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A Product, News and Clinical Update for the Cardiac Catheterization Laboratory Specialist

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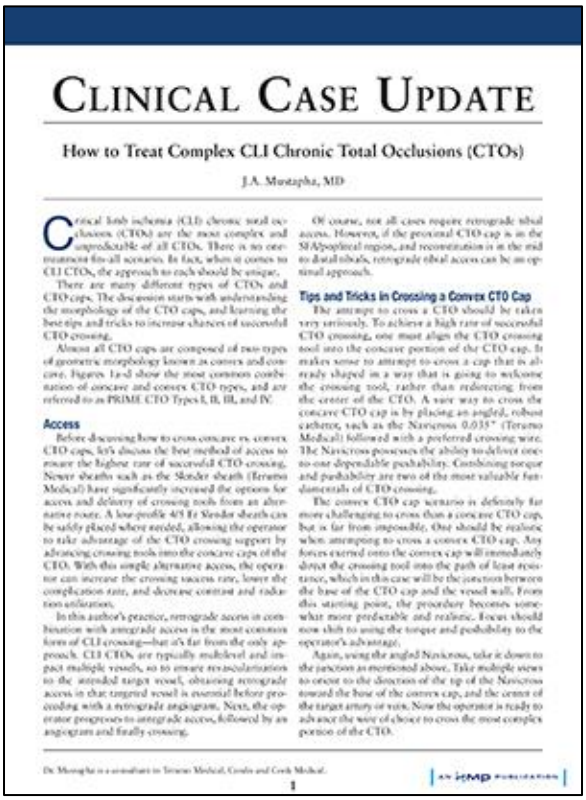
Clinical Case Update



CLINICAL CASE UPDATE

How to Treat Complex CLI Chronic Total Occlusions (CTOs)

J.A. Mustapha, MD

Critical limb ischemia (CLI) chronic total occlusions (CTOs) are the most complex and unpredictable of all CTOs. There is no one-treatment-fits-all scenario. In fact, when it comes to CLI CTOs, the approach to each should be unique.

There are many different types of CTOs and CTO caps. The discussion starts with understanding the morphology of the CTO caps, and learning the best tips and tricks to increase chances of successful CTO crossing.

Almost all CTO caps are composed of two types of geometric morphology known as convex and concave. Figures 1a-d show the most common combination of concave and convex CTO types, and are referred to as PRIME CTO Types I, II, III, and IV.

Access

Before discussing how to cross concave vs. convex CTO caps, let's discuss the best method of access to ensure the highest rate of successful CTO crossing. Newer sheaths such as the Slender sheath (Terumo Medical) have significantly increased the options for access and delivery of crossing tools from an alternative route. A low-profile 4/5 Fr Slender sheath can be safely placed where needed, allowing the operator to take advantage of the CTO crossing support by advancing crossing tools into the concave cap of the CTO. With this simple alternative access, the operator can increase the crossing success rate, lower the complication rate, and decrease contrast and radiation utilization.

In this author's practice, retrograde access in combination with antegrade access is the most common form of CLI crossing—but it's far from the only approach. CLI CTOs are typically multilevel and impact multiple vessels, so to ensure revascularization to the intended target vessel, obtaining retrograde access in that targeted vessel is essential before proceeding with a retrograde angiogram. Next, the operator progresses to antegrade access, followed by an angiogram and finally crossing.

Of course, not all cases require retrograde tibial access. However, if the proximal CTO cap is in the SFA/popliteal region, and reconstitution is in the mid to distal tibials, retrograde tibial access can be an optimal approach.

Tips and Tricks in Crossing a Convex CTO Cap

The attempt to cross a CTO should be taken very seriously. To achieve a high rate of successful CTO crossing, one must align the CTO crossing tool into the concave portion of the CTO cap. It makes sense to attempt to cross a cap that is already shaped in a way that is going to welcome the crossing tool, rather than redirecting from the center of the CTO. A sure way to cross the concave CTO cap is by placing an angled, robust catheter, such as the Navicross 0.035" (Terumo Medical) followed with a preferred crossing wire. The Navicross possesses the ability to deliver one-to-one dependable pushability. Combining torque and pushability are two of the most valuable fundamentals of CTO crossing.

