



American Society of
Anesthesiologists™

Central Line

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Episode Title: Postoperative Delirium and Patient Monitoring Take Center Stage with ASA and ACCRAC

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(SOUNDBITE OF MUSIC)

VOICE OVER:

Welcome to ASA's Central Line, the official podcast series of the American Society of Anesthesiologists, edited by Dr. Adam Striker.

DR. ADAM STRIKER:

Hi, I'm Dr. Adam Striker, host of Central Line. Welcome to our special crossover episode. This will be posted on ASA's Central Line as well as on ACCRAC. I think all of our listeners will enjoy this discussion, so let's listen in.

DR. JED WOLPAW:

Hello everyone. I'm Jed Wolpaw and I am so excited to be here live at ASA in San Francisco at the annual meeting. It's always so fun to have this opportunity every year to be here in front of a live audience. Thank you all for coming. I am very, very excited to have two incredible guests with me, and I'm going to introduce them in a minute. But first, I want to say a couple of words of thank you and a couple of announcements.

First, to all of you, let's hear it for being here live so we can try to get that on tape. Thank you so much. We are going to have this recorded and it will be released both on the ACCRAC feed and the ASA Central Line podcast feed. So check it out in the coming weeks or anyone who wasn't able to make it, you can tell them that they'll be able to get it there.

Let me introduce our two amazing guests. And the format for today is going to be this. I will spend about 15 minutes with each of them, and then we're going to open it up to all of you. Please do come to the mic so that we have that on tape and ask any questions of either guest or me that you have.

So first I have with me Dr. Deb Culley. Dr. Culley is the chair of anesthesiology and a professor at the University of Pennsylvania Department of Anesthesiology. She's a neuro anesthesiologist, and she is known across the world for her research on the effect

of anesthesia on cognition. She's done a huge amount of work on this and is really well known and is going to teach us a lot today. She also has a big, probably several, but at least one big talk coming up on Tuesday where she'll talk more about it. She's a former president of our board, the American Board of Anesthesiology, and she's an executive editor of our biggest journal, Anesthesiology. Dr. Culley, welcome to the show.

DR. DEBORAH CULLEY:

Thank you.

DR. WOLPAW:

And I also have with me Dr. John Eichhorn on this side. Dr. Eichhorn, I'm sure everyone knows is really part of the history of our specialty. He was one of the original Anesthesia Patient Safety Foundation leadership, part of the original leadership. He was the founding editor of the APSF. That's the Anesthesia Patient Safety Foundation newsletter, which many of us read all the time. He was a chair of anesthesiology for many years at the University of Mississippi. He finished his career at the University of Kentucky. After that he retired, still very active, obviously, and giving an amazing talk right after this. He was the winner of what has been called the Nobel Prize for Patient safety. That's the Eisenberg Award from the Joint Commission and the National Quality Forum. In 2010, he won the Individual Achievement Award for Patient safety, which is an incredible honor. He was one of the people who, in the 80s, really got us to start monitoring patients continuously in the operating room. Believe it or not, we didn't always do that. It's hard to imagine, but John was one of the people who made that a reality. So John, welcome to the show.

DR. JOHN EICHHORN:

Thank you. Thank you very much.

DR. WOLPAW:

All right. So we're going to start with Dr. Culley and tell us a little bit about you. What you do, whether you like being a chair.

DR. CULLEY:

Oh my gosh I love being a chair. I happen to be very fortunate. I spent 23 years at the Brigham and Women's Hospital, did a number of leadership roles there, and then was recruited to Penn. And if you were to ask me the logical next question, which is, what's

your favorite part about being chair? It's the people. It's the people that you get to help develop and grow. I saw one of my faculty members, Reilly White, standing right over there. They're why I'm here and they're what keeps me going?

DR. WOLPAW:

Fabulous. And I couldn't agree more. For me, seeing some of my residents and my graduates out here is just what makes this such a fun specialty to be in. And my job the best I could imagine. So tell us a little bit about how you got interested in the topic of postoperative delirium.

DR. CULLEY:

Well, it was a little bit of a complicated course. I was a resident MGH a long time ago now, and there was a mountain climber that came in to visit with me, and he said, doc, after I had my last surgery, I couldn't really think for a couple of months later, and that really spun and spun and spun to the point where it evolved into animal studies and then human studies, trying to figure out what we can do to protect the aged brain, in particular from surgery and anesthesia.

DR. WOLPAW:

Such an important thing. And, you know, I watched my father-in-law have a Whipple and have just horrible post-op delirium, and thank goodness he recovered from it. But, you know, that is such a disturbing thing to happen for a patient and family. So this is something we would we should be able to do better, I hope.

So when we talk about post-op delirium, what do we mean? And is that different than post-op cognitive decline?

DR. CULLEY:

Yeah. So that's a really tight, sticky point. And there's a lot of people who are on both sides of the fence. Oftentimes people would say that postoperative delirium is something that's different than neurocognitive disorders in the traditional sense, in that for delirium you see this acute confusional state. They're either hyperactive or hyperactive. We notice the hyperactive ones because they're pulling their lines out. Neurocognitive decline, or the longer term postoperative cognitive decline, is probably related to some preoperative cognitive impairment, interposed, you have an inciting event and you continue to go downhill. But we see the same thing with delirium with

regards to the acuteness of it and the postoperative period. And there's a lot of evidence to suggest that those with baseline cognitive impairment are more likely to be impaired.

DR. WOLPAW:

Yeah. Okay. So that's a major risk factor having preoperative cognitive impairment.

