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Residents In a Room
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VOICE OVER:

This is Residents in a Room, an official podcast of the American Society of Anesthesiologists, where we go behind the scenes to explore the world from the point of view of anesthesiology residents.

If we combine all these advancements, the culmination of these advancements is the contemporary anesthesia machine.

As we get more advanced technology, we're trying to get better with safety as well.

If we were to have these systems in place, I'm pretty sure most of us would feel rather uncomfortable.

I'm like, Oh, this is like the beginning of the end.

I'm not afraid of robots taking our jobs for a couple of reasons.

DR. DILLON TINEVEZ (HOST):

Hi and welcome to Residents in a Room, the podcast for residents by residents. I'm your host for this episode, Dr. Dillon Tinevez, Chief Resident and PGY4 at Advocate, Illinois Masonic Medical Center. Today, we're going to put the history of our specialty under a lens to consider the many ways anesthesiology has changed from the past to the present. In this episode, we'll focus on technological changes. We'll pick the conversation up next month to dig into human changes. But of course, I can't do this alone, so let's meet our guests.

DR. SHYAM DESAI:

I'm Shyam Desai, I'm a CA1 at Rush.

DR. MIKE PETRAVICK:

I'm Mike Petravick, a CA3 at Rush.

DR. JANHAVI DHARGALKER:

I'm Janhavi Dhargalkar, intern from Advocate Illinois Masonic.

DR. ARTUSH GRIGORYAN:

I am Artush Grigoryan. I'm a CA1 resident at Masonic Medical Center.

DR. KANNAN ARAVAGIRI:

And I'm Kannan Aravagiri, PGY1 at Advocate Illinois.

DR. TINEVEZ:

All right, let's get into it. First question. Late 19th century advances in pharmacology and physiology led to the development of general anesthesia and the ability to control pain. The very word anesthesia was coined by Oliver Wendell Holmes in the nineteen eighties from the Greek words without sensation. And of course, in the 20th century, the safety and efficacy of anesthesia was made safer, with improvements in airway management, monitoring, anesthetic techniques, tracheal intubation, and other advancements. It's easy to take for granted how quickly the specialty has evolved and how enormous its impact on public health has been.

So let's start with the big picture. What kind of technological changes come to mind when we think about how the specialty of anesthesiology has evolved? What advancements, discoveries and inventions do you think have made the most significant impact? Artush?

DR. GRIGORYAN:

Ok. So I think there are a lot of technological advancements that made modern and anesthesia possible. But the main technological changes that come to my mind include some advancements in pharmaceutical agents that we use,, methods of their administration to the patients, and subsequent monitoring. So modern pharmaceutical agents such as sevoflurane, desflurane, isoflourane and their delivery to specific vaporizers enhance the administration of inhalational anesthesia.

And additionally, I.V. anesthetics, propofol, ketamine and analgesics like modern opioids, they also enhance the delivery of intravenous anesthesia.

And with respects to methods of administration, the invention of masks, endotracheal tubes or specialty tubes, they made it possible to deliver the previously mentioned inhaled anesthetics, whereas the invention of intravenous needles, catheters, infusion pumps, newer target controlled smart infusion pumps use that speed algorithms. They have come a long way from using good squeals and pork bladders for IV injections.

And lastly, about monitoring multi-wavelength gas analyzers made it possible to measure inhaled exhaled anesthetic gases, carbon dioxide levels and paramagnetic oxygen analyzers. They made it possible to measure, inhale and exhale oxygen concentrations, or the invention of Wheatstone, which made it possible to digitally measure invasive blood pressure through A line transducers or the anesthetic gas pressure, airway pressures, breathing circuit pressures.

And if we combine all these advancements, the culmination of these advancements is the contemporary anesthesia machine, which is now used to safely administer anesthesia.

DR. TINEVEZ:

That was a fantastic answer.

DR. ARAVAGIRI:

That was so beautiful.

DR. TINEVEZ:

I agree with you. I think as anesthesiologists, you know, essentially for the most part of what we do, we monitor patients. We do other things. We put them to sleep and intubate them and all that other stuff. But for the most part, ninety five percent of our time is really just monitoring patients under anesthesia. So I think that's been the most important technological advances in anesthesiology.

