

**ENDOSCOPIC TRANSSPHENOIDAL HYPOPHYSECTOMY  
TRINITY MOTHER FRANCES HOSPITAL  
TYLER, TEXAS  
December 13, 2007**

00:00:14

SABATINO BIANCO, MD: Welcome to the Trinity Mother Frances Neuroscience Institute. Here at Trinity Mother Frances Health System, we have formed a comprehensive neuroscience institute for the diagnosis and treatment of disease of the central nervous system. The health system executives appointed me to lead the institute with the precise goal to be a premier center in neuroscience. Through the collaborating of different physicians encompassing multiple medical specialties, we have given the foundation to our neuroscience institute. We have available cutting-edge technology to deliver outstanding care for our patients coming from East Texas and throughout the United States. We are proud to have the first functional MRI in East Texas, the second portable head CT scan in Texas. We have now available one of the first microscope with fluorescence modules in the world to allow us to better distinguish between tumors and brain tissue. We also have another microscope that has an infrared camera that is of significant importance during complex neurovascular operations. Furthermore, we have the technology and the extremely rare expertise to offer a complete neuroendoscopic gamut of procedures for our patients, including endoscopic transsphenoidal resection of pituitary tumors, endoscopic resection of colloid cysts, and third, ventriculostomies. We are among the few centers worldwide to be able to perform minimally invasive skull-based surgeries. Our spine institute is founded on the comprehensive treatment algorithm that has shown significant improvements of outcomes through the close collaboration of multiple medical and surgical specialties involved in the care of patients with spinal pathologies, such as rehabilitation, pain and neurosurgery. In conclusion, I am proud of leading the Neuroscience Institute because we offer compassionate, cutting-edge and holistic care for patients with medical and surgical disorders of the central nervous system. We have some of the most dedicated physicians as well as nursing staff that I have ever seen in the United States as well as in Europe. Thank you.

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ANNOUNCER: Welcome to Trinity Mother Frances Neuroscience Institute in Tyler, Texas. Over the next hour, see an endoscopic transsphenoidal hypophysectomy performed live. During the procedure, you'll discover how doctors can successfully remove a pituitary brain tumor through a patient's nasal cavity without cutting the skin. You'll also learn about the specialized endoscopic instrumentation and navigational system technology used for the surgery. Patient benefits will also be discussed. 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.

00:03:27

VICTOR WILLIAMS, MD: Welcome to the Trinity Mother Frances Neuroscience Institute here in Tyler, Texas. Today my colleague is going to be performing an endoscopic transsphenoidal hypophysectomy. My name is Dr. Victor G. Williams. I am a staff nurse surgeon here at Trinity Mother Frances. During this webcast, you will have an opportunity to send various questions, and we will do our best to answer those questions promptly. You

may be asking yourself, "Why are we here to begin with? What are we going to be doing? My colleague is going to be operating on the patient's pituitary gland, which is in the brain. It is located at the skull base. The pituitary gland is very important to us because it secretes many of the hormones that regulate all the functions within our body. At this time we're going to go in and see what Dr. Sabatino Bianco is doing. Good evening, Dr. Bianco. How are you doing today?

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SABATINO BIANCO, MD: Good. Good evening, everybody.

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VICTOR WILLIAMS, MD: Why don't you tell us a little bit about what you're going to be doing today?

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SABATINO BIANCO, MD: Well, we're going to perform a purely endoscopic resection of a pituitary adenoma.

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VICTOR WILLIAMS, MD: Now, I understand there are several ways to approach this pituitary tumor and there's several different methods. Can you please describe to us what the difference between doing a purely endoscopic transsphenoidal versus an endoscopic-assisted transsphenoidal surgery?

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SABATINO BIANCO, MD: Right. Endoscopic-assisted is the usual traditional microscopy to resect the tumor. At the very end of the surgery we have endoscopes to look at different corners of the pathology. Purely endoscopic is the use of only endoscopes to resect the tumor without any microscope.

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VICTOR WILLIAMS, MD: Well, why don't you go ahead and get started, and we'll wait for our people who are watching the webcast to send in their questions for us.

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SABATINO BIANCO, MD: Sure. So we can see the middle turbinate here. As soon as we approach the septum, it's on the left side. And the middle turbinate here. And with navigational system, we can see that we're approaching the sphenoid without any cutting or any other injury to the nasal cavity. We're going to resect some of the mucosa on the middle side of the middle turbinate in order to approach the sphenoid at the very back at the nasal cavity itself.

