

The value of quantifying myocardial flow reserve in relation to left ventricular function on myocardial perfusion PET-CT using ⁸²Rubidium

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PURPOSE: Myocardial flow reserve can be quantified non-invasively using quantifying tool through rest and stress data acquired during myocardial PET-CT perfusion study using positron emitters. The aim of this study is to find the clinical value of myocardial flow reserve in relation to the left ventricular function using ⁸²-Rubidium perfusion tracer.

MATERIALS AND METHODS: This prospective study involve 15 volunteers selected at random. Upon excluding contraindications for dobutamine injection, patients included in the study was advice to be fasted overnight. Stress and rest study protocol performed with close observation onto cardiac activity through electrocardiography (ECG) and vital signs monitoring. Low dose CT performed for attenuation correction of PET emission images. The study commenced using step up dose of dobutamine targeting 85% of maximum target heart rate. All studies performed using 64 slice multidetector Computed Tomography (MDCT) integrated with Lutetium Oxyorthosilicate (LSO) Biograph system with list mode acquisition protocol. The dynamic and static images were acquired, reconstructed and converted into DICOM format. The ejection fraction, volume and wall motion analysis were divided into normal and abnormal depending on cut off values of 50%, 120 mls and segmental score of 2 on 20 segment polar map. The stress and rest dynamic data were manipulated using syngo Dynamic PET application to derived the stress flow, rest flow and coronary reserve flow.

RESULTS: There was 1:14 female to male ratio with mean age of 37.1 (19 to 59 year old). The sensitivity and specificity of coronary reserve flow quantification in estimating left ventricular function are 90% and 60% respectively. The probability of getting false positive clinical assumption is low (18%) with a high positive predictive value of 81.8%. The negative predictive value is 75% with moderate probability in getting false negative assumption (25%). Calculations are done at 95% confidence interval.

CONCLUSION: Myocardial flow reserve quantification has high sensitivity and positive predictive value in correlation with left ventricular function. Thus, can be recommended as a suitable non invasive tool in making clinical decision for managing patients with coronary artery disease.