And after nineteen eighty five, when the ASA recommended five standard monitors for all patients under general anesthesia, the amount of complications declined significantly. So I think monitors are probably one of the most important things that we use in anesthesia, and a lot of the technological changes have been increasing or advancing the technology with those monitors, right? So now we have the ClearSight

system, for example, we have a tiny little blood pressure cuff on the tip of a finger that can show us what second by second blood pressures. We can gather data that you would find on a flow track that used to be invasive. Now we can get it just off of pressure readings and software that's been developed. So yeah, monitors.

DR. PETRAVICK

I think some even more recent advancements in the past 10 to 20 years using ultrasound that before when you had to landmark base or do buy nerve stimulator for nerve blocks, we can now use ultrasound to more precisely pinpoint where to go to use less medication or blocks very effectively. So things that improve patient safety by giving less, giving less is appropriate in a more direct targeted way really makes a difference. And then being able to use ultrasound for point of care ultrasound where before you may have gone to do other imaging, we can use more real time, which can only only improve patient safety.

DR. DESAI:

Yeah, I totally agree with all of these. And I think that kind of the big picture here is that as we get more advanced technology, we're trying to get better with safety as well. So with, for example, invasive non-invasive monitors, obviously we're able to safely administer anesthetics. But I think another huge technological advance over the last couple decades is just having electronic medical records to be able to kind of preop for patients, but also see what things have been done in the past, what we're getting ourselves into when we're going to the O.R. And with the advancement of being able to see records from all over the country, it's definitely made administering anesthetics a lot safer as well.

DR. TINEVEZ:

All right. I think we can jump to the second question. We all know that the practice of anesthesia involves making rapid decisions in critical moments. And we all want to get it right every time. Anesthesia Information Management Systems and Clinical Decision Support Systems digitize and organize information so we can better monitor patients. These tools have shaped our practice. But how much? I'm wondering how you view and use these tools. Do they inform, support or drive the decisions you make? If they disappeared tomorrow? Would you feel safe doing what we do start with? Let's start with Dr. Janhavi.

DR. DHARGALKER:

Sure. So from my perspective, I think Anesthesia Information Management Systems, or AIMS as they're somewhat shortened to be known as, they're sophisticated pieces of hardware and software technology that provides solutions to us providers in real time. These are almost hardwired into the electronic health record itself, and it can provide valuable feedback to a clinician in moments of importance when they're making rapid decisions.

The real power, however, of such systems is to analyze data and to detect ongoing clinical issues or deviations, and prompt alerts to help guide best practice protocols. If we weren't to have these systems in place, I'm pretty sure most of us would feel rather uncomfortable, and if not, highly, it would be unsafe to perform a lot of our procedures. In fact, most of these systems are now geared to make sure that we follow protocol to the T and they are resulted so as to make sure that everything is standardized from the minute the patient is under induction to maintenance and the activation of the patient.

DR. TINEVEZ:

Do any of you feel like the notifications for having a redose anesef every three hours is annoying? Do you experience any-

DR. GRIGORYAN:

I think that one is helpful.

DR. TINEVEZ:

That one is helpful.

DR. ARAVAGIRI:

Whoops.

DR. TINEVEZ:

How about the temperature being under thirty six degrees centigrade, even though there's nothing we can do about it?

DR. GRIGORYAN:

That's not helpful.

DR. TINEVEZ:

That's not helpful. So sometimes helpful, sometimes not helpful. Do you think you can live without these notifications and alarms?

DR. ARAVAGIRI:

The issue is that, if you take away the safety net, right? So it's like, Oh, I'm getting a notification every five seconds about something. But then you don't have that safety net. It's like, Oh my god, do I remember all of this information? And then something bad happens. You never know, right? So it's always like, Are you willing to take the responsibility of your own personal choice in these critical decisions? Or are you willing to allow yourself the safety net for this other system to take you on this ride? Right?

DR. TINEVEZ:

Do you think anesthesia would be just as safe without these systems in place?

