Gerhard Schneider MD & Michael Wang PhD

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TOPIC: Awake paralysis – the heart of AAGA PTSD

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Society.

Michael Wang (MW): 0:09 So, it's a great pleasure to interview Professor Gerhardt Schneider, from the University of Munich.

Gerhardt Schneider (GS): 0:21 Yeah, technically from the University of Munich

MW: 0:23 Yeah, okay. I'm Professor Mike Wang, from the University of Leicester in England. So, I'd just like to begin by asking you about general anesthesia, in terms of what is your definition of what is an adequate general anesthetic?

GS: 0:49 I think one of the key issues of an adequate anesthetic, is what the patient is expecting from it. So, the consciousness is basically…or the loss of consciousness of conscious perception is basically the key issue, because that's what a patient would expect from a general anesthetic. But it goes beyond that because there may be changes in the physiology which are also required to produce this status. So, it's stability of the nervous system of the autonomic nervous system, it's blockade of pain, or of no susceptive stimuli, and it's the absence of conscious perception.

MW: 1:40 What do you make of the fact that some of our colleagues think that it's perfectly acceptable to aim for amnesia?

GS: 1:49 I would not agree with this point of view, not at all. In an extreme, this would bring us towards a point where we say that a certain group of patients does not require anesthesia. There are patients which have amnesia, as part of their pathology—thinking of Alzheimer's patients. I would not agree that these patients do not require anesthesia, and that is sufficient to go to surgery without anything with them. So, what's valid for them should be valid for every other patient of course.

MW: 2:28 And of course we've also got the issue of neonates. It took a class action didn't it, in the United States for neonatal surgeons there to agree to use…

GS: 2:38 to agree and to accept to use anesthesia for that.

MW: 2:42 and of course, their justification was, they suppose there will be no memory in adulthood. Yes, that's …(voice trails off)

GS: 2:50 I think it is a weak argument. If you on the other hand, have a patient who agrees that this is sufficient. You sure have to make sure that all the other components are maintained. For example, you want to perform regional anesthesia with an amnesic component. This would also be…

MW: 3:12 Sure.

GS: 3:13 perfectly acceptable, if the patient is okay with that.

MW: 3:18 Right.

GS: 3:08 but it's always a matter of expectations of the patient and expectations of what's supposed to happen.

MW: 3:26 Yeah, okay.

GS: 3:29 I think most of our patients would give a very clear answer if expecting in anesthesia. We will tell them you may be awake, but you won't remember.

MW: 3:38 Yeah.

GS: 3:39 and this is sort of the level that

MW: 3:41 Sure.

GS: 3:42 sets the goal.

MW: 3:43 Sure, sure. I'm sure you're aware that Jamie Sleigh's group and… Jamie Sleigh's group have talked about connectedness, or disconnectedness. JD Pandit is talking about dis-anesthesia, and these appear to be states that aren't full consciousness, but they're somewhere between full consciousness and unconsciousness. And I think that JD has gone so far as to argue that it is acceptable to target this state for general anesthesia. What do you make of that?

GS: 4:25 As I mentioned, one of the key questions is what my patients are expecting. I would not think that I would find many patients to accept this state. And having said that, it may become an acceptable state in the future if we understand mechanisms behind it. It sounds very appealing in part, because if you maintain your brain in a status that is also present during consciousness. It may potentially help to avoid some of the consequences of anesthesia that we see at the moment. But I do not see that we are any nearer to understanding what is happening in this stadium. And… therefore, it's not a clinically relevant status that I would want to reach, even if it may be some ultimate goal in the future. This is actually something that we learn from our sleep research, that during deep sleep we have connectedness in the brain and during dreaming, patients...or all of us, have a brain activity pattern that really resembles the awake status, but we do not get any information from the outside in that status. So, if we could someday reach such a status, this may be way more physiological than what we do at the moment performing anesthesia. But as I mentioned it's not where we are at the moment.

