Aaron N. Leetch, MD:

Welcome to the latest installment of Paradigm Shifts, the official podcast of the National Foundation of Emergency Medicine. The purpose of this podcast is to create visibility for young and soon to be prolific academic emergency physicians by highlighting their research and their vision for their field. We hope to introduce these ideas to you, the listener, and to expand, and maybe even redirect your thinking toward the forefront of both the science and the philosophy of emergency medicine. Today, I am joined by Dr. Elaine Situ-LaCasse. Dr. Situ-LaCasse completed her residency in emergency medicine and her fellowship in ultrasound at the University of Arizona. She's currently an assistant professor at the University of Arizona and devotes herself to teaching point of care ultrasound to medical students, residents, and even needy faculty like me. She has won numerous awards for her teaching and research, including awards from the Society for Academic Emergency Medicine and Fem In EM. Dr Situ-LaCasse welcome.

Elaine Situ-LaCasse, MD:

Thanks for having me Aaron.

Aaron N. Leetch, MD:

So today we're going to be discussing a broad overview of your research in emergency medicine and ultrasound. The three paradigms, your research addresses are as follows. Number one, ultrasound training and education should be accessible to all medical professionals. Number two, we need better tools for teaching ultrasound and number three, there should be simplification and integration of complex concepts regarding cardiac ultrasound, so that all emergency physicians can perform bedside echocardiography on chest pain and syncope patients. Could you tell us a little bit about how you became interested in this area of research?

Elaine Situ-LaCasse, MD:

I actually became interested in emergency ultrasound as a third year medical student. It was something that was introduced to me by Dr. Srikar Adhikari, who is the section chair, and also my mentor. And through fellowship, he recognized that I really enjoyed education and it was something that I really enjoy through residency as well. And I became the director of emergency ultrasound for our section. Based on this, it's going to segue very naturally into doing research on education.

Aaron N. Leetch, MD:

Great. So this has been something that kind of appealed to you during emergency medicine. Do you feel like you saw ahead in the future of the applicability of this and wanted to be a part of it? Or what part of ultrasound is it that really gripped you and said, I not only want to do this in my practice, which many of us do, I not only want to teach this, but I want to do research in this to kind of further the progression of this field.

Elaine Situ-LaCasse, MD:

Yeah. The history of point of care ultrasound is that it's a relatively new application of this imaging modality, and it really has taken a huge boom in emergency medicine. And I saw that we could use this in not only emergency medicine, but also in other specialties and not only in the hands of physicians, but also in the hands of advanced practice providers and also paramedics. And I wanted to be a part of that wave.

Aaron N. Leetch, MD:

That's great. And I think that we certainly embrace a lot of stuff in emergency medicine that is new and ultrasound is something that has been a huge boom across the country. It's interesting to see how this has changed from just a diagnostic modality that you'd send a patient away to the ultrasound suite for a couple hours. They come back and you look at these fuzzy black and white images and go, I don't know. I have to wait for the read, to where now many of our residents, many of our faculty, where we work can look at those images and interpret them, or even just obtain them themselves at bedside and really cut out a lot of time, make some decisions a lot more quickly. It's really fascinating to see how this has been incorporated just over the last decade or so.

Elaine Situ-LaCasse, MD:

Yeah. In terms of the diagnostic usefulness of the point of care ultrasound, it really has decreased the length of stay for patients for certain examinations. Let's say a right upper quadrant ultrasound of the abdomen, looking for whether or not there's gallstones or cholecystitis. You are cutting out hours of patient waiting, one, waiting for the radiology, sonographer to be available. And two waiting for the read to come back. And also for resuscitation, emergency medicine docs are masters of resuscitation, and this is another tool that will help them better take care of our patients. It not only allows emergency medicine physicians to better care for our patients, but also those that are working in the emergency department in general. Here we train our paramedics and our nurses to point an ultrasound guided IVs. In which case the patients, nowadays are coming in requesting ultrasound guided IVs before our ultrasound techs can even look for a vein. So I can see how that can be frustrating sometimes, but also it really warms our heart when we hear that.

Aaron N. Leetch, MD:

Yeah, it used to be, now I'm a really hard stick, I need your best nurse. Now, it's I need your best nurse armed with an ultrasound.