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VICTOR WILLIAMS, MD: Currently he is bulbing along the septum, which is going to allow us to get to the anterior face of the sphenoid. When we eventually get into the sphenoid sinus, we will be able to see the floor of the sella, which is the bony housing of the pituitary gland. Dr. Bianco is in the nasal cavity once again. Right now he is in medial to the turbinate, which is the pink structure that you see on the left side of the screen. He is going to be bulbing along the septum to remove the [mucosa?]. The blue structure that you're seeing at this current time is called a Bovie. It is used to cauterize the tissue so it minimizes the bleeding. Again, we are along the medial turbinate. And we're working on cauterizing back some of the mucosa on the medial turbinate as working on the mucosa of the septum.

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SABATINO BIANCO, MD: Okay, we are approaching the sphenoid there. As you can see, it's already open there. Change.

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VICTOR WILLIAMS, MD: The first question that I have is what symptoms did this patient present with in the clinic? Dr. Bianco, how did this patient present to you, sir?

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SABATINO BIANCO, MD: This patient actually had a small urinary infection and he had a problem waking up from a small surgery. And the CT scan and MRI were done, and this tumor was found incidentally at that time.

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VICTOR WILLIAMS, MD: The next question is, is this tumor typically benign or malignant?

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SABATINO BIANCO, MD: Typically they are benign, even though we could have some aggressive or even malignant tumor of the sella turcica.

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VICTOR WILLIAMS, MD: What is so different about the way that we are doing this procedure today?

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SABATINO BIANCO, MD: So far we are approaching the sphenoid without any injury to the - the septum, this structure here, is completely intact as well as we have not removed the turbinate at all. That allows for much less destruction and post-op pain for the patient, who usually goes home tomorrow morning.

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VICTOR WILLIAMS, MD: That is our next question. How long does our patient normally stay in the hospital after a procedure like this?

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SABATINO BIANCO, MD: In the absence of any complication and minimal CSF leakage, the stay in the hospital is 24 hours.

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VICTOR WILLIAMS, MD: What type of special training do you have to do to be able to perform this type of surgery?

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SABATINO BIANCO, MD: Usually this is performed after a fellowship in neuroendoscopy or minimally invasive skull-based operations.

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VICTOR WILLIAMS, MD: How long does the typical recovery period for this procedure versus the more traditional way that other people do this procedure?

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SABATINO BIANCO, MD: Usually patients can perform normal activity without exertion within four or five days. Alligator. We are going to remove the volmer, as you can see there, which is the access to the sphenoid.

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VICTOR WILLIAMS, MD: Some of the things to know about a pituitary tumor is that they can present sometimes in patients, patients can have headaches. Sometimes people can have visual difficulties. Sometimes people can have hormonal dysfunction, such as erectile dysfunction. Some women will have problems with galactorrhea, where they produce milk. Other things, patients can have low blood pressure because they don't have enough cortisol in the body. These are things that typically cause people to present to the emergency room or to an endocrinologist, and from that point they are then referred to the neurosurgeon. Dr. Bianco, will the patient have any internal pain when the surgery is over?

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SABATINO BIANCO, MD: No. Typically this operation is done and afterwards patients do not require any major narcotics or any other pain medication for this operation.

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VICTOR WILLIAMS, MD: Dr. Bianco, I have another question for you. I have a patient out here who has already been diagnosed with Cushing's disease. She has a 6x2x2.2mm microadenoma, and she wants to know, is it necessary to wait until the ACTH and the cortisol levels rise again before she has her surgery.