MW: 6:08 What do you make of patient movement, intraoperative patient movement? if you notice a limb move, what would you think and what would you do? Assuming that there's no neuromuscular blockade involved?

GS: 6:28 It's an important indicator for me that there may be something going on with the patient in terms of awareness. It's not a guarantee at all.

MW: 6:38 No.

GS: 6:39 We know that there is a lot of unintentional movement, that are reflexes, which are occurring at a lower level than the brain. So, I would be careful watching them, and trying to contact the patient in this status.

MW: 6:55 So you…

GS: 6:56 So, just asking…

MW: 6:57 You speak to them.

GS: 6:58 I speak to the patient if he's able to move, he's obviously able to move hand.

MW: 7:04 Yeah.

GS: 7:05 and…

MW: 7:06 and signal

GS: 7:07 and signal that there is something going on

GS: 7:09 It won't be an isolated…

MW: 7:12 Yeah.

GS: 7:12 movement of the little

MW: 7:13 Sure, sure.

GS: 7:14 …of the leg. So, therefore…

MW: 7:15 Yeah.

GS: 7:15 it allows me…

MW: 7:17 Yeah.

GS: 7:18 make contact

MW: 7:19 Do…you wouldn't be reaching for a muscle relaxant?

GS: 7:23 I would not. There is…I see in some of my colleagues that they do, and I can appreciate that they want to create an operating field which is ideal for the surgeon, and ultimately for the patient to have safe surgery. But on the other hand, I have to make sure that my…or the goal that I have with the patient is not at risk during such an action. So, I want to maintain contact, and make sure that the patient is asleep, and if this is the case or is unconscious, and if this is the case a muscle relaxant may be acceptable in this situation—if the movement itself prevents the surgery to be performed safely.

MW: 8:18 Wouldn't you though think about deepening the anesthetic before you thought about the muscle relaxant?

GS: 8:25 I would think about it as long as do not have a patient's response. I would not necessarily see it as a requirement. Now…

MW: 8:35 No.

GS: 8:36 the specific situation that we have at our department, is that every single patient is monitored with an EEG. So, I would also look at the brain activity pattern to decide whether it goes towards waking up or awareness, or whether it's just

MW: 8:55 Yeah, yeah.

8:56-GS an movement which is more reflex

MW: 8:59 Yeah, yeah. You touched on an interesting issue, for me anyway, which is about the dynamics and the politics of the operating room, and the extent to which the behavior of the anesthetist is kind of controlled by the surgeon. Probably not consciously, but because the anesthetist feels in some way beholden to the surgeon in certain respects, and perhaps concerned that the surgeon's evaluation of their anesthetist may be compromised. And for that reason, maybe many anesthetists would be reticent about communicating with the patient or attempting communication, because their surgical colleague might think "Doesn't he know that the patient is unconscious? What's going on there?"

GS: 9:57 Actually, I started this as a resident, talking my patient's. It was part of my research field, and of course at the very beginning I received some comments, "Now this is the guy who doesn't know how to anesthetize, he's talking with his patients, he doesn't know what he does." On the other hand, if you explain what's going on, you recognize that this behavior changes…general behavior in the operating room, and in the operating theater. So, if you announce that there is minimal chance that the patient is able to perceive something, this dramatically changes behavior of all persons at…present in the operating theater, and I think it's an important issue

MW: 10:52 Yeah.

GS: 10:53 it's an important way to go.

MW: 10:55 Yeah.

GS: 10:56 I understand that it's a psychological requirement, or may be a psychological requirement of distance for the surgeon to create to the patient during the procedure of surgery

MW: 11:10 Mm-hmm

GS: 11:11 because nobody will intentionally cut somebody with a knife…

MW: 11:17 Yeah.

GS: 11:18 So, there has to be some emotional distance…

MW: 11:21 Yeah.

GS: 11:22 that needs to be created, but it's not necessarily required that this has to translate into behavior in the operating theater.

