Revisit of Beta-Blocker in AMI

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Current ACC/AHA and ESC guidelines recommend beta blocker therapy after AMI. [1, 2] However, evidence supporting these recommendations are on the basis of studies performed in the pre-reperfusion era. In contrast, a few studies were done for the effect of beta blocker in the modern reperfusion era, and there is controversial data. Yang et al. reported that beta blocker therapy significantly reduced all-cause death(beta blocker group vs. no-beta blocker group: 2.1% vs. 3.6%, unadjusted hazard ratio [HR]: 0.52, 95% confidence interval [CI] 0.38-0.70, p<0.001) based on Korean Acute Myocardial Infarction Registry (KAMIR) and Korea working group on Myocardial Infarction (KorMI) data.[3] On the contrary, in COMMIT trial, the use of early beta blocker therapy in AMI increased the risk of cardiogenic shock (5.0% vs. 3.9%, OR 1.30, 95% CI 1.19-1.41, p<0.001) with no difference in death (7.7% vs. 7.8%, OR 0.99, 95% CI 0.92-1.05, p=0.69), although it was reported to reduce the risks of re-infarction (IV metoprolol group vs. placebo group: 2.0% vs. 2.5%, Odds ration [OR] 0.82, 95% CI 0.72–0·92, p=0.001) and ventricular fibrillation (2.5% vs. 3.0% OR 0.83, 95% CI 0.75-0.93, p=0.001). But COMMIT trail has some limitations, because it excluded patients who received percutaneous coronary intervention (PCI), and showed only short term outcome (F/U duration was 28 days).[4] Bangalore et al. conducted meta analysis of 60 randomized trials with 102,003 patients which were performed both in the pre-reperfusion and in the reperfusion era. The results showed beta blocker therapy reduced mortality in the pre-reperfusion (incident rate ratio [IRR] 0.86, 95% CI 0.79-0.94), but not in the reperfusion era (IRR 0.98, 95% CI 0.92-1.05). In the pre-reperfusion era, beta blockers reduced cardiovascular mortality (IRR 0.87, 95% CI, 0.78-0.98), myocardial infarction (IRR 0.78, 95% CI 0.62-0.97), and angina (IRR 0.88, 95% CI 0.82-0.95), with no difference for other outcomes. In the reperfusion era, beta blockers reduced myocardial infarction (IRR 0.72, 95% CI 0.62-0.83) and angina (IRR 0.80, 95% CI 0.65-0.98) at the expense of increase in heart failure (IRR 1.10, 95% CI 1.05-1.16) and cardiogenic shock (IRR 1.29, 95% CI 1.18-1.41) with no benefit on cardiovascular mortality (IRR 1.00, 95% CI 0.91-1.09).[5]

Further, the role of vasodilating beta blockers (carvedilol, nebivolol) over conventional beta blockers (bisoprolol, metoprolol) is still unexplored in patients with AMI. A few studies performed in patients with heart failure, carvedilol was found to reduce all-cause mortality compared with metoprolol. [6] In this regard, we performed the analysis to compare the effects of vasodilating beta blockers (carvedilol, nebivolol) over conventional beta blockers (bisoprolol, metoprolol) using using KAMIR data (8169 AMI patients who were hospitalized from November 2011 to April 2015). The incidence of primary outcome which is the composite of cardiac death, non-fatal MI, and any revascularization at 1 year, did not differ between two groups (vasodilating beta blockers vs.

conventional beta blockers, 4.6% vs. 5.7%, HR 0.828, 95% CI 0.682-1.004, p=0.055). However, cardiac death rate was significantly lower in vasodilating beta blockers group, compared with conventional BB group (1.3% vs. 2.2%, HR 0.579, 95% CI 0.410-0.817, p=0.002). In propensity score-matched population (3101 pairs), all the incidence of primary outcome (4.3% vs. 6.7%, HR 0.639, 95% CI 0.514-0.794, p<0.001), cardiac death (1.2% vs. 2.5%, HR 0.47, 95% CI 0.316-0.699, p<0.001), non-fatal MI (1.3% vs. 1.9%, HR 0.646, 95% CI 0.432-0.967, p=0.032), and rehospitalization for heart failure rates (2% vs. 2.8%, HR 0.712, 95% CI 0.514-0.988, p=0.041) were significantly lower in the vasodilating beta blocker group. There are some limitations in the study. First, data are based on nonrandomized observational registry. Although, we performed propensity score patched analysis to adjust potential confounders, unmeasured variables were not controlled. Second, we do not know whether beta blocker dose was fully uptitrated to the maximum tolerated dose. Third, follow up of 1 year may be relatively short to determine long term efficacy of vasodilating beta blockers. In spite of some limitations, our results suggest vasodilating beta blockers could be superior to conventional beta blockers to reduce cardiac death and other major cardiovascular outcomes in modern reperfusion era. Large-scale, prospective, randomized-controlled trials are needed to clarify the effects of long-term vasodilating beta blocker therapy in patients with AMI undergoing primary PCI.

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