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SABATINO BIANCO, MD: The answer is usually, typically if somebody has a Cushing's syndrome which does not respond to medication, any size tumor is removed. Otherwise, if she is well-controlled with the medication, yes, we'd like to wait until the ACTH goes up.  
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VICTOR WILLIAMS, MD: Thank you, Dr. Bianco.  
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SABATINO BIANCO, MD: I need the navigational system, if that gentleman can move a little bit. I need the alligator, please.  
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VICTOR WILLIAMS, MD: As you all can see, the endoscope is nothing more than a camera that allows us to look into the cavity which we're exploring to allow us to perform surgery. Once again, for those who've just joined our webcast, we are performing an endoscopic transsphenoidal hypophysectomy, which is also brain tumor on the pituitary gland, which is a gland at the base of the skull. This patient presented to Dr. Bianco after being worked up in the ER for a urinary tract infection. The patient was found to have lethargy and they subsequently evaluated him with a CT scan as well as an MRI and found a large pituitary gland tumor. This pituitary gland tumor is felt to be benign. In most cases, pituitary tumors are benign. Currently, Dr. Bianco is in the nasal cavity. He's working along the medial turbinate -- or the middle turbinate on the medial aspect. He's also trying to access the volmer, which is a plate of bone that will then give us access to the sphenoid sinus.  
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SABATINO BIANCO, MD: Yeah, you guys can see the sphenoid is open. This is a small opening we have to enlarge. That's the sphenoid cavity. The pituitary gland is by the base. You guys can see in these slides there, in this picture there. So we are opening slightly more the sphenoid there to widely access it.  
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VICTOR WILLIAMS, MD: Now, Dr. Bianco, is the sphenoid a cavity, or what is the sphenoid?  
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SABATINO BIANCO, MD: The sphenoid is one of the sinuses we have in the face. It's the position behind the nasal cavity in direct continuity with the skull base, the clavis bone as well as the sella turcica, which is the smaller [diploid] at the base of the skull behind where the pituitary gland is located. I need to have an alligator.  
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VICTOR WILLIAMS, MD: Today you all can see that we're using the Steris endoscope, which is what Dr. Bianco is holding. In addition to this, we are using a navigational device by BrainLAB that allows us to real-time look and see where we are operating and where we're going to be going. This allows us to make sure that we're in the proper plane so that we can get directly to the tumor and have great access to the tumor. Currently we're operating between the middle turbinate as well as the volmer, and we're into the anterior face of the sphenoid and we will be going into the sphenoid sinus shortly. We have another question that states, "Does the interior of the nasal cavity always look like this?"  
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SABATINO BIANCO, MD: Yes. This patient has a noticeable deviation of the septum toward the left side. But short of the septum deviation, his anatomy is pretty standard for a transsphenoidal operation. He has never had surgery before. That's definitely a plus for us.  
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VICTOR WILLIAMS, MD: The other question that we have, Dr. Bianco, is what is typically the risk of performing a procedure like this?  
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SABATINO BIANCO, MD: The most common risk is spinal fluid leakage at the end of surgery. Other much rarer operation risks could be injury to the carotid artery. One is there, I'm touching the carotid artery. The other one is on the other side. So we've definitely got to make sure we are in the midline when we approach -- we cannot be off the side. Other

injuries can occur to the optic nerve, which are slightly superior to the gland itself, or the tumor, in this case.

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VICTOR WILLIAMS, MD: Dr. Bianco, is that one of the reasons why you use the navigational system, to help you navigate your way directly towards the tumor?

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SABATINO BIANCO, MD: Correct, correct. In this operation we go over the endoscope cannot be off the side. And the more help we can have, the more safe surgery we can perform.

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VICTOR WILLIAMS, MD: If you were to have a cerebral spinal fluid overflow, how would you go about correcting this real-time.

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SABATINO BIANCO, MD: Patient has the abdomen prepared for a fat graft. We had to remove a small amount of fat from the patient's abdomen and place in the sphenoid and occlude the spinal fluid leakage.

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VICTOR WILLIAMS, MD: Now, do you put a special glue over that to hold the fat into place?

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SABATINO BIANCO, MD: Yes. Eventually we have special glues that can be used to help us in the process.

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VICTOR WILLIAMS, MD: Now, Dr. Bianco, are you able to irrigate through the endoscope or through the --

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SABATINO BIANCO, MD: Yes. The endoscope is within a system where I can use irrigation to help cleaning the lens, when necessary.

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VICTOR WILLIAMS, MD: Dr. Bianco, are there ever times when it wouldn't be prudent to do a transsphenoidal approach where you'd have to do a craniotomy?

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SABATINO BIANCO, MD: Yes. If the patient has a very large suprasellar extension, which is not in the midline but is on one side within the infratemporal fossa, in my opinion, performing craniotomy with the skull-based approach is much more efficacious for the patient [over the long run.] Can I have the alligator, please?

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VICTOR WILLIAMS, MD: Now, if you weren't doing this procedure with the endoscope, would you have to put a retractor in the nose to hold everything open so that you could see the corridor correctly?

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SABATINO BIANCO, MD: Correct. If we did not have the endoscope we would have to place the patient's head in a clamp to hold it still and eventually have a different kind of retractor within the nasal cavity to hold the corridor open and be able to place a microscope to help us performing the operation. So at this stage we are finishing up the exposure. We have a pretty good opening of the sphenoid sinus that we'll work through a little anatomy. So that's the nostril there. We're going through the nostril. We can see the middle turbinate there very nicely. A little dip. The septum is here on the right. We go behind the turbinate. As you can see, without any other structure we are within the -- this is the sphenoid sinus. The patient has a septum which is very typical, as you can see in the middle of the sphenoid sinus. So the mucosa usually, which is the layer of -- all over sinus is relatively bloody, but this is a very small amount of bleeding. This is probably about 1 or 2 cc's, nothing to be worried about.

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VICTOR WILLIAMS, MD: So the magnification of the endoscope actually makes it look like there's more blood that's really there.

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SABATINO BIANCO, MD: Oh, absolutely. This is no more than a drop of blood. If you look at the tip of my instrument here, that's probably about the size of a matchhead, so that's correct. So this is a very nice picture of the sphenoidal cavity. There's still a septum to remove. So as you can see, we can see the clavis inferiorly, which is the bone that goes between the skull base and the middle fossa. You can see on both sides the carotid artery. One is there and the other one -- I can show by cleaning the lens -- is on the other side there. So those are structures to be very prudent -- having the navigational system helps me understand that in this time here I'm facing the middle of the sphenoid, where the pituitary gland is just there. All right. So I need now to remove the -- I need the alligator.

