BBGuy Essentials 033: Straight Talk with an ED Doc: Scott Weingart MD

Joe Chaffin: Hey, this is Joe Chaffin, back with another episode of the Blood Bank Guy Essentials Podcast. My goal for this podcast has really always been to try and get you different perspectives on the basics, on the "essentials" of transfusion medicine. And I've got to tell you, I am so jazzed today to present this particular episode, because I am really bringing you a very different perspective today! In fact, a perspective from completely *outside* of the blood bank. My guest today is Dr Scott Weingart who is from EMCrit.org. Scott is a ED intensivist from New York State. He works at Stony Brook Hospital, where he is the Chief of the Division of Emergency Critical Care. He is an emergency department intensivist, basically, and does enormous amounts of work with educating folks in his field and really across medicine through his podcast, which is known as the "EMCrit Podcast" (amazingly enough). As far as we can tell, its probably the most popular medical podcast in the world. Scott tells me about 20 MILLION, that's million, downloads of his podcast thus far...incredible!

Anyway, Scott approached me several months ago to ask me if I would be interested in appearing on his podcast and having him appear on mine to talk about our different areas of perspective and to try and learn from each other, essentially, so that our audiences could hear what the other side, if you want to put it that way, is looking for, and I want to be really clear on this. I think that one of the most tense areas of interaction can be between the blood bank and the emergency department, especially in really difficult times, trauma settings, things like that. I really don't think it has to be that way, and I was really delighted to hear that Scott doesn't think it has to be that way, either. We're going to talk through some things today that tell you a little bit about what they do in the emergency department, what they're looking for from us in the blood bank, how we can help them. And I think it'll really put you in a place where you better understand what is going on in the emergency department. I don't want to make you wait any more because I think this is an amazing interview, but I will say one last thing: This podcast is coming out on June 19, 2017. A week from that time, my interview with Scott, where he's talking to me about blood bank stuff, will be available on his website, EMCrit.org, as well as on iTunes and any place else that you get your podcasts. OK, time to roll. Let us hear my interview with Dr Scott Weingart!

[00:02:47] Scott, man, welcome to the podcast!

Scott Weingart: [00:02:52] Oh, it's such a pleasure to be here.

Joe: [00:02:54] I am so honored to have you. I've told everyone a little bit about you already, but I wonder if you wouldn't mind just taking us through real quickly who you are, what you do, and a little bit about your background?

Scott: [00:03:07] Sure. I'm an ED intensivist, which is kind of a nascent specialty in the world of medicine. I'm trained in ED and Critical Care. And I have a 25-bed ED ICU adjacent to the regular Emergency Department at Stony Brook. So I went through emergency medicine residency, and then I did two critical care fellowships in trauma critical care which is how I started interacting a lot with folks in the blood bank world.

Joe: [00:03:31] Yeah OK. Well and you have undertaken great educational efforts, and tell us just a little bit about the "EMCrit Podcast," Scott.

Scott: [00:03:41] So the EMCrit Podcast, very similar to your podcast, Joe, was just a way of being able to approach a larger audience with the stuff I cared about, which is resuscitation and critical care in the early stages of a patient's course.

Joe: [00:03:56] Gotcha. Your interactions with that podcast, and I've listened to numerous episodes, especially the ones that deal specifically with transfusion medicine topics, I mean, I can't recommend it highly enough. You take a really interactive view of how medical care should be done. And as a blood banker, I appreciate the fact that not only do you know what you're talking about, but you are interested in working with us in the blood bank in a constructive way.

Scott: [00:04:27] I've been lucky enough to work with some of the best blood bank folks out there in resuscitation medicine. I had the pleasure working with John Hess at Shock Trauma, who was so hands-on, so interactive with every part of taking care of a really sick patient, that I just thought *all* blood bankers were like that!

Joe: [00:04:48] **Joe:** [00:04:48] (laughs) So let's just let's get right to it. Let me hit you with a scenario first. And what I'm interested in is to have you help us in blood bank world understand the thought processes that are going through your head, the things that you're having to do in one of these urgent situations. Let's just imagine you're working in the emergency department, a patient comes in the door, they're wheeling in a patient who's had a motorcycle accident, it's something like that. And you're on duty, you're job is to assess the patient. Your job is to determine what needs to happen. So specifically, and I know that there's a lot of stuff other than the blood transfusion issues that you're dealing with, but specifically in terms of the three big questions for us: the will he need a transfusion question, will that transfusion need to be emergent like without a cross match, and will this be a massive transfusion? How do you assess that? What are the steps that you take, just in brief, that help you get to that point to determine what to do?

