ROBERT FRIEDLANDER: Our speaker today, Dr. Jorge Gonzalez Martinez, who's been with us for a little bit over a year now. Dr. [INAUDIBLE] fellow Hispanic, Gonzalez Martinez, really is the preeminent epilepsy neurosurgeon-- I wouldn't even call that in the country, but really internationally, has a very, very extensive experience in developing new and better ways of both evaluating and treating and curing many patients with epilepsy. He really exemplifies the very best that our faculty are trying to do here day-in and day-out, which is to not only provide the very best care that we can, but also importantly to move and innovate and in neurosurgery. So it's a great pleasure to introduce Dr. Gonzalez Martinez. So please take it away from here.

JORGE GONZALEZ MARTINEZ: right. Good morning, everybody, or good afternoon. It's a truly pleasure to be here. It's an honor for me to be part of this webinar with Dr. Friedlander. I'd like to thank Justin, and Stacey, and Paul for organizing this. It's great to be here.

I put here my slides. Let me see here how it works. I hope everybody sees. Today, we're going to talk about what I do, what I do for a living, which is epilepsy surgery.

And my talk is related to how to make epilepsy surgery less invasive and probably better than, say, how is to why we should do-- we should make epilepsy surgery less invasive. I would like just to start with a patient. This is a pediatric patient with motor seizures, with debilitating motor seizures, which is completely-- which are completely refractory to medication.

So when we see this patient-- this is an imaging, an MRI imaging sagittal view that shows that this patient has perhaps a lesion located in the cortex. And more precisely this lesion apparently is located between two important areas in the brain, which is the sensory and the motor cortex. So in order to define the areas that we need to resect in order to define areas that we call the eplieptogenic areas, but also in order to preserve important areas in the brain, the cortex, and the motor and sensory areas, we do what we call an invasive monitoring phase.

In this case, we perform a craniotomy. We do a large opening, a large exposure of the [INAUDIBLE] cortex, of the cortex in this area. As you can see here, this is the lesion. It's more pale in relation to the rest of the brain.

You see here perhaps the location of the motor cortex, the location of the sensory cortex. And what we did for this patient was an invasive monitoring for using subdural grids. And this was or is [INAUDIBLE] in many centers the standard of investigating those patients.

So why the invasive monitoring is important for this case, because in that situation, we can really demarcate areas that are responsible for the seizures. And as you can see here in purple is where we record the seizures coming from those two electrodes, 39 and 60 over here-- I'm sorry, 66. Those are the two areas that we record most of the activity.

As you can see here, this is the lesion. And the ictal onset, where the seizures are coming from outside from the lesion, but also outside the lesion. And in red, you see the map of the motor cortex and in green the map of the somatosensory cortex. So in that way with this information, we can perform very, very precise resections like this one.

As you can see here, this is the post-op section for this child. The same picture that we had before, here is the motor cortex, which was completely preserved. This is the resection of the lesion, and the resection of portions of the somatosensory cortex that are also, in this case, was causing seizures.

So this child became permanently seizure-free without any deficits. So this case illustrates quite nicely what are the goals and advantages of using invasive monitoring, but what are the problems? The problem is that I think you can clearly see on this imaging in order to perform subdural implantations and many times we need large craniotomies. And with large craniotomies, it comes many times complications.

And this is a picture of a CT scan with a large epidural hematoma caused by the implantation of a subdued grid. So there is, unfortunately, a very high price to pay for localizing seizures. And the price to pay is the high incidence of morbidity that we have in those patients.

Many times those are the type of resections that we need to do, large resections, in this case. And, perhaps, there is a perception from doctors and physicians and patients that epilepsy surgery is too morbid and, perhaps, and too invasive. And perhaps this is true in some sense.

So we still do a large craniotomy. We still do a large resections. Can we make it better? So that's the reason why approximately 10 years ago we translate our methods of invasive monitoring from the subdural method that require a craniotomy to a more or less invasive methods, which is the implementation of depth electrodes guided by a very precise hypothesis of implantation.