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VICTOR WILLIAMS, MD: So you're removing the bony fragment that looks like the keel of a boat, there, sir?

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SABATINO BIANCO, MD: That's correct. We're removing the septum, which is a small [amount of] bone that divides the sphenoidal sinus. That's why it's important to have pre-op imaging, because we know each patient has different anatomy. We know particularly in this patient where the septum is that allows us to reference to the middle line as well.

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VICTOR WILLIAMS, MD: Dr. Bianco, will this patient's sense of smell be affected in any way after the procedure?

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SABATINO BIANCO, MD: No. It could happen. It's very, very unlikely to have any problems since the receptors for the smell are slightly in a different place in the nasal cavity. They are much more superior to where we are working here, so I don't --

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VICTOR WILLIAMS, MD: Dr. Bianco, I have another question. They want to know if this tumor is on the posterior or the anterior aspect of the pituitary and was this tumor affecting any hormone release.

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SABATINO BIANCO, MD: Okay. The answer is the tumor is a microadenoma, meaning it's already grown above the sella turcica itself. So this is a microadenoma. It's not just -- it's taking all the sphenoid. In terms of hormones, the patient was screened by our endocrinologist. He did not have any endocrinopathy. This was a non-secreting adenoma, which actually happens to be the most common kind of adenoma that we deal with.

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VICTOR WILLIAMS, MD: Dr. Bianco, we have a question from Egypt. Someone there wants to know who are the best candidates to perform an endoscopic hypophysectomy on.

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SABATINO BIANCO, MD: Anybody who has any size adenoma which does not go passing the midline. If the lesion goes past the midline, at that point, like we discussed before, I would prefer to do a craniotomy. Otherwise, we have not had any problems with any patient with any size adenoma. As you guys can see, we have made a small hole in the very posterior aspect of the sphenoidal sinus, so we are approaching the dura, which is this white membrane. The dura is the shell of the brain. So we are working our way into removing once again the bone or what we call the floor of the sella turcica where the pituitary gland is located. We're very careful because at this stage of the game now, the risks get slightly higher than before.

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VICTOR WILLIAMS, MD: What are the contraindications for this type of procedure?

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SABATINO BIANCO, MD: well, somebody who's had extensive nasal surgery, extraction and so forth, that could be definitely a problem. I need a Kerison, please. That would be one of the most difficult patients to deal with. Otherwise, there's no difference between standard surgery transsphenoidal and this operation. So we can do either way.

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VICTOR WILLIAMS, MD: What is typically the amount of blood loss that you'd have from this type of procedure?

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SABATINO BIANCO, MD: We get minimal, probably 50 at most, 70 cc's at most. Can I have a suction, please?

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VICTOR WILLIAMS, MD: Another question that's come in: Can this transsphenoidal approach be used for other indications other than a hypophysectomy?

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SABATINO BIANCO, MD: The answer is yes. Definitely more difficult. We can perform extended transsphenoidal to remove a tumor of the skull base such as meningioma of the planum sphenoid or other lesions such as sinus pharyngiomas, but that would be a more advanced operation. It can be done with higher risks.

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VICTOR WILLIAMS, MD: I have another question. A patient wants to know that we have a lot of bacteria within our nasal cavity as well as some types of viruses. They want to know, how do you prepare the patients so you reduce the risk of postsurgical infection?

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SABATINO BIANCO, MD: That's a very good question. The patient gets double antibiotic coverage before we start the operation, and we prep the nasal cavity before we start with an antibiotic as well and disinfectant. So that's the standard procedure for antisepsis. So we have a very nice -- once again, [unintelligible] the dura. I will clean the lens. That's the dura mater there. We can see some of the tumor already coming out up here. There, slowly. And [I will confirm] the navigational system that I am in the midline. I don't know if you guys can see on the navigational system of the BrainLAB that I'm facing the tumor in the midline. I would love to have a slightly larger opening. I think that would be easier for me to work on. Can I have one of those [pedi] also? Technically, the problem with this operation, I don't know if you guys can see my hands, but it's very, very difficult to work with two hands in the nasal cavity. It's a relatively small space, and that's where the difference is with the normal surgeries, where you have much more access by doing a microscopic resection. That's why this is something that definitely you have to have a niche as a neurosurgeon and expertise to perform. This is not something that can be done on a weekend course kind of deal. All right. So we are almost ready to open the dura. Checking with my navigational system. I'm within the boundary of what I feel is a reasonable opening of the sphenoid. Very good. At this time, we switch our endoscope to the longer endoscopes that are made to the same principle. They allow us to perform a resection on the tumor.