The convex CTO cap scenario is definitely far more challenging to cross than a concave CTO cap, but is far from impossible. One should be realistic when attempting to cross a convex CTO cap. Any forces exerted onto the convex cap will immediately direct the crossing tool into the path of least resistance, which in this case will be the junction between the base of the CTO cap and the vessel wall. From this starting point, the procedure becomes somewhat more predictable and realistic. Focus should now shift to using the torque and pushability to the operator's advantage.

Again, using the angled Navicross, take it down to the junction as mentioned above. Take multiple views to orient to the direction of the tip of the Navicross toward the base of the convex cap, and the center of the target artery or vein. Now the operator is ready to advance the wire of choice to cross the most complex portion of the CTO.

Dr. Mustapha is a consultant to Terumo Medical, Cordis and Cook Medical.

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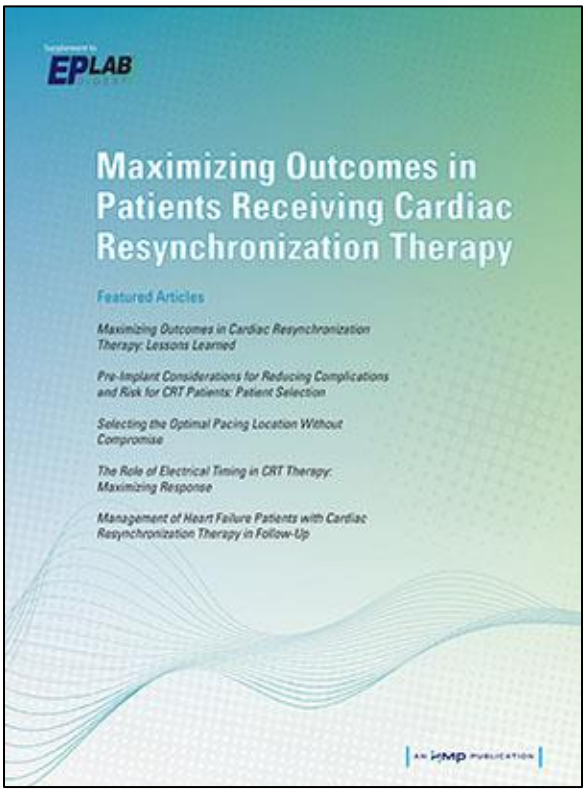

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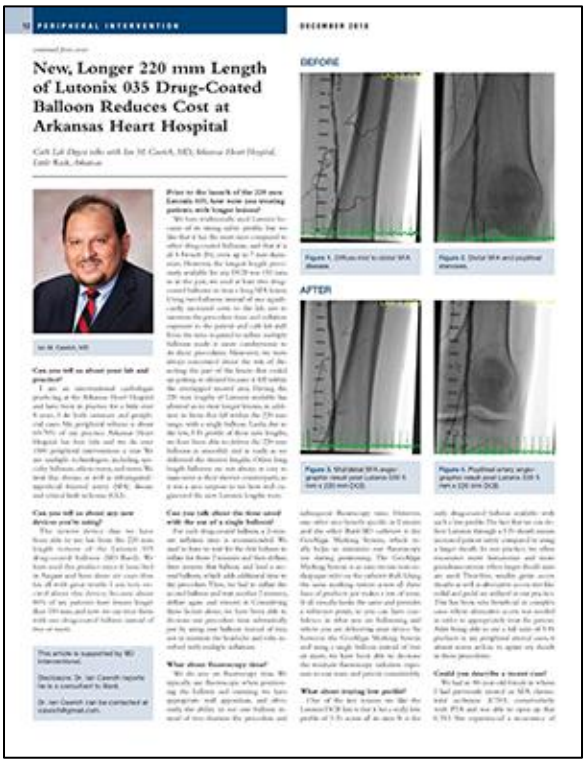

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