Elaine Situ-LaCasse, MD:

Exactly, exactly.

Aaron N. Leetch, MD:

It's good to see that kind of technology has progressed and that people are recognizing it, even our patients are recognizing that extra step that we have. And I'm curious since a lot of your research revolves around ultrasound education, what have you noticed are some of the challenges in teaching ultrasound that you could share with people?

Elaine Situ-LaCasse, MD:

So with this growing group of learners, such as advanced practice providers, medical students, of course, residents, faculty members from various specialties, we have a challenge to meet. And that is to provide high quality teaching with few experts that are trained in ultrasound, emergency ultrasound. So we need better tools to teach these learners and maintain that high quality of training.

Aaron N. Leetch, MD:

So I think we've touched on all of your paradigms, but let's get into them individually now. So number one, ultrasound training and education should be accessible to all medical professionals. So when you say all medical professionals, you mean not just all specialties of physician, but you mean all medical professionals, right?

Elaine Situ-LaCasse, MD:

Yes, right now we have set training requirements for emergency medicine residents, which then hence emergency medicine physicians. But I'm in the camp in which we should be generous with our knowledge and our education. So I'm saying that we should teach not only other specialties, such as internal medicine and family medicine and anesthesia residents, for example, but also advanced practice providers and EMS. We actually have very few EMS programs in the country that use ultrasound. Whereas in Europe, there's a lot of EMS providers that use ultrasound. But also we're teaching nurse practitioner students, CRNA students on how to use point of care ultrasound.

Aaron N. Leetch, MD:

So I think it's interesting with you've got ultrasound with it's multiple applications, we're using this pretty much everywhere. Are you looking to kind of have, as I'm waiting for it to happen where ultrasound just replaces a stethoscope?

Elaine Situ-LaCasse, MD:

So there's a little bit of controversy on whether or not ultrasound should be considered part of the physical examination or a diagnostic modality. And at this point in time, I think that we are still considering it as a diagnostic tool, because if you all of a sudden lump it into the physical exam, you're not really giving credit where credit is due. It takes a lot of training and time and practice to be good at point of care ultrasound. And we don't just want to say, "Oh, it's just part of the physical examination." And not get credit.

Aaron N. Leetch, MD:

All right. So, it's interesting being an emergency doctor that you're training all of these different specialties in what they do. And the more I was thinking about it, it's almost like being an EMS medical director of you are not a medic, but you are the one directing their care that you need to really have a good idea of what all of these different specialties are doing and kind of brainstorming how they might use it in their practice. So how do you approach an emergency physician versus an advanced practice provider versus an RN when you're going to teach them ultrasound.

Elaine Situ-LaCasse, MD:

We sit down with them and we create a curriculum that's tailored for them. And just like you were saying, the scope of practice for an RN is going to be very different from the scope of practice from a family medicine doctor or an emergency medicine doctor. So before creating a course or even a class, we sit down and talk with them about what is important to them in their day-to-day practice. And how will it best improve their workflow, patient care, decreased patient wait times and hopefully healthcare costs.

Aaron N. Leetch, MD:

That's really great. And you mentioned, of course, your ultrasound IV program, which you have. So it seems like for a while, we were teaching our residents to do this, which we still want our residents to be good at doing this for any residents that may be listening, but it seems natural to have the paramedics or the nurses who are already skilled at putting in, I guess you could call them blind IVs now and saying, "Here's how to use the ultrasound." And it seems again, we've come back to where, well, the nurse will get it. The nurse who's trained in ultrasound guided IVs can get it because you take someone who is already skilled and then taught them how to see in the dark.

Elaine Situ-LaCasse, MD:

Yeah, but the principles of using ultrasound to put in an IV are the same principles that we use to put in central lines. And it's all hand-eye coordination. It's all about practice and repeated practice. We actually have our residents when they rotate with us during their two weeks, as an intern to have them do at least five ultrasound guided IVs, because the next line of assistance after the nurses or the medics can't get the ultrasound guided IVs is going to be the physician. So you have to be skilled to do that. Although sometimes I have to say that that might not be the best choice. But we should still be competent in doing so.

Aaron N. Leetch, MD:

Likely not the first choice.

Elaine Situ-LaCasse, MD:

Right. Exactly.

