Ultrasonic Integrated Backscatter discloses Intramyocardial Hemorrhage in Patients with Acute Myocardial Infarction

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Intramyocardial hemorrhage (IH) can be detected by MRI and this phenomenon reflects severe myocardial injury resulting from extravasation of erythrocytes into reperfused myocardium. On the other hand, recently, ultrasonic integrated backscatter (IB) has been used for tissue characterization clinically and IB is shown to be useful for predicting recovery from myocardial dysfunction in patients with acute myocardial infarction (AMI). Thus, IH may produce pathophysiological change in myocardium and IB may document this change early after coronary reperfusion. In this study, we examined whether IH can be evaluated by IB in the 17 patients with reperfused AMI (12 patients with anterior AMI and 5 patients with inferior AMI) who underwent successful coronary angioplasty within 24 hours after symptom onset. We measured cyclic variation and calibrated IB (CV and C-IB, respectively) in the center of risk area using 2D format IB analyzing system (SONOS 2500) on 3 day after reperfusion. C-IB was calculated as follows: IB value of risk area - reference IB value of intraventricular blood. ECG gated gradient echo acquisition and Gd-DTPA-enhanced spin-echo MRI were performed with 1.5 Tesla system within 7 days after reperfusion. Regional wall motion score index (RWMSI) was calculated soon and one month after reperfusion as follows: sum of scores (normal = 0 ~ dys- / akinesis = 3) in risk area / number of segments of risk area. IH was observed in 5 cases (29%). RWMSI in IH group was significantly higher than in non-IH group (2.8±0.3 vs. 2.0±0.6: P<0.05) on e month later while RWMSI in both groups were almost similar (3.0±0.1 vs. 2. 9±0.2) soon after reperfusion. IH group showed significantly a higher value of C-IB (19.1±2.5 vs. 16.4±1.9: P<0.05) and a lower value of CV (2.5±0.6 vs. 4.6±2.2) than non-IH group. Conclusion: Ultrasonic integrated backscatt er discloses intramyocardial hemorrhage that induces the poor recovery from myocardial dysfunction in patients with reperfused acute myocardial infarction.

Integrated backscatter (IB)を用いた急性心筋梗塞(AMI)における出血性梗塞の評価

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我々は心 MRI で出血性梗塞を診断し、IB との関連を検討した。AMI で primary PTCA を行いステントを用いなかった 17 例を対象とし HP 社製 SONOS2500 を用い評価した。PTCA 後 3 日に梗塞部の IB の心周期変動(CVIB)と心腔内 IB で補正した Calibrated IB(CIB)を計測し、7 日以内に心 MRI を施行し、出血性梗塞を診断した。心筋梗塞発症日と 1 ヶ月後に

心エコーで risk area の壁運動スコア(normo=0～akinesis=4)をセグメント数で除した RWMSI を計測し、出血性梗塞と非出血性梗塞で、IB と RWMSI を比較した。出血性梗塞は非出血性梗塞に比し、梗塞発症日の RWMSI には差が無かったが、1 ヶ月後の RWMSI では有意に前者が高かった。IB の検討では、出血性梗塞は有意に CIB が高く(19.1±2.5 vs. 16.4±1.8: P<0.05)、CVIB は有意ではないが低い傾向を示した(2.5±0.6 vs. 4.6±2.2)。【総括】AMI で primary PTCA を施行した例で出血性梗塞を伴うと壁運動改善が悪く、出血性梗塞は IB で評価できる可能性が示唆された。

質疑応答

一番多かった質問は欧州の医師から integrated backscatter はどの機械についていて計測方法はどうするのかという質問でこの integrated backscatter という手法が特にヨーロッパではまだ多く臨床応用されていない印象を受けました。一応方法を説明すると帰国後ぜひやってみるとの回答でした。一番印象深かったコメントは別府先生から「この通りやろ」とオスミツキをもらったことで日本では得られない(?)心強いコメントでした。