Scott: [00:05:47] Yes such a great question, and it's a question we all deal with in all resuscitative situations. There are scores out there, and they're useful, somewhat. They are not perfect. But for instance there's the "ABC score" we use which is a four point scale and therefore easy to remember, and it's essentially: Is the patient hypotensive? Are they tachycardic? Do they have a penetrating mechanism of their trauma? Were they stabbed in the chest versus the motorcycle crash you talked about? And then, the last part of it is, do they have a positive “FAST exam,” which is sticking an ultrasound on the patient's belly and looking for free intraperitoneal fluid? If they have two or more of those, it predicts mass transfusion reasonably well. But as they get to the three or four range it really pushes you towards it. Now to be quite honest, I think of that as more fueling gestalt than actually having to calculate that score, because as you get more experience, you just look at the patient, you look at their vital signs, you figure out what their mechanism was, and you say this patient's actually sick! And then, when they are borderline hypotensive, you start calling for blood products with rapidity.

Joe: [00:06:52] OK. And how how quickly, generally speaking, is that decision made?

Scott: [00:06:58] Well, it might be from moment one. Some patients are just meta-unstable, meaning like they are scaring you a little bit, but you want to see. And, in the old days, we might have given those patients a couple liters of fluid. We don't do that anymore. **Scott:** [00:07:12] By the time they get to us, they've already gotten 1000 cc of

fluid by the EMS folks, so we don't generally do that, but we'll just watch them for a little while. But the nice thing, in my current shop, and in the other places I've practiced (though sometimes it took a lot of work to get to that), is we have an "intermediate stage," and I think this is really important for every center to have. There's the, you know "standard type and cross," wait for the units, "Oh they're trending down, let's give one and we'll transfuse it." There's massive transfusion, which I'm sure we're going to talk about, but I think there needs to be a middle ground and that middle ground at our current shop, is we could order what we call a "stat pack." We send one of our clinical assistants down to the blood bank and they get us a cooler with two units of blood and two units of FFP, and the FFP is usually type A and the blood is obviously type O. It's usually just type O negative, though if the patient's a male or non child-bearing female, they might give us O positive. And it just comes, and it doesn't force the blood bank to start preparing the second delivery, it doesn't force them to shut down the whole blood bank as a massive transfusion might. They just have that ready, and they hand that to us. Well now, all of a sudden, we have the latitude of saying, "We have these products here, they stay up with us for two hours in that cooler, and then they could go back without being wasted. Let's see! Maybe the patient needs one unit of blood and they're done." OK, that patient doesn't need massive transfusion. "Oh wait. The patient's getting to the end of that first stat pack." Well, we have something called a "critical administration threshold" that's been verified and validated in the trauma literature world. It says: By the time you're going to transfuse your third unit of red cell, that is an absolute predictor of massive transfusion. Well, this is nice, because you get that stat pack on these patients you're not quite sure of. You've given them the two units of red in that box. By the time you want more, by the time you are hanging up maybe that second unit of FFP, you know for a fact based on that critical administration threshold: That's a massive transfusion player, and you can now push the button and say we do need to shut down the blood bank! Let's go and actually, you know, take it to the point where we're going to do consecutive deliveries, where we're going to ask for a bunch of products.

Joe: [00:09:25] You said several things in there that I that I want to expand on just a little bit. The first thing that actually made me smile is the phrase "shut down the blood bank." And I love that you that you understand that! I don't think that that's, unfortunately, universal among clinicians in understanding how much a massive transfusion impacts the operations in the blood bank. And so, with that being said, Scott, blood bankers, because it is such a big deal, we notice things like cancellations of MTP orders, where you know, you call an MTP, and then we shut down the blood bank as you said, we get the products out there and then all of a sudden the MTP is canceled. And it sounds like in your shop that doesn't happen often because you have that intermediate step, which by the way I love, but I can tell you that I put some questions out to some of the people that follow me on social media. This was one of the biggest questions that was asked: Why do MTP orders get canceled? Obviously, assuming that the patient is still alive. But what changes that makes an MTP suddenly go away?

Scott: [00:10:35] Well eventually you "win" on a lot of the patients! And that may be that you win in the operating room and maybe you win in interventional radiology or it could and you know this doesn't happen as often, but it does happen, patients need and this doesn't really make sense, you know until you actually see these patients, you get a patient who needed seven units of blood, seven units of FFP a pack of platelets, and all of a sudden, they just naturally clot and they stop bleeding. And that was clearly a massive transfusion patient if you got to that point, that was an appropriate activation. And yet, they didn't need continued transfusion until the point of definitive hemostasis, their body managed to do it on their own. So those are the three ways. Generally it stops, or you

know the last way, which is they never needed a massive transfusion in the first place. But there was no intermediary step that got new products rapidly.

Joe: [00:11:28] And I think that's a really important point. And to that point, Scott, is there something in the trauma world that you guys use as a quality measure for what I would describe as "false positive MTP activations," one that was activated that didn't need to be activated?