Aaron N. Leetch, MD:

I always tell our patients, there are some things you just don't want your physician doing because yeah, we can do it. We're just not as good. It sounds silly, but putting on a monitor lead or a pulse-ox, I swear I've strangulated more fingers trying to put on a pulse-ox and poor nurse has to fix it later. When looking at all of these skills, I mean, all the applications that we have from a physician perspective of the point of care ultrasound for soft tissue infection, for evaluating for foreign bodies, for evaluating for DVTs or bedside ultrasound for cardiac reasons, syncope and chest pain, as we mentioned earlier, there are so many different options of what's out there. They can seem kind of overwhelming. If you're not somebody that already has ultrasound incorporated into your practice, do you suggest like an [inaudible 00:11:57] method of like, well, I kind of want like this, but I don't like that. So I'm only going to focus on this area of ultrasound.

Elaine Situ-LaCasse, MD:

Yes. The [inaudible 00:12:08] method is part of the initial discussion about how to create a program or a course that's going to best serve the needs of the learner. So for, let's say, for example, internal medicine residents that we teach. So we talk to them about various applications of ultrasound. They want to do cardiac, they want to do the FAST exam or rush exam, but they might not be as interested in OB ultrasound because they're not going to be ideally for them. They're not going to be taking care of pregnant patients all that often. And they would rather have a radiology performed ultrasound to evaluate for fetal movement, heart rate, et cetera. So we do sit down and figure out what handful of applications, because if we just open it all up to them all at the same time, it is going to be overwhelming.

Aaron N. Leetch, MD:

Yeah. I think for me, I've trained in this during residency and then try to learn some on my own as a faculty member. And some of these I do all the time. We see a lot of pregnant women in our paeds pod because we see all the way up to 21. So I do a fair amount of first trimester OB ultrasound. And I do a lot of soft tissue ultrasound. But man, I don't look at eyes. I don't look at DVT as much. And so even though I was kind of trained in it, I just don't feel as comfortable making those decisions. So I just kind of choose not to do them. But for somebody who's trying to incorporate more ultrasound or maybe they're just skeptical in general is like, I can't interpret those snowy black and white pictures that you keep showing me. What's your encouragement to them to kind of start to learn to do this in their practice.

Elaine Situ-LaCasse, MD:

I say that it is not as hard as you think it is, because if it was that hard, I wouldn't be doing it.

Aaron N. Leetch, MD:

Yes it is, no I'm just kidding.

Elaine Situ-LaCasse, MD:

If it was that hard, I certainly wouldn't be doing it because I certainly am not a genius. And it's all about practice. Just being, A, open to it and B, practicing and starting with one application at a time. If you're really interested in just resuscitative ultrasound, let's say, why don't you just start with a cardiac ultrasound, we'll start with one view, looking at the subxiphoid to see if there's a pericardial effusion. Have a very directed question and using ultrasound to answer that.

Aaron N. Leetch, MD:

And I think the next step that's difficult, like you may be able to look at that. I have no problem looking at a right upper quadrant in a patient that has abdominal pain when I don't actually think they have cholecystitis, cholelethysis, any kind of gallbladder pathology. But when I'm actually worried, they do, I go why don't we get the formal ultrasound because I'm just not ready for this. How long do you think it takes for you to actually be comfortable enough to interpret and make a decision on an ultrasound you perform yourself?

Elaine Situ-LaCasse, MD:

That's a really good question. And that's a question that I don't think our field really knows. Right now, based on expert consensus, we say twenty-five exams. So you perform 25 gallbladder exams. And we say, "Okay, well you're competent." But we need to look into that some more. We need to do more research, have more evidence-based information behind saying that 25 is the right number. Or maybe it's 35, maybe it's 45. We just don't know yet.

Aaron N. Leetch, MD:

Yeah. And maybe it depends on the scan. Maybe some scans that are more technically difficult than others are going to require more scans. Maybe you have to do it on different body habitus is because I find that on a cardiac echo on a 20 year old is a lot easier than a cardiac echo on a morbidly obese, 50 year old or a cachectic 75 year old, very difficult to get some of those windows and interpret and find myself saying, "Well, it's worth a look. And if I can't tell, I won't make a decision based on what I see. I'm not going to incorporate this into my care because I didn't get a good look." But if I can find something and I know what I'm looking at as pathologic, then I'm willing to kind of keep going with that. I think ultrasound very specific when you find something it's there, not very sensitive, unless you are really, really skilled at it, you've practiced at it and you know exactly what you're looking for. Would you agree with that?