DR. CULLEY:

Yeah.

DR. WOLPAW:

How prevalent is post op delirium?

DR. CULLEY:

Well it depends upon the patient population and the cardiac surgery literature, it's roughly about 50, 60%. If you look at routine older individuals, at least in the Boston area, it's approximately 20 to 25%. But some other areas where there's lower education levels and different demographics, you'll see a higher percentage. The interesting part is that post operative delirium in particular is most often hypoactive delirium. That's the patient that's laying in bed, not paying attention to the world. And that's much more challenging to detect.

DR. WOLPAW:

Yeah. And so we talked about preoperative cognitive impairment as a major risk factor. I'm guessing age is another one. What other risk factors do we think about?

DR. CULLEY:

Yeah, those who have other neurologic diseases seem to have a greater prevalence. But there aren't a lot of big things except frailty. And so it's interesting when you look at a combination of cognitive impairment at baseline and frailty, you can pick up or identify a large percentage of the patients that will develop post operative delirium.

DR. WOLPAW:

Okay. And so maybe just say a couple of words about frailty in case people don't know what that is.

DR. CULLEY:

Oh, frailty. Frailty is a very interesting thing. It basically has to do with you maintain your muscle strength. Do you have appropriate nutrition? Have you lost a lot of weight? And those types of things are just associated with basic poor health. As you get a little bit older and there are a ton of scales that you can use. Some of them in the clinical setting because they're fairly short. And so you don't have to take an hour to do them. Some of them are a little bit longer. They are very good predictors of whether or not you're likely to have some subsequent cognitive deterioration in the form of delirium or post operative cognitive dysfunction.

DR. WOLPAW:

And do you think we should be screening all our patients with a frailty screen or certain ones, or what should we do?

DR. CULLEY:

Yeah. You know, I'm never an all or none kind of a person. And there's always costs associated with everything that we do. So for the frailty, I would suggest for individuals that are 65 years of age and older, you can usually pick them out if you're carefully paying attention, but they surprise you every once in a while. But I don't think that frailty screening alone is enough. I think you need a combination of frailty screening and cognitive screening, and it doesn't have to be a rocket science cognitive screen like a full on neurocognitive testing. You can really use some of these shorter tests to be able to help predict whether or not the patient's likely to have some problems.

DR. WOLPAW:

Well, I'll tell you a fun story. So when I was a resident we had, at UCSF here in San Francisco, we had every year the way we did the kind of quality project for all the residents was we all did one. So we would come up with one project and all the residents would participate. And I ended up being voluntold to be the spokesperson for my year. One year, I don't know what year, maybe my CA3 year. And so we decided we were going to do preoperative cognitive impairment screening, and then we were going to try to do that for all our patients. And we decided to use, and I don't remember exactly how we landed on this, but the animal fluency test. And that is as simple as having a patient name as many animals as they can in one minute. And there was a cut off. And if they scored below a certain number, then that sort of screened them in for cognitive impairment. Is that a good one?

DR. CULLEY:

Well, there's no perfect one. There are a ton of cognitive screening tests, and every single one of those cognitive screening tests has some positives and negatives. So for verbal fluency, it works really well. It's not going to ever work really well for me because my daughter in law's a zookeeper. And so I will in my brain go through the entirety of Sedgwick Zoo every time somebody asks me about that. For other people who might not have that same background, it probably works pretty well.

And you don't want to label somebody as cognitively impaired. We put kind of call it probably cognitively impaired because you're just using a simple screening test. You can let them know that it puts them at higher risk, but you really don't want to tell somebody that they have cognitive impairment when you don't actually know that they do, in particular in a busy, stressful environment.

DR. WOLPAW:

Great. Okay. Now what causes it? Is it anesthesia? Is it surgery? Do we know?

DR. CULLEY:

I don't think we know. But I'm suspicious that we have less to do with it than we think. And part of that has to go back to the mountain climber. He had climbed Mount Everest on a number of occasions, and chance has it he had some degree of baseline cognitive impairment or cognitive injury or brain injury as a result of all of that. So if I were to guess, and we still don't know the 100% the answer to it, although we're continuing to look into it, it's going to have more to do with that patient's baseline brain, as well as the rest of their organ systems that is going to predispose them to those adverse outcomes.

DR. WOLPAW:

So they have some baseline risk from prior injury, whatever it may be. And then something -- the anesthesia, the surgery, some combination -- kind of is an additional insult and sets them off.

DR. CULLEY:

Yeah.

DR. WOLPAW:

Okay. Now what if anything can we do to prevent it? Let's say we have someone they need surgery. It's not elective and they're high risk. Maybe they're older. They've got some preoperative cognitive impairment. What, if anything, can we do to kind of optimize their their chances of not getting this? Yeah.

DR. CULLEY:

You know, it's going to be provide the best medical care that you can. And that sounds trivial. But providing really good medical care as well as anesthetic care is going to be important. So the basic things we all know about: maintain blood pressure, maintain oxygenation. There's a growing body of literature though that's really interesting. And that is EEG monitoring in the perioperative space. And it's not perfect because we've got all of these different monitors that can be used. But what people have found, and when you're taking care of patients, you probably see this too -- all of a sudden, you give a relatively low dose of whatever anesthetic you're going to give, and that older person's value hits the floor. And it doesn't come back up. You're continuously turning it down, turning it down, turning it down. And they're such a fine line between being asleep and being in burst suppression. And I think that that's probably the best marker that we have right now.