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VICTOR WILLIAMS, MD: Now, Dr. Bianco, I see this strange metallic arm here. How are you going to use that during this procedure?

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SABATINO BIANCO, MD: Well, whenever we are in the sphenoid, the arm is a retractor and holder that will allow me to have the endoscope in the nose. And I will try to use both hands as well as the endoscope, of course, to visualize. It's okay. So we're registering -- what I'm doing now, I'm registering the instrument with the navigational system. Sorry? Yes. Okay. Good. So now we will test and make sure that the navigational system is accurate by touching the tip of the nose midline. Excellent. So we have a good view of the nasal cavity. So we can -- slightly -- same image, slightly longer endoscope. Once again, we have the same picture there. Okay. So at this point, we have a -- can I have a small needle? Even

though the navigational system is very good and accurate, we would like to make a small opening with a very small needle to confirm that by doing a -- making a small hole we do not injure the carotid artery. And the safest way to do that is a small needle that allows us to make -- fortunately, the needle is very flexible, being a very small gauge.

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VICTOR WILLIAMS, MD: So Dr. Bianco, what you're saying is the proximity of the internal carotids to the pituitary gland, that necessitates that we first put a needle in there to make sure that we're not in the internal carotid artery.

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SABATINO BIANCO, MD: Absolutely, absolutely. This will -- it will be the worst complication of this operation. Here we are. Making a small hole, you can see there. And I do not see any arterial blood, so that's good.

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VICTOR WILLIAMS, MD: We have another question. Someone wants to know, is this the most common way to remove a pituitary tumor?

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SABATINO BIANCO, MD: No. The most common way is done to a transsphenoidal hypophysectomy made with a microscope and standard technique. This is definitely the least common way to do the operation.

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VICTOR WILLIAMS, MD: Is that due to the complexity, or the learning curve, to perform this type of procedure?

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SABATINO BIANCO, MD: That's correct. The instrumentation necessary is extremely expensive and the learning curve is also extremely difficult. Can I have a knife? So now we're going to open the dura, the shell of the brain. That's one of the most critical parts of the operation there. So you can see the knife is inside the instrument. Now I will have the blade of the knife coming up.

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VICTOR WILLIAMS, MD: Dr. Bianco, will you be removing any portion of the pituitary gland?

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SABATINO BIANCO, MD: We try to leave the pituitary gland as much as we can, depending on the pathology that we treat. At times we have to remove some of the gland. In this particular case, I'm planning not to remove any.

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VICTOR WILLIAMS, MD: In a case where we had to remove a portion of the gland, how could that affect the patient?

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SABATINO BIANCO, MD: Well, that will be the lack of hormones that are tested clinically immediately after surgery, and tomorrow morning we will test the patient to make sure that he does not have what we call hypopituitarism. What that means is a lack of hormones. And as you can see, the tumor is coming out. That's the tumor there. Try to clean the lens.

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VICTOR WILLIAMS, MD: We have another question. How is this patient breathing throughout the procedure? I think I can answer this question for you. Prior to starting this procedure, the patient has a breathing tube placed, and then this machine actually breathes for the patient during the procedure.

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SABATINO BIANCO, MD: Knife.

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VICTOR WILLIAMS, MD: Dr. Bianco, how are you going to tease this pituitary tumor out of that cavity?

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SABATINO BIANCO, MD: Well, it's the duty of the lab. We're going to show in a few minutes, we have a dedicated instrument that will help us in removing the tumor. Those tumors are very soft usually. And they are small curettes. As you can see, the [dest] tumor is already there. I wonder if you can appreciate what I'm doing. I'm opening the dura widely to be able to -- here we are. Can you guys see the tumor there? Very nice picture there. That's the tumor coming out. Tumor forceps, please. We're going to remove some of the tumor now for pathology. Okay. Tumor coming out. So this is a relatively indolent form of surgery for the patients. Removing some more tumor there. That's just for the biopsy. As you can see the tumor very well coming out.

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VICTOR WILLIAMS, MD: Now, do you send that specimen off to see what kind of tumor it is?

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SABATINO BIANCO, MD: That's correct. We have to confirm -- curette. We have to confirm the nature of the tumor to make sure this is benign, like we postulated before, and there is no malignancy. So those are the instruments we use to -- there are many, many shapes and many, many sizes. We call them ring curettes. And as you can see, we go in in the sphenoid and very carefully, that's tumor coming out. See very nicely there on the top of my curette. Okay, tumor forceps. It's a very tedious operation in terms of being very patient. And tumor, as you can see, that's tumor coming out. Can I have the -- mm-hmm?

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VICTOR WILLIAMS, MD: Dr. Bianco, someone is asking, how do we close the defect from the exposure in the anterior cranial fossa?