This is what we call SEEG. And this is just a close picture of one of our patients here in our hospital showing a very extensive exploration of the temporal, parietal, and occipital areas without the need of performing a craniotomy. This is done through percutaneous implantation through robotic devices.

This is not a new technique or new method. This has been done for quite a long time ago in France. And this is one of the original pictures showing a patient in the operating room being recovered from seizures with depths electrodes.

And, of course, the methodology changed. The technology changes. And now we do have sophisticated devices, like this one, a robotic device that can help the surgeon in performing very accurate and with very high efficiency the implantation of those depths electrodes as you can see here.

So efficiency, it means nothing if it does not come with safety. So what are the safety profile of those SEEG implantations? And I think you can see here the four different types of complications that we can have with SEEG electrodes.

This is probably the most common CT findings that we can have, a small amount of arachnoid blood in the systems over here. As you can see in A, this is-- it's is a CT finding after the implantation. And I don't consider this to be a complication. It's just a finding. And none of those patients will become symptomatic. This can happen is up to 20% of our patients.

In B, you have the little tiny contusions that are also asymptomatic. In C, we do have the more large intraparenchymal bleeds that may become symptomatic, depending on the location. And finally, on D, you have the large collections intraparenchymal collections that can create mass effect and can be very symptomatic and life-threatening.

So when we study our experience, this is a cohort of patients with 749 implantations with 7,000 electrodes implanted. And we found that our complication rate for this group of patients with this technique it's between 0.5% to 1%. We perform a meta-analysis, and we analyze all the complications from all the reports so far. And we the median rate of complication is 0.7%.

So in conclusion, we reached the conclusion that in our experience and also in the word experience with this method, among different methods of extra-operative invasive monitoring, SEEG is the safest when compared to subdurals or any other method of implantation. With SEEG, you can truly perform not only a safe implantation with the placement of the electrodes, but also minimize the amount of tissue that we resect. This is another pediatric patient that underwent SEEG implantations for rolandic epilepsy.

As we can see here, after the monitoring, which took this patient back to the OR. We connected SEEG electrodes. And we did the resection under live visualization of the SEEG electrodes. This will give us the advantage of checking for changes in the activity why we're doing the resection. And that way we can ensure that we are going to do the minimum resection necessary in order for this patient-- so for the patient should become seizure free.

So once we connect the SEEG electrodes in our EEG recording machine in the operating room, we can plan our conventional craniotomy. And then we can expose the rolandic cortex in this case. You can see the dotted line. It represents the central sulcus with the motor cortex in front and the sensory cortex in the back. In that way we can perform defined dissections of the areas that we saw the epileptogenicity. In this way we can do a staged resection. We can remove a small portion of the areas, which is important specifically in this location. The minimal you resect it, the less complications you're going to have-- the less deficits you're going to have.

So you want to do a staged approach, where we remove a small amount of the cortex, arrest for a second, see what are the consequences in the recordings. And if the activity continues, we will progress to the resection of the more eloquent areas. In that way we can do a staged approach, and we can truly minimize the amount of cortex that we resect.

In this case, this was the first stage when we just resected a small portion of the sensory cortex. And then we performed an ECOG, and then the recording showed complete normalization of the SEEG recordings. You can see here this is the post-op CT, a post-op MRI showing a small resection. I just want to remember you this was a known lesion on the right in the rolandic. Little tiny resection-- a small resection. Completely seizure free after four years. I just want to show him. The mom-- she sent me this video. He likes to play with *Star Wars* games and puzzles. And as you can see, he's completely normal from a functional point of view, and mom and family are very, very happy.

So this is the type of results that we can obtain with a very accurate mapping with intracortical electrodes with intra-op monitoring. And also with the combinations of different techniques in order to really minimize the morbidity in order to really provide our patients the best outcome possible that we can provide to them.

The question is, can we make it better? This is another patient that-- and again, at 17 years old-- a patient with debilitating seizures. More than 100 seizures a day. You can see here and see some snapshots of the seizures. Very hyper motor seizures-- very debilitating. With a completely normal MRI, we had the hypothesis-- those seizures were coming from the frontal lobe. And what we performed is the implementation of SEEG And we found seizures coming, as you can see here-- very clear, coming from the L prime and many times N prime electrodes.

