Karen Jagoda: Welcome to the empoweredpatientpodcast.com show. I'm Karen Jagoda and my guest today is Chris Hutchison. He's the CEO of Cheetah Medical. That's cheetah-medical.com and the topic is advances in fluid monitoring devices and how they're making a difference for patients and healthcare providers. And I want to welcome you to the show today, Chris. This is a topic that we touch on occasionally and it seems to be a really growing field, so thanks for taking a few minutes to be with us.

Chris Hutchison: It's my pleasure, Karen. Thank you for having me.

Karen Jagoda: So let's just jump in and talk a little bit about why Cheetah has chosen to develop fluid monitoring devices. It's a kind of a interesting category. So tell us a little bit about what that's all about.

Chris Hutchison: It is an interesting category and the answer to the question is health care providers were facing a real problem without any practical solution for many, many years. As you probably know, IV fluids are often a first line therapy for patients suffering from shock, characterized by dangerously low blood pressure. And this commonly occurs in the emergency department, ICU and surgery. And IV fluids can be effective at supporting blood pressure and improving the delivery of oxygen to the organs, but not always. So it's really important to monitor your patient's fluid status and their response to fluids because research has shown that about half the time we give large volumes that IV fluids, these are not effective because the patient's heart cannot appropriately respond. And this puts these patients at risk of fluid overload, which is associated with numerous and pretty dangerous complications.

Karen Jagoda: So in the past everybody was pretty much treated the same. Is that the world that you're trying to disrupt?

Chris Hutchison: Yeah. Physicians have always tried to do their best, relying on their best medical judgment, on vital signs, on patient's presentation, on the patient's history. But for years they've really had no way of quickly assessing whether a patient will respond appropriately to fluids, whether fluids will be effective with what we call patients have unstable fluid status or whether in fact giving those patients fluids puts them at risk of fluid overload. And the methods to assess this before Cheetah came along were invasive, expensive, and not terribly effective. So we are really kind of revolutionizing a space and providing an answer for a problem that has been very, very challenging for many years.

Karen Jagoda: It sounds like this sort of challenge that you've taken on has been a challenge for medical practices throughout the ages, trying to figure out what's wrong with a patient without having any kind of a invasive, a procedure that could
make things worse. So tell us a little bit about how the Cheetah sensors work because that's really part of the solution here.

Chris Hutchison: Well, the way the device works is we put four non-invasive sensors, pads are affixed to the patient’s chest or back depending on what position they are in the bed, essentially creating like a box around the heart. But that's really the only requirement. They're not positionally terribly sensitive at all. And then a small electric current is applied across the chest from an outer pair of sensors. And then a voltage signal is recorded from the inner pair of sensors and the flow of blood in the chest causes a time delay or what we call a phase shift that disrupts the signal and the inventors of the technology correlated that signal change with invasively derived cardiac output of 65,000 patient samples. And that's how we built our algorithm. The approach is clinically validated, easy to use, and our tests can be done by either doctors or nurses and you can get very, very vital hemodynamic data in minutes without any invasive lines or complicated assessments.

Karen Jagoda: So tell us a little bit about this hemodynamic information. That's kind of a new term for me, but maybe it's a really common term. What exactly is being measured?

Chris Hutchison: What we’re actually measuring is the amount of blood that the heart delivers every time it beats. That's called... That's the stroke volume. So the way our device actually works in practical application, I can tell you a real patient story that I saw. I was in a major medical center, an urban medical center early in the morning as the emergency department shift was coming off and this nurse came running down towards us and said, "You know, you won't believe this patient we just had." And then it was an elderly woman that presented with dangerously low blood pressure. She was edematous, which means very puffy. So she looked like she was overloaded with fluid and she had a history of heart failure. So they looked at her and they assessed that, "Oh yeah, she's overloaded and we have to put her on diuretics." And they did an ultrasound exam, which is a pretty good test, but it requires a highly, highly skilled user.

Chris Hutchison: And they confirmed that diagnosis and they were going to put her on diuretics and send her up to the ICU. But this nurse said, "You know, we just got these new Cheetah devices, why don't we give it a try?" And what you do is, as I said, you put the sensors on a patient's chest and then you lift the patient's legs and that moves about 300 mls to the right heart. And then you watch for a left heart response, the stroke volume increase. And if that stroke volume increases, you know the patient is actually responsive to fluid and you can use fluids safely to manage their blood pressure.
Chris Hutchison: In the case of this particular woman, her stroke volume increased dramatically and she sat up and reported that she felt better just from that 300 mls from her lower limbs. They confirmed that in fact she was fluid responsive. They canceled the diuretics and they didn’t send her to the ICU. Now if you’d send woman up to the ICU on aggressive diuretics with a history of kidney failure, this patient also had, they’re putting them in dangerous risk of kidney injury. And for less than $200 and a five minute test, we’ve completely changed the course of that woman's therapy and I’m confident we improve the outcomes.

Karen Jagoda: So in some ways you're providing data that's almost counter-intuitive to the doctors and the clinicians who are used to handling these kinds of decisions. Is that fair to say?

Chris Hutchison: Absolutely right. And you know, and there's risks at both ends of the patient's spectrum. Some patients are at risk of being overloaded and other patients are at risk of being under-dosed. It's very common. We hear stories sourced from the field where a patient comes into the ICU and they have a history of heart failure and they're very afraid therefore to give them IV fluids. So they put them on much more complicated drug therapies when in fact a number of those patients are in fact responsive. So you can't rely solely on your intuition and traditional vital signs to assess a patient's volume status. You really only know if you check.

Karen Jagoda: And so when you're introducing this into a hospital or into the world of a clinician, are you getting pushback saying, "Well how do you know? How come our old ways of sort of diagnosing it aren't just good enough?" Because there's always this kind of skepticism about technology. So I'm just wondering much pushback from your audience?

