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INTERVENTIONS

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Staged Percutaneous Coronary Intervention in STEMI Patient

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CASE STUDY

Patient Presentation

A 45-year-old man with hypertension, dyslipidemia, peripheral vascular disease, as well as 15-year history of type II diabetes, presented to his primary care physician for a previously scheduled appointment regarding diabetes management. He had been experiencing cold-like symptoms, including shortness of breath and wheezing over the previous 2 days. An electrocardiogram (ECG) was performed at his physician's office and revealed ST elevation. The patient was sent to the emergency room (ER) by ambulance for further evaluation.

Results of Physical Examination

Upon arrival at the ER, the patient's troponin level was 2.35 and his ECG revealed an ST elevation MI (STEMI). The patient was comfortable and pleasant. He did not believe he was experiencing an MI. He denied chest pain, nausea, and dizziness. He was still experiencing shortness of breath. He was taken emergently to the cardiac catheterization lab.

Pre-Procedure Plan and Clinical Course

Cardiac catheterization revealed total occlusion of the left anterior descending artery (LAD) with 90% stenosis in the mid circumflex artery (LCX; FIGURE 1). The right coronary artery (RCA) was totally occluded (chronically) at the ostium (FIGURE 2). There was good collateralization from the left-to-right coronary system. His ejection fraction was 35%.

Emergency coronary bypass was considered, however surgical consultation was not available and a decision was made to proceed with staged percutaneous coronary interventions (PCI). The first procedure was performed using thrombectomy with an aspiration catheter (FIGURE 3) and subsequently deployment of two drug-eluting stents in the LAD (FIGURE 4) resulting in TIMI 3 flow and 0% residual stenosis (FIGURE 5).

The circumflex artery was staged 2 days later (FIGURE 6). A drug-eluting stent was successfully deployed, resulting in 0% residual stenosis (FIGURE 7). The patient's ejection fraction was still 35%. The patient had no complication and did very well after both the procedures.

The patient was transferred to the coronary care unit (CCU) and underwent diuresis along with a consultation with endocrinology for elevated glucose. On the fifth day of his hospitalization, the patient was discharged to home wearing a wearable cardioverter-defibrillator (WCD; LifeVest®; ZOLL; Pittsburgh, Pennsylvania).

The patient was scheduled to have an office visit in 2 weeks and would follow-up with his physician in his health system for continued general care. In 90 days he was to have his ejection fraction reevaluated. If at that time his LVEF remained ≤35%, an implantable cardioverter-defibrillator (ICD) would be considered for permanent sudden cardiac arrest (SCA) protection.

Clinical Update

Five days after being discharged, the patient experienced an episode of ventricular fibrillation (VF) (FIGURE 8); his wearable defibrillator appropriately detected the episode, and delivered a 150J biphasic treatment shock 34 seconds later (FIGURE 9). The treatment successfully converted his VF to a normal sinus rhythm at a rate of 62 BPM.

The patient returned to the hospital and subsequently had an ICD implanted to protect him from further ventricular arrhythmias. He had subsequent episodes of VF, which were successfully treated with ICD shocks and suppressed with antiarrhythmic therapy. He has been on optimized medical therapy and is thriving after his hospitalization. He has since returned to work and is enjoying his second chance at life with his wife and family.

Case Discussion

This patient was experiencing cardiac symptoms which he mistakenly attributed to an illness. Fortunately, his MI was discovered by his physician during a routine office visit. Emergent catheterization resulting in two staged PCI procedures led to his discharge 5 days later. Patients with large MIs are known to have significant risk of sudden death in the early period after the MI. Studies have shown that a low ejection fraction is the most important factor used to assess SCA risk. With an LVEF ≤35%, the patient was identified to be at risk for SCA and a plan was developed for electrophysiology to reevaluate the risk in 90 days (after his condition had stabilized and he was on optimal medical therapy). A WCD was prescribed for protection of SCA during this period and did provide a lifesaving therapy. This case provides an excellent example of interpreting the patient's clinical course in the context of proven physiological risk factors to assess, identify and provide protection from SCA. ■

FIGURE 1 Culprit lesion is 90% ulcerated, thrombotic proximal LAD stenosis (solid arrow). There is also a 90% mid-LCX stenosis (white arrow).