DR. WOLPAW:

Interesting. And so would you advocate for more use of EEG monitoring?

DR. CULLEY:

Well, I'll tell you what I do. If I have an older patient who's coming to the operating room, I don't even care whether or not I know that they've got baseline cognitive impairment. I will put BIS on them, try to titrate it, to get it to where it's supposed to be. It's way harder than you might think, especially if they've got a brain that isn't working so well and then just recognize this is going to be a patient that's probably going to have more cognitive deficits than somebody who didn't have burst suppression as a result of a normal dose of an anesthetic.

DR. WOLPAW:

Okay. And when you're using the BIS, are you going off the number? Are you looking at the waveform? Both.

DR. CULLEY:

I have a tendency to look at the waveform not because I'm an expert at it, but oftentimes the numbers that are reflected there are not indicative of what you actually see on the screen with regards to the aged brain.

DR. WOLPAW:

You know, I'm not can't tell you I've seen it, but I've heard of the study of anesthesiologists who got just rocuronium and their BIS number went down to the 40s.

DR. CULLEY:

Yes, yes.

DR. WOLPAW:

Yeah, well, that is striking and clearly not what we want to do with patients.

DR. CULLEY:

Right.

DR. WOLPAW:

All right. So what do you think? If you had a crystal ball and you're looking into the future, what does the future hold for this? Are we going to do better? What might be on the horizon?

DR. CULLEY:

Well, I think we're going to try to work towards identifying people a little bit earlier. I've seen some studies here today at the ASA, looking at things like either bis monitoring or cerebral oxygenation and how that might affect it. So I think we're going to try to do a little bit better job to identify those patients that are at risk. The other things that we can do though, is that good medical care, and it's not just our anesthetic care, maybe we could think about putting them into special wards. Don't like that term, but in essence, special rooms where you're not doing the crazy things that we do all night to people in the hospital, like take their blood pressure every 15 minutes when they really might not need their blood pressure taken every 15 minutes. Turn the lights down so that the patients can sleep. Do those normal non-pharmacologic things that we can to help improve their sleep which seems to help.

DR. WOLPAW:

Great. All right. Thank you so much, Deb.

DR. CULLEY:

Thank you.

DR. WOLPAW:

We're going to turn to John. Dr. Eichhorn, tell me a little bit about you, kind of what you're doing these days, and we'll start there.

DR. EICHHORN:

Well, as you pointed out correctly, I retired clinically about five years ago. And so I'm paying attention to family. I work with the APSF routinely. I've enjoyed retirement. The pandemic changed everything, and all the great plans are yet to be realized. But we'll get there.

DR. WOLPAW:

Great. So when did your career start? When did you graduate residency.

DR. EICHHORN:

1979.

DR. WOLPAW:

1979. That's the year I was born. All right. So am I correct that when you started, when you were a resident, we were not continuously monitoring patients in the operating room?

DR. EICHHORN:

No, not at all. That's actually a big part of the story because the standard is very colloquially. When I first started training, where every five minutes you would do the circle, you look at everything all the way around, every five minutes, takes on the record, and then you're done for the next four minutes. That was standard and that was

routine. And unfortunately, as played out a lot, that was not adequate. And we, through the long process of serendipitous coincidences that led to the committee that I chaired that created the Harvard standards, we realized that the absence of genuinely continuous monitoring was the core of the problem, and that that was the reason that the concept of safety monitoring, as I like to call it, was born to change the paradigm, change the idea about what was required of the anesthesia professional in the operating room.

DR. WOLPAW:

It's easy for us now to think. I can't imagine, I can't imagine. And when you say every five minutes, you don't mean you looked up at the monitors because there weren't any, right? You mean you manually took a blood pressure.

DR. EICHHORN:

And I had an earpiece stethoscope connected to either a precordial stethoscope or esophageal stethoscope. And as far as oxygenation is concerned, if you could see the patient's hand in a Caucasian patient, that was helpful. But the best thing to do is stand up and see if you could see blood in the surgical field to see what color it was. I mean, that was before pulse oximetry, obviously, but that's what it was. And unfortunately there are many, many, many stories about developing cyanosis that was not appreciated until it was much too late. And the downward so-called, what I like to call the toilet bowl spiral. When you get decreased cardiac output, decreased myocardial perfusion and ischemia, and it gets worse and worse and worse and you can't get it back. So the concept of genuinely continuous monitoring. And it took a while to get there because people don't understand this. In the original Harvard standards -- and I can explain how we sort of got there -- but the idea that monitoring ventilation and monitoring oxygenation was required. But in 1985, the profession was not yet ready for mandatory capnography or pulse oximetry. So there was a agitation, even in our committee that wrote the standards to make pulse oximetry mandatory in 1985. But we realized the profession wasn't quite ready for that, and the technology wasn't quite accepted well enough. It was really starting to get popular in 84, and it wasn't until the end of the 80s that both ultimately pulse oximetry first, and then capnography became mandatory part of the ASA standards for basic monitoring. So it's a small point, but to me, very important that behavior at the beginning of monitoring, particularly oxygenation ventilation, was required. But it didn't rely on technology until several years later when the integration of the technology and behavior became standard of care in the end of the 80s.

DR. WOLPAW:

So everybody in the 70s and early 80s was sitting there doing this every five minute thing. And most people, as we all tend to do, just accepted this is what we do, and it's kind of how it is.

DR. EICHHORN:

It's what you were taught.