So in the past, this was a work done in collaboration with our group with Dr. Patrick Chauvel, who is coming also at UPMC in August to join our group. Patrick and myself were very, very interested in recognizing what are the true landmarks or the true points that really identify the focal seizures, which many times can be very, very diffuse. So with this approach that we found we recognize what we call the fingerprint for seizures, which is a three-phase type of recordings. Initial with sharp transient or spikes that were followed by fast activity in which you followed with the suppression of low frequencies. So it's the combination of the interictal to ictal activity that truly defines the epileptogenic zone.

So in that way, you can really identify what is the minimal tissue that is essential for the organization of seizures, and what are the propagated areas that are not essential but can be perceived as the epileptogenic zone. So why this is important? Because this is the mapping of the frequency of the fast activity in this patient, which involves the entire frontal polar areas on the left side, and perhaps some of the areas in the mesial front on the contralateral side. So based on our previous criteria, those are the areas that need to be resected in order for this patient to become seizure free.

But if you do the fingerprint approach, we now can recognize a much smaller, from a volume aspect area, in the mesial front. And this changes everything, because now we can not only map those seizures with percutaneous electrodes, but we can treat those patients without a craniotomy by performing a small ablation just in the area from where we see the fingerprint at.

So in that way, we can take the situation back to the OR. We can implant a laser probe that is going to guide-- will be guided exactly in the same trajectory as the L or the L prime electrode where we saw the fingerprint. And we can perform a focal ablation of the areas, and make this patient seizure free completely without any neurocognitive deficits.

Can we make it even better? Can we proceed and try to really further minimize the areas that we need to treat in order to stop the seizures? And with that in mind, we use-- this is another project that we have with Aix-Marseille University. It's a collaboration that we have with them-- University of Pittsburgh. This is Dr. Jirsa from Aix-Marseille, and this is Dr. Patrick Chauvel that is also part of this project.

This is what we call the Virtual Brain Project or the Virtual Brain Simulations. What we're doing here is we have this wonderful data-- intracranial data from all these patients with medically intractable epilepsy. And from a scientific perspective, it's very interesting data. And this is important, because with this data-- with MRIs, with DTIs-- we can recreate in a computer-based system the same seizures or the same structures that this particular patient has.

So this is an individualized simulation of that particular patient. And we can replicate or we can recreate the same seizure patterns that this patient will have been in normal situations. In that way, we can demarcate what are the areas that are truly epileptogenic based on our model. We can validate this simulation by comparing the data from the clinical aspect-- from the gold standard, which is the clinical evaluation we can compare with our model. And we can see how good and precise is our model.

As you can see here, the precision is pretty good, and we almost have 80% matching in this. And using this data, we can simulate resections, and we can predict what would be the outcome from seizures and also from cognition.

So this is an example of a comparison between a patient that we performed SEEG. And this is the clinical hypothesis in red. You can see what were the conclusions of the clinical team in terms of what are the areas that needs to be resected in order for this patient to become seizure free. As you can see, this is a large area that corresponds also to the posterior areas of the superior frontal gyrus all the way to the frontal [INAUDIBLE] areas.

And in the bottom here is the virtual brain hypothesis, which is a little bit different than the clinical hypothesis. And I would say much more restricted and smaller and more localized here in the back. So the next stage in this research is to do a comparison again to the results that we obtained with the clinical hypothesis versus what the virtual brain hypothesis would tell us. And in the future, we could perform a clinical trial to compare the clinical hypothesis guided resections basis versus in comparison with the virtual brain guided resections. Our hypothesis-- this approach will provide us much more precise and restrict that we follow with less morbidities in comparison with the current clinical standards.

And this is my three last slides or four last slides. In order to really continue in this mission of making epilepsy surgery less invasive, I think this is an example of a wonderful collaboration with our team here-- our endoscopic skull-based team led by Dr. Gardner with our ENT group, and also with us with epilepsy to try to come up with a better way to perform temporary resections or resections of the mesial structures.

