Dynamic Myocardial Ischemia Caused by Circumflex Artery Stenosis Detected by a New Implantable Left Atrial Pressure Monitoring Device

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A 81-year-old man with severe left ventricular dysfunction (left ventricular ejection fraction 24%), prior coronary artery bypass grafting, symptomatic heart failure (New York Heart Association class III), and an investigational percutaneously implanted permanent left atrial pressure (LAP) monitoring system (HeartPOD Savacor, Inc, Los Angeles, Calif) in situ (Figure 1) was admitted with an acute coronary syndrome. High-fidelity resting LAP waveforms were acquired at least twice daily by the patient, using a hand-held computer to communicate with the implant by radiofrequency digital telemetry. Mean LAP variations included frequent, diurnal increases to $\geq 35$ mm Hg, with large c-V waves $> 60$ mm Hg. The patient underwent successful stenting of an unprotected circumflex marginal branch (Figure 2). Figure 3 shows hemodynamic waveforms during the angioplasty. Myocardial ischemia may elevate LAP by causing transient systolic or diastolic left ventricular dysfunction or mitral regurgitation from papillary muscle dysfunction. In this patient, ambulatory direct LAP monitoring detected dynamic ischemia and helped to confirm successful revascularization of the culprit circumflex artery.

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Figure 2. Native circumflex marginal branch stenosis before (A) and after (B) stenting.

Figure 3. LAP and electrogram waveforms from the implanted monitoring system showing a normal LAP at baseline (A), LAP elevation during 20-second coronary occlusion with massive c-V waves (B), and normalization of LAP and c-V waves within 3 minutes after successful circumflex artery stenting (C). IEGM indicates intracardiac electrogram.
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