DR. WOLPAW:

It's what we're taught, it's how everything goes. I mean, there are so many things we're doing now that for sure, 20, 30 years from now, we're going to look back and think, I can't believe it. But for some reason, in 1986, just seven years out of training, you wrote an article in JAMA that's been called one of the 20 most game changing articles of all time.

DR. EICHHORN:

Correct.

DR. WOLPAW:

So how did you come to this realization when everybody else or so many people were just thinking, this is fine. And you said it's not fine. But how did you realize that?

DR. EICHHORN:

It wasn't just me. I was very fortunate to be named chair of the brand new Risk Management Committee at Harvard. That was created because in 1984, the insurance company, the captive insurance company, that insured all the Harvard faculty, physicians and hospitals from malpractice insurance, they came to the nine departments of anesthesia. And they said, you are costing us a fortune, basically. Because at that time, anesthesiologists represented 3% of the faculty, but they generated 12% of the insurance payout for claims of malpractice. That was considered a real problem. That provoked the chairs to say, we've got to have a committee to figure out what to do about this. And as a result of the fact that the prior year, 1983, I got involved with investigating an Army hospital accident in Alabama, where they attached argon to the main central oxygen supply system. Ultimately, that was a catastrophe. Three patients ultimately died, one was damaged. And I investigated that accident and wrote a report and presented it to the Defense Department. And that sort of set me up.

That was my real introduction to catastrophic accidents and maybe what we could do to prevent them. The next year, I got made chair of this committee. The committee examined in great detail all of the claims, every insurance claim since then, all the big ones came down to one simple thing -- lack of monitoring and specifically ventilation. It was almost all ventilatory accidents that were not picked up in time. So, light goes on. What are we going to do about this? And the answer was very simple. If we issued recommendations or guidelines, that's fine. But there's guidelines or recommendations all over the world. The only way we were going to make it stick and make it change was to make it mandatory standards. Because when you claim something as a standard, when you put it out there as this is the standard of care, the plaintiff's attorneys love that because you've created a mandate where the practitioners have to do that, because if they don't, they're clearly violating the standard of care and they're going to be liable. And the plaintiff's attorneys go like this saying, okay, we got you. So we knew the impact of that would be dramatic. It took a while to get the idea across, but we did. Ultimately, the standards were accepted at Harvard in 85. We anticipate a lot of resistance. There was a little bit, but not a lot. And to jump to the head in the important part of the story, people say, well, you don't know that it makes any difference. Well, of course we do, because my personal malpractice insurance premium paid to the insurance company between 1986 and 1991 decreased by two thirds, decreased by 66%. Okay. Insurance actuaries are not charitable people. They are not going to decrease my and all the other anesthesia faculties insurance premium unless there was a very, very good reason. And the reason was the virtual elimination of intraoperative catastrophes. Far fewer claims and less severe claims are the ones that did get through. So the fact that the insurance premiums went down like that to me is better than $P < 0.05$. You don't need $P < 0.05$, because I have bills from 86 and 91 showing a dramatic difference.

DR. WOLPAW:

Sounds compelling to me. Let's talk about today. How are we monitoring. How are we doing today. We're doing better?

DR. EICHHORN:

Obviously the ASA standards, they'll always be there. They've always been the presence of a qualified personnel, which sounds obvious, but unfortunately we still occasionally see cases where there's inappropriate, not an emergency situation, inappropriate patient being left alone in the OR even for a few minutes. And then something happens. But otherwise oxygenation, ventilation, circulation, temperature. The classic things that everybody should be familiar with them. And as I note frequently, virtually every anesthesia record, whether it's paper or electronic, has a box. You check a box ASA monitors applied. That's what we're talking about.

DR. WOLPAW:

Yeah, the ASA monitors. And these are in many ways, I think everyone would agree much better than every five minutes with nothing in between. Do you think there's anything to be said for the idea that because we have all these machines and they're doing all this so well, and counting all the numbers, that we don't pay as much attention as you had to when it was just you and a precordial stethoscope.

DR. EICHHORN:

My great fear has always been that, yes, it's absolutely wonderful that there's basically no more unrecognized esophageal intubations, no more disconnects unrecognized until the patient arrests, that kind of thing. It doesn't happen. And that's wonderful. But it leads to, I fear, and I feel, a sense of complacency and the potential, not lack of vigilance, but the relaxation of vigilance. Remember the ASA motto -- vigilance, very important. And so that very, very real. And I have a whole section about distractions. And should you be using your cell phone, should you be shopping on Amazon or eBay in the OR? I mean, you know, these are questions that are very difficult to answer because some people say that's beneficial. You don't get bored to be on the computer. But I worry that because the lawyers will tell you and our lawyer for the APSF tells us all the time that an accident that occurs while someone is genuinely distracted, and people in the OR will testify that they were distracted by their phone, that will not go well if it goes to court. But the overall big picture is still very favorable.

DR. WOLPAW:

Great. Is there anything you think we should be doing differently, other than maybe not being distracted by our cell phones in the operating room in terms of our monitoring?

