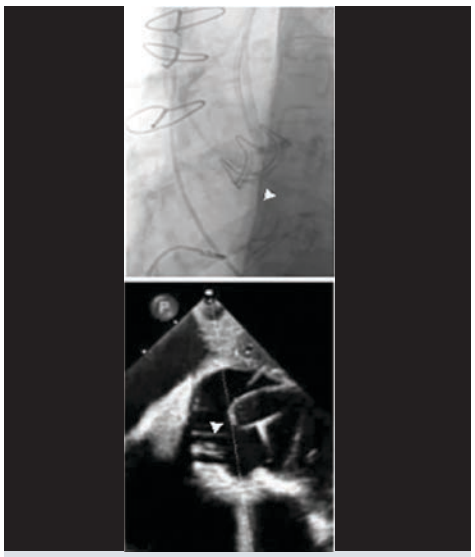
Cath Lab Digest

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



CUTTING EDGE

A Look at the Future of Structural Intervention: The Rise of the Imaging Specialists and Cardiac Electrosurgery

CLD talks with Stephen H. Little, MD.

Baptist Health's Echocardiography and Structural Heart Symposium took place September 27-28th, in Coral Gables, Florida. CLD shares a discussion focusing on one of Dr. Stephen Little's presentations, "Interventional Echocardiography: Bridging the Gap Between Sonographer, Structuralist, and Surgeon."

Dr. Little discusses the present and future of the structural echocardiographer on the heart team, as well as an evolving addition to the structural field, the application of percutaneous, image-guided electrosurgery.

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In This Issue

STRUCTURAL HEART & EP

A Growing Concern: Patients With CIED Leads and Tricuspid Regurgitation

CLD talks with Electrophysiologist Laurence M. Epstein, MD, and Cardiac Imaging Specialist Rebecca T. Hahn, MD.

Part I. Electrophysiologist Laurence M. Epstein, MD

How should we approach the treatment of patients with cardiac implantable electronic device (CIED) leads and tricuspid regurgitation (TR)?

Dr. Epstein: A heart team approach is mandatory, because these patients are very complicated and the leads may or may not be contributing to the TR. Heart failure physicians can help medically manage and optimize these patients. Imagers help us understand the anatomy and the relationship of the leads to the valve, and guide any interventional procedures.

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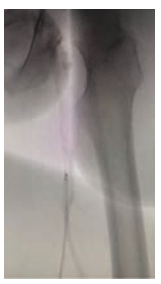
THROMBECTOMY

Use of the BD® Aspirex™ Mechanical Aspiration Thrombectomy System for the Treatment of DVT and Thrombosed AV Grafts and Fistulas

CLD talks with Jeffrey E. Silpe MD, MS-HPEd.



How are you treating deep vein thrombosis (DVT)?

Over the last year or so, my practice switched from only offering treatment to patients with iliofemoral DVT to patients with both iliofemoral DVT and femoropopliteal DVT, because I believe there is both a reduction of post-thrombotic syndrome and an improvement in subject well-being with thrombectomy compared with anticoagulation alone. The Aspirex™ Mechanical Aspiration Thrombectomy System (BD) is one of my top device choices for these cases because of its ease of use.

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A Look at the Future of Structural Intervention: The Rise of the Imaging Specialists and Cardiac Electrosurgery

CLD talks with Stephen H. Little, MD.

Can you describe the importance of the imaging specialist for structural intervention?

Interventional echocardiography has, over the last decade, become an increasingly recognized subspecialty of cardiovascular medicine.[1,2] This role works at the intersection of live imaging, volumetric imaging, real-time imaging, the innovations and complexity within structural heart procedures and related devices, and the scope of what we can now achieve with catheters. For the echocardiographer, it is an exciting time because we are moving from the historic role of a diagnostician who looks at images and really transitioning that role into someone who is a valued cooperator in these procedures. That is a paradigm shift and a message that is taking some time to spread, but the people who are doing high-volume, innovative work, whether it is the interventional cardiologist or the cardiac surgeon, or the broader imaging team, will be the first to tell you about the importance of the interventional echocardiographer, without question. Their role, in these large, successful teams, is as a cooperator. By that, I mean that the echocardiographers are involved in patient selection, device selection, size selection, the approach to the problem, the strategy that the case involves, and then perhaps how it evolves, if things go well or don't go well. Clearly, it is still a role essential to the diagnostic element, but also in helping the team understand whether things worked and the result. Beyond these elements, it also means stepping back and saying, how did we do in this particular case? Was the patient outcome what we all wanted and expected? Have we learned from this case? And let's bring that learning forward to the next case so that as a team, we keep getting better, and the next patient benefits from this experience.