Scott: [00:11:44] You know I keep coming back to this intermediate step, but I've worked at centers that didn't have that, and we were actually trying to get it. And in those cases there are going to be a lot of what is considered "inappropriate massive transfusion." You know, you give that whole MTP pack, and they only gave one unit of blood from it. Well, I look at that as an appropriate activation if at the time they called for it, that was the only way in that center they could get blood immediately to bypass all the bureaucracy. You know sometimes the appropriate bureaucracy, don't get me wrong, but to bypass it because that patient may have had a very transitory hypotensive episode they might have dropped down to 60/40, and you give the one unit of blood and all of sudden they stabilize. That does happen, and when it does happen, there's no way at the time of the hypotension to predict how much they're going to need. So that doesn't in my mind go in the "inappropriate" category if there was no other way. Now in our shop, and the other shops I practice with where you can get a pack if you activate a massive transfusion at Time Zero and only gave two units, that kind of is inappropriate, because we could have gone a different direction. We could have just gotten that "stat pack" there. So, I think it really depends on the system.

And you know you had asked me earlier about how you know I interact with blood bank, and how other folks do. There's this very appropriate friction in the world of blood banking in my opinion, and you tell me if I'm incorrect because you know better than I do, of the desire to rapidly provide products to patients that need it versus the desire to preserve the actual blood bank and then similar friction goes on between rapidity versus safety, and those are the things that are like really fighting for any individual patient circumstance. And if your perception of it is as the resuscitation doc or the blood bank doc is slightly different than the other, those frictions will really lead to conflict.

Joe: [00:13:39] You're 100% right, Scott, those tensions do exist, and they are the opposite sides of blood banker's natures fighting against each other, essentially. We want to…I mean our job is obviously in a different role than your job, but our job is big picture the same. We're all trying to save the patients, we're all trying to do the right thing for the patients. We struggle, of course, with rules and regulations put on us by regulatory agencies that make that tension sometimes greater than others, I'll just put it that way. You're 100% right that when we're trying to find that balance, it can be really, really difficult. And for example, when you're talking about an MTP where we get the product out, we fire it out to the emergency department, and it comes back. And I'll tell you a worst case scenario and this happens a lot more than than what you might think: When the products come back, and they've been taken out of the coolers, and all of a sudden we've got to throw away a bunch of product, that is enough to make a blood banker insane.

Scott: [00:14:46] Well it gets worse, Joe, and I don't know if you know this, but there are many centers, it may even be a majority, that are sending up these massive transfusion packs without a cooler. Those are just burned the second they leave the blood bank, and it drives me nuts! I worked at one of these shops for a while and I just could not understand

it. But their take on it was because they were more in the safety world, "I don't know what these jokers upstairs are going to do with these products. I don't know if they're going to stick them out in the sun for a little while and then send it back to us. We're just going to consider these dead products."

Joe: [00:15:19] Well, and that that goes to something that we're going to talk about in just a few minutes, Scott, which is how we can better communicate expectations between our two areas. We'll get to that in just a second, but I want to come back to massive transfusion for a second. And I wonder if you would give us a thumbnail of your goals when you're in a situation, the MTP has been activated, you've got a patient who's in dire straits, What are you in modern critical care, in modern emergency department medicine and trauma care, what is your goal in hemorrhage resuscitation? What are you trying to do? What are the things that you're working through as you're caring for this patient?

Scott: [00:15:57] Absolutely, and now I've got to give the proviso that some of this is going to divert from evidence, and I will try to really state where there is actual literature versus where there is opinion and clinical practice style. So the patient in my mind now in this scenario is already at the point where either by gestalt or by score said, "They're a massive transfusion player." OK, well now we shift, because we've gone from a mindset of really avoiding products, can we get through without giving a transfusion, because transfusions are dangerous, all transfusions are dangerous, versus now, I'm in the mindset of massive transfusion. Well, now we're going to give as many products as we deem appropriate, and we've just broken that barrier. OK, so I'm there on this patient. They're sick. They've probably been hypotensive, maybe I've given a couple of units from that intermediate pack, or maybe from moment one, just because they looked so sick and their blood pressure was low, I automatically activated a massive transfusion on arrival. Now the massive transfusion pack comes. I'm going to take the platelets off the top of that cooler, because they're not in the cooler, they're at room temp, and give that to a nurse and say, "Just put this through a peripheral IV." So those are now going. The PROPPR trial, which you mentioned, would tell us that platelets probably should be the first product given, and the nice thing is, they're given kind of out of the stream of the red cells and plasma, because we don't pressurize those and we don't heat them. You probably can, but we don't. We just put them through a peripheral line. So I'll hand that off...

Joe: [00:17:24] Let me just interject, Scott, and say I appreciate you saying that because that is the "correct answer." However, you and I both know that in centers everywhere around the United States they're popping those suckers through the blood warmer. It happens a lot.

