# Cath Lab Digest

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


TRANSRADIAL HEMOSTASIS

## Comparison of Two Methods for Transradial Hemostasis After Cardiac Catheterization and Impact on Post-Procedure Efficiency


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Transradial access (TRA) for invasive cardiac catheterization procedures has increased over the last decade.[1] According to the National Cardiovascular Data Registry, the practice of TRA for percutaneous coronary intervention procedures increased from 16.1% in 2012 to 53.7% in 2021.[2] Despite this rapid increase in TRA utilization, the United States still lags behind other countries.[3] Research has shown that use of radial access offers earlier mobilization, less risk of kidney injury, decreased mortality, and shortened length of stay as compared to the transfemoral approach.[4]

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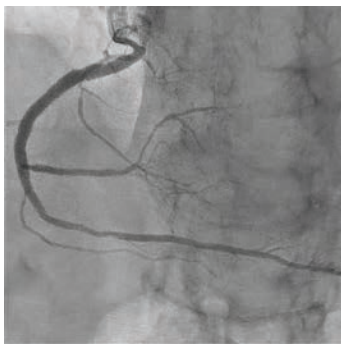
CALCIUM CORNER

## An "IVL-First" Strategy Using 120 Pulses With the Next-Gen C²⁺ Shockwave Catheter

*CLD talks with Brian Jefferson, MD.*

**What has been your experience with intravascular lithotripsy (IVL) and the Shockwave C²⁺ catheter?**



We have used Shockwave IVL since its commercial launch in the United States, so we have a long experience with the use of IVL for calcium modification. The new C²⁺ IVL catheter offers fifty percent more pulses, for a total of 120, and these extra pulses often come in handy. Having 40 extra pulses allows us to treat lesions that in the past might have been too diffuse or too long for single-catheter IVL use, and we also can use the extra pulses in the C²⁺ to treat lesions in more than one vessel. In multiple cases, we have now been able to use a single IVL catheter in two vessels or in lesions where we might have previously used atherectomy due to pulse limitations.

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NEW TECHNOLOGY

## Talking to TCT 2023's Shark Tank (Innovation) Competition Winner: HeartPoint Global's IntelliStent is an Adjustable, Multilumen Stent System for Pulmonary Hypertension in Congenital Heart Disease

*CLD talks with Elena Amin, MBChB, pediatric interventional cardiologist at the University of California, San Francisco, and a member of HeartPoint Global's Advisory Board, and HeartPoint Global Chairman and CEO Seth Bogner.*

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# An "IVL-First" Strategy Using 120 Pulses With the Next-Gen C$^{2+}$ Shockwave Catheter

**We have now been able to use a single IVL catheter in two vessels or in lesions where we might have previously used atherectomy due to pulse limitations.**

*CLD talks with Brian K. Jefferson, MD.*

**Can you describe the lesions where you use IVL?**

We use IVL in lesions with evidence of severe calcification, either angiographically or by using other forms of imaging like intravascular ultrasound (IVUS) or optical coherence tomography (OCT). Often these complex lesions lead to issues with stent delivery and optimization. IVL has been shown to be a safe and efficient way to modify calcium before stenting. Other forms of traditional calcium modification such as orbital or rotational atherectomy have an elevated risk profile and many people are hesitant to use them because of the risk involved, especially if surgical backup is not available. Having a safe mechanism available like IVL allows us to more effectively treat patients with severely calcified lesions.

**How are you changing your pulse management strategy with the additional 40 pulses of the Shockwave C$^{2+}$ catheter?**

Because of the limitations of the prior catheter, we developed several strategies for pulse conservation with IVL. One option is using intravascular image guidance as a way to target areas of severe calcification for treatment. For example, OCT has built-in algorithms to determine the depth and degree of the arcs of coronary calcium. We can employ these algorithms to help focus therapy on those diseased areas. Similarly, we can use IVUS to identify areas where there is concentric or nodular calcium that would potentially need modification, and spare therapy in less diseased sections of the artery.