MW: 11:31 Yeah, that's really interesting, because it seems tom me that what you're saying is that if even a resident…even a very junior anesthesiologist who's in training actually expresses a view in the operating theater, actually articulates that there is a chance that the patient should be perceiving things and you need to check that out. So, you're giving a justification, and it's not that you are incompetent, that actually causes a change in the sort of sociology, if I could use that word, of the operating room staff.

GS: 12:13 It does, it definitely does. That was my impression, but then…but, it's often that the anesthesiologist, or the residents in charge, do not really have enough self-trust to point that out. And so, it's maybe easier to just put in muscle relaxant, have the patient paralyzed, nobody will realize that there was something going on if there was something, and that sort of…part of it may be to maintain

professional impression on the team, but that's just…basically it's the opposite because you tried to hide something, or you avoid a clinical monitor.

MW: 13:05 Yeah, okay. Nice and neat Segway into me asking you about monitoring. You've published quite a lot on the issue of depth of anesthesia monitoring, and indeed you're going to be talking about, or you have talked about that issue at this conference. I wonder if you just give us an outline for the sake of the camera off the lay of the…the lie of the land. What's the current situation? I mean, we know there are processed EEG monitors such as BIS and entropy. There are lots of pioneering and innovative new things on the horizon, perhaps about to come. And also, I would want to argue for the isolated forearm technique which I know you have experience of yourself. So, could you just give us some general comments about the whole era of monitoring?

GS: 14:07 I think there are the basic clinical tools, and clinical assessment which everybody uses on a regular basis. They are…

MW: 14:17 You think they work?
GS: 14:19 Quite imperfect, but they give an impression.

MW: 14:23 Yeah.

GS: 14:24 It strikes me that if you want to add information to this. There is…seems to be that the perception that the information that you're adding needs to be perfect. So, we're living with imperfect tools, and adding something which is also imperfect, but may add information is actually hard to do. This is what surprises me a little bit, maybe it's the impression that some of the devices gave that they may be perfect tools, and everything is solved…it's not the case. But, there's important information which is added, and this is both true for a clinical method as the isolated forearm technique, and for EEG based monitors. We saw them, or started to see them I think 20 years ago in the first operating theaters, and there was a high expectation…

MW: 15:28 Yeah.

GS: 15:29 connected to the new innovation, and by now we know that this is just not … has not been fulfilled, but as compared to what we had before. I think we have done a great step forward, and we have started looking at the main target organ of anesthesia, which we basically had ignored for more than a hundred years. So, there is some benefit, we are not at the end of the road though. The benefit is that we have started looking into brain activity. It has started a whole new field of research, and we start to understand what's going on during anesthesia, in terms of consciousness, and loss of perception, and loss of consciousness. So, I think it has advanced the field very much. The good thing is, I have the impression that we are now at a point, where we really start to look into basic EEG stuff, and basic EEG interpretation on a greater level. Had always been experts were able to read the EEG, only parts of the EEG. But with recent developments, I think it's become more open to the clinical anesthesiologist, and that really is one of the major advantages of getting those machines on the market. Because everybody or many of us had started to look into details of the EEG, and it has been shown that it requires some basic training and then you are pretty much able to do a basic interpretation of what's going on. Our brain and our eyes are so able to capture complex information,

MW: 17:24 Yeah.

GS: 17:25 that even if you can say the EEG has these features you would realize it looks different than it looks at all…with all your other patients

MW: 17:34 Sure, sure

GS: 17:35 And this is an additional information that you get if you apply this method.

MW: 17:37 Yeah, yeah.

GS: 17:41 Therefore, I think it's very useful.

MW: 17:43 And of course, the danger we have, certainly I can't comment on what's going on in Germany, but I do know that in the United Kingdom as a result of the NaP 5 activity survey. There's something like 40%-50% of all hospitals in the United Kingdom and Southern Ireland…and the Republic of Ireland actually have this monitor, possibly entropy, but processed EEG monitors. But only 15%, 14% of the anesthetists are actually using them, and that's partly because they distressed the number, the single number, but I also think that it's possibly because they don't think that awareness is a big issue. And sadly, I think that NaP 5 is currently being used as a valid indicator of incidence of AAG, which I think is a very regrettable—I'm sure you do too.