DR. ARAVAGIRI:

I mean, we're always transitioning between the idea of like medicine as an art versus a science, right? At some point, it is a science in the sense that we need to have these protocols that allow us to do our work safely, effectively, and to have these safeguards for us. But like, back in the day, it was kind of just like there is a science behind it. But at the same time, it was a lot of personal decision making that changed the outcome. And now it's like we're having these protocols and safety measures to make sure we deliver anesthesia effectively and safely throughout everybody equally.

DR. TINEVEZ:

Great answer. All right. Let's jump to the next question. Let's talk mobile, because let's face it, apps have changed our lives in a lot of different ways. But how are you using mobile apps as an anesthesiology resident? Any apps you'd refer to your colleagues or our listeners? I know we all look through our phones to see what apps we had, and we all wrote them down. So let's go. Let's start your top three apps.

DR. ARAVAGIRI:

My top three?

DR. TINEVEZ:

Yeah, everyone's top three.

DR. ARAVAGIRI:

Yeah, besides the ones I use all the time, which is like epic or the paging system....

DR. TINEVEZ:

No, those count.

DR. ARAVAGIRI:

Those count? Ok, cool.

DR. TINEVEZ:

Those are apps. So EMR on your app.

DR. ARAVAGIRI:

I have the EMR in my app. I have up to date and I also have MD calc.

DR. TINEVEZ:

Ok, stole a couple of mine.

DR. ARAVAGIRI:

As a PGY1, Right?

DR. TINEVEZ:

Right. How about you, Dr. Grigoryan?

DR. GRIGORYAN:

I also use MD calc and epic, of course, and also ... for pediatric doses or airway equipment sizes. I use itiva for intravenous anesthesia. Nysora nerve blocks. The one that's my favorite is the train of four app that we can monitor train of four ratio without bumps.

DR. TINEVEZ:

How does that work?

DR. GRIGORYAN:

That's based on the accelerometers that are built in our smartphones. And if you just put your phone in patient palms and you just use your peripheral nerve stimulator to stimulate that other nerve, and it records the twitches and then it subsequently calculates train of four ratio.

DR. TINEVEZ:

You have combine something with it? Or, put it on the patient's face?

DR. GRIGORYAN:

No, the accelerometer is built into a smartphone.

DR. ARAVAGIRI:

That's pretty dope.

DR. DHARGALKER:

That's amazing.

DR. TINEVEZ:

Don't think I've heard that because I've never seen that. Not that I use nerve monitors much anyways.

DR. DHARGALKAR:

Yeah, yeah. I think starting with the electronic medical record app, the epic app got. It's good to have for interns. But there's a new app I found, I think it was called the Anesthesiologist app, and I guess it, you plug and chug numbers from anywhere from the age of the patient to the weight, their BMI, and it pumps out various airways, the patient's physiology, various medications and dosage ranges from pediatric to adult

induction agents, everything you might need from at your fingertips. So I'm really excited to utilize this next year.

DR. TINEVEZ:

I'm curious to see what you have to say because when I was a junior resident, I had a whole bunch of apps, and now that I'm almost done, I don't use any.

DR. PETRAVICK:

Yeah, I really like the asra coags app. That's useful for not just the standard anticoagulants you see patients on, but as new ones come out. It's being updated with those. So if you encounter an anticoagulant that you haven't seen before, we can tell you how long it needs to be held before any regional anesthesia has guidelines for both neuraxial and for peripheral nerve blocks. So I think that one's really useful as we develop newer and newer drugs.

But then also there's one Block Buddy Pro, just a lot of information about idealized pictures of different blocks, and they have a wide variety of them on there, so I find those to be very useful.

DR. TINEVEZ:

Alright, your top three apps?

DR. DESAI:

I would have to agree that probably epic is the one that I use the most, but kind of mirroring off Mike my asra coags app, often, especially when patients are on anticoagulants you don't see all the time, doing visual catheters and things like that. But another app that I use pretty frequently, that many may have used in medical school is Tompkin, just to keep up with random facts that I may forget not only for exams, but also for practical use, keeping up to date on dosing of medications and drugs and things like that.

DR. PETRAVICK:

One more that, while not standard medical app is doing pediatrics, a YouTube to play requested videos or music for kids in pre-op and as we're heading back to the O.R. is a great way to help help to calm them down is to give them whatever they would like to listen to.

DR. ARAVAGIRI:

What do you play?