DR. EICHHORN:

Yes. The it's interesting that the ASA did, the last practice parameter was January of this year, evolving neuromuscular blockade antagonism and monitoring. Very important because it stresses the difference between quantitative monitoring of neuromuscular blockade and qualitative. When I started training, when you started training, if the patient's hand was accessible, you put the two electrodes on the ulnar nerve, you put your hand in the patient's hand, hit the twitch monitor and you see do you feel four twitches? If you feel four twitches, what's the ratio of the fourth to the first? You know, that's great, but that's my hand feeling the patient's hand twitch. Today we have the quantitative monitors. There's multiple different kinds. The other thing is directly related

to Dr. Culley. Because I was an early adopter of BIS, the very first time it was available. If I were still practicing and if I do again, I will use BIS on every single patient all the time because I really believe in it and I understand about the waveform versus the number. But I think brain monitoring either for awareness prevention, but I think for quality of care actually is very important, I think, for many years, hopefully not so much me, but certainly people I saw and trainees, they would more deeply anesthetized patients than they really needed. These patients were ... and if you showed sometimes go in and see somebody with 3 or 4% Sibo exhaled and you put the bis on and it's 13, you know, okay, that's not good. And then you try to illustrate to them that this is not what we need to be doing. This patient is far too deeply asleep. And I think that contributes to some of the problems that you were talking about. So I think brain monitoring -- it shouldn't be a standard standard, but it should essentially be a functional standard.

DR. WOLPAW:

Okay. Looking further into the future and your crystal ball, is there anything you think will have ten, 20 years from now that will help us?

DR. EICHHORN:

Absolutely. I will emphasize again, the Stolting conference from the APSF last month had several outstanding talks, astounding information, about the potential for the future. Smart alarms that can make suggestions, not just diagnostic, but therapeutic. And more importantly, AI absolutely is the future. There are AI systems that are being developed now, that are being tested retrospectively on available databases, that absolutely will extend even further monitoring the way we're familiar with it, to new heights that we're not yet familiar. In the land of the 80s, pulse oximetry and capnography vastly extended the human senses better than looking at the blood or putting my hand on the chest to feel the patient breathe. That's oximetry and capnography, a huge step forward. This is a new, huge step forward. Analogous. But it's the wave of the future. AI will be the future not only of great many things in our world, but of monitoring patients getting anesthetics.

DR. WOLPAW:

Fabulous. Well, I want to thank both of you so much. I've learned a lot just from these few minutes, and I'm sure our audience has too. If I could put one theme together from what you both have said and urge all of you to think about, it would be this that Dr. Culley, you found yourself in a world where people said, well, post-op delirium is part of the deal and you know, it is what it is. And you said, wait a minute, let's study this. Let's be rigorous about it, and maybe we can find ways to prevent it. Let's not just accept the status quo. Dr. Eichhorn, you found yourself in a world where people said, yeah, I

mean, every five minutes, that seems to be just fine. And you said, no, let's really try to do better. And you changed the face of how we do monitoring in our specialty. And so I would say to all of you, all of the things that we do every day, ask yourself, is this the right way? Why do we do it? Is it just because it's always how we've done it? Maybe some of those things. If you question them, you will find that it's not the right way. Maybe there's a better way. I love the example of supplemental oxygen, and my residents are probably going to roll their eyes because they know I harp on this all the time, but, you know, it seems to make sense. You come in to the ED, you're having a heart attack. Man. Let's give you oxygen. That's got to be a good thing. And yet now we know that if you're sitting fine and we give you extra oxygen, we're going to make your heart attack worse. Right? But that is not something that anybody, even today. Still, you have to fight to get people to take that oxygen off.

DR. EICHHORN:

Including post op on the way to the recovery room.

DR. WOLPAW:

Yes.

DR. EICHHORN:

That's another thing that I tried to make a point about for years and years and years. If the patient needs oxygen, terrific. But they don't all need oxygen because what happens is the instant you get to the recovery room, they put on pulse oximeter. Right. And that pulse oximeter reading is going to be falsely elevated because of the supplemental oxygen. What you want to know, is the patient breathing. Is the ventilation adequate. Not the oxygenation. Because that's the latter thing to go. Ventilation deteriorates first and you will be fooled by the pulse oximetry. So I frequently in the old days, not that long ago, would come into recovery, patients delivered to recovery. I take the oxygen off and the nurse says, what are you doing? And I said, I'm trying to make you get an accurate pulse oximetry reading.

DR. WOLPAW:

Fabulous. All right. Lots to think about. Let's do random recommendations. And then we're going to turn to our audience Q&A. Dr. Kelly, do you have something fun that you would recommend the audience check out?

DR. CULLEY:

Well, yes, I think I would look inside your own soul. Every single one of you sits in an operating room for a certain number of hours a day, and there are things that are going on in there that you just don't feel right about. Think about them. Dream about how you might be able to change the world and make anesthesia even safer than it is right now.

DR. WOLPAW:

Well, that's a great recommendation. I love it, Dr. Eichhorn. Anything you'd.

DR. EICHHORN:

She took it.

DR. WOLPAW: She stole your thunder.

DR. EICHHORN:

Yeah. I was going to say that I had the enormous good fortune of running into a former resident of mine from the 80s, from the Beth Israel in Boston, yesterday in the lobby upstairs. And he reminded me that today he still quotes me and the way I taught him and everybody I've taught, especially in the early days, about mechanisms, about if you think mechanistically ahead of time, okay, we have this. What could go wrong? If that went wrong, what would you do? And then how could you prevent that so you never have to worry about that going wrong. The mechanistic thinking every single time, every case, every situation will serve you extremely well.