So we realized that perhaps the best way to perform those resections is going through the temporal lobe. But in order to go through the temporal pole, it would be a complicated approach, and we developed a way to reach those areas with an endoscopic tans-maxillary approach. In that way, we can perform the resections of the mesial structures, which is truly the pathology, without affecting the lateral neocortex-- without affecting the cognitive fibers-- and provide to the patients less complications and better cognitive outcomes after epilepsy surgery.

So with this approach-- those are the pictures done here in our microsurgical lab, this showing the view of this trans-maxillary approach, with exposure of the temporal pole. As you can see here, this is the exposure of the temporal pole with the left here-- the lateral aspect of the mesial. This is the uncus, and this is the superior temporal gyrus.

And with this approach, we can really visualize-- remove the amygdala, the temporal pole, and finally visualize the head of the hippocampus, reach the temporal horn, and finally perform a complete resection of the mesial structures through a very, very minimal-- I would call this the highly selective approach for mesial temporal lobe epilepsy. Something that we develop here-- it's very unique from our group, and this truly highlights the benefits of having a structure like UPMC with a prominent world-renowned skull-based team that helps you to perform those procedures.

This is a picture of our first procedure. This was done in May. As you can see here, our team-- Dr. Gardner in the back, our ENT group here. And we're performing the first trans-maxillary temporal resection.

And this is the post-op imaging showing the resection performed on this patient. Patient is doing very well. Of course, we're going to need more time for the follow up, but so far it looks very, very promising. So there will be more to come, but this is another interesting, very promising project that we have here in our hospital in collaboration with Dr. Gardner and his team.

So those are my last slides. I again would like to thank you very much for this opportunity to talk with you. It's wonderful to be here. And I'm looking forward to any more questions. Thank you so much.

JUSTIN MEYER: Thank you Dr. Gonzalez-Martinez. What an amazing presentation. We're so honored to have you a neurosurgery trailblazer with us at UPMC and the University of Pittsburgh. We're going to begin the Q&A portion of our presentation. We'll try to answer as many questions as we can in our allotted time. Dr. Friedlander, did you want to say a couple words?

ROBERT FRIEDLANDER: Yeah, absolutely. Thank you, Justin and thank you Dr. Gonzalez-Martinez. I wanted to put his talk into context right now. And many people have epilepsy around the country, and that many, many of them can be treated fairly safely with medicines. There are, however, a significant proportion of them that medicines either don't control them or potentially that a procedure can cure them of epilepsy and not need those medicines anymore. So it's really been a transition and a translation from really managing these patients and evaluating the risk and benefit of doing these procedures.

And as you could see from Dr. Gonzalez-Martinez's talk, many years ago the procedures-- not many years ago-- a few years ago and as well as the procedures that are being done currently in many other centers-- are much more invasive. Require larger openings, more brain resected. And the consequences are significant, and the outcomes may not be as good. So as you think of a procedure, particularly the kind of procedures that were just described, there are different parts of the management.

One is the diagnosis of the patient. You have to make sure you have the right diagnosis, patient's being treated by expert epileptologists. These are neurologists that do not do the surgery but manage patients with epilepsy. And then there's a decision that needs to be made when a patient should have a surgical evaluation. And a surgical evaluation doesn't mean having surgery. It's to have an expert neurosurgeon being part of a global team with the neurologist to evaluate is this a patient who would be a candidate for evaluation.

Now the evaluation is part of, I think, the first step. And each step has potential consequences and potential side effects and complications. And the wide open monitoring with the surface recordings which require large openings, as Dr. Gonzalez-Martinez described the beginning, or really the SEEG electrodes that he really has become a world expert on.

And I went and I saw him in the OR actually yesterday, and I walked in when he was doing one of these cases and I jokingly said, are you nuts? I mean, it's amazing-- I'll say crazy, but in a good way-- but amazing that he's able to do these procedures, placing so many electrodes, which are really important to be able to get to the right diagnosis-- to really target the therapy as best as possible, and do it in a safe manner. And that's something really a master can do. Not everybody can do that and really to push the boundaries.

