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Diagnostic and Prognostic Use of Kinetics of Microrna and Cardiac Biomarker in Acute Myocardial Infarction

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Abstract : Background and objectives: Acute myocardial infarction (AMI) is the most common cause of mortality and morbidity. Over the last decade, microRNAs (miRs) have emerged as a potential marker for detecting AMI. The current study evaluates the kinetics and importance of miRs in the differential diagnosis of ST-segment elevated MI (STEMI) and non-STEMI (NSTEMI) and its correlation to conventional biomarkers and to predict the immediate outcome of AMI for arrhythmias and left ventricular (LV) dysfunction. Materials and Method: A total of 100 AMI patients were recruited for the study. Routine cardiac biomarker and miRNA levels were measured during diagnosis and serially at admission, 6, 12, 24, and 72hrs. The baseline biochemical parameters were analyzed. The expression of miRs was compared between STEMI and NSTEMI at different time intervals. Diagnostic utility of miR-1, miR-133, miR-208, and miR-499 levels were analyzed by using RT-PCR and with various diagnostics statistical tools like ROC, odds ratio, and likelihood ratio. Results: The miR-1, miR-133, and miR-499 showed peak concentration at 6 hours, whereas miR-208 showed high significant differences at all time intervals. miR-133 demonstrated the maximum area under the curve at different time intervals in the differential diagnosis of STEMI and NSTEMI which was followed by miR-499 and miR-208. Evaluation of miRs for predicting arrhythmia and LV dysfunction using admission sample demonstrated that miR-1 (OR = 8.64; LR = 1.76) and miR-208 (OR = 26.25; LR = 5.96) showed maximum odds ratio and likelihood respectively. Conclusion: Circulating miRNA showed a highly significant difference between STEMI and NSTEMI in AMI patients. The peak was much earlier than the conventional biomarkers. miR-133, miR-208, and miR-499 can be used in the differential diagnosis of STEMI and NSTEMI, whereas miR-1 and miR-208 could be used in the prediction of arrhythmia and LV dysfunction, respectively.

Keywords : myocardial infarction, cardiac biomarkers, microRNA, arrhythmia, left ventricular dysfunction
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