Elaine Situ-LaCasse, MD:

Yeah, absolutely. And it is all about the performers comfort in whether or not they can acquire an image and whether or not they can interpret something with confidence. And that's very astute Aaron, in terms of how you use ultrasound in your medical management. If you don't feel comfortable calling something then don't do it. And that's the safest thing for a patient.

Aaron N. Leetch, MD:

That's generally how I practice. I don't feel comfortable with it. So this kind of leads to paradigm number two, which is that we need better tools for teaching ultrasound. You want people comfortable with the decisions they're making. And I think it's just like reading a chest x-ray or a CAT scan, or even interpreting a physical exam in front of you, of you have to be comfortable saying what's normal and you have to do a lot of practice in order to figure out what's normal and what's not. It's probably really easy to put your probe on the heart and see a giant effusion and say, "Well, that's not right." But it's got to be harder when you're putting the probe on the heart and you're trying to find the left ventricular outflow track and say, "I think this is it. I'm not certain." But tools have gotten better, correct?

Elaine Situ-LaCasse, MD:

Tools have gotten better. And there are a lot of educational tools out there to teach novices. And part of my research is to explore how those tools can be integrated into ultrasound education. One of the things that I've worked with, with medical students is a pelvic ultrasound simulator and we've tested them and surveyed them and medical students. And they said that it would be a great adjunct to performing ultrasounds on real patients, pelvic ultrasounds on real patients. So these tools we know that are out there are great things for people to use, in addition to practicing on live patients. There are also virtual reality tools out there, which helps you create the environment of, let's say an emergency department, seeing a trauma patient in front of you. And a lot of these learners just don't have access to real trauma patients or real standardized patients to perform ultrasounds on. And with this growing population of learners that were advocating for, saying that medical students, fellows, residents, faculty members of all specialties, should learn. We have to keep the quality of ultrasound education high and consistent so that they can practice it.

Aaron N. Leetch, MD:

So how are these modalities in comparison to doing it on a real person? Because when we initially started doing simulation and you have the little Annie, Annie recess dolls that we would use in the American Heart Association classes. They give you a little bit for what you need, but especially Emergency Medicine Simulation has really just exploded. And the high fidelity simulators are really incredible. But there's still nothing like being there in real time and doing this with a real person, who's got real pathology, who can say, "Aw, that hurts. I don't want you to get a subxiphoid view."

Elaine Situ-LaCasse, MD:

Mm-hmm (affirmative).

Aaron N. Leetch, MD:

How are these simulators in comparison to doing them on real people?

Elaine Situ-LaCasse, MD:

They're getting better and better. And the simulators are a great start to seeing what normal is. As you were saying before, you have to do a lot of normal exams in order to recognize what is abnormal. And the simulator is really try to recreate that. In these tools, these simulators are also trying to recreate pathology, which is really helpful. Some of the obvious pathologies such as a pericardial effusion or a positive FAST exams, they are really good at recreating. But nowadays we have handheld ultrasounds. So that's another teaching tool, but also another learning tool that these learners have. I have emergency medicine physicians across the country, who all of a sudden with an ultrasound machine that they only paid $2,000 for. That's a great tool. That's a great learning tool. That's a great teaching tool because ultrasound is getting smaller and smaller and more portable and cheaper. So you don't have to pay tens of thousands of dollars to buy a cart based ultrasound to use in your emergency department. But that speaks to the need of teaching them. And we can certainly use these handheld ultrasounds to teach various novices, which we've been doing.

Aaron N. Leetch, MD:

Yeah. I think that the more you have people out there with a new toy that they might know a little bit of how to use, a consistency of the training is really important because if you've got an ultrasound and you can just kind of put it anywhere, you may not know that you're missing something that is important. Kind of like, you buy some power tools. There are people who can build houses with a skill saw and there are people who can chop off their fingers.