DR. PETRAVICK:

Whatever the kid asks for.

DR. ARAVAGIRI:

Whatever the kid asks for?

DR. PETRAVICK:

Whatever the kid asks for, yeah.

DR. TINEVEZ:

I think that a ketamine dart works better.

DR. DESAI:

It's also useful for patients who are just super anxious. Background music, especially for regional blocks where you're not administering anesthetic.

DR. TINEVEZ:

Never done that. Yeah, that's a good idea. It's a great idea. Let them play their own music while you do the block. All right. So let's move on telemedicine and wearable health care technology or examples of products in the consumer space being adapted for use in preoperative exams, ICU care, intraoperative monitoring, and post-operative assessments. They even impact our ability to collect patient data. And as a practical matter, the pandemic made telehealth more accessible for many Americans. Do you use telemedicine or wearable technology in your job now? If so, how? And if not, do you want to? And where is this all going?

Me, at our hospital, we do telemedicine really only for preoperative exams and our clinic. So we used to do half of them on the phone and half of them would come in to the clinic. But now they're either on Zoom, Microsoft Teams or. So we've gone

completely 100 percent telemedicine now. Essentially, that's all we use it for currently. How about you guys?

DR. DESAI:

I would agree that that's definitely an area that we use it. But also in our chronic pain clinic, other than that, there's always a patient that shows up to pre-op and ask them if they have any problems with their heart, and they're like, No, my Apple Watch tells me that.

DR. TINEVEZ:

There's your wearable technology right there. That's that's the second question. Does anyone have any examples of wearable technology? Again, all I could think of was my Apple Watch.

DR. AVAGIRI:

Yeah, different forms of that Fitbit Apple Watch smartwatch.

DR. TINEVEZ:

Yeah.

DR. DESAI:

I think those are actually really useful, especially if you're trying to figure out nets for others.

DR. TINEVEZ:

Have you ever put your Apple Watch on a patient to see if they were a-fib? I have done that twice.

DR. AVAGIRI:

Really?

DR. TINEVEZ:

Yeah.

DR. DESAI:

Has it worked?

DR. TINEVEZ:

It worked. It's FDA approved to detect it. So, you know, the teli monitors we have sometimes are garbage. So I've done that. It works.

DR. PETRAVICK:

For telemedicine or at least a change in technology being able to use video interpreters on an iPad for a patient. I find most them find that much easier to use than trying to use a call on your cell phone to a phone interpreter, which is good when you need to use that. But having them on an iPhone, patients respond better to that. They have a wide array of languages to choose from. I think patients are more comfortable when there's somebody to physically talk.

DR. TINEVEZ:

Now a follow up question for you. What about augmented or virtual reality from the video game industry? You do any of you see any augmented reality being part of anesthesiology anytime soon.

We discussed it yesterday, and we thought that, you know, virtual reality for practicing intubations, practicing lines, practicing neuraxial or regional techniques may be in the future for anesthesiology. What about you guys?

DR. DESAI:

I was reading an article not too long ago, actually augmented reality while placing blind pediatric patients. So I think that in the future, you know, especially with that more advanced ultrasound techniques

DR. TINEVEZ:

Do you think we'll ever have robotic intubations? The Da Vinci intubation? A Billion dollar machine to put things in the throat?

DR. DESAI:

It might take five times as long.

DR. AVAGIRI:
In the future.

DR. GRIGORYAN:

That's actually a very good idea, especially during this pandemic, because it's like a work-related hazard to intubate COVID positive patients. So we were able to have robots that during intubation for us.

DR. TINEVEZ:

There was a team in Beijing that I saw in an article online. They're using Microsoft Kinect sensors. The same thing that you have on the Xbox, where you can sort of play bowling and baseball without a controller and camera just senses your movement. But Kinect, they're using it in ICUs to track patient mobility and seeing how much the patients are moving, how often are they moving? And a lot of data is being collected from that. So that's the one thing I found online for augmented reality in our specialty.

All right, next question. Let's talk about AI. Who harbors secret fears that a robot will take your job one day? Change isn't going to stop today, and the specialty will keep evolving. What do you imagine artificial intelligence will or won't do as the specialty continues to change?