GS: 18:39 Sure.

MW: 18:40 And that's the problem you have…you have an anesthetic community who already think that awareness is much less common in common than the one in 600, than the Brice interview tells us it is, and then they have NaP 5 which is now apparently telling them that it's 1 in 19,000. So, they're now thinking this is no longer significant, and I don't have to worry about it. But what I think is really great about what you're saying is that, in your practice you've got the raw EEG signal in front of you and you know…well at least you've got the cognitive tools to interpret that signal without a number. And really somehow, we have to persuade your colleagues that everyone should be doing that.

19:36---GS I think it's an important recommendation if you use a number, which is calculated by some algorithm. You really don't know that you have to also have to have a look at the raw signal. And it's been shown by Avidan and colleagues that you can train residents to read the EEG in such a way that they can reproduce the bispectral index number.

MW: 20:06 Sure.

GS: 20:07 So, it's not hard to do. It's…even if you don't know what the reason behind it is, it's just a visual impression that you…that you get from that. And I think it is more important to have this in place because it's not only…even if you do believe that awareness is not an issue, you should have a look at what you're doing to the brain.

MW: 20:33 Yeah.

GS: 20:34 And it's being stressed out tremendously that deep anesthesia, or maximum effect of anesthetics on the brain, may I also not the ideal data are not entirely convincing yet, but we know there are certain patterns of EEG which are physiologically just not appearing, and we try to avoid them. This is mainly burst suppression which is a suppressed EEG with high activity intermingled in between, which is only be observed during certain pathologies, and during very, very deep anesthesia, or very high concentrations, inadequately high concentrations of anesthesia. So, if you do not think that you

patients may be aware, start using the EEG to avoid this pattern, and if you start using the EEG you may once in a while run into a patient where you see that the EEG pattern turns different than in other cases, and not different in terms of too deep, but too light, or not sufficient effect. So, we may…this may help.

MW: 22:00 Um, if you needed to have an anesthetic for surgery, what sort of monitoring would you ask your anesthetist to be using, or what would you hope that they would be using?

GS: 22:18 To be honest, I had to go through some surgery and I personally, definitely prefer regional anesthesia without sedation. So, if this is not possible and I need to go through general anesthesia, I would first of all select a colleague or choose a college who's able to integrate information from a lot of different sizes and different sources, who has some experience with the surgical procedure that I'm undergoing. Because no monitor can tell you what's going to happen the next minutes of the surgical procedure, and so only the clinically experienced anesthesiologist. And that's part of the training of our residents, that they go through this surgical process intellectually to understand what's gonna happen. And then yes, I would like to have an EEG.

MW: 23:17 Yeah, okay.

Anthony Messina (AM): 23:20 How many leads do you use in your routine use of EEG's?

GS: 23:23 We use a one channel only in routine…

AM: 23:25 One?

GS: 23:27 Yeah. So, we do give out potentials in specific cases, we do some experimental places more channel EEG, but for clinical routines we just use one of these devices on the market and put a one channel EEG on.

AM: 23:44 And in terms of burst suppression, so if you use one then…so do you think burst suppression…so you don't have two parts of the brain to compare?

GS: 23:54 It's a general…it's a general phenomenon. If burst suppression happens, it happens all over the cortex.

AM: 24:01 Oh, it is?

GS: 24:02 Yeah, it's not localized.

AM: 24:06 No that's it. That was great.

MW: 24:08 Yeah, thank you very much indeed.

GS: 24:10 Thank you.

MW: 24:11 That was great, you got the job

[All laughing]

Manuscript transcribed by Vanessa Soto; reviewed by MAW & AM; emailed to Dr Schneider on 11/23/17;