

# Cath Lab Digest

A product, news & clinical update for the cardiac catheterization laboratory specialist



## CUTTING-EDGE CONVERSATIONS

### Townhall at ISET 2024 Artificial Intelligence in Healthcare: The Good, the Bad, and the Scary

Barry T. Katzen, MD, talks with Peter Fitzgerald, MD, PhD, in advance of Dr. Fitzgerald's January 23rd keynote address at ISET 2024.

In a preview of the upcoming International Symposium on Endovascular Therapy (ISET) townhall session, ISET director Dr. Barry Katzen discusses artificial intelligence (AI) in healthcare with Dr. Peter Fitzgerald during the San Francisco TCT 2023 conference. Dr. Fitzgerald is a Stanford-based interventional cardiologist working with an early stage investment fund called Triventures.

"With everything he gets to see on the horizon as people are trying to improve the status of healthcare," says Dr. Katzen, "Peter holds tremendous insight into the future of healthcare delivery." Dr. Fitzgerald and Dr. Katzen dive into "the good, the bad, and the scary" of AI for vascular proceduralists.

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## In This Issue

### Upsizing a Radial Sheath? Methods and Cautionary Notes

Morton J. Kern, MD, and Arnold Seto, MD, MPA with contributions from J. Dawn Abbott, MD; Douglas E. Drachman, MD; Dmitriy N. Feldman, MD

Dr. Kern and his expert colleagues discuss a question from Dr. Anthony D. Pisaniello, Interventional Cardiologist, Clinical Senior Lecturer, at the University of Adelaide, Australia, who asks, "I always love listening to tips and tricks for coronary angiography. Last week, I had a 6 French [F] radial sheath in situ, and wanted to perform a 7F intervention, but didn't want to convert to femoral [access]. I thought about exchanging for a 7F Glidesheath Slender [Terumo] over a coronary wire, eg, a Grand Slam wire [Asahi Intecc]. What methods have you used to upsize radial sheaths?"

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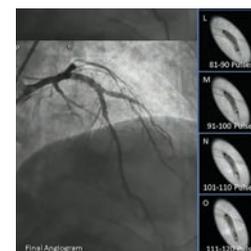
## CALCIUM CORNER

### Changing the Strategy: Introduction of the 120-Pulse Shockwave C<sup>2+</sup> Catheter at St. Francis Heart Center

CLD talks with Ziad A. Ali, MD, DPhil.

St. Francis Heart Center was the first to introduce the Shockwave C<sup>2+</sup> catheter (Shockwave Medical) in the United States. Can you share your experience?

Since August 2023's limited market release when we first started using C<sup>2+</sup>, we have done 30+ cases over the past few months. The concept behind the development of the C<sup>2+</sup> was that if more pulses were available to the operators, it would facilitate the management of more complex, calcified lesions.



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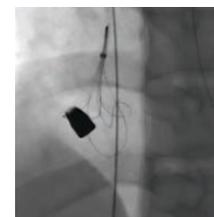
## CASE REPORT

### Bullet Captured From the Right Atrium Using Novel Sheath, Preventing Central Embolization

William Terrill, MD; Andrew Klobuka, MD

#### Abstract

A 21-year-old man presented as a Level 1 trauma following a gunshot wound to the left lower quadrant of the abdomen. A bullet was first identified on radiographic imaging but was not found during exploratory laparotomy. Subsequent chest radiographs and computed tomography demonstrated the bullet to be at the junction of the right atrium and inferior vena cava with slight variation of positioning, suggesting mobility and an intravascular location. Following interventional radiology consultation, the bullet was determined to be intravascular by fluoroscopy. The migratory bullet was extracted safely using a snare and a Protrieve sheath (Inari Medical), a novel device designed to trap thromboemboli in the inferior vena cava during mechanical thrombectomy procedures.



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# Townhall at ISET 2024

## Artificial Intelligence in Healthcare: The Good, the Bad, and the Scary

Barry T. Katzen, MD, talks with Peter Fitzgerald, MD, PhD, in advance of Dr. Fitzgerald's January 23rd Keynote Address at ISET 2024.

[Learn more at ISET.org](#)

**Barry Katzen, MD:** I am the chief medical executive emeritus of Miami Cardiac and Vascular Institute and the program director for the International Symposium on Endovascular Therapy (ISET). At ISET, we will be holding a townhall session focusing on artificial intelligence (AI). The

ISET townhall meeting will discuss a number of issues around AI and will present examples of AI that are coming into the procedural community. It will also address how the FDA will be approving AI platforms and the challenges that come with the introduction of AI into clinical practice, something



Dr. Peter Fitzgerald and Dr. Barry Katzen.