DR. DHARGALKAR:

I think AI has been a very remarkable change in medical practice so far. In fact, it seems like almost until a couple of years ago, the FDA even approved a novel software that can help diagnose diabetic retinopathy based on the images of the fundus. And this was basically done by AI. Currently, from our perspective, in the anesthesia field, it would make sense to maybe have some sort of AI to help us track possibilities of intraoperative hypertension or any alternative drug medication reactions that we could seek out from our patients. I think there's a lot of scope for AI to help improve some of our practices in the OR.

DR. AVAGIRI:

I saw a paper or a research project essentially in cardiac anesthesiology, where they were able to manipulate the blood pressure of a rat to a certain level, and it would just have the AI decide how much fentanyl and how often it would have to give to create that

certain blood pressure for a certain amount of time. And I'm like, Oh, this is like the beginning of the end. You know, it'd be like, we never know the scope of which A.I. and robotics can enable to just increase patient safety, right? It's just determinate of whether technology is better at humans at this practice. Right? That's the final straw.

DR. TINEVEZ:

So what you're talking about is actually closed loop anesthesia delivery systems. None of these have been approved, but there is quite a few studies on this. And the study you're alluding to is actually a randomized control trial done by Puriet... multicenter. And what they looked at was giving propofol and fentanyl to a patient and using a BIS monitor and a machine, or essentially a robot, to detect the BIS monitor and will titrate the propofol and fentanyl to keep that BIS spectral index in a certain range to keep the patient asleep. And when they compared that how the robot does and how they titrate the medications, it turns out to be a lot better than a human doing it. And there's actually been several studies on this. Anyone else have anything?

DR. GRIGORYAN:

Another example would be about neuromuscular monitoring smart infusion pumps. They are integrated with objective neuromuscular monitors, so they monitor to train up for ratio and based on that control, neuromuscular blocker infusion rates. So another example.

DR. TINEVEZ:

Do you think anesthesiology will be almost completely automated in the next few decades?

DR. PETRAVICK:

I will play the contrarian and say, I'm not afraid of robots taking our jobs for a couple of reasons. One, I think we have to remember that we are trained not just to take care of keeping somebody asleep in a case where everything is going smoothly, but also trained to care for patients when emergencies happen. I think that is much harder to automate. Not saying that it can't be done eventually, but I'm not seeing that being done any time soon as I think we were still trained for when emergencies happen. I'd like to see a robot put a line under the drapes. But then also, I think we have to remember we take care of people and people want to talk to somebody that's real. They don't want to just talk to a robot or have somebody say, this robot is going to do your anaesthesia. I think we'll become will integrate technology more and more into our practice to do

what's safest for the patients. We have to remember that it's a lot of, again, not just the science, but part which involves a lot of the human connection. I think they ... have somebody there as a person taking care of them, not just a robot.

DR. GRIGORYAN:

Also, robots can take care of routine things that we're doing, or we can concentrate more on those emergency situations. Take care of the patient now.

DR. AVAGIRI:

Would you say the classical model where it's like anesthesiologist with one patient monitoring throughout and operating at that point? Is that model changing rapidly? And will that change as automation gets more advanced instead of one just has to deal with a full operating just in case something bad happens, right? Is that the go to at that point, or are you saying classic models still sustains with technology?

DR. PETRAVICK:

I think we're already seeing shifts from decades ago where it was one call just for room to enhance the security model, whether it's one anesthesiologist, residents anesthetists or with anesthesia assistants. We're seeing that we are trained for the whole perioperative period, have a team to take care of people. I don't think we'll ever move away from the time where we have an anesthesiologist supervising everything, no matter what else is being being involved.

DR. TINEVEZ:

I certainly think maybe not in the near future, but the distant future we'll have anesthesiologist supervising robots.

Ok, perioperative technology, mobile technology, automation, non-invasive monitoring. Modern anesthesiology is a marvel. It's also inextricably dependent on technology. It's not a stretch to say that technology made anesthesia possible. That made it safe, and it's still making it more efficient and scalable.

Do you think this is truer for anesthesiology than other specialties? And if so, why do you think that is? You think we use technology more than other medical stuff?