The growth in importance of the interventional echocardiographer also brings new challenges in credentialing, training, and examining for special competencies.[2] How do we define an interventional echocardiographer? What should they be able to do? How do we do we train them with specific learning objectives and what competencies should they have by the time they finish their training? What are the competencies that the training center should have? If you're going to claim that you are training people in this field, what do you have to be able to do and offer? Then you have to develop an examination and then you have to ultimately tie all of that back to the payers, meaning to CMS and secondary payers, to show how this role is different in practice, and the risks and the skillsets interventional echocardiographers bring. It means a different fee schedule. One of the main challenges of this field at the moment is that it is still embedded in the diagnostic fee codes, but this doesn't really reflect the actual activity of the role.

TABLE. Percutaneous Electrosurgery Procedures

Location	Acronym	Description
Aortic Valve Leaflet(s)	BASILICA	Bioprosthetic or native aortic leaflet intentional laceration to prevent coronary artery obstruction
Mitral Valve Leaflet	LAMPOON	Laceration of the anterior mitral leaflet to prevent left ventricular outflow obstruction; performed tip to base or base to tip, depending on the presence of surgical repair with a ring
Left Ventricular Outflow Tract	SESAME	Septal scoring along midline endocardium
Mitral Valve Leaflet	ELASTA	Laceration of the anterior mitral leaflet "east to west", such that a previously placed transcatheter edge-to-edge repair device and its fixed anterior and posterior leaflets fall posteriorly to then allow for a transcatheter mitral valve replacement

Percutaneous, image-guided electrosurgery for structural heart disorders is a new and evolving procedure. Can you tell us about it?

Percutaneous cardiac electrosurgery is the new frontier, and involves some great acronyms like BASILICA, LAMPOON, SESAME, and ELASTA (Table). Historically, structural intervention originated from procedures like balloon valvuloplasty, where nothing was left behind. You go in percutaneously, affect some change with a balloon, and then leave. We then entered an era of placing devices into the heart, like the Watchman device (Boston Scientific) for left atrial appendage occlusion, septal occluders, and transcatheter aortic valve replacement (TAVR) devices, soon followed by percutaneous mitral procedures, and now tricuspid valve procedures. We place these devices and don't necessarily change the landing zone beforehand. Percutaneous, image-guided electrosurgery takes us full circle — we are back to the notion that it is not always necessary to put in a device. We actually can do almost surgical-type changes, for example, with electrocautery, used in a specific, controlled manner to slice tissue. Slowly, with catheters, dedicated imaging, and tight teamwork, we are starting to replicate a lot of the elements that a surgeon can accomplish. Surgeons can cut things out and change a landing zone by removing tissue. Using percutaneous access, we can now change the tissue and slice it. So far, we haven't yet developed easy tools for the percutaneous removal of tissue, but I think that is coming. I suspect we will soon have baskets, graspers, and clips, and will be able to start using catheters to remove tissue from the body. Then we are truly competing with surgery for select patients. We are growing our ability to provide treatment opportunities for patients who previously did not have any options. It's not about just competing with surgery at some level, but expanding the options for patients who are not now and never were going to be surgical candidates. Yet there is still a great deal to be defined and discovered. How far can we go? Who are the patients? What are the technologies or ideas that are not quite ready for broad application, and which ones are?

How are the BASILICA, LAMPOON, SESAME, and ELASTA procedures used?

Probably the most broadly applied of the catheter-based electrosurgeries is the BASILICA procedure; certainly, many TAVR operators are familiar with it and it has become fairly advanced. The BASILICA procedure is typically done to prepare a surgically implanted valve, although it could be a transcatheter valve, for the placement of an additional transcatheter valve (or a valve-in-valve procedure) (Figure). If the new valve is going to sit inside the old valve, you often have to first open up the prosthetic leaflets in order to keep them from becoming opposed against the coronary artery and blocking coronary flow. The leaflets are sliced to prepare for another valve to go inside of them. The idea behind the