And the next stage in terms of safety and efficacy. So something is safe and efficacious. Doesn't make any sense if something is efficacious but not very safe. Doesn't make any sense. You really have to be both safe and efficacious in the management, And really be able to target and tailor the treatment to as small of a part of the brain as needed, but as much as necessary to be able to cure the patients.

And the case that he described at the end really brings out some of the very best of the best of what we have to offer that UPMC. We have leading epilepsy surgeons and leading endoscopic skull-based surgeons. And when he and Dr. Gardner, who presented that in a prior version of this series, got together, they really developed a new way. He's really minimizing the impact that this-- really developed a new way to treat these patients in a more efficient and effective manner.

So wanted to put into context really the huge impact that he's had on the field. And I look forward to many, many years of a partnership and in working together. So I just wanted to make those comments to help put this into context. But Justin, why don't you go ahead with the questions?

JUSTIN MEYER: OK. Thank you, Dr. Friedlander and Dr. Gonzalez-Martinez. We have a number of questions, so we'll try and get to as many as we can here. The first one-- RNS is supposed to be for 18 and older. Do you think 12 years old is too young?

JORGE GONZALEZ-MARTINEZ: No. I don't think it's too young. Again, this is-- the RNS-- the FDA labeling is for age 18 years old or older, because it was tested in the adult population. And this is the permission that we have for the FDA.

We can definitely apply RNS technology to younger, or to teenagers. Definitely it's possible. It's an off-label use, but I don't see-- I think the principles are the same. As long as we give a good indication for RNS, I think definitely it's a possibility. It's an off-label use, but I do believe it's a safe procedure to be done in younger patients.

Again, just to clarify, RNS is a treatment, which is a brain pacemaker. It's a device that records seizures and stimulates the brain in the same region. And it's designed for patients that are not candidates for resection-- for resective surgery for whatever reason. Because perhaps those patients they have multifocal epilepsy. Perhaps the areas that we need to treat are areas that we consider to be highly eloquent, and resections cannot be done.

And the reason for that is that always resection will provide us with better seizure outcomes in comparison with any neuromodulatory procedure. So we want to make sure that those patients will be-- are not candidates for conventional surgery in order to indicate those patients for RNS or other types of neuromodulation.

That's why I think what Dr. Friedlander said in the beginning a few minutes ago is so important. Again, epilepsy surgery is not only the technique of implanting a device or performing a resection, but it's a whole group that comes-- it's a complex process that comes all the way from the right diagnosis to the right medical treatment again, and for the right indications for the correct procedures for that particular patient. So it's important to have a very comprehensive evaluation for those patients before, for example, RNS or any sort of treatment is indicated.

JUSTIN MEYER: All right. Thank you. Is spasticity a common effect after resection? When spasticity occurs after resection, is it temporary? Would post-resection spasticity be treated differently than spasticity from other causes? I'm sorry that's three questions.

JORGE GONZALEZ-MARTINEZ: Right. I'm not sure if I understood the question, but I answered what I understood. Spasticity-- it's not caused by a resection of areas outside the motor system. So in general, when you have seizures coming from motor areas, there will be a very clear consent and discussion with the family to balance the risks of the procedure versus the chances for this patient should become seizure free.

Unfortunately for many patients that they have rolandic epilepsy, surgery is an option, because the seizures are so debilitating that they prefer to have a neurological deficit instead of having seizures. And these neurological deficits will cause the spasticity with time. But in general, epilepsy surgery-- the short answer is in general it will not cause a spasticity.

JUSTIN MEYER: OK. Thank you. How can we clear up misconceptions of functional neurosurgery so that patients do not delay seeking treatment?

JORGE GONZALEZ-MARTINEZ: Yeah. That's a very, very important question. Again, and I think there are a couple of papers. And for example, last year we only operate 18% of our patients-- candidates for epilepsy surgery in the country-- in the United States. And perhaps this number is much more drastic.