DR. GRIGORYAN:

I do think so. So anesthesia is arguably the most acute setting that a patient may enter. And this mandates extreme vigilance, precise monitoring, and timely treatment. As such, to help ensure each action by an anesthesiologist is delivered with precision, technology is required. And I agree with the belief that technology has made our profession more efficient, scalable and safe. When I decided to pursue anesthesiology, and people would ask me what it involves, aside from putting the patient to sleep, I would ask them to imagine that they were not only putting someone to sleep, but also shutting down most of their organ systems and needed to use tools to keep their organs functioning. And this requires an absolute precision in order to execute these actions, and that's why technology plays a critical role in anesthesia.

DR. TINEVEZ:

Anybody else think that we use more technology than other physicians?

DR. AVAGIRI:

Equal.

DR. TINEVEZ:

What about an infectious disease specialist? The technology they use?

DR. AVAGIRI:

They have to use like, I guess technology says that they have their own systems in which they gather knowledge.

DR. TINEVEZ:

Can do their job without modern technology?

DR. DESAI:

I think that we use technology probably more than any other specialty. If you come into the operating room, every second, we're on modern technology, whereas no other specialty because no other specialty does that second by second. So in that perspective, absolutely more than any other specialty.

DR. DHARGALKAR:

Exactly. And I was just going to add to that being highly technical field that's undergone massive changes in over the last 50 years or so. Majority of it is because of these technological changes that we talk about and to discuss this, our ability to work with the technology and also have to improve over the course of the last 50 years or so. And it's almost undeniable that our job is very much become very technical and very driven by machines on a daily basis.

DR. TINEVEZ:

And the data shows that. The more technology or the more technological advancements we see in anesthesiology, the less patients are dying, right?

All right. Is all this change all good? Are there risks? Do you worry about keeping up or do you think the change is such a net positive, any risks or concerns pale by comparison to the benefits?

DR: PETRAVICK:

I think it's important to say that as we introduce these new technologies to do studies to see how much the benefit you have, there is always a cost benefit ratio that we see. The cost of health care in the United States just continues to increase and increase. And we do have new technologies to make drastic changes in people's lives. But we have one that provides a standard of care that equal, or perhaps only slightly better to what we do. Not only is it statistically different, but can we say it makes a comfortable difference as well? And we have to weigh that with how much does this cost do something patients can access and is it crowding out paying for other things that would make an impact on people's lives as well? I don't think you can say that a change is necessarily all good. You have to weigh it against the other factors.

DR. TINEVEZ:

Can anyone give me an example of a technological advancement that didn't really show much benefit

DR. PETRAVICK:

If we are looking at it in the air in general? I was going to use the example of somebody using a robot to take out a gall bladder.

DR. TINEVEZ:

The \$900 upcharge for that.

DR. PETRAVICK:

If only it was \$900. And I just would like to know, is this any better for this one patient? And I know the surgeons will make their arguments. That you just have to be aware is what we're using, making a clinical difference for the patient and it's costing them x more.

DR. TINEVEZ:

Right. And the data for robots is a slightly decreased risk of surgical site infections. That's about it. I was going to say exparel, which that that's very controversial. We're all know the ASA published study showed that it was actually no real benefit for post-op pain with extra costs, 400 times more than generic marcaine. So I don't think there's a whole lot of benefit to that technology. Anything else?

DR. DESAI:

I think that as technology advances get more data operating, it's going to be important to kind of keep a big picture of things get lost. You know, at some point, I think overall there's a net cost.

DR. TINEVEZ:

Okay, now, for the second part of that question, what I really wanted to hear what you guys have to say about this. Do you think older anesthesiologists have a tough time keeping up with the new technology? For example, some of our attendings can't use an ultrasound for the life of them. Half of our cardiac attendings are never trained in transit, esophageal echo and they still have not learned this, but they're doing cardiac. Half of our attendings have troubles charting. They don't even know how to use the EMR. You have to help them all the time. What do you guys think?