FIGURE 2 RCA is chronically occluded ostially (arrow).

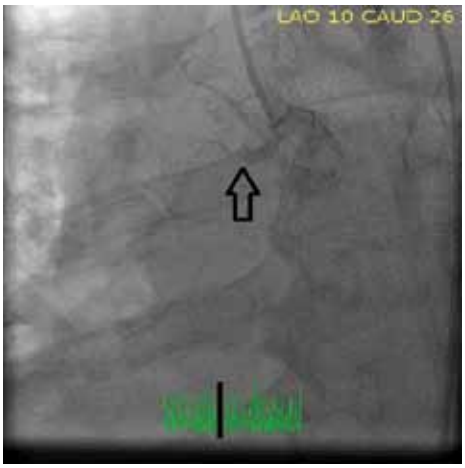


FIGURE 3 **Aspiration catheter (arrow) is advanced down LAD to remove friable thrombus prior to stent deployment.**

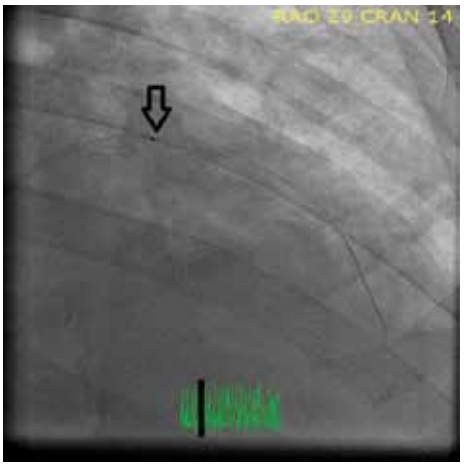


FIGURE 6 **Guiding image for staged stenting 90% mid-LCX lesion (arrow).**

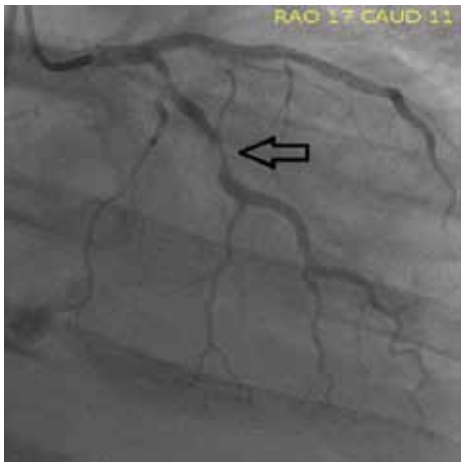


FIGURE 7 **Final result of LCX after drug-eluting stent deployment (arrow).**

FIGURE 4 **Stent deployment (arrow).**

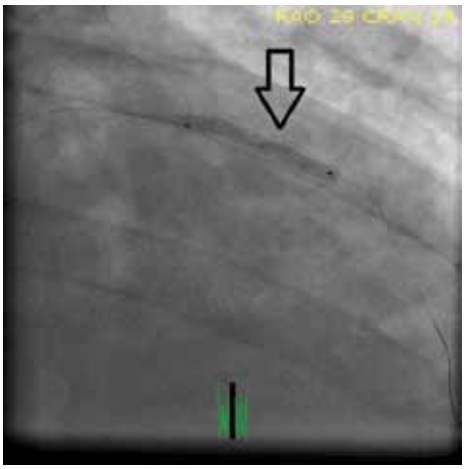


FIGURE 8 **ECG downloaded from WCD. The WCD continuously monitors the patient's ECG using a 4-electrode, 2-lead system side-to-side (SS, top) and front-to-back (FB, bottom).**