Scott: [00:17:37] Without a doubt, and I have a couple of studies saying it's safe, that there is no degradation of function. But for me, it's easier not to because I want to reserve...there's many of the so-called "massive transfusion devices" out there; we have what is probably the most common one, which is called a "Level One" (and I'm not promoting any of these companies and in fact if I was getting my druthers there's many things I could change about these devices). But what this is, is you get a two-chamber pressurized area and it's going to, with pretty good success, heat these products up to about 40 C whatever you stick through them. So they're going in rapidly and they're going in warm, which is good, because hypothermia begets the coagulopathy of trauma. So we want to avoid that. So what I'm going to do is going to look up that patient's blood pressure, 60/40…not happy. And now I'm just going to go red-yellow, red-yellow, red cells-plasma, one by one, with a blood pressure goal. And that's just being put through the Level

One in my case, or any massive transfusion device, to get at the minimum a MAP (a mean arterial pressure) of 65. And I'm just going to continue that transfusion until either I run out of product and hope the next massive transfusion delivery is coming soon, or their blood pressure stabilizes to a reasonable extent, or better than a MAP of 65, in a patient with a head injury, it might be a little bit higher, it might be a MAP of 80, but I'm going to use my blood pressure goal to determine 1:1 red cell to plasma transfusion. And we are giving these products through big lines, usually at this point I will have asked or placed myself what we call a introducer sheath or a "cordis" in some places in the United States maybe the way people know of it. This is an 8.5-9 French. This is an *enormous* catheter going in the patient's central circulation. I could put in through one of these massive transfusion devices, **a unit of blood in about 30 seconds**!

Joe: WOW!

Scott: And this is a point of misunderstanding between the resuscitation doctor and the blood bank, at least in the earlier days, and maybe still now in many places, because when I asked before their massive transfusion became popular I just said, "Give me four units of red cells. I got a critically old G.I. bleeder," they'd be like, "There's no way!" because in their minds, you know, three of those units are just going to be rotting on a desk for 40 minutes because they're used to these products going in over an hour, over 30 minutes. That's not how it is when a patient's sick. I am putting in unit by unit easily less than a minute, for sure. That's if it's going through a peripheral line, or like I said, 30 seconds in a really sick patient.

Joe: [00:20:29] So that's incredibly fast, and I think if blood bankers only understand that, I think we will have accomplished something huge in these discussions. So, thank you for covering that. One question that I that I have for you, Scott, when you're doing that, when you've got blood products firing in that rapidly (and I will admit that as blood bankers we're used to a different model, no question about it), but my question for you is how do you monitor patients, or is it possible to monitor patients for transfusion reactions in that type of a setting?

Scott: [00:21:01] Probably not. These patients are intubated, if not at this moment they shortly will be, they are sedated. You're going to attribute the hemodynamic perturbations of a reaction to the fact that the patient's exsanguinating, and not even consider that. So you know short of a rash developing, you're not going to realize it probably until afterwards. Now it's the contention of people far smarter than me in the trauma transfusion world that the likelihood of a reaction in the setting of massive transfusion is quite low, even to the point where we have had ABO incompatibilities realized, and I will never mention which centers this occurred in, retrospectively. And the patient had no reaction at all in the course of really profound massive transfusion.

Joe: [00:21:53] And while I agree with you, Scott, that when things are going in and out so rapidly, that I think it does decrease the risk somewhat, it would be unfair of me not to mention that every year the FDA reports transfusion-related fatalities, and almost every year there is a scenario where someone in an emergency transfusion, massive transfusion setting, got blood that was incompatible in some way either through either due to ABO or a non-ABO antibody like Kell, Kidd, Duffy, something like that, and died as a result. I will also grant you that it's in my opinion it's difficult to tell whether they died from the transfusion reaction or whatever caused them to get the massive transfusion in the first place! That

seems challenging to me, but it's also true that there are things like that reported to the FDA every year. They're not huge but they are there.

Scott: [00:22:47] Joe, let me be clear: I am not advocating that anyone do that! (laughs)

Joe: I wasn't taking it that way, Scott! (laughs)

Scott: We will not do the "n" of one trial on giving the patient the wrong blood type!

Joe: [00:22:58] I totally gotcha. I completely understand. I want to talk just a little bit Scott...Actually, before we leave massive, real quickly, just to finish up kind of your goals. Is it your goal in the emergency department to essentially to get the patient, is your job to stabilize the patient enough to get them to surgery? How long do these patients typically stay in the ED?