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SABATINO BIANCO, MD: Well, we try to use patient bone, when possible, or we can use other material. In absence of a CSF leakage, the closure is less important than -- can I have a suction, real suction? It's less important if we have a spinal fluid leakage, we have to reconstruct the anterior skull base to either bone or mesh, metal mesh or something like that. So once again, you can see tumor there that came out, that fell off the -- in front of my suction I'm going to give to Antonio. Removing small -- mm-hmm. We're going to watch the endoscope once again and -- so I will try to place the endoscope in its holder. Sometimes I forget we have it just because of normal use. We do -- we -- so this is a pneumatic arms that allows us to position the camera where we want it, and it stays perfectly still for the rest of the surgery. So now I have both my hands free. Can I have the curette, please? Curette, please? So now I can use both hands with the -- as you guys can see, I'm working within the sella. That's fine. I'm not worried about it.

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VICTOR WILLIAMS, MD: Is there a particular method to the way that you use the curettes to remove the tumor?

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SABATINO BIANCO, MD: Yes. What we try to do -- of course, by looking at the anatomy of the tumor, of course, go in the central part first, the central part. Eventually we go to the corner. And at times it's very tedious and difficult to go and remove the part of the tumor behind the normal gland, so we follow the different ways. The first thing I do, I remove the central part first and eventually I go to the corner. I will receive the endoscope. I will have some guidance to show me within the sella turcica. We also have an endoscope that angles. This is the zero degree, so this is facing directly in front of the -- the portal, the view. But we have some 30 degrees, some 45, and even 75 degree endoscopes to be able to look at the corners. And that's really one of the biggest advantages versus traditional surgery. You look through the tunnel made by the microscope. As you can see, I can see very well the tumor in there. I'm slowly but surely removing all the tumor out there. You can see -- can I have the tumor forceps? Relatively large fragment of tumor.

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VICTOR WILLIAMS, MD: One of the questions we have is the size of the exposure hole is very small. Is there any risk of leaving part of the tumor inside? You do your best. For this size, you can see pretty well the tumor and you keep milking the tumor out with the curettes. And typically, when the bleeding stops, that's when you have most of the tumor out. Is there any risk of leaving tumor inside? There's always a very small risk that you can leave a very small portion of the tumor, but what we do is we do our best to try to bring that tumor out with the curettes. And most of the time, the amount of bleeding that we have after we remove the tumor, it will begin to stop or slow down, and that's when we know that we've done a pretty good job in terms of resecting pituitary tumor.

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SABATINO BIANCO, MD: Once again, we're going -- those instrumentation is designed for this job. I can change the angle of my curette to allow me to go in the corner. Now I'm working at the very bottom right corner here, removing everything left in there in the very bottom.

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VICTOR WILLIAMS, MD: Dr. Bianco, you can put your endoscope actually into that small opening and look in after you're finished, is that correct?

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SABATINO BIANCO, MD: That's correct.

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VICTOR WILLIAMS, MD: And that helps to reduce the possibility of leaving tumor behind?

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SABATINO BIANCO, MD: Yes. That's one of the advantages. We can place an endoscope within -- tumor forceps -- within the cavity and try to explore the corners with direct vision. I will try now to go deeper in the -- so as you can see, we explore. So we have pretty much a [nasty complexion] on this side. There's still tumor on this other side there, which can be [appreciated] very well there, so we're going to go back out. Curette. I'm going to turn the curette for the right angle, which is at 10 o'clock. We divide the field like watch: 12, 6, 9 and 12. So now I'm going in this corner where I see tumor there. And as you can see, we are slowly working the tumor out of there. It seems very bloody. So once again, we're talking about micro -- very -- this is very enlarged by the endoscope. Tumor came out. Can I have the tumor forceps? Okay. Excellent. So now we do another exploration within the tumor itself. Wash the lens.

00:42:16

VICTOR WILLIAMS, MD: Dr. Bianco, how large is this tumor?

00:42:18

SABATINO BIANCO, MD: This tumor in the pre-op studies was about 14 to 16 mm, so it's what we call -- it's definitely suprasellar, but it's not a large tumor. For a microadenoma, this is not a large one. Now we work in the corner, like I mentioned before. Try not to leave anything in place, as much as possible. So this is now the -- we can see we have normal brain structure in the membrane. One second, I will wash the camera. So up here, so everybody can see, there is no more lesion there.

00:43:06

VICTOR WILLIAMS, MD: So the apricot-looking structure behind there, is that the pituitary gland?

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SABATINO BIANCO, MD: Pituitary gland are those membranes I'm working on right now. The pituitary gland is much more bloody. The tumor itself does not bleed.

00:43:20

VICTOR WILLIAMS, MD: So how can you tell when you're actually removing the tumor that you're removing the tumor and not the gland itself.