Sometimes identifying areas for treatment is as simple as inflating the IVL balloon. At 4 atmospheres, if you are able to get full expansion of the balloon, then that area may not benefit as much as areas without expansion. Subsequently, after IVL treatment, I dilate with a 1:1 noncompliant (NC) balloon that is the size of my stent to ensure I have full expansion. If not, I focus more pulses in that area to ensure full stent expansion.

Another area where we were limited by pulses previously was using IVL in two separate vessels. There have been times when I was in a second vessel with moderate to severe calcium but had already used all of therapy in a catheter. I tried to not use IVL in these scenarios, being economically conscious, but with the extra pulses of the C$^{2+}$, treating a second vessel with IVL and having enough pulses is no longer as big of a concern. While some of the previous economic concerns have been alleviated with the coding changes supporting IVL reimbursement, now with the extra 40 pulses, you often have enough pulses to treat two vessels using a single catheter.

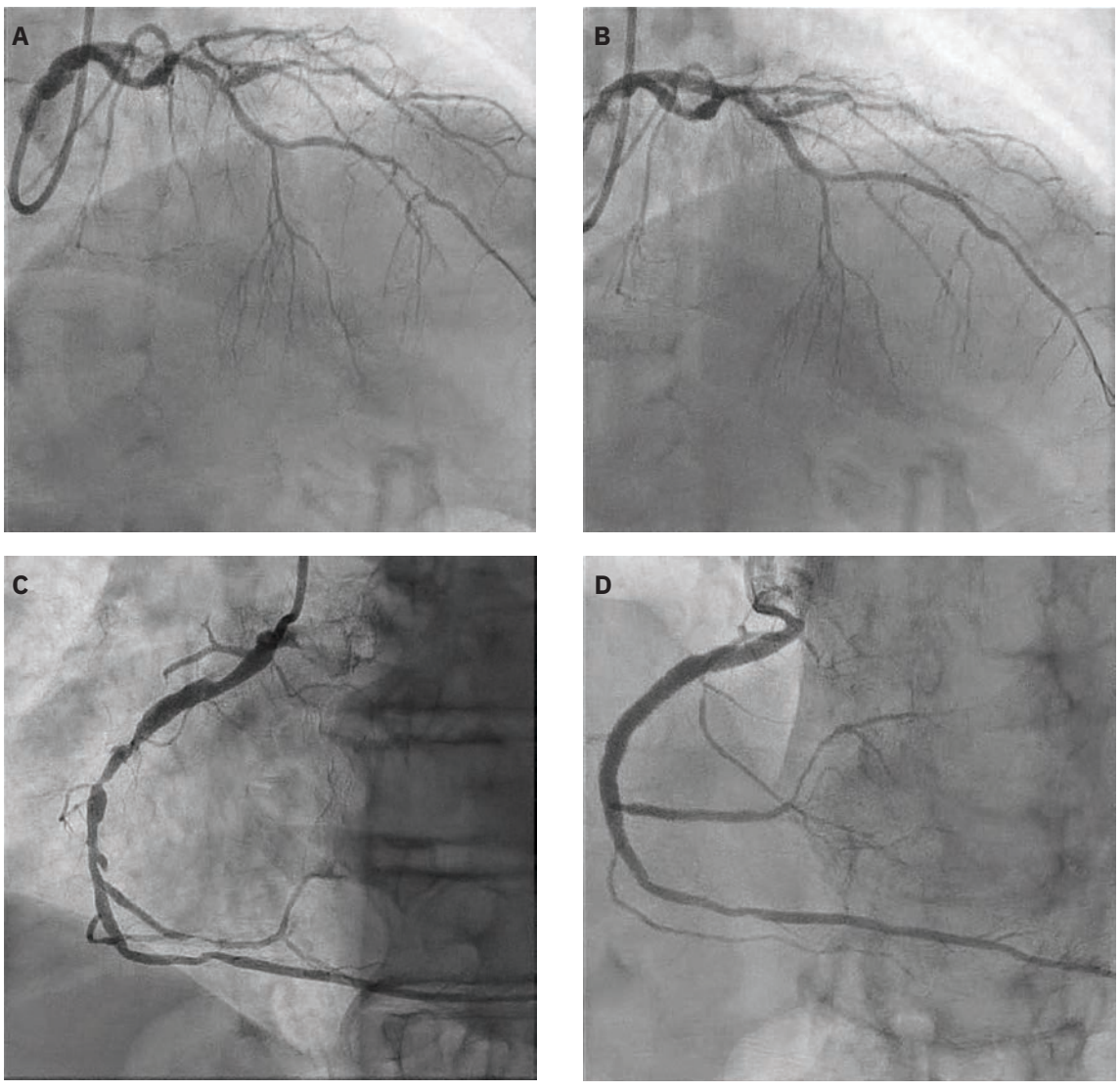


**Figure 1A-D. Use of a Shockwave C$^{2+}$ IVL catheter in multiple vessels. (A) Baseline angiogram of a diffusely diseased left anterior descending (LAD) coronary artery. A 3.5 mm C$^{2+}$ catheter was used with 40 pulses delivered across the proximal LAD and (B) successful placement of two drug-eluting stents. The remaining pulses in the IVL catheter were then delivered into the (C) right coronary artery with subsequent (D) successful drug-eluting stent placement.**

**Are there cases where you might have considered atherectomy first, or something else to modify the calcium, but now with the 40 additional pulses, you are thinking about IVL first?**

I think of IVL first, period, just because of the lower risk profile of IVL versus other forms of calcium modification. It is a simple balloon-based therapy versus mechanical atherectomy, whether rotational or orbital, which carry a higher risk of perforation or dissection, and are technically more cumbersome to perform. When we started using IVL, many of us first thought we were going to need to use mechanical atherectomy in order to deliver the IVL balloon. However, the balloon is a great deal more deliverable than we initially thought. In our institution, we use a rota-shock or rota-tripsy paradigm in less than 10% of cases.

Also, IVL's mechanism modifies calcium differently compared to other modalities. Rotational atherectomy modifies superficial calcium and

doesn't affect the deeper calcium, and is somewhat limited on burr size. Orbital atherectomy may have some modification of deeper calcium due to the nature of its mechanical forces. But, again, the risk profile is higher compared to IVL, so I still prefer to use IVL up front.

