Diagnostic Performance of Mean Platelet Volume in the Diagnosis of Acute Myocardial Infarction: A Meta-Analysis

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Abstract : Mean platelet volume (MPV) is the most accurate measure of the size of platelets and is routinely measured by most automated hematological analyzers. Several studies have shown associations between MPV and cardiovascular risks and outcomes. Although its measurement may provide useful data, MPV remains to be a diagnostic tool that is yet to be included in routine clinical decision making. The aim of this systematic review and meta-analysis is to determine summary estimates of the diagnostic accuracy of mean platelet volume for the diagnosis of myocardial infarction among adult patients with angina and/or its equivalents in terms of sensitivity, specificity, diagnostic odds ratio, and likelihood ratios, and to determine the difference of the mean MPV values between those with MI and those in the non-MI controls. The primary search was done through search in electronic databases PubMed, Cochrane Review CENTRAL, HERDIN (Health Research and Development Information Network), Google Scholar, Philippine Journal of Pathology, and Philippine College of Physicians Philippine Journal of Internal Medicine. The reference list of original reports was also searched. Cross-sectional, cohort, and case-control articles studying the diagnostic performance of mean platelet volume in the diagnosis of acute myocardial infarction in adult patients were included in the study. Studies were included if: (1) CBC was taken upon presentation to the ER or upon admission (within 24 hours of symptom onset); (2) myocardial infarction was diagnosed with serum markers, ECG, or according to accepted guidelines by the Cardiology societies (American Heart Association (AHA), American College of Cardiology (ACC), European Society of Cardiology (ESC)); and, (3) if outcomes were measured as significant difference AND/OR sensitivity and specificity. The authors independently screened for inclusion of all the identified potential studies as a result of the search. Eligible studies were appraised using well-defined criteria. Any disagreement between the reviewers was resolved through discussion and consensus. The overall mean MPV value of those with MI (9.702 fl; 95% CI 9.07 – 10.33) was higher than in those of the non-MI control group (8.85 fl; 95% CI 8.23 – 9.46). Interpretation of the calculated t-value of 2.0827 showed that there was a significant difference in the mean MPV values of those with MI and those of the non-MI controls. The summary sensitivity (Se) and specificity (Sp) for MPV were 0.66 (95% CI; 0.59 - 0.73) and 0.60 (95% CI; 0.43 – 0.75), respectively. The pooled diagnostic odds ratio (DOR) was 2.92 (95% CI; 1.90 – 4.50). The positive likelihood ratio of MPV in the diagnosis of myocardial infarction was 1.65 (95% CI; 1.20 – 22.27), and the negative likelihood ratio was 0.56 (95% CI; 0.50 – 0.64). The intended role for MPV in the diagnostic pathway of myocardial infarction would perhaps be best as a triage tool. With a DOR of 2.92, MPV values can discriminate between those who have MI and those without. For a patient with angina presenting with elevated MPV values, it is 1.65 times more likely that he has MI. Thus, it is implied that the decision to treat a patient with angina or its equivalents as a case of MI could be supported by an elevated MPV value.

Keywords : mean platelet volume, MPV, myocardial infarction, angina, chest pain