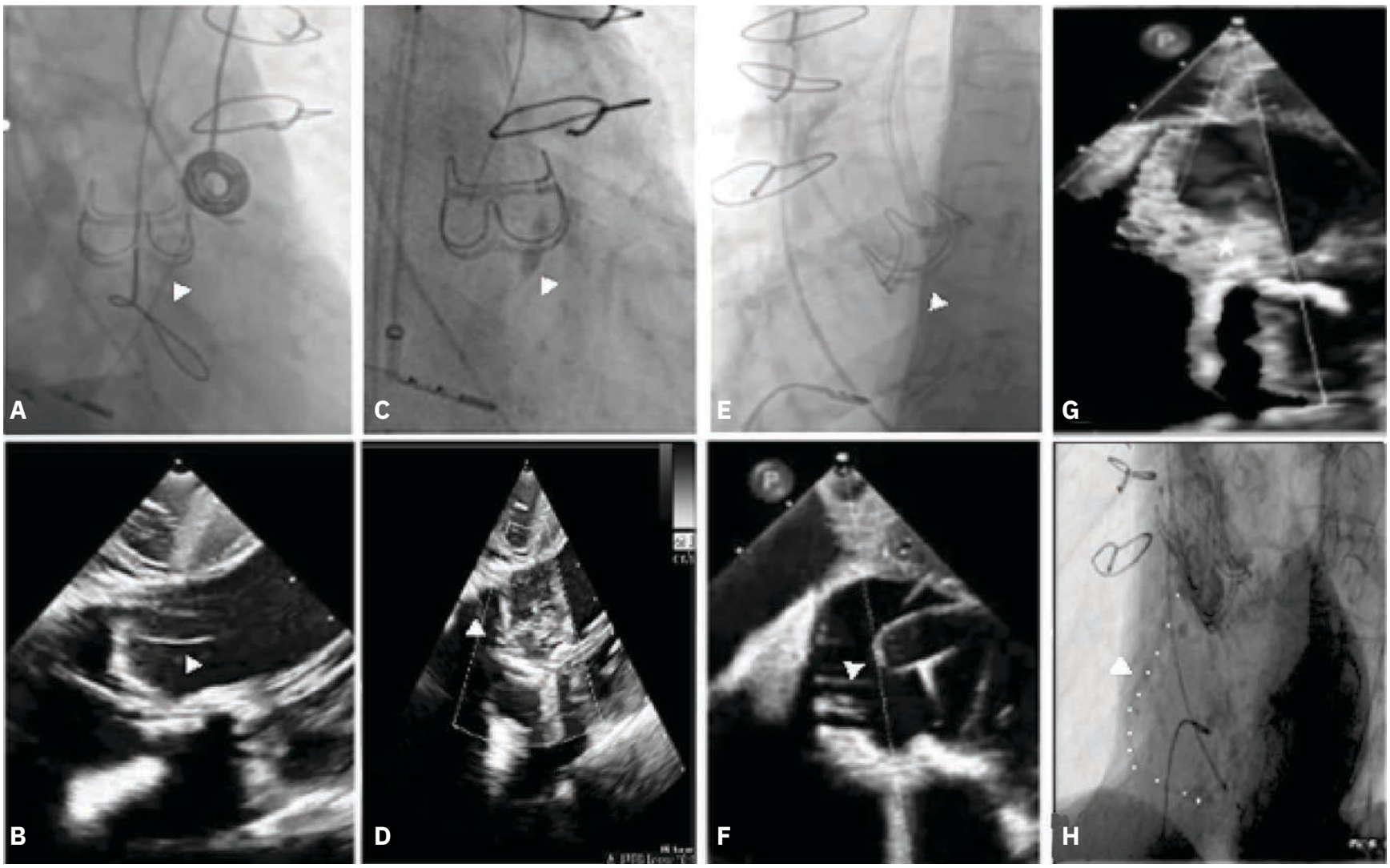

Figure. Fluoroscopic and ICE-guided balloon-assisted BASILICA with TAVR ViV: (A, B) wire traversal of bioprosthetic leaflet (white arrowheads); and (C, D) balloon-dilation of puncture (white arrowheads) and (E, F) leaflet laceration with "flying-V" (white arrowheads) electrocautery technique, with (G) resultant valvular aortic insufficiency on ICE (white star). (H) Aortography post-valve deployment demonstrated patent flow in RCA (white dots).

BASILICA = bioprosthetic ornative aortic scallop intentional laceration to prevent iatrogenic coronary artery obstruction during TAVR; ICE = intracardiac echocardiography; RCA = right coronaryartery; TAVR = transcatheter aortic valve replacement; ViV = valve-in-valve.

BASILICA procedure is to perforate a leaflet in a specific location using both fluoroscopy and echo guidance, deliver a catheter with sort of a denuded electrical or unshielded piece of it, and then pull it back strategically and slice the leaflet. You could also balloon facilitate, which means you make a slightly bigger hole. The BASILICA can be done on one or two leaflets.

The LAMPOON procedure is a similar concept, but the goal is to split the anterior mitral valve leaflet, generally to prepare for a transcatheter mitral valve replacement (TMVR). If you are placing a transcatheter valve inside a native valve with, for example, mitral annular calcification, you would go in one direction, starting at the annulus and splitting towards the leaflet. If you are doing a LAMPOON inside a patient that has a prior surgical repair with a ring, you go the other way around, splitting from the leaflet down to the base. Therefore, splitting the leaflet can move in either direction, depending on whether the base is protected by a surgical ring. The LAMPOON procedure is a mechanism to split the anterior mitral leaflet in a similar fashion to BASILICA, so that after a TMVR, the leaflet tissue that is displaced into the left ventricular outflow tract (LVOT) is not a single sheet obstructing flow. Instead, the tissue is displaced as two pieces with a central gap that no longer obstructs flow. The LAMPOON procedure is really a mechanism to preserve the neo-LVOT after a TMVR. Centers doing TMVR are a smaller subset compared to those doing TAVR, but would increasingly be familiar with the LAMPOON and have it as part of their toolkit for how to protect the LVOT.