**The ISET Townhall will take place January 23, 2024, from 8:20 – 10:00 am**

**Moderator: Barry Katzen, MD, FACC, FACR, FSIR**

|                 |   |
|-----------------|---|
| 8:20 – 8:30 am  | Welcome Remarks   |
| 8:30 – 8:55 am  | Keynote Presentation: Artificial Intelligence in Healthcare: The Good, The Bad, and The Scary: <i>Peter Fitzgerald, MD, PhD</i> |
| 8:55 – 9:05 am  | Current Challenges for the FDA in Assessing and Approving AI Products: <i>Troy Tazbaz</i>                                       |
| 9:05 – 9:15 am  | Role of AI in Procedural Medicine: <i>Sanjay Misra, MD</i>  |
| 9:15 – 9:25 am  | Potential AI Applications for Intervention: <i>Dania Daye</i>   |
| 9:25 – 9:35 am  | Current and Future Challenges Regarding AI in Scientific Publications and Editorial Review: <i>Daniel Sze, MD, PhD</i>          |
| 9:35 – 10:00 am | Panel Discussion and Audience Q&A   |

that is happening now and will continue into the future. The hope is that our audience will leave with an understanding of how AI will affect them and what plans they should be making, particularly in the next year.

We are here with the townhall session's keynote speaker, Dr. Peter Fitzgerald. He is an interventional cardiologist from Stanford who has worked in bio-design development and education, and is currently one of the principal partners of Triventures, an early stage investment fund. With everything he gets to see on the horizon as people are trying to improve the status of healthcare, Peter holds tremendous insight into the future of healthcare delivery. Peter, your keynote presentation is on the good, the bad and the scary of AI, because of all those different aspects to it. You have been spending time thinking about and evaluating AI, and looking at what's ahead. Those of us that are down at a little different level see AI all over the place and are just trying to ferret out what is real, and how AI is and isn't going to affect us. What are your thoughts?

**Peter Fitzgerald, MD, PhD:** People sometimes think that AI is just going to make the EMR even more complex than it is already. But I have used many of the technologies out there, and have seen, for example, how I can have a conversation either with you or a patient without having to stare at my keyboard, with the information obtained correct 99% of the time. AI is simply a term coined to indicate how we can be predictive at less cost. We need this ability in healthcare. These large language models may allow us to address some of the flow of patients before they get to the hospital. When patients are in the hospital, then AI can help us with the menial tasks, things that are a nuisance in our healthcare system and can be made more efficient. I recently spoke at a social investing meeting called SOCAP about some of the financial toxicities that we have in healthcare and the inability to reach some of the people who need healthcare the most, who live in not only rural areas, but in cities as well. My hope is that we can move treatment upstream. Instead of waiting for people to have their congestive heart failure episode, chest pain, and/or out-of-control hypertension, we can see them before these events happen. Using different types of predictive models, we should be able to engage people before they become patients. We might be able to delay that curve that gets bent. Because once it gets bent, it becomes a significant financial drag on our healthcare system.

**Barry Katzen, MD:** Five years ago, we were talking about artificial intelligence and machine learning, and trying to educate ourselves. Fast-forward to the present day and where we think we are headed, and AI looks different depending on whether you are a practitioner, patient, investor, developer, or innovator. Can you talk more about how you see it affecting healthcare?

**Peter Fitzgerald, MD, PhD:** I heard a lecture given by a CEO of one of the largest healthcare companies in the U.S., and he mentioned AI 7 or 8 times in a 10-minute speech. Yet most people don't know quite what AI does or what it could do. We have to realize that AI itself is not a product. GPT-4 is approximately a hundred trillion parameters that have been digested and created as linguistic subsets so you can search quickly and get some insights. These various large language models being put forward in healthcare are "amplifiers" of products or we could say they are "linguistic text-based imaging facilitators". In medicine, we can apply some of these predictive processes, which actually create their own content. I like to think of AI as an instructive or instrumental amplification of the healthcare provider by giving them hierarchical choices. Healthcare professionals don't have to make those choices, but can rely on their own experience.

**Barry Katzen, MD:** Many practitioners might be afraid of how it might affect them as a radiologist or as an interventionalist, wondering, is the role of AI really going to be amplification and making our work easier, or is it going to replace us?

**Peter Fitzgerald, MD, PhD:** I think that it will potentially lessen our workload. But we have to get docs to embrace it. They shouldn't be scared by it. There are not enough radiologists to read all the scans we have today. There are not enough echocardiography experts to read all the echos being done, especially as we move point-of-care ultrasound out in the periphery and make our referral lanes more synchronized to actually track early heart failure detection, early aortic stenosis or sclerosis, and type 3+ mitral regurgitation that hasn't been noticed before. Some of these conditions confer life-changing episodes, especially in the aortic and the mitral valves, so I am excited about what is coming. I want to emphasize that AI is not going to replace physicians. I think we will see radiologists becoming more efficient. We will increase the acuity of what is being done, and it will be faster and cheaper. In our field, where we are working in blood vessels, AI techniques will make us better and help us to do the right things. There is a saying that a good cardiologist knows how to do things, a better cardiologist knows when to do things, but a really good cardiologist knows when not to do things. There is a hierarchy there that could be helpful.