Chris Hutchison: Yeah, no. That's a very good question. But you know, in medical devices, evidence moves markets and we have got tremendous clinical evidence demonstrating that our product does what we say it does. In fact, there was a large study a couple of years ago from a... Done at the University of Kansas where they looked at a group of patients before Cheetah was implemented and then a group after Cheetah was implemented and the post-implementation group, the group that used our technology and to make these volume decisions stayed in the ICU for about three fewer days, had about a 50% reduction in the need for ventilation and about a 30% reduction in the need for dialysis. So medical evidence is very, very compelling. And generally, we have to lead with that to convince the skeptical physicians.
Karen Jagoda: Those are pretty interesting numbers. And when in the process would these sensors be placed on someone, after they weren't being responsive or right at the get-go when they're admitted? Just give us a sense of what the process would look like.

Chris Hutchison: Yeah, we try to train that whenever you're contemplating giving that first fluid bolus, just check to make sure that it's going to be effective. So whenever and wherever in the hospital you're contemplating doing that, whether it's in the emergency room, the ICU or the general care floor, when you're first contemplating giving a large volume, a bolus of IV fluid, we recommend that you fix the sensors and do an assessment at that time.

Karen Jagoda: And does your interface give information to the patient as well as to the clinician and the doctor for sort of better understanding their own body and what's going on?

Chris Hutchison: Yeah, I think probably not, Karen. I think mainly our feedback is intended to help the medical team, the doctors, and the nurses assess this stuff. These are very, very sick patients typically. You know? They're laying in an ICU bed most commonly and so our device is really not that much consumer facing, but it is for the physicians and nurses.

Karen Jagoda: I got you, but the patient is getting the benefit of having that interface so that the clinician can make, it sounds like real time decisions here. This is not like a snapshot in time. You're getting a constant flow of data, isn't that right?

Chris Hutchison: Absolutely right. And it's important to note that a patient who was not responsive on hour one can become responsive in hour three. So this is a very dynamic, you know, a patient's hemodynamics are very dynamic and they change over time. So it's important maintain vigilance.

Karen Jagoda: And what kind of training and support is required from Cheetah for the people who are using this system?

Chris Hutchison: Yeah, that's a very good question. We devote a lot of time and resources to professional education and customer training, both in and out of the clinical setting. In fact, about 40% of our field force, are former critical care nurses or other forms of clinicians who have real world experience managing the challenges of fluid management. So we've got online training modules on our website, as well as training courses designed to help providers understand how the technology works, why it may be useful. We have one hour classroom courses, we have three hour classroom courses, whatever the customer needs, we're more than happy to provide that because an informed customer is a good customer for us.
Karen Jagoda: And where does the development come in? Are the sensors getting smarter? Are they getting smaller? Where is your sort of research and development taking you?

Chris Hutchison: The company was actually founded in Tel Aviv and we still have our R&D center there, brilliant engineers who are constantly working to improve the user interface, the software user interface, but also working to add enhancements and capabilities to our sensors. And we’re working on some sensor enhancements in fact right now. Nothing imminently planned for release, but we have recently done a new software update and are planning another one for later in the year.

Karen Jagoda: When I hear this kind of solution, I think about precision medicine and how these kinds of sensors really add to the environment. Is that the world that you consider your working in this kind of personalized precision medicine?

Chris Hutchison: Absolutely right. In fact, you know what we enable the physicians to do is customize care to the specific needs of the patient. In the US, IV fluids are regulated by the FDA like drugs, but they’re dosed like soft drinks and they should in fact be dosed like drugs. They should be dosed according to the specific response of the patient. And we help that... We help physicians make that happen.

Karen Jagoda: And so I’m just kind of curious, how did you get into this space? What did your career path lead you through to get to this medical device that’s with such a specialized application?

Chris Hutchison: Yeah, that's a good question. I was actually... This is my first early stage company. Prior to this I was working at Covidien, which is now part of Medtronic based in Europe. And one of the product lines that I was responsible for included a number of specialty parameter monitoring technologies. So I kind of knew the area, I knew the space, I found it really interesting. And when I decided to do something early stage, I found Cheetah and saw the first thing that was alluring to me is anytime you can do something non-invasively and cheaply that is otherwise done invasively and extensive, that sounded like a winner to me. And the more I studied it and understood the problem that they were trying to solve, the more attractive it became. And it's really very gratifying work. We see... Like the stories I described to you of the woman in that hospital, we see those patient stories all the time and it makes it really easy to get up and go to work in the morning. We believe we’re really making a difference.
Karen Jagoda: And really the point here is that you need to educate the doctors, the hospitals, the people who are treating patients in emergency situations to know that this is available. Is that really your next challenge?

Chris Hutchison: Yeah, that's right. You know, once we convince them to give us a look and we're actually in evaluations with real patients, we try to seek what we call these ah-ha moments where a physician is liberally giving IV fluid, believing that that's the right course. We do a test and demonstrate that in fact, that patient is not volume responsive and you should consider other strategies or patients where they're very, very reluctant to give fluid. And we can demonstrate that in fact, this patient is responsive and then the administration fluid is shown to improve blood pressure. Those ah-ha moments are how we win, but it's not easy. It's hard work changing medical practice, but as I said, with good clinical evidence and well-run evaluations, that's how we win.

Karen Jagoda: Thanks to my guest today, Chris Hutchinson, CEO of Cheetah Medical, that C-H-E-E-T-A-H-medical.com. Follow them on Twitter @cheetah_medical. I'm Karen Jagoda and you've been listening to the empoweredpatientpodcast.com. So follow me on Twitter @KarenJagoda, like us on Facebook at Empowered Patient Radio. Thanks for listening and we'll see you next time.

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