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SABATINO BIANCO, MD: Well, the consistency is completely different. The tumor is usually creamy and does not have the classic vascular [pattern] of the lesion itself. Curette? So it's usually the feel that we have that will help us understand. So I'm going to explore a few times and make sure that we really have done a complete resection of the tumor. I'll go in with my curette.

00:44:00

VICTOR WILLIAMS, MD: Dr. Bianco, do you feel this patient will need hormone replacement after the surgery?

00:44:03

SABATINO BIANCO, MD: We know that before surgery he had very mild lack of hormones, so I believe that those two hormones that were replaced will possibly be still replaced for a while, but I don't foresee him being a [unintelligible] hypopituitarism patient. I believe he will be doing well without any replacement hormone. Most of that is normal gland. I'm just looking in the normal gland to make sure I'm not leaving anything behind. Actually, the membrane up there, which is the arachnoid covering the spinal fluid, so that's normal. Once again, that's normal tissue there. We'll try again in the bottom corner. Can you go in this way?

00:44:56

VICTOR WILLIAMS, MD: Dr. Bianco, how does this navigation system actually help you locate the tumor and make sure that you stay on the correct plane to get to the tumor?

00:45:05

SABATINO BIANCO, MD: Right. Well, the navigational system helps us to work within the patient's face and brain, trying to guide us in the midline and trying to avoid possible complications. It works very well for transsphenoidal because we have bony structures that cannot change by the surgery. Once we perform brain surgery, unfortunately -- tumor forceps -- the brain shifts during the operation. That is probably the biggest downside of the navigational system today. But in doing a transsphenoidal, we're dealing with -- I see some more tumor there. There's a little sliver of tumor left at the very bottom here. I don't know if you guys can appreciate it on the screen. Very small. Clean that, please. That's why in this job it's very important to be patient and [to do] it a few times. That's nice. Nice. Okay. [Rongeur], please. So now we're going to perform a little bit of hemostasis in there. Hold on a second. I'm looking in the corner there and feeling some very -- little bit of tumor there. So I'm putting the endoscope in the sella turcica there within the tumor itself, looking in the corner, we mentioned it before many times.

00:47:19

VICTOR WILLIAMS, MD: The sella turcica is the bony housing of the pituitary gland. Is that correct?

00:47:12

SABATINO BIANCO, MD: That's correct, Dr. Williams. The sella turcica is the small scalp at the very base of the skull where -- okay, give me the curette, please -- where the pituitary gland is lodged. Trying to work at the bottom corner around four here. There could be some tumor left. There's a small corner there. I don't see anything. At this point I really don't see anything anymore. Okay, gel foam. So we're going to perform a little bit of hemostasis by placing a gel foam, which is a hemostatic with thrombin and a small [coronoid] padding. And now we wait for a few seconds, let the bleeding stop, and if it looks good, we can finish.

00:48:44

VICTOR WILLIAMS, MD: One question is, is this -- our navigation system use preoperative images or intraoperative images to help us locate --

00:48:51

SABATINO BIANCO, MD: It can be used both ways. Ours is only preoperative. We do not have an intraop MRI capability yet. Really few places actually have intraop MRI. It can be used to upgrade the navigational system to current situations. So it can be done both ways. So I'm washing with a normal sealant irrigation.

00:49:17

VICTOR WILLIAMS, MD: Dr. Bianco, what are the possible causes of a tumor in the pituitary gland?

00:49:20

SABATINO BIANCO, MD: We do not have at this time any ideology. We do not know exactly the reason why people develop those kind of tumors, but we know that it's very common. It's about one to two percent of the population have one. Thankfully, some of them are very benign and they never grow to a point to give any problem to the patient. Can I see the bone, please, that we took out?

00:49:43

VICTOR WILLIAMS, MD: Dr. Bianco, do you think this patient will need postoperative radiotherapy?

00:49:49

SABATINO BIANCO, MD: I don't. This is [not a big adenoma], and by having a -- we'll do a post-op MRI tonight, and unless the patient has a tumor, we just follow clinically and radiographically. He will need radiation only if it recurs.

00:50:08

VICTOR WILLIAMS, MD: We have another question. What methodologies are used to practice and prepare for this procedure utilizing the tools that we've seen today?

00:50:16

SABATINO BIANCO, MD: I'm sorry, could you repeat that, Dr. Williams?

00:50:18

VICTOR WILLIAMS, MD: What methodologies are used to practice and prepare for this procedure, utilizing the tools that we have seen today?

