Host: Welcome to the ACE Behind-the-Scenes podcast, giving you an exclusive look at the creation of the popular continuing education program from the American Society of Anesthesiologists. ACE: testing your knowledge of the fundamentals of anesthesia.

Christopher J. Lace, MD, MBA: Welcome to the ACE Behind-the-Scenes podcast. I’m Dr. Christopher Lace, perioperative medical director for the University of Colorado and one of the editors of ACE. With me today are the two editors-in-chief and our guest Dr. Jeffrey Lu.

Stacy L. Jones, MD, MHA, FASA: I’m Stacy Jones. I’m at the University of Arkansas for Medical Sciences in Little Rock. And I’m a co-editor-in-chief for ACE.

Joel O. Johnson, MD, PhD: Hello, and I am Joel Johnson. I’m the co-editor-in-chief for ACE, and I’m at the University of Wisconsin in Madison.

Jeffrey K. Lu, MD: I am Jeffrey Lu. I am an ACE editor, and I am talking to you from the University of Utah School of Medicine.

Christopher J. Lace, MD, MBA: So, a little background on ACE. This product is designed to be walking around knowledge in anesthesia. It is published twice per year in April and October. Each edition has 100 questions and is certified for up to 60 AMA PRA Category 1 Credits™ per year. It is available either in print or in a web/application-based version that can be accessed.
This time we’re going to be discussing items of interest from ACE 17B, which will be launching in October of 2020. We usually start this podcast by talking about items that relate to our own practice in anesthesia in some way. Often, we find that this is an impetus or an inspiration for an item that we write. And Dr. Jones, can you tell us about one of the items from the 17B issue that was based on clinical experience?

Stacy L. Jones, MD, MHA, FASA: I sure can, Chris. Several of the items I wrote for 17B actually pertain to my personal clinical experience, and I know that Joel and I really try to encourage the editors to draw from their daily practice. Because I think those items can really be more engaging, more interesting to people. Even though this is still walking around basic anesthesia knowledge, I think the applicability is as an important concept here.

One of the items I wrote for this was about postpolio syndrome. And over the years I’ve had several patients who had been afflicted with polio when they were young, and this population is now in their 70s and 80s. One of the things that we don’t think about much, but these folks are very prone to muscle weakness. And twice in my career I’ve had to reintubate somebody postoperatively because they were pretty weak after a general anesthetic.

So, I think knowing a little bit about this syndrome helps us better care for them. It then helps us be prepared to manage their pain, because they very commonly have chronic pain syndromes. And they also have difficulty with temperature regulation. And the degree of their affliction early on really doesn’t correlate with their risk of postpolio syndrome later. We’re not really sure of the etiology of this, but it can really affect their perioperative course.

Jeffrey K. Lu, MD: Dr. Jones, this was one of my favorite items in the issue, and the main reason is because of the photograph that is in the discussion section of the
question. What I liked about it was that it reminded me of my father, who was an ear, nose and throat surgeon, and when he started out as a young intern, he talked to me about his experiences as a young intern taking care of polio patients in Minneapolis. And so this photograph just reminded me of the fact that we are in a time of epidemics, and they’ve always been around. Until we have a vaccine, like the polio vaccine, we’re all going to kind of hold our breath and wait and see if we can get a vaccine for the SARS-CoV-2 virus. And then we’ll be able to come back to a more normal situation in society.

Christopher J. Lace, MD, MBA: So Dr. Johnson, I believe you had a clinical situation that was related to an item written by Dr. Gali, who’s another one of our editors.

Joel O. Johnson, MD, PhD: Yes, and this is an example maybe of hopefully what we are giving to our readers and subscribers. In reading Dr. Gali’s item and doing the editing, this gave me information that I could use directly in a clinical situation. And I was on call, and a younger patient had arrived emergently to the OR and was bleeding from an AV fistula. And this patient had been given rivaroxaban. The vascular surgeon was adamant that the rivaroxaban needed to be reversed. And we had just discussed this item about rivaroxaban reversal and the use of andexanet alpha.

And so of course I needed a sort of a secondary piece of information. So I called up our hematologist to confirm the dosage for this particular patient. And interesting enough, the hematologist said, “Well, are you sure that the patient had actually taken their last dose of rivaroxaban?” And, in fact, when I looked into that, they hadn’t.

