

Summary

Assessment of Most Appropriate Background Subtraction Method for Quantification of ^{123}I -Metaiodobenzylguanidine (MIBG) Myocardial Uptake by Comparing with Plasma ANP and BNP

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Background Quantification of ^{123}I -metaiodobenzylguanidine (MIBG) myocardial uptake is widely accepted as a useful tool for estimating the severity of congestive heart failure. However, most reliable method has not been determined yet because of the difficulty of background (BG) subtraction. In this study, the most appropriate BG subtraction method was evaluated as compared with plasma atrial natriuretic peptide (ANP), brain natriuretic peptide (BNP), norepinephrine (NEP) and left ventricular ejection fraction (LVEF).

Methods Twenty-one patients with chronic heart failure were examined. After bolus injection of ^{123}I -MIBG (111 MBq), dynamic anterior chest images were collected every second for 2 minutes. Planar anterior chest images were obtained 15 minutes (early image) and 4 hours later (delayed image) respectively. The parameters for quantification of ^{123}I -MIBG myocardial uptake used in this study were heart to mediastinum ratio (H/M), myocardial washout rate and uptake ratio. Background was calculated using the region of interest (ROI) placed over a part of upper mediastinum, whole upper mediastinum, right lung

and pericardial space respectively. The values of these parameters were calculated with and without BG subtraction and compared with plasma ANP, BNP and others.

Results H/M did not correlate with ANP or BNP. Myocardial washout rate without BG subtraction showed significant correlation with ANP ($p < 0.01$) and BNP ($p < 0.05$). After BG subtraction employing ROI placed over the part of upper mediastinum and whole upper mediastinum, myocardial washout rate showed better correlation with BNP ($p < 0.01$). Myocardial uptake ratio did not show any correlation with ANP or BNP without BG subtraction. However, myocardial uptake ratio showed significant correlation with BNP ($p < 0.05$) after subtraction of upper mediastinal BG. BG subtraction using ROI over right lung or pericardial area revealed poor results in both myocardial washout rate* and uptake ratio.

Conclusion BG subtraction using ROI over the upper mediastinum is likely to be suitable for quantitative analysis of ^{123}I -MIBG myocardial scintigram.

Key words: ^{123}I -MIBG, ANP, BNP, Quantitative analysis, Heart failure.