A 72-year-old woman with past medical history of hypertension had an episode of non-exertional chest pain. She was chest pain free at time of presentation to the emergency room. The following ECG (Figure 1) was obtained at the time of arrival.

**Figure 1.** 12-lead Electrocardiogram obtained at presentation to emergency room.
What is the next best step?

Answer options

A. Emergent cardiac catheterization
B. Observe the patient and obtain cardiac enzymes
C. Obtain stat potassium level
D. Obtain stat echocardiogram
E. Obtain repeat electrocardiogram
E. Obtain repeat electrocardiogram

Explanation
The electrocardiogram shows sinus rhythm with significant T-wave abnormalities which are larger in limb leads compared to precordial leads, but absent in lead I (arrows in Figure 1). This is an artifact caused by placement of an electrode over an arterial impulse. The left leg electrode was placed over a very pulsatile left dorsalis pedis artery. This caused mechanical artifact due to motion of the electrode. As the artifact is due to disturbance in left leg electrode, it is manifested in all the limb leads except lead I which is recorded between left and right arm. As the left leg electrode is part of the reference Wilson central terminal for the precordial leads, the artifact is also manifested in these leads, though the amplitude is much reduced.

Since the artifact is related to an arterial impulse, it is synchronous to the cardiac cycle and occurs at a fixed interval from the QRS complex during the ST-T wave. It can therefore be difficult to recognize and be confused with repolarization abnormalities due to acute ischemia or hyperkalemia. Figure 2 shows elimination of the artifact by moving the left leg electrode off the arterial impulse.

REFERENCE
**Figure 1.** Presenting 12-lead electrocardiogram. An artifact (arrows) is seen in all leads, except lead I. This artifact is due to left leg electrode placement over an arterial impulse that causes a mechanical artifact synchronous with the cardiac cycle.

**Figure 2.** Repeat 12-lead electrocardiogram performed after repositioning the left leg electrode. This shows sinus rhythm with first degree AV block, left atrial abnormality and non-specific ST-T wave abnormalities. The artifact seen in Figure 1 is absent in this tracing.