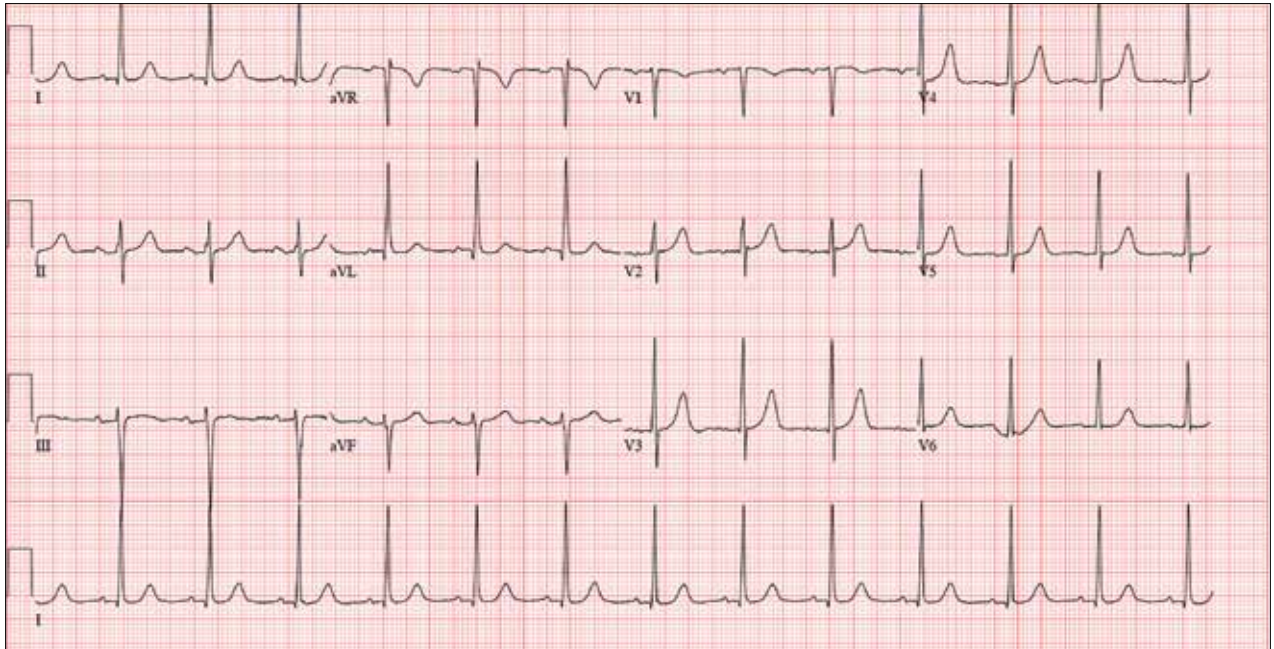


# Knee Pain, Heart Strain?



**A** 47-year-old man presents for preoperative exam prior to right knee arthroplasty. He twisted his knee while training for a triathlon; MRI showed a bucket handle tear of the medial meniscus.

The patient has been very active throughout his life. Medical history is remarkable for essential hypertension. He has no history of chest pain, palpitations, shortness of breath, syncope, or near-syncope.

Current medications include metoprolol XL (25 mg/d)—which he hasn't taken in five days, since he hasn't been able to pick up his refill—and ibuprofen (600 mg tid, prn for knee pain). He denies illicit drug use.

The patient works as an accountant and is married with two children. His parents and grandparents are all alive and well. He has never smoked tobacco but does use marijuana socially on weekends. He also has one to two glasses of wine each night.

Review of systems is noncontributory: no recent colds or flu, bowel or bladder dysfunction, or weight changes. Vital signs include a blood pressure of 138/80 mm Hg; pulse, 80 beats/min; respiratory rate, 14 breaths/min<sup>-1</sup>; and temperature, 98°F. His

weight is 194 lb and his height, 75 in. Pertinent physical findings include pain on palpation of the medial aspect of the right knee and a positive McMurray sign.

Bloodwork, a chest x-ray, and an ECG are obtained. The ECG shows a ventricular rate of 79 beats/min; PR interval, 184 ms; QRS duration, 76 ms; QT/QTc intervals, 382/438 ms; P axis, 48°; R axis, -29°; and T axis, 33°. What is your interpretation of this ECG?

## ANSWER

The correct interpretation includes normal sinus rhythm with left ventricular hypertrophy (LVH) and possible left atrial enlargement. Criteria for LVH include high voltages in the limb leads (R wave in lead I and S wave in lead III  $\geq 25$  mm) or the precordial leads (S wave in V<sub>1</sub> and R wave in V<sub>6</sub>  $\geq 35$  mm). Left atrial enlargement and ST-T wave abnormalities are often seen with LVH. The notched P wave in lead II and biphasic P wave in V<sub>1</sub> raise suspicion for left atrial involvement. Finally, repolarization of a hypertrophic left ventricle following systole is responsible for the tall T waves seen in leads V<sub>2</sub> to V<sub>6</sub>.

**CR**



**Lyle W. Larson, PhD, PA-C**, is clinical faculty in the Department of Medicine, Division of Cardiology, Cardiac Electrophysiology, at the University of Washington, Seattle.