**Barry Katzen, MD:** That saying certainly could apply to all proceduralists.

In AI, there is the hypothetical and the developmental, and then there is what is on the ground right now. Physicians, hospitals, and health systems are all seeing people trying to sell us AI products. If you are a vascular surgeon, people might be trying to sell you products to improve your office and make it more efficient, or products that might make your diagnosis more accurate. AI functions being sold

right now include, for example, predicting whether someone with an aortic aneurysm is at high risk of rupture or an intracranial aneurysm. This is AI that incorporates the clinical into the imaging findings and provides more information for diagnosticians. The average physician in these high-tech specialties is being confronted with these AI abilities already. Many of them are in positions along with their hospital administrators where they are trying to make purchasing decisions. We know that similar to the dotcom era, probably a lot of funding is going to be flushed down the drain in a bit of trial and error, so at ISET, we are hoping to provide some guidance. If you are considering a customer relationship with someone, you need to make sure the value can actually be delivered and there is some return on investment (ROI). It doesn't have to be a financial ROI, but hospital administrators want to see either that or a clinical ROI. So how do you decide if you are looking at competitive AI products? One of the things we have to collectively remember is that in the end, it has to bring value. We don't want people to be sold on the gimmickry of it, because the current products cost money.

**Peter Fitzgerald, MD, PhD:** My only comment to that is we have to build trust. People are always suspicious about the new. Remember, when I take a drop of blood from this person and I put it in this machine and it arrives at a number, I don't know what the machine is doing inside. I've somehow trusted it, maybe because it is FDA-approved, for example. But somehow we have trusted a lot of black boxes and AI is a black box. We are going to have to take baby steps, build the trust, and make sure that we confine some of these hallucinations and some of these other abnormalities we fear. There are a lot of people in the news providing that fear, including figures like Yuval Harari, Elon Musk, and some of the former Google folks that have left because they think AI is going to be more sentient. We have a great deal of education to do, but in healthcare, it will be incremental movements, rather than massive steps, and coupled with guardrails.

**Barry Katzen, MD:** Right. There are limits in what you can do because the amount of data is so great. There are companies trying to coalesce all this and make the data usable, but it is an enormous task.

**Peter Fitzgerald, MD, PhD:** There is a tremendous amount of data in healthcare. Thirty-six percent of all the world's data is in healthcare and it is disorganized, inefficient, sometimes deviant. Data are in silos and unstructured. AI

can bring us partners to try to disseminate and derive insights from these data, not only for the clinical pathway, but for other opportunities. For example, we have 28 different drugs to treat prostates. I guarantee that the 58-year-old in Birmingham, Alabama, is not being treated the same as the 58-year-old in Tacoma, Washington. There might be an opportunity here to actually bring data together, but it may not happen from within our healthcare hallways. It may require a focused effort from outside healthcare.

**Barry Katzen, MD:** Do you think AI is actually disruptive as a concept, or will it bring an incremental transformation across various components of what we do on a daily basis?

**Peter Fitzgerald, MD, PhD:** There is a great book out called "The Coming Wave" and one of the authors is Mustafa Suleyman, who is a co-founder of the artificial intelligence research company DeepMind. The book reviews innovations from the printing press all the way to the first transistor, and tracks how those innovations occurred and how they were

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— Peter Fitzgerald, MD, PhD

embraced. Interestingly, each innovation took a while to be fully implemented. For example, the Catholic Church wouldn't allow the Bible to be printed for a long time. Medicine is perfectly suited to take small steps in menial increments, which can make a big difference in our workflow. But AI is not an evolution; it is a revolution. There is no question about it and it is going to impact folks. We still have to be careful. There are 'hallucinogenic' things that can happen when you feed those training sets with abusive data or data that aren't congruent, so we have to build shells around these sets for validation. In fact, GPT-5 has a shell built around it to authenticate its results, using a separate way of digging into where data came from. It may prove extremely helpful.

**Barry Katzen, MD:** Our hospital board saw a demonstration of ChatGPT-4 doing a discharge summary. There were two cardiovascular cases and there was information that the generative AI made up, based on the information that it was given. This is an example of the hallucination you mentioned.

And one patient should have had an EKG and did not, yet the AI put forward an EKG report and an assumption that was made up from it. Clearly, it is not going to replace humans, but will hopefully make us better.