Scott: [00:23:19] Yeah, it depends on their injury pattern. If they have a intraperitoneal organ or other source of bleeding, in general, the best place for that patient is the operating room as soon as possible. And we're actually graded as a quality measure on how quickly they leave the emergency department. Now, where it becomes a little bit different is if the patient has an injury that would be more conducive to interventional radiology, then going the OR in general is not going to be as successful. There are temporizing measures. But in general, if you could stabilize them to get to IR for something like a horrible arterial pelvic bleed or a retroperitoneal bleed, then that's the better place. And they may stay in the emergency department for 30 minutes waiting for interventional radiology to come in, because very rarely are they in-house; even at the best trauma centers, these folks are usually at home. And in those cases, they may very well stay in the emergency department. And then, up until a few years ago, I was also in a SICU, and so after the initial operation, we still had a lot of work to do on the transfusion side to actually stabilize these patients, because they would leave the operating room in a grossly unstable state. Something in this trauma world called "damage control operations," where they were not trying to stabilize the patient in the OR; they were trying to just do enough to staunch the bleeding, get them out, re-transfuse them to get them to a point where they could take them back to the OR again for a safer definitive operation.

Joe: [00:24:54] OK. So let's leave massive transfusion and let's move on to something else that I think from our previous conversation, Scott, know it's something that's a little bit of a hot button for you, and it is for me as well. Let's talk about patients coming into the emergency department with intracranial hemorrhages. In particular, I'm interested in two particular situations: One, the patient with an intracranial hemorrhage who is on an oral anticoagulant, whether that's warfarin or one of the new novel oral anticoagulants, and the second is patients who are on a platelet-damaging medication from aspirin all the way up through any of any of those medications. So let's start with the intracranial hemorrhage in a patient who is who is anti-coagulated with warfarin or another another novel oral anticoagulant. What is your approach to those patients?

Scott: [00:25:43] All right. This is a soapbox issue for me. I did training in neuro critical care. I watched the degree of patients' expansion of their hematoma while they're on oral anti-coagulation or any anti-coagulation. And so, unlike patients who just smashed their head and have an intracranial hemorrhage, where they will have the potential for hematoma expansion, but in general it's not huge (usually it's what you see is what you get), and you just will trend them, but they're generally, a) there's not too much you could

do, and b) the expansion is not enormous. A patient on oral anticoagulation, you essentially have 60 minutes to prevent their hematoma from expanding, and in the neuro critical care world, and I think many people in medicine don't understand this, the difference of like 1-2 cc may be the difference between a neurologically intact survival versus a vegetative state or death. So we're not talking big amounts of expansion being a problem here. We're talking small amounts. So you need to get them reversed right away. And for warfarin in particular, that, in my opinion, now, should be done with some prothrombin complex concentrate and not with FFP. FFP will eventually work (FFP plus vitamin K), but it will take too long. It will take hours and hours unless you do the right thing, which no one does, and the right thing is to give at the minimum four units of plasma within that first hour, just empirically. And that is in a patient who is appropriately targeted on their anti-coagulation, they have an INR somewhere between 2, 3, 3.5 in a patient whose INR is elevated, you know the 7s or 8s, arguably you should give six empirically in that first hour! And that will almost certainly give volume overload in most of your patients, but it will get their INR reversed with alacrity. Or you can give a prothrombin complex concentrate in that first hour and get the same reversal effects, probably a more potent reversal effect. Now in order to make that happen, logistically, it's very hard.

Joe: [00:27:55] OK. So Scott let me just interject for a second and ask you about about prothrombin complex concentrate. I am a very strong believer that it is a better product than fresh frozen plasma to reverse warfarin in these in these situations exactly as you're talking about. But I am wondering, in the United States, forms of PCC have changed a little bit over the years, and up until not that long ago, all we had was really what I would call “three-factor PCC" in other words it lacked the factor VII; pretty important in reversing warfarin. Nowadays we do have an approved four-factor PCC in the United States so I'm wondering has your feeling changed one way or the other with the introduction of Kcentra?

Scott: [00:28:37] It hasn't, because I was always a fan of PCCs, even when we only had a three factor. Yeah. And even that's kind of a misstatement which we'll talk about in a sec, because everyone had access to a four factor, it was just the one that was deemed, I think unfairly, as "dangerous" and that would be FEIBA, but we could come back to that in a sec.

Joe: Please.

Scott: So the three factor we had was Bebulin, but I think they were all pretty much the same. We did a quality assurance study on our reversal potential, and with the three factor, we got patients reversed to less than 2 almost across the board, regardless of their initial INR with reasonable doses of three factor PCC. And when we didn't, my presumption was that INR as a test is very factor VII-avid. So they're not necessarily going to reverse the INR without the VII but their actual bleeding risk was probably reversed. And this is not my opinion, this is the opinion of people far smarter than me, and this is the reason you were always told in medical school, “Don't monitor things that aren't warfarin with INR,” because the liver failure patients for instance who lack factor VII probably are not going to bleed even though their INR is quite high, because they just don't have the factor that the test is for. INR almost exclusively is testing for VII activity. So I think three factors were fine. We always had an activated form of the four factor, that I think got a bad rap. But when you actually delve into the data, FEIBA seemed pretty safe, and now was always an option, as well. But I think this is all, kind of academic at this point, because I think most centers really should have four factor, they should have Kcentra in the United States. It's the only one currently available, and in most places across the world, they've

had this for a while, and there's just no reason to give three factor any more with a four factor approved product out there.