00:50:24

SABATINO BIANCO, MD: Sure. Well, most of the skull base program, the fellowship [offer] cadaver lab, and no question that by practicing with cadavers, along with by slowly working the way with patients is the safest way to learn this kind of operation. Okay, can I have a tumor forceps? I need the small tumor for the bone. So we go now to remove the gelatin. That's the padding. Let's have the glue ready, guys. I'm going to remove the gelatin in the area. I'm going to leave it in there since there is no bleeding. It's hemostatic. And we have a small fragment of bone which we took in the opening, and I will place it at the very front of the sphenoid. So that's a fragment of bone we took in the opening. Okay. Can I have a --

00:51:27

VICTOR WILLIAMS, MD: Okay, so this bone that you've laid over the floor of the sella, this was from the bone removed during the opening part of the procedure?

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SABATINO BIANCO, MD: That's correct. Patty?

00:51:35

VICTOR WILLIAMS, MD: Did you leave gel foam or something inside the cavity to actually act as, one, something that will control the amount of bleeding and also will act as a support so that the pituitary gland can't herniate through the defect?

00:51:46

SABATINO BIANCO, MD: That's correct. We don't want for the suprasellar structure to herniated because that could be reason for a syndrome we call empty sella syndrome. But that's the reason why we put some gelatin in there to allow for a safer hemostasis and also to give some support. We're almost ready for the glue. Good. I'm putting the endoscope slightly back so that the glue does not smear the face of the endoscope. Okay. Whenever you guys are ready, I'm ready for the glue. Is it ready?

00:52:19

VICTOR WILLIAMS, MD: Dr. Bianco, I have a question. Someone's asking, would an intraoperative MRI be helpful during this procedure?

00:52:28

SABATINO BIANCO, MD: The answer is, for this size, possibly not. For a very large, definitely. It will help all throughout the surgery to make sure that we have removed all the tumors. So yes, the answer is yes. So I'm now advancing the glue. And it's a very pretty blue color. The glue is placed within the sphenoid, and that allows us to seal. In this case, we have very little worry about CSF leakage since we did not have any leakage at time of surgery.

00:53:05

VICTOR WILLIAMS, MD: Now, this glue won't be in there for the rest of the patient's life. It helps to hold everything in place. Is that correct?

00:53:11

SABATINO BIANCO, MD: Actually, this glue is there for possibly seven to ten days, and eventually the scarring tissue will stop the possible chance of infection or other complications. So this is a temporary; it's not a permanent glue. So we are gluing at the very bottom of the sphenoid. We have the blue dye inside allows us to see very well where the glue goes. Okay? Now, at this time we will take the scope out and re-put -- can I have the short one? -- put the short one, explore the nasal cavity, make sure that there is no bleeding that we have not seen at any point, and we will be done. So we explore the right nasal cavity where we did the surgery. And once again, you can see the turbinate is very healthy. There's been no trauma at all. The nasal septum, very healthy. We go to the very, very back where the glue is. It looks good here. There's no bleeding. I'm aiming toward the nasal structure. But I'm going to remove some of the blood product as well as mucous the patient had. Cleaning the patient's upper nose. So you guys can see very well the turbinate here. And now we're looking at the pharynx with the eustachian tubes down there and the adenoids.

00:54:52

VICTOR WILLIAMS, MD: Now, Dr. Bianco, if this patient decided not to have surgery, what kind of things could happen to him? Could he lose his vision or would he have more hormonal dysfunction?

00:55:02

SABATINO BIANCO, MD: Hormonal dysfunction is one of the issues. The most important is when you have an adenoma that grows above the -- we call diaphragm sella. When it goes above the normal size for the pituitary gland, the next structure above is the optic nerve. And if there's an injury to the optic nerve, you can get blind. So it looks like it's cleaned very nicely the [rear] pharynx here, the eustachian tube there. Once again, middle turbinate there. There's no bleeding. It looks very healthy. I'm going to explore very briefly the left side. As you guys can see, the left side is much different anatomy because of the [boing] of the septum. The septum is closing our way. Again, navigate to show you the middle turbinate back there. Definitely would have been difficult, if even possible, to perform the surgery from the left side. All righty. So that's the end of the operation. The patient does not need any packing in those. We're going to remove all the dressing, the Band-Aid, and he can be awakened by our anesthesia colleagues. The blood loss was less than 40-50 cc's for the whole operation.

00:56:28

VICTOR WILLIAMS, MD: So what you all witnessed was the endoscopic transsphenoidal hypophysectomy performed by Dr. Dino Bianco, which was a surgery that involves the pituitary gland. Dr. Bianco, do you have any last comments for our audience?

00:56:43

SABATINO BIANCO, MD: My comment for the audience is even though having a brain tumor can be psychologically very difficult, for pituitary adenoma, we have a variety of treatments, surgically as well as with radiosurgery, to help patients to have a normal lifespan. Thank you.

00:57:02

VICTOR WILLIAMS, MD: Thank you all for watching and good night.

00:57:10

ANNOUNCER: This has been an endoscopic transsphenoidal hypophysectomy performed from Trinity Mother Frances Neuroscience Institute in Tyler, 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.

00:57:47

[end of webcast]