**Demand Ischemia**

Represents **symptoms** consistent with myocardial ischemia primarily due to **oxygen supply-demand imbalance WITHOUT ELEVATED TROPONINS** above the 99th percentile.

**Demand Ischemia Etiologies**

♣ Brady or Tachy-Arrythmia

♣ Aortic Dissection

♣ Severe Aortic Valve Disease

♣ Hypertrophic Cardiomyopathy

♣ Shock (Septic, Cardiogenic, etc.)

♣ Coronary Spasm

♣ Coronary Embolism

♣ Coronary Vasculitis/ Arteritis/Endarteritis

♣ Coronary Endothelial Dysfunction

♣ Hypertensive Crisis

♣Anemia

♣ etc.

Example: 66 yo male presents with paroxysmal atrial tachycardia and substernal chest pressure with ventricular rate of 180. Troponins were 0.01/0.03/0.02. PAT and a troponin leak were documented.

\*This clinically supports ***Demand Ischemia*** since the *troponins were present but not above the criteria* with *evidence of acute ischemia* (chest pressure).

**Type II MI**

Type 2 MI is evidenced by an acute myocardial ischemia **without acute coronary atherothrombotic injury. It is caused by** an **oxygen supply-demand imbalance** **WITH ELEVATED TROPONINS** from the same demand ischemia etiologies.

**Type II Criteria**

Detection of a rise and/or fall of cTn values with at least 1 value above the 99th percentile requiring at least one of the following symptoms or test findings:

♣ Symptoms of acute myocardial ischemia

♣ New ischemic ECG changes

♣ Development of pathological Q waves

♣ Imaging evidence of new loss of viable myocardium or new regional wall motion abnormality in a pattern consistent with an ischemic etiology

Example: 82 yo male admits with B/P 250/135, neck and shoulder pain and SOB. EKG show non-specific ST and T wave changes. Troponin were 0.08/1.5/1.8. #1 HTN emergency and #2 NSTEMI probably due to #1-probably demand ischemia is documented.

\*This clinically supports a ***Type II MI*** based on *elevated troponins* with *findings and symptoms of ischemia* (EKG changes, neck and shoulder pain and SOB).

**Myocardial Injury**

**Elevated troponin WITHOUT SYMPTOMS of myocardial ischemia.**

♣Myocardial injury should be used when there is evidence of elevated cardiac troponin values (cTn) with at least one value above the 99th percentile upper reference limit (URL)

♣Nonischemic myocardial injury may result from many mechanisms including myocardial strain and resultant apoptosis (heart failure, valvular heart disease, or hypertension) or direct cardiotoxicity (chemotherapy and illicit substance use)

♣Chronic myocardial injury can be seen with other diagnoses such as chronic kidney disease and congestive heart failure

♣Acute myocardial injury can be seen in many situations, including atrial fibrillation, sepsis, and hypovolemia

Example: 62 yo male admitted for acute on chronic systolic CHF. He had no CP or other ischemic symptoms. Troponin was 0.26 which trended downward. “Troponin elevation was likely due to a combination of CKD and “troponin leak” from the cardiac strain due to CHF” was documented.

\*This clinically supports non-ischemic ***Myocardial Injury*** because the troponin elevation was due to a non-ischemic cause (CHF and CKD).