[00:30:32] And if you'll allow me the latitude, Joe, I just wanted to just very briefly mention the logistics I alluded to earlier. If you're going to give Kcentra, you really need an incredibly well-trained nursing staff or, and this is an unpopular opinion, you need to take it upon yourself as the resuscitation doc to be doing the mixing on this yourself, because it's very easy. The patient comes in, they're on warfarin, you get a point of care INR, it's 5 and you say, "OK, give the Kcentra," and you push the button as a doc and you feel like you've done your job. And then if you actually go to the bedside and check, it'll be two hours before the patient even gets a drop of that Kcentra touching their bloodstream, because there's been these multiple layers of, "Oh is there someone in the department who remembers how to fix this? We haven't done it," and it just can't happen. So we made videos on how to mix this we made cheat sheets and I actually was taught by the company how to mix it. They're ever so happy to come and give you these tutorials, and I just mixed it myself if they couldn't immediately find nursing staff who felt familiar enough to do it because this product is logistically tortuous. You know there's a whole bunch of vials that have to be mixed, and you have to figure out how you're actually going to get it from the vials to the patient, which is not a trivial thing. You really need to either convince yourself, even though no one says it's safe, it is safe to put into normal saline. Or, you need these empty bags, these sterile bags made to put things in which are never available when you need them. So if you got a busy center, no problem. But if you're in a community center, and you're to be sending this intracranial hemorrhage patient somewhere, but you're just like, "Ah, this is too much work. I'll let the receiving center do it," you're really doing that patient a disservice and you just need to find a method to get this done quickly at your shop.

Joe: [00:32:23] Your perspective is really helpful, because in blood bank world, it's very easy to think, "Oh, they'll just give him Kcentra, what's the big deal?" but that's really helpful to know that there is more to it than that. So moving on to the other novel anticoagulants, the dabigatrans, for example, of the world. How does how does that change your decision point?

Scott: [00:32:42] You mentioned Dabi. So let's talk about that. I would be ever so pleased that this drug just died off. You know, and there's probably some good reasons to say that, now with the "xabans" available, to just let this one go. But up until recently, we had no real antidote. It was very questionable in my mind whether the PCCs would actually reverse this. Everyone says, “Oh, do dialysis." That's a logistical nightmare as well. It just doesn't happen. Now we have a reversal agent, I'm not going to try to pronounce. It's questionable how well it works. But that's what we would be using if a patient came in with dabigatran, it starts with an i and I won't pronounce it and that's what we would...

Joe: [00:33:25] OK, fair enough. So in the interest of time, let's move on and talk about another scenario where the patient with intracranial hemorrhage who is on a platelet-killing medication, again from aspirin all the way up to the heavy duty ones. I know that you're well aware of a study that came out in Lancet in 2016 which was which was called the PATCH study. I wonder if you would talk us through a little bit about what that showed, how that impacted your practice. I'm guessing you probably already believed what it showed in the first place, but I'd love to hear what that study showed and what the implications should be for us?

Scott: [00:34:04] Yeah, so the first thing you need to understand is it's a dichotomous world of head bleeds. There's the "neuro" head bleeds, the folks in the bow ties. And then there's the "neurosurgical" head bleeds, and I'll put in that same category trauma, and you have to understand there's a pretty clear divide in their perceptions of these things when it comes to reversal of anti platelet agents. The neuro folks forever have just said, "There's no evidence that reversal helps, there is evidence that giving products like platelets are bad. We're not doing it until you show us evidence that it helps." For those folks, the PATCH trial, which actually looked at non intervened-on bleeds, they weren't getting a hemi-craniectomy, they weren't getting monitoring devices inserted through their skull, was just a validation of what they already believed. So if you had a bleed that was small enough that they weren't going to get an operation, we weren't reversing with platelets for aspirin or clopidogrel, and now after the PATCH trial, we definitely are not. That is different than the bleeds that are getting an operation or a monitoring device. And now the neurosurgeons will say, and they may be right, that we cannot apply the PATCH data to patients who are having drills stuck through their brain, let's try to avoid the brain, through their skull, and they will tell you, "We want them reversed until we have evidence that it's NOT helpful." So you could see the different perceptions of the of the people that want to make their errors of commission versus errors of omission. They will tell you a patient on aspirin or Plavix for any of those three situations: Bleed that needs a operation, a bleed that needs a monitor, or a traumatic brain injury, will absolutely get their antiplatelet agents reversed. And as to how to do that, no one really knows, but in general, they'll be giving one donor pack of platelets for aspirin. And from the PATCH trial, many people have extrapolated two donor packs for clopidogrel, and you're probably going to be doing that for any bleed managed by neurosurgery or trauma.