So we still have 80% or more than 80% of patients there are candidates for epilepsy surgery that are not referred for an epilepsy center to perform surgery. And the misconceptions are from the reasons that I just explained. The perception that perhaps seizure surgery is too morbid. The conception that the patient will be sent to a tertiary epilepsy center, and this patient will require surgery, and this surgery will come with some sort of complication, because epilepsy surgery has been perceived as highly morbid. As you can see here, that's why it's important, first of all, to educate our primary care physicians, educate our patients, our neurologists to show to them that there are many, many alternatives to highly morbid large procedures.

And those alternatives, they come from medications that can provide better control to procedures that can provide much more less invasive procedures that can provide optimal seizure outcomes. Again, this is an education to indicate that epilepsy surgery is not as invasive as before. It will provide higher access for patients to come to a epilepsy centers to perform operations.

I just want to also highlight that it's very easy for primary care physicians to provide medications, and there are more than 20, 30, 40 different types of anti-epileptic medications. And those patients-- they can keep giving medications to those patients almost for the entire life without always going to a new medication. So it's important to understand that this is very, very clear data that we have in our literature saying that after a patient fails a second medication trial, the chances that this patient will have to become seizure free with a third or fourth medication are much less than the chances for these complications to have a complication of those patients who have a complication because of this medication.

So in general, we consider that after patients fail two or three medications, those patients should be referred to a tertiary epilepsy center for consideration for surgery. And I think this idea and concept is not so clear in our community.

JUSTIN MEYER: Thank you. Can you talk about some of the other conditions that can be treated by functional neurosurgery?

JORGE GONZALEZ-MARTINEZ: So functional surgery is a very broad sub-specialty in neurosurgery. We can have the treatment of medically fractured Parkinson's disease with abnormal movement disorders. For example, Parkinson's disease, essential tremor. Also spasticity, psychiatric disorders like OCD and depression. So there is a whole multitude of different types of pathology-- pain, and of course epilepsy-- that can be treated by functional surgeons.

JUSTIN MEYER: OK. In your time spent at UPMC in Pitt so far, what have you found to be the most special and unique?

JORGE GONZALEZ-MARTINEZ: Again what attracted me to UPMC-- and I found this to be true, so I'm very glad for my decision-- was this combination of a very busy clinical practice with high clinical expertise in combination with a world-class University attached to it. It makes the whole difference. In order to develop epilepsy surgery in my case-- in my particularly selfish case, in order to perform the research that I'm trying to perform in order to minimize the morbidity in order to make surgery more precise, and perhaps as a dream one day we don't need to do epilepsy surgery anymore for those patients.

There is no way to advance the field if not in a system like this one, when you have a busy clinical practice with experts in various sub-specialties, and also to have an association with a very high prominent neuroscience and medical school system here next door. It's very, very integrated, and I can say that there are very few examples in the country that I can see this integrated system when you have a very hard core clinical practice associated with a hard core research institution. So this is very unique from UPMC, University of Pittsburgh in my view.

Just an example, I was amazed to see how quick we developed this collaboration with a scholar based system-- with a scholar based group to develop this completely new approach that we could take this in a very rapidly translational way from our anatomical lab to the operating room, because of the expertise of our clinical teams, and also because of the facilities that we have here-- the microsurgical lab, and the possibility of performing different type of research. For example, high definition fiber tracking-- this is a combination that makes the translation of any surgical approach much faster and much more secure. And so this is very unique from this institution. That's why I came here.

JUSTIN MEYER: Thank you along those same lines of academics, do you need a background in physics to be a good functional neurosurgeon?

JORGE GONZALEZ-MARTINEZ: You don't. I don't have any background in physics. I think the only background that you need to have is fundamentally to love what you do and to understand what are your weaknesses. And if your research involves physics, you can learn physics. You can learn the methods. You can really push and reinvent yourself.