DR. WOLPAW:

Fabulous. All right. I'm going to recommend, so I lived here in San Francisco for eight years. I could recommend 100 places to eat, but I'm going to tell you the place I crave the most, one of three that I crave the most. And it's not fancy and it's not expensive and it's a hole in the wall. It is not close to here. You've got to go into the sunset where UCSF Parnassus Hospital is. But there is a place. It's a Vietnamese restaurant called Fa Fuqua, and it is at the corner of 19th and Irving. And it is you would not see it and think, oh, I've got to eat there, but it's got the best Vietnamese food, the best for the best bone. They've got these imperial rolls, which I could just eat a bucket of. Everything there is amazing. Highly, highly recommend checking it out. Take a cab, take an Uber. You can hop on the the streetcar. I'm sure there's a way to get there. But the place is not expensive and the food is amazing. So it's also known as PPQ, but it stands for Fu

Fuqua and you'll see it there 19th and Irving. So check out that restaurant and you will not be disappointed.

DR. EICHHORN:

A San Francisco landmark for many, many, many decades is the Tadich Grill in the Financial District, which you get the Petrol sole just absolutely spectacular. Only place you can get it. Just like that.

DR. WOLPAW:

Nice. All right. It's a great recommendation too. All right, let's open up the floor to our audience.

ATTENDEE:

Hi, my name is Ravi I had a question for doctor Culley. I was wondering is the confusion assessment method still are best diagnostic measure for detecting post-operative delirium?

DR. CULLEY:

Well, for identifying postoperative delirium. It's a good one. It depends upon who you speak to. If you speak to a neuropsychologist, they have their own way of doing it. The cam was created, in essence, by a group of geriatricians to allow people like you and I to actually have an appropriate and adequate assessment method. So it works really well. But if you look into the literature, there are more cams than you can possibly imagine. And I'm not going to sit here and try to tell you that I think one is better than the other, because it probably depends upon the circumstance, but I would learn how to do one of them and do it well. And there's a lot of training courses out there that you can get for free. If you look up Sharon Inoue and Ed Marcantonio, who are two of my geriatric mentors, they've got videos all over the place on how to do this type of work. And it's it's not easy, but once you study it enough, any of us can do it.

DR. EICHHORN:

I have an important question for Deb. I'm going to ask a question. Midazolam. Early, when midazolam was first around, we used it a great deal. I used it a lot. By the 55 gallon drum almost. I mean, it was just everywhere, all the time. Everybody got pre induction midazolam. It became clear that older people sometimes didn't do well, and when you figured it out, eventually it was the midazolam that made them hallucinate or

have delirium, or have delayed recovery. I guess would be a good way to put it. Do you agree with that? I mean, I stopped using Pre-induction midazolam towards the end of my clinical career.

DR. CULLEY:

I don't know that it's that simple, because many of our older patients come in on some benzodiazepines, so perhaps withholding them from that group who's used to having kind of a chronic baseline level of benzodiazepines is not necessarily the right thing to do. I don't give hardly anybody, I don't care how old you are, any benzodiazepines, I can usually talk them through getting into the operating room and that would be my preference. But there are some people that are so anxious preoperatively and in particular, if they're taking benzodiazepines, I think that's you're probably better off relieving some of that anxiety a little bit earlier. I try to use my kind, wonderful personality, though, long before I try to use benzodiazepines.

DR. EICHHORN:

But you recognize that that's a legitimate concern.

DR. CULLEY:

Yeah.

DR. EICHHORN:

Okay. Because.

DR. CULLEY:

Absolutely.

DR. EICHHORN:

Good. Thank you. Because I really believe that.

DR. WOLPAW:

Do you ever advocate using a little bit of prosodics, a little bit of very low dose propofol, anything to on those very anxious patients instead of midazolam?

DR. CULLEY:

Yes. It just depends upon the patient. You know, if they're on chronic benzodiazepines I would probably give them a benzodiazepines. I have been noted to give people dexmedetomidine. I really do try to rely on my wonderful, charming personality. But every once in a while it fails me.

DR. WOLPAW:

Every once in a while. All right.

DR. EICHHORN:

Tiny dose of ketamine.

DR. WOLPAW:

Tiny dose of ketamine.

ATTENDEE:

My name is Zara. I hold dual allegiances to the ... University of Pakistan ... n Dallas. Thank you for walking us from where we started, where we are and where we could be tomorrow. My question is to anybody on this panel is, we talk about a lot of wonderful things that we could do to make things safer. But a lot of times when we're trying to advocate for something, there's a lot of structural barriers in the way. So how would you recommend combating people when people say, you know, we've done this a certain way a certain number of years and it's worked for us, so why should we change?

DR. WOLPAW:

So I think the question is, how do we advocate for change amidst the inertia that we often find? You can both answer.

DR. EICHHORN:

Well, unfortunately, we were in a situation where all this happened that I was involved in where money talked. As much as it's crass and it sounds not necessarily the best way to go. If you can convince a hospital administrator, even a very small savings, and you have to have data and you have to have reliable data, you're going to win that one. You're going to get what you need. If you can put the cost savings argument out there,.

It's not always easy, and it can be a struggle to try to get that information and construct that argument. But if you can do it, you're going to win.

DR. CULLEY:

It took a village to move implementing preoperative cognitive screening into a busy pre-admission testing clinic. And once Covid came, it kind of went out the door. It requires that you are communicating, talking to, convincing every single person around you that what you're doing is right. It's not easy, but man, it's really worth it.

DR. WOLPAW:

Thank you so much. Thanks for your question, Zara.