And the other part of these sorts of questions is that the half life of rivaroxaban is very short, five to nine hours in young patients. And so for elective surgery, the recommendation is to stop it at 24 to 48 hours. In this
case, the patient had not had it for a day. And so we didn’t even need to reverse. So not only did I use that information, but the interesting part about this as well is that andexanet alpha is very expensive. I was quoted a number of about $60,000. And so we saved a bunch of money as well.

Christopher J. Lace, MD, MBA: So what are some other items in this issue that you think relate closely to your clinical experiences?

Stacy L. Jones, MD, MHA, FASA: Dr. Dutton wrote an item for 17B about the current management of pheochromocytoma. And for me it was really sort of fortuitous because I had an active phe resection really quite recently. And one of the changes in the management of that, since I was a resident, is the addition of magnesium infusions or blood pressure management. And so I thought that was very interesting and pretty useful. And we did indeed run an infusion with magnesium.

The other thing I think for this item is that there’s a fantastic Netter image associated with it. Again, I want to just brag a little bit about the images and the drawings and the graphs in ACE, being really I think a huge addition to – and different from what you might see in other continuing education products.

Joel O. Johnson, MD, PhD: Well, and I have something to add along the lines of clinical experience and the use of the ACE product. One of the items, item 99 written by our guest editor Jeff Lu was talking about the relationship between common extubation criteria and whether or not there was any need for intervention after extubation. Interestingly this is pretty common practice, and as anyone would expect, eye opening was the best predictor.

But the really interesting part of it was that there were five positive predictors. And as each one passed, for instance, a patient when seeing – patient opening
their eyes, et cetera, that your positive predictor for a great extubation went up and up to almost 100%. So these kind of things really lend themselves to clinical practice.

Jeffrey K. Lu, MD: That’s right Joel, and if I could just jump in also, this particular item talked specifically about pediatric extubation criteria. But I think it could also be generalized to adult extubation criteria. And if you look through our literature, there really is very little information or published studies that talk about what are good extubation criteria. And so this particular paper I think extends our information about the safety and the timing of extubation, in children and potentially in adults as well. And it basically says, the more criteria that you can fulfill, things like eye opening, purposeful movement, things like that, the more likely you’re going to have a successful, uneventful extubation. Which is what we all want to have.

Christopher J. Lace, MD, MBA: Dr. Jones, any other items that come to mind on this topic of clinical practice?

Stacy L. Jones, MD, MHA, FASA: Well, there’s another item in 17B that I wrote about septum primum, atrial septal defects. And this was one of my favorite things to torture my residents with in the heart room. But what are the other associated anomalies that go along with the different types of atrial septal defect? We do our PFO closures in the cath lab, and because our cardiologists prefer continuous TEE, we typically use general anesthesia for this. And sometimes they get a little ambitious, and it takes hours. And sometimes the defect is larger than they had originally anticipated.

And so knowing what other anomalies are associated with atrial septal defect, whether it be a PFO or a prime secundum defect, is important as you plan your anesthetic and look for potential complications.
Christopher J. Lace, MD, MBA: Dr. Johnson, there is an item in this issue that I think was a little bit controversial initially, but ended up in the issue anyway. Can you tell us a little bit more about that item? And perhaps give us a little bit of a behind the scenes look at the editorial process and how this item ended up being in the issue.

Joel O. Johnson, MD, PhD: This is kind of a funny story in the sense that, as an editor and the editor-in-chief, I kind of review all these things and try to figure out which of the items are appropriate. And Dr. Rick Dutton, one of our editors, wrote an item that basically in my first glance at it said, well, this is just a definition. And actually the definition was about the word “excipient,” e-x-c-i-p-i-e-n-t. And I felt that okay, well, we’re asking, what is an excipient, rather than talking about a specific anesthetic issue.

And the democratic process of our editorial board outvoted me and said that defining an excipient was actually a doorway into a more extensive discussion of the impact excipients have on an anesthetic. And the text of the item that Dr. Dutton had written was accompanied by an excellent table from a publication in *Anesthesia & Analgesia* that listed additions to many of our common intraoperative medications. And so it was a learning process both for me and hopefully for the people who are reading the item.

Christopher J. Lace, MD, MBA: Thank you Dr. Johnson. Any other items that ring a bell in kind of coming in this flavor, in this issue?

Jeffrey K. Lu, MD: If I could just add one thing about the terminology of excipients. One of the classic things that I think of when I read this question is the use of the 30-mL vials of normal saline that come with, I believe it’s a preservative known as benzyl alcohol. And it’s important not so much to adults, but when that 30-
mL vial is somehow used to be injected into infants and smaller children, it can cause toxicity. So I think it is important to be mindful that there are other things that are contained in some of our injectates that we need to be careful of and be aware of.

