once again like to thank Dr. Joseph Petelin for allowing us to participate as moderators in this laparoscopic adrenalectomy here at Shawnee Mission Medical Center. I'd like to remind the audience that they can access this. It will be archived on the Web. The address for Shawnee Mission Medical Center in general is www.shawneemission.org. And.....

00:59:35

[Audio drop]

01:00:03

ANNOUNCER: ...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.

01:00:23

[END OF WEBCAST]