Joe: [00:36:17] OK, Scott, well let's close with just a couple of a couple of quick things. This is a question that that I get asked a lot, and I'll be completely honest with you and tell you that I have a fairly negative bias towards it, but I'm going to be fair and see if you can convince me: What is the benefit, or should there be a blood refrigerator or some other remote blood dispensing device in the emergency department?

Scott: [00:36:43] Well you know this ties in naturally to the question of interactions. I think if you are a major trauma center, yes, there probably should be. And this goes to that same, you know we talked about the blood bank maybe not appreciating how quickly we get these units in, they might also not appreciate the alacrity with which we need these products to avoid a patient going into cardiac arrest in some of the patients we treat, and therefore having a couple of units of blood, and in some centers that could support it, a couple of units of plasma there may be the difference between a patient who is really hypotensive and a patient who is now in traumatic arrest. And in trauma, what happens when you have even a brief period of arrest is kind of devastating. What's going to happen on that patients are going to have their chest opened, and it might very well have been that you could have left them without a palpable pulse for the five minutes it took to get the stat pack or massive transfusion pack to the bedside from the blood bank. But no one's willing to wait because you don't know if they will have come back by the time the blood gets there. It's impossible. So the only thing you wind up doing is what we are trained to do which is now the patient gets a thoracotomy, which is not a trivial cut on that patient. So having products there, being able to temporize them until the massive transfusion pack arrives, may be the difference between some very significant morbidity. So I really am a supporter of that. We finally got ours out at my current center. It is locked down, you can't get in there until you scan the patient. It's only a certain cadre of nurses that are allowed to access it. They get a enormous amount of crap when it gets messed up and the messing

up is never you know doing something dangerous, it's just not accounting for where those products went. I think this can be functional, and I think it can be, if not lifesaving (though I believe it is), certainly saving the patient from some really grievous procedures.

Joe: [00:38:46] And under the circumstances that you're describing, Scott, I actually do see the benefit of it. The issue for me is always control, and I don't mean being a compulsive blood banker and having to control everything around us. That's not what I mean. What I'm referring to is the fact that, as you know, blood banks live in an incredibly regulated world where where we are held responsible for things that are sometimes completely beyond our control, and the thought that blood is just sitting in a refrigerator somewhere, which obviously you're not describing that, you're talking about a very controlled situation, not only can I live with that, I actually have supported that, and have done that. Where it becomes a problem for us is in smaller hospitals that maybe don't have the logistical setup or the expertise to set up the kind of controls that you're describing, to where just anybody can access the blood and that is a problem for us.

Scott: [00:39:42] And I will say in those small centers, and I just keep harping on it because it might be the most important thing that's changed in my interactions with the blood bank, is that intermediate pack that has no red tape. That if someone in the emergency department or critical care or the operating room says, "Send us a stat pack." If you can eliminate as much as possible any bureaucracy, and have a system in place, regardless of who the actual person physically doing it is, to get that product from the blood bank to the people that need it. Then in many centers, even medium sized centers, I don't think you need a blood fridge. But, if you do not have the ability, and it should be actually and we did this, it should be simulated out. You should have a call made to the blood bank and say, "I have a crashing GI bleeder; I need products now!", and see how long it takes, and see where the barriers are. If you can't make that happen, then there needs to be something, and that's something may be a blood fridge. But I think it's much smarter in those small or medium centers to make that happen, to make something that gives you an immediate release of a reasonable amount of product without red tape.

Joe: [00:40:43] So you you have just transitioned me beautifully to the last thing I want to talk to you about, and that is improving relationships and improving communication between blood bankers and clinical staff. And one of the things that you just said to do is to do a drill to test things to see what works what isn't working and what is working. In my current role I work in a blood center and I interact with with an enormous number of hospitals here in Southern California that are trying to figure out how to do this well. One of the things that I always tell them, ALWAYS tell them, is that, "You cannot wait to figure out what your flaws are until 10:30 p.m. on Saturday night when you've got a patient crashing in the ED! You've got to figure that out before you ever get to that point!" So with that being said, Scott, from your perspective, what can we do and what have you personally done and seen work to improve those relationships, improve the communication so that the blood banks know what you need as a clinician, and you know what we need as a blood bank. How do you go about bridging those gaps?