I think the driving force here is the passion that you need to have for things that you do. And this will drive you to learn things that you didn't know in the past. So to me, it was important to learn anatomy for the things that I do. It was important to learn electrophysiology, and I never did any special course. I just learned by discussing with my colleagues and the people that truly helped me in my career.

So you don't need to have any specific skills to be a functional surgeon. You need to really have passion for it, and then you reinvent yourself.

JUSTIN MEYER: Excellent. Thank you. I'm a donor to the department. How do you do donations help your research?

JORGE GONZALEZ-MARTINEZ: Donations are a critical portion of any research. And of course, we do have federal grants and federal money from our research. But of course research projects like the virtual brain projects-- that the trans-maxillary approach will benefit from any sort of donation so we can support our staff.

We can support the techniques and the personnel and the fellows and the residents that are interested in helping us with those projects. So again, it's fundamental. I think this is one of the wonderful things that we can have in this country, is that we have wonderful and generous people that we donate for science, and we can do wonderful things with that.

JUSTIN MEYER: Thank you I am from out of town and would like to be evaluated by you. Are you accepting new patients?

JORGE GONZALEZ-MARTINEZ: Of course. Yeah. New patients-- you have my contact at the website, I believe, at UPMC. And please reach out to us. We are completely open for new patients.

JUSTIN MEYER: OK, great. This is probably coming from one of your colleagues back in Cleveland. Steelers or Browns? Maybe your most difficult question today, doctor. Be careful with this one.

JORGE GONZALEZ-MARTINEZ: Yeah, I need to be careful, but I will be sincere with you.

ROBERT FRIEDLANDER: I think we should-- I think we should cut you off and this is the end of the interview right now.

JORGE GONZALEZ-MARTINEZ: That's right.

[INTERPOSING VOICES]

I'm not a football fan. I didn't grow up in this country, as you notice, so football is not in my heart. But I got interested by the enthusiasm for some people from Cleveland and also from Pittsburgh. Of course in Cleveland we are very into the Browns, and there is this rivalry between the Browns and the Steelers. And I like to tease my colleagues over here-- my partners in the OR wearing like a Browns mask in UPMC to see their reactions. And people, sometimes they get funny, and sometimes they don't.

But what I really enjoy and I really was amazed to see is the passion that people from this town have for their football team. And I think this is-- it's lovely to see. This is part of the tradition of the city. And I understand that, and I respect it. The same way I have our traditions, perhaps, with my family to have always Sundays to have lunch with my family. Perhaps people-- we have the tradition here to go to the Steelers Stadium and to watch a football match. And this takes you to a family. So I respect the passion that this town has for their sports teams, and of course the Steelers. So I respect that.

JUSTIN MEYER: Good answer, Doctor. You are an M.D. PhD. How did you choose that path of study, and what are the benefits of it?

JORGE GONZALEZ-MARTINEZ: I was lucky to have good mentors who guided me into this path. The M.D. was easy for me. For whatever reason, I always liked the science of medicine. I always from the beginning liked anatomy and neuroanatomy and that's what took me to the neuroscience. When I was a second-year medical student, I went to a neurophysiology lab that was implanting electrodes in rats' brains to study the sleep cycles in rodents. And I stayed in that lab for 4 years.

I had such a great-- I was very lucky to have my mentor who told me no, Jorge, I think you did enough of your research that we can put you on the PhD program. And perhaps you can use this data for your PhD, and that's what I did. I never had this vision, but he did. He had this vision. So again, I just want to recognize how mentors are important, especially in educational institutions like our institution.

We can treat one patient. I can treat 10 patients. I can treat 1,000 patients in my lifespan, but if I teach and mentor and educate our residents and fellows, I can exponentially expand this knowledge and treat tenfold the number of patients that I can by myself. So that's why I think I truly believe mentorship is something that is extremely, extremely important in our field.

JUSTIN MEYER: OK. Thank you. I really like this question-- what do you want your patients to know about you?

JORGE GONZALEZ-MARTINEZ: To know about me, I want them to know that I really love what I do. And that there is a much broader mission to this career, and that I would do everything that I can to make their procedure and their life better. And that's my passion. That's what I wanted them to know.