Joel O. Johnson, MD, PhD: And then as long as we’re on this topic of words and that sort of a thing, there was an item that Dr. Jones, my co-editor-in-chief, wrote where she was referring to this term called “organic mitral regurgitation.” Well, I buy a lot of my groceries from our organic grocery store. So I was wondering if there was a synthetic option to mitral regurgitation. But, in fact, the item talked about the different classifications of mitral regurgitation, that you have both organic and functional mitral regurgitation, in which the organic is damage to the valve structure itself. And functional mitral regurgitation involves changes to the actual heart. And so for me anyway, when I was confronted with this word difference, I could better remember the different etiologies of the disease.

Christopher J. Lace, MD, MBA: So I think as an editorial group we try to focus very much on clinical content and scenarios. But sometimes, as we alluded to a little bit above, we do look at some more abstract concepts. And I’m sure there’s some other examples in this issue that we could bring up that some of the readers may feel are a little more abstract. Dr. Lu, any examples?

Jeffrey K. Lu, MD: Yeah, I wrote an item about a physics property known as “wall tension.” And although it may seem really unrelated to how we practice, I think it’s very important to recognize it as being almost the heart and soul of how we practice anesthesiology. We’re always concerned about hemodynamics. And at times if the blood pressure is too high, why are we worried about that? Well, this question about wall tension is exactly why we worry about that. In
particular in people with aneurisms and particularly in patients whom we don’t know have aneurisms.

Although it may seem like a distant concept, it is important to recognize that this is one of the reasons that we practice anesthesiology the way we do and why we control hemodynamics.

Christopher J. Lace, MD, MBA: Dr. Jones, you wrote an interesting item this time about HIPAA. Want to talk a little bit about that?

Stacy L. Jones, MD, MHA, FASA: Okay, well, we talk a lot about HIPAA and what it is and what it is not. And I think the differences between the actual law itself and what hospitals and health care systems do – or policies they implement to preserve patient confidentiality, and sometimes they’re very different things. So the item has a listing of scenarios saying, which of these is a violation of HIPAA?

I had a health care law module when I was working on my MHA, and I found this to be very interesting. Also my husband’s an attorney. And so every once in a while, he pipes up with, all doctors think they’re lawyers, and I don’t go out and push the propofol. But anyway, I think the distinction between what the law actually states and what we should be doing to be in compliance with it is very interesting. And it affects pretty much our daily life.

Christopher J. Lace, MD, MBA: So occasionally when talking about kind of non–directly clinical topics, we include an item with a historical focus. Dr. Johnson, you wrote an item for 17B that certainly could be described as having a historical focus. Do you want to talk a little bit about that?
Joel O. Johnson, MD, PhD: Yeah, and I also want to make the point that history is an important part of anesthesia education. We don’t have that many items about history, mainly because it’s more of interest rather than something that you can apply to your clinical practice. But it does give you some background into why things are the way that they are today.

And so I wrote this item about the evolution of inhaled anesthetics, and in particular, how advances in fluorine chemistry during the development of atomic bomb affected advances in anesthesia. The introduction of fluorine onto an anesthetic molecule made it so that the anesthetic itself could be faster on, faster off. That there was different physical properties that affected both the anesthetic action of the molecule, but as well caused us to think about how fluorine affects parts of the body.

The fact that all of these advances occurred, particularly in the ’60s and the ’70s where numerous compounds were fluorinated and then investigated as possible anesthetics, and that this has gone by the wayside now. That it’s very unlikely that we’re going to have a new inhalational anesthetic that is fluorine based. Because it’s been really well researched, and we have about as good as it will get.

Jeffrey K. Lu, MD: Yeah, Joel, if I could also add that I went ahead and looked up how much it costs to bring a new drug to market. And it’s roughly $1 to $2 billion, with a “b,” in the United States.

Joel O. Johnson, MD, PhD: Yeah, I don’t have that kind of pocket change.

Christopher J. Lace, MD, MBA: Dr. Lu, you wrote an interesting item in this issue about opioid metabolites. Do you want to talk a little bit about that?
Jeffrey K. Lu, MD: Yes, sure. Well, we all know that codeine has to be metabolized into its active metabolite, which is morphine. And then we also know that morphine also has active metabolites, morphine-3 and morphine-6-glucuronide. But I was interested also in finding out whether or not there are other opioids that also have active metabolites. And it turns out that they do. And many of these drugs that have active metabolites are prescribed as oral medications.

