as a rise or fall in cardiac troponin levels with a peak value above the 99th percentile of the URL, caused by either acute coronary thrombus or plaque rupture and accompanied by signs of ischemia, such as angina, ischemic EKG changes, or visible ischemia or wall-motion abnormalities on noninvasive testing (Table). Type 2 MI is a similar entity, defined as a rise or fall in cardiac troponin levels above the 99th percentile of the URL with similar signs of ischemia, but rather than acute thrombus or plaque rupture as the inciting mechanism, cell death is the result of inadequate perfusion of the myocardium, due to inordinate metabolic demand in the setting of chronic coronary stenosis, coronary vasospasm, or dissection.

In contrast, patients with troponin elevations above the 99th percentile of the URL but without signs of ischemia fall into the category of myocardial injury. If this is accompanied by a rise and/or fall of troponin levels, the injury is considered acute (e.g., due to acute heart failure), whereas if there is no rise/fall pattern, the injury is considered chronic, as is often seen in patients with CKD.

In patients presenting without baseline elevation of their troponin values above the 99th percentile of the URL, a single elevated value is enough to diagnose either acute MI or acute myocardial injury. However, in patients presenting with an initial troponin value above the 99th percentile of the URL, serial troponin values are essential in guiding diagnosis. The figure illustrates the proposed kinetics of troponin release (Figure), with an initial immediate release of “free” troponin from within the myocytes, followed by a longer, slower release of troponin subunits as dead myocytes slowly degrade (9). Depending on blood flow rates, this process can take hours to days, and the ability to appreciate a substantial rise or fall may depend on when within this cycle troponin levels are monitored. Numerous studies have looked at the optimal change (delta) in troponin values sufficient to diagnose acute MI. The Fourth Universal Definition of Myocardial Infarction recommends that a rise or fall of cardiac troponin levels greater than 20% is sufficient for the diagnosis of acute MI or injury.

Management strategies should vary by diagnosis, and since myocardial necrosis in and of itself is not associated with increased risk of arrhythmia, telemetry monitoring should be considered on a case-by-case basis depending on the chronicity.