Scott: [00:41:50] Well you and I both mentioned, just try it out as a simulation. First off, it's amazingly educational for both services. We talked about not understanding how how quickly we could put products in, the other thing that I think blood bank doesn't understand sometimes is how quickly patients could bleed and we have something that my mentor Tom Scalea called "audible bleeding," meaning that patient with a variceal bleed, or the patient with a stab wound to the femoral artery, is bleeding so quickly that you hear the

rush of their exsanguination as they take their whole blood volume out in the course of just a couple of minutes. That is scary. And if a blood banker ever got to witness that, they may understand why the dyssynchrony between the services sometimes happens. So simulate out a variceal bleed in the ED just as you said, or a or a patient in the operating room who's exsanguinating that was unexpected, and see where the barriers are. Now, by the same token, someone from that service, emergency medicine or critical care, should be present during either a real or simulated massive transfusion in the blood bank, so they could see the amount of work that goes into it, because they certainly don't appreciate that. I didn't until I actually did that myself. So that's one way I think really you could bond, and there should just be one liaison from the emergency department to blood bank, there should be a liaison from a critical care unit the blood bank, and those folks should be friends with the blood bankers and all of a sudden you understand the difficulties.

The other thing that I think needs to happen at any major center is there should be real time communication between a blood bank physician and a physician in the resuscitation in charge of blood administration. And there should be one of those there. And it's usually me in these major traumas because I like the role, I think I understand what's going on. In some places, it'll actually be the blood banker themselves appearing at the massive transfusion. But there should be a direct communication between the blood administration physician and the blood bank physician, and if they're the same person at the time, then that's easy communication in real time. And that might mean on your cell phone you're talking to them every five minutes and they're asking you, "Where do you stand? Should we do the next delivery? Should we not? Have you checked the fibrinogen lately? Should we at some CRYO to the next pack?" If you're in a place that has a TEG or ROTEM, both of you should be looking at that in real time and discussing what your next move is going to be. Should we switch off massive transfusion and go for a more directed product strategy, based on the results of a TEG? So that communication, if it's not happening, it's a real loss, for that individual patient, but also for the bond between the blood bank and that service, because if you're talking in real time, you're all on the same page, you're bonding over a stressful circumstance you're not going to treat them badly the next time around.

Joe: [00:44:46] That's a really important point. I would mention, Scott, in case any of your followers are listening to this discussion, generally speaking, pathologists are in charge of medical oversight of blood banks. Quite frankly, there is a wide spectrum of interest and expertise in transfusion medicine. In some cases you get a transfusion medicine expert and that's perfect. In other cases you get someone who is an anatomic pathologist and tries to stay as far away as possible from the blood bank! But again I think it goes to what you said: You've got to figure that stuff out before we're in the heat of the battle, and having those discussions, figuring out who you can talk to about those things in real time is so, so critical. I completely agree with what you said there.

Scott: [00:45:30] Yeah you know look, all the small-medium centers, they might just have someone who that's not their interest. But if you're at a major trauma center, and it may not be the head of the blood bank, but somewhere in the blood bank, there needs to be an expert on resuscitative medicine at major trauma centers. And if that person is not there then that's a gulf for your care of your patients.

Joe: [00:45:50] I agree completely. I agree completely. Well, Scott, this has been awesome! I think that you have really helped shed some light on things for my audience and really put us in a better situation of understanding the things that you guys are dealing with. I am enormously grateful for you taking the time to talk to me.

Scott: [00:46:08] Oh such a pleasure. Such a fun conversation.

Joe: [00:46:15] OK guys, that was really a lot of fun for me! I hope you had as much fun as I did listening to that. Scott is a brilliant, brilliant guy, and he has a lot of great thoughts. I need to tell you, a lot of the questions that I asked today were generated from followers that I have on Twitter and Facebook. I told people that I was going to be talking to Scott and asked for their feedback and their questions and some were excellent questions that I received through Twitter. And remember on Twitter it's @bloodbankbuy and Facebook which is facebook.com/bloodbankguy. Continue to follow me on those places and you'll get previews of other stuff that's coming up. Again I'm sorry that I couldn't get to all the questions that you guys submitted. There were a heck of a lot of them, but we included some of them as best we could.

The one other thing I do want to tell you is that the comments section for this page on BBGuy.org, so it's BBGuy.org/033, at the bottom of the page, you can scroll down and you can add any comments that you have. I really want to encourage you to do that. I interact with people through the comment sections, I read every single comment that's put on the web site, and I will try to answer your questions as best I can. And if I don't know the answer, I will try and engage Scott on some of those. He's a really busy guy, but I think he'd be open to a few questions, anyway. So I will do that as well. If you have the chance, when you're listening to this either on your computer or when you get to a computer, if you wouldn't mind, head to iTunes, give the show a rating and a subscription. It would really help us get the show in front of more people, and I would really appreciate any feedback that you have. And last but not least, go to BBGuy.org/subscribe, especially if you're a new listener to the podcast, so that you can be alerted when new stuff is coming out. I have lots of great interviews in the pipeline. Lots of fun stuff that's coming through the Blood Bank Guy web site, and I would love to share it with you and I will never spam you! I would love for you to be a part of things going forward.

So that's it for today everyone. I hope this has been really, really helpful for you. I wish you the best, and as always as you go through your day, I hope that you smile, I hope that you have fun, and above all, never EVER stop learning! Take care and we'll catch you next time on the podcast.