ATTENDEE:

Hi, my name is Sam Aldous. I'm a fourth year medical student at the University of Vermont. I can't help but think in this conversation that both of your ideas kind of stem to this idea that we as anesthesiologists need to be extending beyond just the operating room. It seems like there needs to be a lot of prehabilitation as well as rehabilitation when it comes to what we provide our patients. So do you foresee in the coming years, almost the expanse of the role of an anesthesiologist kind of months or before or after their procedure to try and make sure that we optimize them in both the cognitive way, but also in a safety way as well.

DR. EICHHORN:

I'll start because in the last nearly, you know, quite a few years before I retired, I half time in the pre-op clinic, I was one of the two co-directors of a big pre-op clinic, and on an average day I'd see 50 patients. And so the concept of prehab is genuinely not only important, it's critical, very difficult to sell, but, but especially when it comes to pulmonary. It was a patient population that we were serving at the University of Kentucky, huge smoking penetration. And there were times when surgery didn't have to occur next week when, if you could convince the patient to wait and genuinely get the pulmonary people and the rehab people involved and having them prehab, it made an enormous difference in not only their care, but their recovery and their ability to go home on the third post-operative day after major surgery, instead of being in the intensive care unit for a week like many of them were. So I think that's a definite feature for the future. It's going to take, exactly as they said, a great deal of convincing. But if you can get some data like that about you, shorten the stay by four days. If you are willing to make the investment in Prehab for that kind of patient or any kind of patient where it applies,

you're going to, again, you're going to win that because that's what the administrators are willing to listen to and pay for.

DR. CULLEY:

I think I'd spin that a little bit differently. With due respect. We already do a lot of things in the periprocedural space. We do have the busy pre-admission testing centers and clinics and prehabilitation. We extend out into the ICUs. Anesthesiologists are very valuable individuals to an institution. I don't know that we should be the ones that are doing all of the prehab. We can probably best identify the patients that need it, but I don't think for a minute that I need to be doing that prehabilitation. We should probably be sending that out, especially when you look at what's going on globally right now and we don't have enough anesthesiologist to care for them in the ICU, the pain medicine centers, as well as in the operating rooms or procedural spaces. And so I think we need to be pragmatic and look for value based care in the process of this evolution, where we're trying to make sure that people are adequately rehabilitated.

DR. EICHHORN:

You're absolutely right. I wasn't suggesting that. No, I made great friends with the director of outpatient cardiology and the director of outpatient pulmonology and talked to them pretty much on an everyday basis. And they accepted that when we said, this patient will benefit from your care, and then we arrange for them to go there, sometimes we even walk them there.

DR. CULLEY:

Yeah. Good for you.

ATTENDEE:

Thank you very much.

DR. WOLPAW:

Thanks, Sam. While you all think if you have another question, I'll ask one. So, Deb, this is for you. When you think about, we always want a magic bullet, right? I work in the ICU. I think we have so many patients who are delirious and we think, isn't there just something we can give them? And what often happens, which I don't do personally, but we see all the time, is they all get Seroquel. Right? That's the answer. They're delirious. Give them Seroquel. And I try to teach my residents that that's not helping, right? We

might take hyperactive delirium and make it hypoactive, but it's not treating or shortening the course of delirium. So I guess the question is, other than nonpharmacologic interventions, which you mentioned, right? Trying to get them to sleep at night, be awake during the day, have family around, give them their glasses, give them their hearing. All these help. We know that. Pharmacologically maybe dexmedetomidine I mean, what do you think? Is there anything that we have?

DR. CULLEY:

It's probably the best agent if we were going to use something that we do have. I have an interesting story. I had a patient who had Parkinson's disease a number of years ago, and they were in the operating room. And, you know, they don't want them to have any sedatives because they want them to be shaking. And the patient became delirious. Very low dose dexmedetomidine infusion just kind of settled it out. They still had their little tremor and it worked. So I think I can see that both ways. I don't know that I just routinely give everybody dexmedetomidine, but somebody who is high risk, I'd seriously think about it.

DR. WOLPAW:

And you'd think about starting it when in the operating room and then continuing post-op.

DR. CULLEY:

Yeah. I mean preferably, yeah. But if you didn't need it post-operatively you'd want to try it.

DR. WOLPAW:

You could always turn it off. Sure.

DR. EICHHORN:

Another side of that is it's a tremendous opportunity. Not that I have any interest in pharmacologic development and big pharma, which is supposedly the bad guy. But think about the idea. If you could really come up with something, a chemist or a pharmacologic scientist who may or may not work for a drug company, but what a huge opportunity. You know, you look at it really could do something that would be another major step forward. Like some of the others we talked about.

DR. CULLEY:

We got to figure out what's going on in the brain during all of that. And that's the hardest part.

DR. EICHHORN:

All right. Let me ask you a critical question. What is the nature of consciousness? And to that related...

DR. CULLEY:

Max, are you here? Max Kelz, are you here? Oh dang.

DR. EICHHORN:

Related to that, we can't figure out exactly how inhalation general anesthetic works. Get some ideas about protein structure. Okay, but we don't really know how it works. If you did figure that out, could you know the nature of consciousness?

DR. CULLEY:

Not necessarily. I think you'd know the nature of unconsciousness.

DR. EICHHORN:

Very good, very well put. But that's directly related to the potential to have new pharmacologic agents that could impact not only general anesthesia, but delirium.

DR. WOLPAW:

Absolutely.

ATTENDEE:

Thank you for adding time to the discussion. I'm a faculty at the University of Kentucky. I work with John Icon past. Been good to see you again. Good seeing you here in this stage. Thank you too. I've worked well in some meetings. But the question is, you know, with especially the residents coming up and some of the faculty are very particular about the, the midazolam. So it's mostly with the post op cognitive delirium versus

dysfunction, however you put it. But the question is is there an age cut off you recommend or is there a dosing that helps? And I think I'll leave it at that.