Elaine Situ-LaCasse, MD:

Yeah, exactly. When we see those patients in the emergency department, for sure. And certainly these wonderful tools out there, aren't going to be able to replace life human beings is what you were saying before. And with these handheld tools, all of a sudden you can perform ultrasounds on life people. And for our ultrasound education with residents, we recommend that people do educational ultrasounds in which there's a confirmatory study. So let's say there's a patient that has a CT scan of their belly. Well, that's a great patient that you can practice a FAST exam on, for example, or try to scan their aorta.

Aaron N. Leetch, MD:

Yeah. I think that's a great thing about ultrasound is it's not harmful really in any way, unless you're inflicting pain on somebody with peritonitis or the ultrasound is taking the place or the time of something that might actually be more helpful. Like sometimes when we're in the trauma bay, if the patient's got a knife sticking out of their abdomen, well, they don't need an ultrasound. They need to go to the OR.

Elaine Situ-LaCasse, MD:

Right.

Aaron N. Leetch, MD:

But for those other patients, you can tell them, you can tell the patients, I'm doing this to try to increase my learning. How do you recommend people approach patients about doing an educational ultrasound when they've had other testing done that is more diagnostic, but you still kind of want to do this ultrasound that you may or may not be able to interpret.

Elaine Situ-LaCasse, MD:

Right. And being at an academic institution, a lot of patients come in understanding that this is a training facility. So I do walk in and I introduce myself and I say, "I'm going to be performing an ultrasound that is going to be for my education only to practice and hopefully help patients like you in the future so that you don't have to wait in the emergency department for so long." And I invite them to be part of the educational experience. So let's say I'm doing a aorta scan. I'm going to be pointing out this pulsating circle on this screen is your aorta. Or I'm doing a cardiac ultrasound, which people really love.

Aaron N. Leetch, MD:

Mm-hmm (affirmative).

Elaine Situ-LaCasse, MD:

And they get to see what their heart looks like. This is the chamber of your heart, that pumps blood into your aorta and they're fascinated. And that's one of the big things about point of care ultrasound is that there's higher patient satisfaction because wow, there's a doctor actually performing this exam on me. And we know from medical school that the more contact that you have with the patient, the happier they are.

Aaron N. Leetch, MD:

Yeah. I know ultrasound supposed to be just diagnostic, but you have to admit in those circumstances it's a little therapeutic too. There's a placebo effect associated with seeing your own heart and going, wow, man, I'm distracted from my chest pain for a little bit.

Elaine Situ-LaCasse, MD:

Exactly.

Aaron N. Leetch, MD:

And hey, I feel better. How do you determine the limitations of what you do on a bedside ultrasound? Do you let the hospital determine that? Is it the radiology department that determines that the way that anesthesia might determine what drugs you can use for sedation? Or do you set your own limitations on what you do and don't do when you're learning ultrasound?

Elaine Situ-LaCasse, MD:

It's a little bit of everything. One of the things that we do is mainly self policing. If you're not comfortable using ultrasound, just like if you're not comfortable using a particular drug, you're not going to be using it until you're further trained in it. And one of the great things about our ultrasound program is that we've created this very rigorous credentialing system in which each physician who is credentialed to perform a cardiac ultrasound has done at least 25. And everything is reviewed by either an ultrasound fellow or an ultrasound faculty member. And to make sure that these are high quality exams. So when they go out and do ultrasound on patients, we have faith that they will be using it correctly.

Aaron N. Leetch, MD:

That's good. So this gets to your third paradigm, which is there should be simplification and integration of complex concepts regarding cardiac ultrasound, so that all emergency physicians can perform bedside echocardiography on chest pains and syncope patients. You care to elaborate on that a little bit.

Elaine Situ-LaCasse, MD:

Yeah. It's very wordy. I have to say that cardiac ultrasound feeds the nerd in me. I am absolutely fascinated by cardiac ultrasound because I think that is the application where you get the biggest bang for your buck. You use it in all sorts of scenarios, not only in chest pain, syncope patients, but also being in a level one trauma center, we use it on our trauma patients all the time. Now the key thing to focus on that is the simplification of it. Because as emergency medicine doctors, we don't want to spend hours and hours being trained on these minutia items that we have to look for in cardiac ultrasound. That's why we have cardiology echos, right? They're looking for the velocities, et cetera, et cetera. But I think that we need to simplify things like, for example, diastology, diastolic dysfunction is one of the prospective projects that I'm doing in the emergency department. And the American Society of Echocardiography says, you look for four things. And my project is trying to simplify that. Four things I say is too much for emergency medicine doctor, we don't have time to do that.