DR. PETRAVICK:

I think the natural progression with age, I use the example of when I was a kid Nintendo 64, I laughed at my parents for not being able to play on the mario cart. Now on a Wi, I'm terrible at it, but it's still bigger. N sixty four, as you get older, it can be harder to learn some of these new things that doing thinks our careers where we rely on some of our younger colleagues 30 years from now to help teach us. So I don't think it's a poor reflection on them for something that I think is fairly natural that we'll all have to work,

maintain these skills. I think they trained in a different era and learned to the best of their ability and solid quite good care with the knowledge that they've gained over the years. And it's a shared environment that we have to care for patients. The knowledge they have, the skills that we have on newer technology.

DR. TINEVEZ:

You don't think that the gaming generation and the computer generation, like our generation who grew up with computers and video games are going to adapt a lot quicker than the Boomers did?

DR. PETRAVICK:

We, I think we may adapt to some of the computer-based things, but there will be still get some new technology we did not have.

DR. AVAGIRI:

Isn't our job as physicians to always be on top of our game?

DR. TINEVEZ:

Ideally.

DR. AVAGIRI:

The goal is that our try to be at the forefront of technology in order to keep the patient safe, right? So at what point are we allowed to say, Look, I am worried about technology overtaking what I'm able to do, even just starting out. At what point will I not be able to adapt? And at what point should we be like, Oh, there's no way to adapt? We should be able to change, right? The whole point.

DR DESAI:

I think that to an extent that's true, but it's kind of hard to keep up with things after a certain point in your career, especially if it's me versus an older attending who did not grow up with a computer. For example, I've been using computers since I was, I can't even remember. But so just that much time makes it a lot easier to pick up things that are computer based. So, for example, like things with virtual reality, I've never really mess around too much with virtual reality. But in the future, if our career does

incorporate a lot of virtual reality, I think that that's something that I'll have to put full time to pick up.

DR. TINEVEZ:

The Metaverse is coming for us.

All right, last question. Before we wrap up this episode, if you could step back in time 20 years or 50 years or a hundred years, you think the anesthesiologist of the past relied on different skill sets? And are there skills they employed you wish you had more of? I'm wondering if you think something important is lost with these advances?

DR DHARGALKAR:

Oh, absolutely. I think over a hundred or fifty or so odd years ago and we weren't relying on, say, this monitor to tell you the depth of the anesthesia or trade or anything like that probably rely on your best judgment. Everything that you would need to use and then been taught to word of mouth would have to be applied into real time physiology. I'm sure that involved doctors making a lot of mistakes at the time, but I think you stand on the shoulders of giants. And so we learn a whole lot from their mistakes. But also something that maybe we've lost through the scope of these advances is being able to think without this machinery, without knowing that would we have still come up with the same standardized protocol as we do for patients now, despite the machines alerting and prompting us at every point, no matter how annoying it might get? Would we still count on ourselves to deliver the best possible patient care? Maybe not utilizing so much of technology all the time. I think that's a much harder question. And I don't think any of us would be prepared to sort of go into an O.R. without any of these advances in our arsenal.

DR. TINEVEZ:

I don't think we're at the point yet where we're sort of losing all these skill sets that the older anesthesiologist had. I'd say maybe 15 percent of the time I'd use a video laryngoscope, still 85 percent of the time I'm using direct as they always have since anesthesiology was, I think. Same thing with ultrasound putting in lines. The only thing that I could think of where the skill set is lacking in the skill set is regional anesthesia without an ultrasound. That's the one thing that we always use ultrasound for now. So I wouldn't be able to do an axillary block without an ultrasound. Well, some of these older attendings do this with their eyes closed. What do you guys think?

DR AVAGIRI:

I think just like both of you said, I think back in the day without these kind of monitors and ultrasounds, it's more almost an intimate experience, right? You're trying to understand the human body as much as physically possible without any backup, without ultrasound, without any of this technology we have. And you're just guided by your own knowledge of like probably exploring cadavers, trying to figure out where everything is, like understanding how the person feels at the time.

DR. DESAI:

I agree with and one really big thing with technology is that has provided us a kind of a fallback, even though we use direct laryngoscopy 85 percent of the time, we know that we have bioscope, at least in the building. So just that fallback is really a huge step forward in safety.

DR. TINEVEZ:

All right. Well, thanks, guys. Thanks for listening to Residents in a Room, the podcast for residents by residents. We hope you'll join us again next month. We also hope you will subscribe to residents in a room wherever you get your podcasts.

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