JUSTIN MEYER: Excellent. I think we have maybe room for one more question here, and then we're going to throw it back to Dr. Friedlander. For patients who have a family history of epilepsy, how is the genetic connection being studied?

JORGE GONZALEZ-MARTINEZ: Yeah, this is a very good question. And again, most of epilepsies are not genetic. Most of the epilepsies that we see-- they don't have a genetic basis on it, at least what we know at this point. Of course, the future can bring new data. But so far, this is what we know.

There are genetic syndromes that can cause epilepsy, and those are very, very specific families, and very specific diseases and syndromes. But they are much less frequent than the normal genetic basis for epilepsy.

JUSTIN MEYER: OK, I'm going to ask you one more question that just came in. Why do some patients respond to medications and some do not?

JORGE GONZALEZ-MARTINEZ: There is, I think perhaps to be cliche here, the $1 billion question that we are all looking for. What makes a patient respond to medications and other patients not? We don't know that. Because if we knew that, and this is what we are looking for and to understand, that perhaps we can improve the medical treatment for those patients, and in the future, stop doing SEEGs and stop doing surgeries. And perhaps they can stop everybody's seizures with just a pill-- a medication.

In order to understand that, I think we need to go back to the lab. We need to do a lot of research and basic science and to understand what are the differences in the epileptogenicity mechanisms related to patients that respond to medication versus those patients that don't. We don't know that yet, but that's something that I think a lot of groups are looking for very, very aggressively at this point.

JUSTIN MEYER: OK. Thank you again, Dr. Jorge Gonzales-Martinez. I'm going to throw it back to Dr. Friedlander here.

ROBERT FRIEDLANDER: All right. Well, thank you. And I want to make sure that our audience really realizes what a treat you've all had today with Dr. Gonzalez-Martinez.

I wanted to draw a corollary in one aspect that I mentioned at the beginning regarding COVID. So with COVID, people are suffering consequences by not being evaluated-- by being worried about coming to the hospital. And the same thing is happening with epilepsy, because there are so many patients with epilepsy that are being treated with drugs for epilepsy, some more successfully than others, as was just addressed. By drugs also have consequences, and everything that we do has as a risk and a benefit equation to it.

There's been this stigma about surgery for epilepsy-- that it's risky, and it's so invasive, and it's a last ditch effort, or really it's something that people would not consider. And what I would urge both patients and families taking care of patients with epilepsy, as well as their primary care doctors or neurologist-- to seek the advice and evaluation of an expert team, as Dr. Gonzalez-Martinez said. Obviously, he's an expert on the epilepsy surgery side. We have really a gifted group of phenomenal epilepsy neurologists. Dr. Patrick Chauvel, really probably the world's preeminent epileptologist is joining us in August.

And it's really important to be evaluated. Being evaluated doesn't mean to have surgery, but being evaluated means to really understand from the experts what are the potential risks and benefits of having this procedure. Epilepsy really is a life-altering disability, and if something can be done to alter the natural history of the disease and cure it, as he's able to do in many cases, is something that needs to be evaluated.

Again, I urge everybody to seek an evaluation by an expert. And evaluation doesn't mean surgery, but then you are able to really evaluate everything. Another important point that he talked about-- he said he was lucky of meeting some people at different events in his life, and this is serendipity. It's how do you go and you make the most out of events, and you just have to want to help people, which is what he talked about-- the love that people in our department have. I am incredibly fortunate to be able to work with what in my mind are the world-leading neurosurgeons from many, many different sub-specialties, which have spoken and will continue to talk in the future sessions of the series.

So again, thank you Dr. Gonzalez-Martinez for providing the really great summary in a way that a lot of people can understand and push forward. And we want to make sure that we push the capabilities of UPMC to the region, the nation, and the world. So many people come and seek our help. People travel to Pittsburgh to see us. I know more in the pre-COVID era but they will continue to do, and they're actually starting to do that, given how safe it is to come here. I want to thank everybody for joining us, and we'll see you again then next week.