DR. CULLEY:

I get the age cut off a lot. But if you look at older individuals, there going to be people in their 40s who are going to have some degree of cognitive impairment that's progressive. When you look at the 60s, there's going to be an even larger percentage of those individuals. So I can't give you an age cut off, and we can call a demographic age. And this is better than nothing. But really it comes down to the individual patient. It's really less about us as a group. But what's going on in your brain as an individual. So I'd like to know what's going on in people's brain. Most people would say 65. I think that it depends upon your patient population. If you were in a very well-educated group, maybe it is 65, maybe it's 70. If you've got a lower socioeconomic group, you're probably going to find things a little bit earlier in their lifespan.

DR. EICHHORN:

I can't help but think about Mike Rosen's real age. Remember the idea about your biologic real age as opposed to your chronological age? There should be the same thing for brain age, and you could potentially use the term brain age and have a new movement and be the next Mike Rosen.

DR. CULLEY:

Probably not.

ATTENDEE:

Hi, my name is Ricardo Munoz. I'm a postdoc at VI, and I've been able to work a little bit on postoperative delirium in regards to hypertension and OSA, and my current interest or investigation goes more along the line of using artificial intelligence to predict delirium and also to capture delirium. And one of the things that that I've come across while doing my research in terms of delirium, and before we can go any further and thinking of us thinking that new technologies will solve and help this, is that we as physicians need to talk to one another and first establish, let's say, the language of delirium. How do we are actually calling this? Is it some people say altered mental status, acute confusion, and part of detecting delirium in clinical notes comes a lot with this language. Was this a case of unidentified delirium because the nurse had to rearrange this patient? Or was this patient just somnolent and was not through delirium? So would you guys agree that in the medical field right now, there is a whole lot of confusion and a big need to come

across and agree on a true definition and name for delirium, instead of just being acute encephalopathy, altered mental status and all this bunch of.

DR. CULLEY:

Yeah. You know, there are some standards or suggestions from anesthesiologists, and it moved from postoperative cognitive dysfunction to postoperative neurocognitive disorders. And there's a whole array. And they were created by Neuropsychologists. And so I think that we are moving in that direction. I realize that it's a little fuzzy. And it's hard to see delirium in particular the hypoactive component. But I think that we're really heading in a much more positive direction by having a little bit more clarity with regards to the nomenclature.

DR. EICHHORN:

I'll pick up on that a little bit. As far as you alluded to the idea about AI, because the predictive analytics now in the impending probably soon to be clinically introduced, I hope, smart so-called smart monitors that can predict intraoperative hypotension 5 to 15 minutes before it appears, based on the waveform analysis and a lot of fancy computer math that I don't understand, but that may be related not only to cardiovascular and hemodynamic issues, but also brain function issues. Now I'm going to ask you a question. Do you believe that intraoperative hypotension is directly related to post-op delirium?

DR. CULLEY:

Well, directly is always the word that I'm going to get caught on. Do I think that it's related? There's a lot of data to suggest that that's the case. The data is growing, it's swelling. I mean, you look at some of the stuff that Dan Sessler has done fairly recently. It does appear that hypotension is not a good thing in particular for the older brain. But you figured that out a long time ago for us.

DR. EICHHORN:

In a much larger sense as far as a catastrophic accident is concerned. Fortunately, there essentially aren't any more of those, and we're down to the fine tuning of a much more specific and targeted things brain function related to hemodynamics. I mean, you know, another huge future. I mean, go for it. You're the future.

DR. CULLEY:

Yeah, I think that that's a really important point for those of you that are interested in these perioperative outcomes. You are the future. And if you think of something and it doesn't seem quite right, go out there and fundamentally explore it. That's how we make progress. It's not by some really smart person saying, oh, I think this might occur. No, it's by people like you and I who are sitting in an operating room who say, wow, that's an interesting question. Why do I believe this? Why do I think a systolic blood pressure of 90 is good enough or not good enough? It's fun to think about while you're doing it, but you can also change the world in which you live.

DR. EICHHORN:

And never forget the APSF gives three, four, or five research grants a year. Significant research grants. You've got ideas? Work them up. Apply it to the APSF for a research grant. Every year they have these the program excellent program potential future.

DR. CULLEY:

APSF is absolutely spectacular. So I basically started in the basic sciences. And when I got interested in the preoperative cognitive screening component, I knew I wanted to transition a little bit of my career in that direction. My funding was all basic science, so to be able to transition to that and actually execute enough of a study in order to move in that direction, I went to the Anesthesia Patient Safety Foundation and received a grant from them. And it was fundamentally important in my ability to change the direction of my career. So thank you.

ATTENDEE:

You're welcome.

DR. WOLPAW:

Fabulous.

I want to say a huge thank you to my guests for being here. And I'm going to end how I always do by saying that for all of you, whether you are medical students, whether you are residents, whether you are practicing attendings, your job is hard. You're working incredibly hard. And I hope you know that that is seen and recognized that what you're doing out there every day is really important and it is truly valued. And if nobody else, I will say to all of you, thank you for what you do every day. Thank you for being here. And thank you to my guests for being here today as well. Thank you.

DR. STRIKER:

Thanks for listening. Join us again next time.

(SOUNDBITE OF MUSIC)

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