**Peter Fitzgerald, MD, PhD:** I think AI will bring us augmentations. A few years ago, I searched my name on ChatGPT and it got most of my information right, but then it said, “What’s amazing is that in between his residency and his fellowship, he was a senator.” There is indeed a Peter Fitzgerald who is a senator, but ChatGPT didn’t verify that information. We need to use technology to interact with the data and maybe provide software as guardrails. I am excited about arriving at a hierarchy that is derived from a large data set, but ultimately it is the physician who is going to make the decision. After all your years in medicine, and mine, too, we already know how to treat that 56-year-old woman that has hypertension and is resistant to everything she’s taken for it.

**“The fear of job loss, the fear of function loss, it’s what you were saying, Peter — you can’t be afraid of innovation. You have to embrace it and figure out the best way to use it to make what we do better.”**

**— Barry Katzen, MD**

**Barry Katzen, MD:** For our colleagues in the cath lab, is AI going to be telling them, “Treat this lesion, don’t treat that lesion,” or helping them make that decision?

**Peter Fitzgerald, MD, PhD:** We sold a company called CathWorks to Medtronic, which does exactly that, and it builds on itself in every case. Yesterday’s case in Chattanooga and what was done builds on the case for Sacramento tomorrow. It refines itself within a pretty narrow area — angiograms and the success of the patient — and now it is beginning to build in clinical success downstream. As we get better and we broaden out those training sets, it is going to help standardize our approach. One of the biggest components we face is variability. I hope that the standardization of how we do things in certain areas will solidify as we gain the ability to go in and find out who does a certain thing well and who doesn’t. As one example, everyone is excited about transcatheter aortic valve replacement (TAVR), but when you

look at how many African Americans or Hispanics are treated with TAVR, it is a minuscule amount. We need to become potentially more inclusive as well.

**Barry Katzen, MD:** Hopefully AI will help us extend treatment into the more rural areas and low-income populations.

**Peter Fitzgerald, MD, PhD:** At ISET, Troy Tazbaz, who is the head of the digital innovation at the FDA, will be presenting during the townhall meeting. One of the FDA’s goals is to be able to expand clinical trial participation and access to those that haven’t had the luxury of some of these fancy medical devices and therapies that we have today.

**Barry Katzen, MD:** I would add that the amount of information that an average medical student needs to learn today compared to what you and I had to learn is virtually impossible. The AI tools that are being developed will help us be better physicians, in one way or another. I think the fear of job loss, the fear of function loss, it’s what you were saying, Peter — you can’t be afraid of innovation. You have to embrace it and figure out the best way to use it to make what we do better.

**Peter Fitzgerald, MD, PhD:** A quick story. I had my daughter dissecting the sciatic nerve and I said, “Honey, how did you learn how to do that? Did you read about it?” She said, “No, TikTok.” We are in a generational change and we, being the elders, have to embrace it, open our eyes, and maybe help with some of the guardrails as well. ■

**Barry T. Katzen, MD,** is founder and chief medical executive of the Miami Cardiac & Vascular Institute. In 1989, Dr. Katzen founded the International Symposium on Endovascular Therapy (ISET). He is Chairman, Department of Interventional Radiology and professor of radiology and surgery, Herbert Wertheim College of Medicine, Florida International University; and holder of similar appointments at University of Miami, School of Medicine and University of South Florida, Morsani College of Medicine.

**Peter Fitzgerald, MD, PhD,** is Director of the Center for Cardiovascular Technology at Stanford University Medical School, and Co-founder/Managing Partner at Triventures. He is an interventional cardiologist and has a PhD in Engineering. He is Professor Emeritus in the Departments of Medicine and Engineering at Stanford University.

**Hear more about AI from Drs. Fitzgerald and Katzen during the ISET Townhall session starting at 8:20am on Tuesday, January 23<sup>rd</sup>.**

**ISET takes place January 22-25, 2024, in Miami Beach, Florida. Learn more at [ISET.org](https://www.ISET.org)**

## In the Literature: CLD Editor’s Picks



**VDM** Vascular Disease  
Management

### A Rare Case of Simultaneous Acute Embolic Occlusions of the Right Upper and Lower Extremity, Recanalized With Endovascular Thrombectomy

Stanislav Petrov Kernov, MD;  
Ivan Martinov, MD

When evaluating a patient with acute limb ischemia (ALI), it is essential to thoroughly assess the patient by taking a complete history and performing rapid diagnostic tests to preserve the patient’s limb and life. In this case, we performed endovascular thrombectomy of acute simultaneous embolism of the right upper and lower extremity in the setting of atrial fibrillation and long-term oral anticoagulation with edoxaban. The main factor that can improve survival of patients with ALI is early aggressive treatment aimed at restoring the patency of occluded arteries.

Vasc Dis Mgmt. 2023 June; 20(6): E96-E102  
[vascular-disease-management.com](https://www.vascular-disease-management.com)