So I think it’s also important for us to be mindful that metabolism has an impact on how we care for these patients when they go home. Some of these metabolites are active and we need to be mindful of that when we’re prescribing these medications.

Christopher J. Lace, MD, MBA: So normally we only discuss items in the upcoming issue. But this time we have an item to talk about from last year, the 16A issue that launched in April of 2019. Dr. Johnson, can you tell us about that item?

Joel O. Johnson, MD, PhD: Well, yes, and this refers to primarily the fact that we really encourage our subscribers to send in their comments to tell us what we maybe got wrong. Hopefully more often tell us what we got right. And this particular item was one that created quite a bit of controversy. It generated a bunch of email from different subscribers, and it had to do with the difference between deep sedation and general anesthesia.

And that controversy hinged on the fact that withdrawal from a painful stimulus is a component of general anesthesia and not deep sedation. Whereas deep sedation is characterized by a purposeful response. And this all comes out of a chart that was published by the American Society of Anesthesiologists that specifically defined these levels of sedation and then the continuum going on to general anesthesia.
Just in the fact that we had so much response from the members, some of whom were adamant that the correct answer was deep sedation rather than general anesthesia, we looked a little bit closer at the writing that occurred. And admittedly there were some statements in the actual item that maybe were a little confusing. But what it offered for us editors and the editorial board is an opportunity to see just how much our writing impacts, not only the question itself, but the answer to the question and the learning that the different subscribers have. So that was really informative, and I think it gave us an opportunity to do a lot of learning about the editorial process.

Stacy L. Jones, MD, MHA, FASA: And I do want to reiterate what Joel has said. We appreciate our subscriber’s feedback. We read all of the comments, and I know it’s sort of annoying to finally finish the product, but then have to do the evaluation. But we read all of those comments. And we try to address the more specific ones individually to the subscribers that write to us.

And we even had a subscriber pick up a typo that was in a textbook figure, that had been published in the textbook, and then we had permission to republish it. So it had gone through several editorial processes and had been missed. So again, it’s a learning experience for all of us. But we really do take seriously the comments that our subscribers send in to the ASA in regards to ACE content.

Christopher J. Lace, MD, MBA: So I’m going to throw this out to the entire group. Before we finish up, are there any other items in the 17B issue you would like to talk about?

Jeffrey K. Lu, MD: Yeah, I have another question that I’m interested in. It was written by Dr. McAllister. And it has to do with the Bezold-Jarisch reflex. I hope I pronounced it right. But the question asked whether or not there was a
preventative treatment for this reflex, which is a triad of bradycardia, hypotension, and vasodilation. And it’s particularly noted after spinal anesthesia.

The answer I won’t tell you about, but I thought it was quite surprising and quite simple. And what I really liked also about this question was the discussion. Because it actually goes into the origins of the Bezold-Jarisch reflex, where it starts from, how it’s initiated, and also discusses several potential treatments for preventing this reflex.

Stacy L. Jones, MD, MHA, FASA: I’ve got one Chris. Item 50 in 17B is another item in my own personal series of weird things that people have implanted in them that you have no idea what they are. It’s about the Watchman device, and some of these things have very clever trade names. And the patients don’t always have the little card in their wallet with them when they come in.

But I had a patient come through the other day that told us he had a Watchman device. And we were, like, well, that’s nice. What’s that? And educationally, the Watchman is a device that’s implanted into the left atrial appendage in people with chronic afib to – or paroxysmal afib – to prevent clot formation. And it has some effect on long-term anticoagulation for the patient. So that’s I think a fifth in the series for me so far.

Jeffrey K. Lu, MD: And then I have another item that you wrote Chris, and it has to do with age and how age is impacting anesthetic requirements. And I just wanted to just say that it was a very nicely written question. And again, the discussion that follows the question is what I think is really important and really helpful for readers and anesthesiologists in general. Just to understand and see how the effect of age and anesthetic requirement is.
Christopher J. Lace, MD, MBA: Well, thank you everyone for joining us today for this episode of the ACE podcast. The 17B issue launches in October of this year. You can order it now at asahq.org/ACE. Thank you and have a wonderful day.

Host: Thank you for listening to the ACE Behind-the-Scenes podcast. For more information or to subscribe to the ACE program, visit asahq.org/ACE.

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