Aaron N. Leetch, MD:

That's why we only have three paradigms.

Elaine Situ-LaCasse, MD:

That's right. That's right. Only three paradigms. And I'm trying to figure out, can we get away with one thing? Can we get away with two things? And slowly introducing and integrating these one item things or one question into our daily use of point of care ultrasound.

Aaron N. Leetch, MD:

Yeah. I feel like cardiac ultrasound is great for a lot of these indications, but it is something that you can get deep in the weeds about. Like you said, you can get all of this information. You can do spectral Doppler and you can do velocities and all these things that don't necessarily matter to me as much as an emergency physician. There's a handful of things that I can actually do something about versus hey, by the way, we want to let you know that you have mild tricuspid regurg. Like that doesn't really mean anything to me as an emergency doctor. So you approach this from like the high yield information that you can get, the fastest information you can get and then work your way down to some of the nuances of cardiac echo that might still be useful for us. But if you don't get it, won't be as big of a deal.

Elaine Situ-LaCasse, MD:

Yeah. I would agree with that statement. Let's say with cardiac ultrasound systolic dysfunction can be pretty obvious. You look at a heart and you say that contractility is really bad, or that is an EF less than 10%.

Aaron N. Leetch, MD:

And emergency physicians are pretty good from research that I've seen at being able to look at an ultrasound and say, "That doesn't look right." And that's about all you have to do as an emergency doctor, right?

Elaine Situ-LaCasse, MD:

That's true. And we're really good at identifying extremes, like, okay, that's grossly normal versus that is really bad, I'm not going to flood that patient with three liters of fluid. And that's systolic dysfunction and it's sexy. It's cool. You feel good about yourself, right? But with diastolic dysfunction, it is the other part of the cardiac cycle. It's less obvious, but still just as important I would argue. So that's what I'm trying to do is that instead of figuring out four things, half of them, which it's pretty impossible to get when you're at bedside in the middle of a resuscitation, maybe we can look at one simple thing and base our decision on that. But not only diastolic dysfunction, but also just looking at patients coming in with a chief complaint of syncope, for example, a lot of times people don't look at the heart in syncope.

Elaine Situ-LaCasse, MD:

They say, "Oh, okay, well maybe you're dehydrated or maybe have a dysrhythmia and we'll admit and let the internal medicine folks figure it out." What I'm arguing is take a few minutes to take a look at the heart and what we found in our preliminary data of reviewing hundreds of patient charts in point of care ultrasounds that were performed on them is that yes, that is correct. The most common finding is the collapsibility of the IVC, which may suggest that they have hypovolemia. But also there's decreased LV function. There's IV dilation, a wall motion abnormalities, maybe there's a pericardial effusion. Recently one of our patients had come in with nausea and turns out they had a pacemaker lead that went through their heart. Yeah. So you wouldn't have picked that up if you didn't perform an ultrasound or cardiac ultrasound to look whether or not there's something abnormal in there.

Aaron N. Leetch, MD:

So there's a lot of big words in bedside echocardiography or echocardiography in general. And big words scare me, sometimes. I feel like we learned so much in four years of medical school and during residency that is medicine. And then I spend the rest of my life trying to figure out how to translate that into English. So in doing this, some of this stuff seems like it's overwhelming, but how would you start, if you're learning cardiac ultrasound from the very beginning, you know how to put the probe on, you know how to get the views, what are the high yield things that you want to catch first? And then how do you work your way down?

Elaine Situ-LaCasse, MD:

So approaching any ultrasound examination, you have to walk in with specific questions. So before walking into the patient room, you determine, okay, this patient has chest pain, or they have a history of cancer or end stage renal disease. What do I want to look for? And you tell yourself, okay, I'm going to look for pericardial effusion, yes or no. Very specific, dichotomous questions that you can answer. And you place the probe on the patient, whether it be subxiphoid view or parasternal long axis view, and you look, is there a pericardial effusion or not? And if you answered your question, you might be done. Or if you want to become a little bit more advanced, say, what's the contractility based on this view that I'm looking at, the short axis view or this apical four chamber view. The question you could ask is how well is that heart contracting? And you can say good or bad, you might be done based on that. So understanding what questions you have and how you want to answer them and knowing when to stop.

