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Editorial Comment

“It Ain’t Over Till It’s Over”

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As the great sage, Yogi Berra, predicted, sometimes complications occur even after a patient has left the catheterization laboratory. The accompanying case report by Verstraete et al. describes an unusual but potential risk associated with diagnostic intravascular ultrasound imaging. An intravascular ultrasound examination of the left coronary artery appeared to proceed smoothly and provided helpful information to the operators in their decision to send this patient for bypass surgery. The operators visualized the torn capsule of a vulnerable plaque in the left main coronary artery. Passage of the ultrasound catheter presumably exacerbated the disrupted plaque with progression of thrombus despite heparinization and eventual occlusion of the left main coronary artery approximately 10 min after the patient left the catheterization laboratory. It is pertinent to note that the left main stenosis appeared worse on the angiogram obtained just prior to the ultrasound examination, suggesting that an active thrombus was present to account for such rapid progression. The operators were clearly trapped with a difficult clinical decision. The use of abciximab might have prevented the progression of the thrombus, but would have jeopardized the planned surgery. An alternative would have been immediate stenting; however, stenting left main disease is a high-risk procedure that many laboratories would not perform electively. After the patient suffered hemodynamic compromise, he was taken back to the laboratory where emergent stenting of the left main artery was successful. This case study serves as a useful way to remind all interventionalists that imaging with intravascular ultrasound has potential risks. As the authors point out, the overall risk for severe complications is small. The most common complication associated with intravascular ultrasound imaging is coronary artery spasm (≤2%). This is easily reversible in most cases by removing the catheter and infusing intracoronary nitroglycerin. The only exception to this rule appears to be in transplanted hearts. These denervated arteries are more likely to go into spasm (≤1.5%) and the degree of spasm is more intense than in nontransplanted hearts. Since these hearts do not transmit painful stimuli, the recognition of coronary artery spasm is discovered by angiography, intense ST elevation, or profound hypotension. Dissection of a coronary artery has been described but is an unusual complication of intravascular ultrasound imaging. The monorail IVUS catheter that uses a common end hole for passage of either the guidewire or the ultrasound imaging core (2.9 Fr Clearview Ultracross Sci Med, Boston Scientific, Watertown, MA) has been associated with more trauma to the artery. This tends to occur when repositioning the guidewire out of the fixed tip of the catheter sheath. These complications have not been identified with the 3.2 Fr short monorail design or the current 2.6 Fr model (Discovery). The other area where trauma to the
endothelium may occur is in initially passing the ultrasound catheter around the primary
curve, either into the left main coronary artery or its major branches. The fundamental
recommendation in this situation is never to force the IVUS catheter. Excessive force on
the monorail catheter system tends to separate the IVUS catheter from the guidewire,
which can lead to wire entrapment. As outlined in the article, there are significant
benefits of preintervention imaging. These include better understanding of plaque
composition, identification of a vulnerable plaque, assessment of the extent of the lesion,
accurate measurement of the reference artery size, and media-to-media measurement at
the stenosis. All of these observations are extremely helpful in choosing the best device
to treat the lesion as well as specific sizing of stent and balloon for optimization of the
procedure. Nevertheless, this case presentation underscores the fact that the intravascular
ultrasound catheter is a diagnostic device to assist in interventional procedures. As with
any coronary intervention, the operator must be prepared for complications such as acute
closure and be able to respond appropriately.