Intracoronary ECG During Primary Percutaneous Coronary Intervention (PPCI) for ST Elevation MI Predicts Microvascular Obstruction and Infarct Size

INTRODUCTION

- In patients with acute myocardial infarction up to 30-40% patients treated with PPCI have evidence of microvascular obstruction (MVO) that is responsible for the ‘no-reflow’ phenomenon which is associated with larger infarct size and an increased mortality.

- Although post PCI predictors of MVO have been identified, clearly an “in lab” predictor would be crucial, in order to influence therapies administered during PCI.

- Intracoronary ECG (IC-ECG) is a simple and novel method to assess MVO at the time of PPCI with the potential to guide medical therapy.

METHODS

- Fifty-three consecutive patients (age 62±10 years; 79% male) presenting with STEMI (anterior 42%, inferior 36%, inferoposterior 22%) had IC-ECG ST segment measurement before and after (5, 10, 15 mins) opening of infarcted related artery with PPCI.

- The intracoronary unipolar ECG was acquired by connecting the angioplasty guidewire to an ECG monitor while situated in the distal infarct-related artery.

- Contrast enhanced CMR was performed post PPCI at 4 days (Early phase) and 3 months (Late phase).

- Association between binary variables was assessed by Chi Square and continuous variables by Spearmans correlation.

- Association between binary and categorical variables were assessed by Mann-Whitney test with two tailed p<0.05 as significant.

RESULTS

- Intracoronary ECG ST resolution documented immediately upon achieving TIMI 3 flow (Early IC-STR) correlated with microvascular obstruction (MVO) area (424 vs 717 mm², p=0.018).

- Early IC-STR also correlated with size of infarcted myocardial mass (28 vs 41 g, p=0.003), non viable mass (21 vs 37 g, p=0.000), peak CK (1761 vs 2699, p=0.011) and ESV (61 vs 71 mL, p=0.044).

- Early IC-STR also correlated with favourable left ventricular remodeling at 3 months (EDV-142 vs 175 mL, p=0.022; ESV-54 vs 74 mL, p=0.022).

- TIMI Myocardial Perfusion Grade (TMPG) and Myocardial Blush Grade (MBG) did not correlate with MVO area.

- MVO area correlated with infarct mass (r=0.469), non viable mass (r=0.544), EF (r=-0.737) and peak CK (r=0.637).

CONCLUSION

- Early intracoronary ST Resolution predicts extent of MVO, infarct size and left ventricular remodelling.

- Intracoronary ECG is a novel immediate “in-lab” predictor of MVO and has the potential to direct future therapies for the reduction of microvascular injury.

- IC-ECG is a better predictor of microvascular obstruction than TMPG and MBG.

- Further studies with this novel index are now warranted.