Clinical Policy: Cardiac Biomarker Testing

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Coding Implications
Revision Log

Description
The release of cardiac biomarkers is among the cascade of events that occur during acute coronary syndromes and cardiac ischemia. This policy discusses the medical necessity requirements for testing of these cardiac biomarkers.

Policy/Criteria

I. It is the policy of PHW that troponin I or T testing is **medically necessary** and the appropriate cardiac biomarker for evaluating for suspected acute myocardial infarctions (AMI) or myocardial injury due to other mechanisms.

II. It is the policy of PHW that creatine kinase myocardial isoenzyme (CK-MB) and myoglobin testing are **not medically necessary** in the evaluation for suspected AMI because troponin is the recommended biomarker due to its superior sensitivity and accuracy. However, CK-MB may be considered in the setting of reinfarction concerns once an MI has been diagnosed.

Background
Detection of specific cardiac biomarkers in blood serum is a useful clinical indication of AMI, myocarditis, or heart failure. According to the 2014 clinical practice guideline of the American College of Cardiologists / American Heart Association, (ACC/AHA) cardiac troponins have become the main biomarkers used for the diagnoses of acute coronary syndromes, specifically troponins I and T because these subunits are expressed in the myocardium.[1,2] Furthermore, troponin levels are also elevated for acute and chronic decompensated heart failure in instances of myocyte injury and/or necrosis.[3]

Other cardiac peptides that were previously assessed for AMI include CK-MB and myoglobin. However, recent evidence suggests that the sensitivity and specificity of these biomarkers are inferior compared to the troponins, suggesting that troponins are a more accurate biomarker of myocardial injury.[1] According to the 2014 ACC/AHA clinical practice guideline, CK-MB and myoglobin are no longer necessary for acute coronary syndrome diagnosis as a result of the advent of troponin assays.[1] CK-MB detection is comparatively less sensitive and less specific. Voltz et al. performed a retrospective cohort study across 55,000 emergency department visits for AMI and examined their CK-MB and troponin levels with screenings; the authors concluded that CK-MB can be omitted during the initial screening of AMIs.[6] Eggers et al, evaluated the role of myoglobin with troponin I to detect AMI in a sample of 197 patients and determined that neither myoglobin nor CK-MB added clinical diagnostic value.[4] Aviles et al analyzed AMI amongst patients with elevated cardiac troponins in a prospective cohort and noted that at least 20% of patients had normal CK-MB levels, thereby further questioning the validity of CK-MB as a valuable cardiac biomarker.[7] Of note, Singh *et al*. measured CK-MB testing from 2007 to 2013 and found a dramatic decrease from 12,057 tests in 2007 to 36 tests in 2013.[5]

Coding Implications

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Table 1: CPT codes not medically necessary when billed with CPT 84484 Troponin

CPT Codes	Description
82553	Creatine kinase (CK), (CPK); MB fraction only
83874	Myoglobin

Reviews, Revisions, and Approvals	Date	Approval Date
Policy developed	04/18	06/18
References reviewed and updated.	03/19	
References reviewed and updated. Coding reviewed.	06/2020	8/7/2020
Added "or myocardial injury due to other mechanisms" in addition to acute myocardial infarction for approval in criteria I. References reviewed and updated. Coding reviewed.	8/31/2021	9/27/2021

References

1. Amsterdam EA, Wenger NK, Brindis RG, et al. 2014 AHA/ACC guideline for the management of patients with non-ST-elevation acute coronary syndromes. *Circulation* 2014. 130. 25.
2. Neumann JT, Sörensen NA, Schwemer T, et al. Diagnosis of myocardial infarction using a high-sensitivity troponin I 1-hour algorithm. *JAMA Cardiol* 2016. 1.4: 397-404.
3. Yancy CW, Jessup M, Bozkurt B, et al. 2017 ACC/AHA/HFSA focused update of the 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology/American Heart Association Task Force on clinical practice guidelines and the Heart Failure Society of America. *Circulation*. 2017. 136.6.
4. Eggers KM, Oldgren J, Nordenskjöld A, Lindahl B. Diagnostic value of serial measurement of cardiac markers in patients with chest pain: limited value of adding myoglobin to troponin I for exclusion of myocardial infarction. *Am Heart J 2004.* 148.4: 574-581.
5. Singh G, Baweja PS. Creatine kinase–MB: The journey to obsolescence. *Am J Clin Pathol 2014.* 141.3: 415-419.
6. Volz KA, McGillicuddy DC, Horowitz GL, Leon DS. Creatine kinase-MB does not add additional benefit to a negative troponin in the evaluation of chest pain. *Am J Emerg Med 2012.* 30.1: 188-190.
7. Aviles RJ, Wright RS, Aviles JM, et al. Long-term prognosis of patients with clinical unstable angina pectoris without elevation of creatine kinase but with elevation of cardiac troponin i levels. *Am J Cardiol 2002.* 90.8:875-878.

8. Reeder GS, Kennedy HL. Diagnosis of acute myocardial infarction. UpToDate website www.uptodate.com. Published June 4, 2020. Accessed December 17, 2020.
9. deFilippi C, Henrich WL. Serum cardiac biomarkers in patients with renal failure. UpToDate website www.uptodate.com. Published June 29, 2018. Accessed December 17, 2020.