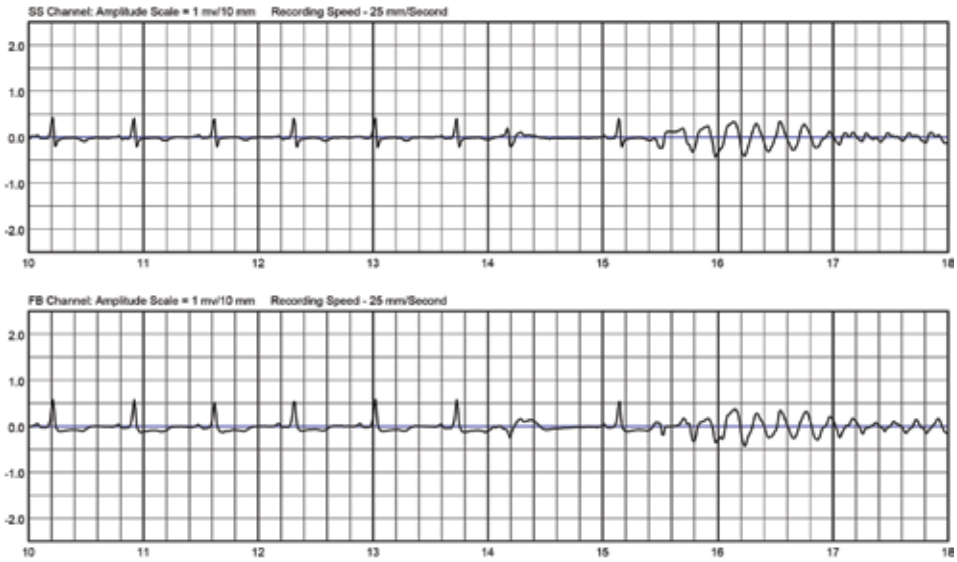


FIGURE 5 **Final result of LAD after deployment of two overlapping drug-eluting stents (arrows).**

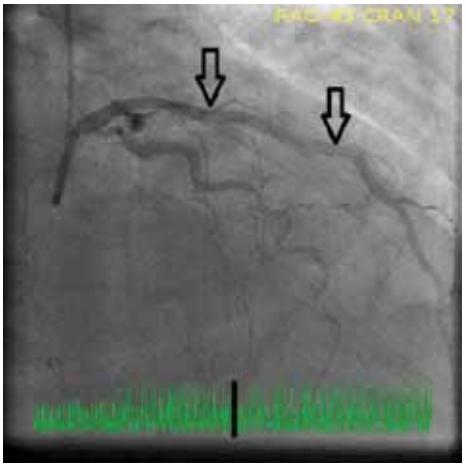
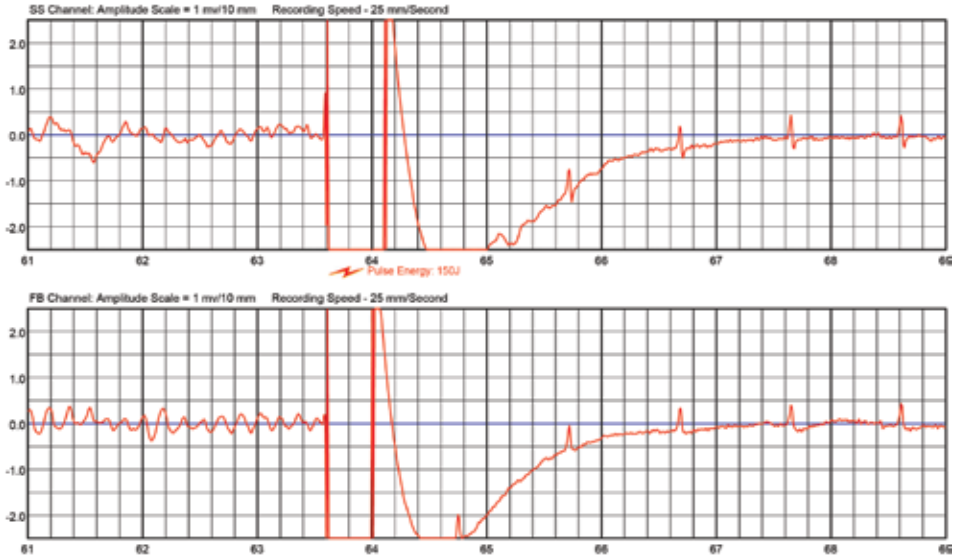


FIGURE 9 **ECG downloaded from WCD displaying a 150J biphasic treatment shock which successfully converted his VF to a normal sinus rhythm at a rate of 62 BPM.**



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