Aaron N. Leetch, MD:

I think that the question you asked is one of the most important questions we have in emergency medicine, which is what are you looking for on this diagnostic test? Because so much of we do should be paired down with history and physical and we're doing a focused exam. So when you're doing a bedside ultrasound, you're doing a focused cardiac ultrasound. We're not trying to find everything if we don't need to find everything. I think it's very different when you're a specialist in your quote unquote, the last line of defense. And you have to make sure that you've looked for everything. We're looking to answer a question. So I asked residents all the time, what are you looking for with that white blood cell count? What are you looking for with that CT scan? Tell me what you're looking for, and then we'll get it. And we'll see if that test actually helps.

Aaron N. Leetch, MD:

But if you've got a patient with fever and you want to get a white blood cell count to see if they have infection, well, they already got fever. So it's the white blood cell count really going to help you? If you've got a patient that comes in with chest pain and you're going to do a bedside ultrasound, because you're worried about acute coronary syndrome, that's not the right test. But if you're looking to see, do you have dysfunction? Do you have signs of congestive heart failure with a poor EF? Because they have shortness of breath, like that's a legitimate test to help you change your management. So I like the approach that you suggest of find a question, answer your question, and then you're done because the nice thing about ultrasound is that it's adjunctive to a lot of what we do anyway. So if it didn't get the information that you wanted, you can still go on treating the patient with all the other resources that you have. But if you put the probe on and you find something where you can then, it's actionable, then you've done something good for the patient.

Elaine Situ-LaCasse, MD:

Absolutely. And another thing about ultrasound is that especially in our [inaudible 00:34:19], you can feel confident knowing that anything that we ask the faculty member and the residents to do, we've done ourselves. The new credentialing system that we have with the privileges is that there's a level three credentialing now, and it is TEE it's transesophageal echo. And it seems very daunting. And it is. So yesterday I just came back from doing a two day TEE course because we want to be able to not only do it ourselves, but also be able to train our faculty members to do it. And only in the setting of cardiac arrest. So even in the way we write our credentialing privileges, we are very specific in terms of how to use point of care ultrasound in our patient population.

Aaron N. Leetch, MD:

Now, do you see a point at which if somebody was so inclined that they could do a complete echo in the emergency department to the point of where they wouldn't have to send them to cardiology, we wouldn't have to admit this patient for an echo. We'll just do all this stuff here in the ER.

Elaine Situ-LaCasse, MD:

Yeah. If they wanted to, if they wanted to spend the time, not only in the training, but also spend the time in the patient's room because doing a comprehensive echo, there are a lot of facets that are very complicated. And I think most of us just don't feel comfortable saying that, okay, all of these things that we've seen and measured, that's going to yield conclusions X. So I would say it's possible, but not recommended.

Aaron N. Leetch, MD:

I remember when I was rotating through with the paeds cardiologist, I said, "Hey, do you guys have like a system of how you get through this?" The go, "Oh yeah, absolutely." And they gave it to me and it's 29 steps to do a pediatric echo. I was like, "Okay, well this is going in a drawer somewhere for when I just want something to go to sleep at night."

Elaine Situ-LaCasse, MD:

Right.

Aaron N. Leetch, MD:

But I think that it's nice that we are able to pick and choose what we do. There's so little, we get to pick and choose in the emergency department that when we're doing this as a focused exam, I think you can say these were the things I was looking for in this patient. When they say, "Hey, how come you didn't pick up that this patient has aortic stenosis." That's not what I was looking for. But I think that inherent in that is you have to explain to the patient, I am not doing the kind of echocardiography that your cardiologist will do. I am only looking for these things. So you still need to see them. You still may need a more comprehensive echo. This is just a quick look.

Elaine Situ-LaCasse, MD:

Absolutely. And that's what I teach the residents to do as well. A lot of times after we do an exam or a FAST exam, for example, we say, "Everything looks great." And that is wrong. We should not say that because we didn't look at everything. We have a very specific question to answer. So in a FAST exam, we're looking for free fluid and that's it. So when I walk into a patient's room, I say, "I'm going to be performing an ultrasound to look, to see if there's free fluid or blood. In your case, since you're a trauma patient in your abdomen, I'm not looking at all the details of your abdomen." And at the end of the exam, say, "I didn't find any signs of free fluid to suggest that you are having massive bleeding internally." That way the patient has an appropriate expectation.