I use an IVL-first strategy and reserve mechanical atherectomy mostly for cases when I just can't deliver the balloon. When I see severe calcium, the first decision is how I am going to safely modify it, independent of the pulse limitations. The additional pulses allow us to treat longer and more lesions while maintaining this IVL-first strategy.

**Can you comment on how the radial approach might impact delivery of the IVL balloon?**

Even though radial access penetration in the U.S. is pretty high, for more complex cases, the use of that approach tends to be lower among operators. Traditionally, a 6 French (Fr) radial approach has been limited by guide size for equipment delivery and support in the more complex cases. While a 7 Fr radial guide can be used, in some patients there are some limitations due to radial artery caliber, especially in women. To overcome this, many experienced operators will still use a femoral approach for more complex cases or maybe a single-access Impella (Abiomed) approach where you can use a 7 Fr guide catheter.

At our institution, IVL has allowed us to maintain the benefits of a radial approach for even the most complex cases. The IVL system can usually be delivered via a 6 Fr guide, utilizing a guide extension if needed. This allows us to treat disease that historically might have required a larger sheath and femoral approach. IVL is a large part of how that is possible.

**How do you think the extra pulses with the C$^{2+}$ will change calcium modification in the cath lab?**

A lot of people have adopted IVL, but one of the limitations has been the number of pulses available in a single catheter. Fifty percent more pulses allows us to treat more lesions or even more thoroughly modify a single lesion. This ultimately will lead to more successful stent optimization and outcomes.

**Any final thoughts?**

When I look at transformative technologies IVL is one of the more significant tools to impact my practice. It allows us to improve outcomes in complex patients with lower risk. The key advantage to the greater number of pulses with the C$^{2+}$ is our ability to treat longer, more diffuse lesions and multiple vessels with a single catheter, both limitations in the past. The C$^{2+}$ is the same profile and cost as the first-generation C$^{2}$ catheter. Quite simply, more is better and leads to additional benefits of therapy. ■

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*Shockwave Medical sponsored this interview and Dr. Jefferson is a paid Shockwave Medical consultant.*

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