The SESAME procedure is probably the most aggressive and interesting. It is used in similar fashion to the LAMPOON, to either open up an LVOT in a patient with hypertrophic obstructive cardiomyopathy or to prepare the LVOT for another TMVR. Instead of splitting the anterior mitral leaflet (as with the LAMPOON), the SESAME is used to actually split the septum itself, if there is septal hypertrophy. It is a retrograde technique where you cross the aortic valve and quickly burrow into the immediate part of the septum, passing a wire all the way down to roughly the mid ventricle and then out into the left ventricle. You first create a channel or a tunnel and then, using a similar sort of electrocautery to the exposed wire, pull back and slice the septum and fillet it. Even though the myocytes can still contract, you have disrupted the fiber so much that they don't create the thickening of the septum and therefore, the area for flow is maintained. The SESAME procedure was pioneered by a group of innovators at the NIH, and Emory University, as well as some other centers, with a few early publications.[3] The SESAME procedure clearly has a fairly steep learning curve and early cases have been fraught with some complications, but with team experience and patient selection, it is becoming safer.

Finally, the ELASTA procedure is what you could call a sideways LAMPOON procedure, very similar to the original LAMPOON in the mitral position. The goal is to slice off the anterior leaflet effectively. If someone's already had, for example, a transcatheter

edge-to-edge repair with a device, and now you want to do a TMVR, it can't be done if the first device is still present. This procedure is a way to slice the anterior mitral leaflet "east to west", such that the device and its fixed anterior and posterior leaflets fall posteriorly to then allow for a TMVR. An ELASTA is probably the least common or might be tied with SESAME as the least common procedure. But this is all early days.

A year ago, we published American Society of Echocardiography (ASE) guidelines on training competencies for interventional echo,[2] and in a fascinating demonstration of how quickly this field is developing, these guidelines are already out of date, because there was no discussion of electrosurgery, which wasn't being used at that time. It is amazing how brand-new guidelines already have gaps because the field is moving so quickly.

You talk about the structural imager as a "cooperator" on the team and it seems like it is a little bit of a dance among specialties. How does it all work in practice?

The short answer is, there isn't one way it should work. It is very much dependent upon the team that is present and to some extent, the experience and expertise of the team members. If you simplify the team down to predominantly a dedicated interventional echocardiographer and an interventional cardiologist, we describe it to patients as "the interventional cardiologist is the hands and the interventional echocardiographer is the eyes." One sees and one does. Now, obviously, it is more complex than that — both are seeing and both are doing. Take the example of a transcatheter mitral valve repair. The imager would help with patient selection and helps us answer questions like, what is the severity of the dysfunction? What is the mechanism, is it primary or secondary? If we were to do an edge-to-edge repair, which device would be used? Where would we land it? What size would be used? Is there enough tissue to graft? The imaging specialist is a crucial voice in the conversation around device selection and deployment strategy. This conversation takes place before the procedure. Then the interventionalist and echocardiographer will do the transseptal puncture together, but the imager might suggest, let's do it at this particular location, because they have discovered an issue in the patient. The imager and interventionalist work together to guide the transseptal puncture, a procedure that has standard moves and unique moves, and sometimes you need to combine both in a particular patient. After the device is deployed, let's say there is some residual mitral regurgitation, and so there will be a conversation on what to do next, based on the gradient and flow. Perhaps they conclude another device is necessary and determine the location, but further discuss a concern and conclude a particular size is necessary as a result. You can see it is a back-and-forth discussion, as it should be.

The best outcomes are when you have two thinking clinicians discussing a case from the beginning to the end. It's not one person saying, you must do it this way and just show me what I need to see. Or the other person saying, you must use this device because I say so. It is the benefit of two experienced clinicians discussing the case as they move from the beginning to the end. It can be a bit of a dance and a partnership, but when it is working well, it is pretty tough to beat. The outcomes are excellent and importantly, the whole team is at ease. Everyone knows what is happening. The worst examples I've seen are when it is one dominant operator and people who are just instructed to do things. Then you lose all the benefit of the "multi-brain" arising from the experience present in the room. ■

The imaging specialist is a crucial voice in the conversation around device selection and deployment strategy.

Baptist Health's 42nd Annual Echocardiography and Structural Heart Symposium will take place September 26-27, 2025. More information is available at shorturl.at/JPHq3

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