Aaron N. Leetch, MD:

Right. I try to keep it positive when I'm doing these. It's not like, "Well, there still could be lots of stuff wrong with you." I don't even do that with blood work or CAT scans. I say, "Hey, here's the good news. We didn't find anything dangerous." And at the end of the day, that's what we're trying to do in emergency medicine is find something dangerous, find something actionable. And we didn't find anything like that. That's good news, but that means you need to keep looking. Should you continue to have these symptoms. So real quick, since you mentioned chest pain and syncope specifically, when you have a, we'll say 55 year old female come in with chest pain and you're going to do a bedside ultrasound, what are you going to be looking for?

Elaine Situ-LaCasse, MD:

So the big things that I also tell the patient is that first of all, we're doing a very focused exam. We're looking for specific things. One thing is pericardial effusion. And I tell the patient whether or not fluid around your heart. And two, how well is your heart contracting overall? And three, it's whether or not we think that you're dehydrated or you need more fluid, or if they say they have history of having anemia, whether or not they need blood. So those are three main questions. And from there, based on my training, I add in things like, Hmm, is there a diastolic dysfunction in this. But overall for the emergency medicine doctor, if a patient comes in with chest pain, you just look for those basic things, pericardial effusion, overall contractility, and integrating IVC into the cardiac ultrasound. And IVC is a very controversial topic. People would go back and forth in terms of how important that is. I say, "Find the IVC, but incorporate that into your findings of the [inaudible 00:39:24] in general."

Aaron N. Leetch, MD:

Okay. And what about for syncope?

Elaine Situ-LaCasse, MD:

For syncope, I do the same thing. I use the point of care ultrasound as part of my workup and whatever I see on ultrasound that is positive or negative, I let the patient know and it dictates the way I manage them.

Aaron N. Leetch, MD:

So where do you hope bedside ultrasound goes during your time doing research?

Elaine Situ-LaCasse, MD:

The technology is very quickly evolving and it's actually becoming more and more user-friendly. There are artificial intelligence tools that are being integrated into machines, cart based machines. One of the machines that we have at our South Campus ED has tools for LVOT VTI. The machine asks you to measure the diameter of the aorta, and the machine tells you where to put your gate and the machine then spits out a number of telling you what the cardiac output is.

Aaron N. Leetch, MD:

That's awesome.

Elaine Situ-LaCasse, MD:

So it's actually simplifying these complex concepts that we think, Oh my gosh, LVOT VTI, I would never want to do that. Or I would never be able to learn that. But now the ultrasound machines are helping you and holding your hand in that way. So that speaks to the third paradigm as well. But it's going to become more user-friendly. So this is the time to jump on the point of care ultrasound train, because it's not that hard and our field is making it more accessible and making it simpler.

Aaron N. Leetch, MD:

So it sounds like whether you're interested in looking for life-threatening things at bedside, or whether you're looking at improving your ED throughput and length of stay, there's an exam at least one that will probably help you do those things. So pick it up little by little, practice makes perfect. My hope is that in 20 years there'll be like this ultrasound tanning bed that we put people in. It just covers them in gel. And we just get a 3D rendering with no radiation whatsoever. That's my hope.

Elaine Situ-LaCasse, MD:

Yeah, it's on the horizon.

Aaron N. Leetch, MD:

Elaine, thank you so much for your time with us today. We're really happy to highlight your research, and again, your paradigms that you hope that we can adopt are that ultrasound training and education should be accessible to all medical professionals. That we need to and seem to be progressively getting more and more better tools for teaching ultrasound. And there should be simplification and integration of complex concepts regarding cardiac ultrasound so that all physicians or emergency physicians can perform bedside echocardiography on chest pain and syncope patients. And probably more simplification for any of these tests that we're doing. We'll make them more readily available, make people more likely to learn them and to apply them for the best care of their patients. So again, Dr. Situ-LaCasse is one of the scholars supported by the National Foundation of Emergency Medicine. Hear more from her and others at www.NFOEM.com. Thanks for listening.