

Impact of mechanical circulatory support on mid-term outcomes in patients presenting with STEMI and reduced left ventricular ejection fraction

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Background. Previous clinical trials assessed the role of temporary mechanical circulatory support (MCS) in the setting of cardiogenic shock (CS) complicating ST-elevation acute myocardial infarction (STEMI). Particularly, circulatory support with Impella System provides superior hemodynamic support in comparison with IABP, leading to a reduction in major adverse events. Recent animal studies showed a benefit of a primary unloading strategy with Impella System in terms of reduction in infarct size and evolution towards heart failure. Few data are available about potential clinical benefits of MCS in STEMI patients presenting without CS.

Purpose. The aim of the study was to evaluate the impact of MCS on mid-term outcomes in patients presenting with STEMI and reduced LVEF in a hub hospital.

Methods. We retrospectively analyzed all consecutive patients presenting with STEMI and left ventricular ejection fraction (LVEF) = 40% from January 2012 to December 2016 in a single centre (San Raffaele Hospital, Milano, IT). We divided the study period in two phases: a first phase from 2012 to 2013 and a second phase from 2014 to 2016. One-year mortality was analyzed in relation to MCS treatment and study period.

Results. We collected 181 patients (127 patients presenting without CS and 54 with CS). During the entire study period (2012-2016), MCS was used in 30% of pts without CS and 85% with CS ($p < 0,0001$). We reported a significant increase over time in MCS use during the study period: total MCS rate was 37,5% in 2012-2013 and 51,3% in 2014-2016 ($p = 0,075$). Particularly, we observed an increase in MCS use in patients presenting without CS. During the second phase of the study, there was a statistically significant increase in the use of Impella System (1,6% vs 10,3%, respectively; $p = 0,03$), with a numerical increase in IABP support rate (35,9% vs 46,1; $p = 0,184$) and VA-ECMO support rate (6,3% vs 10,3%; $p = 0,364$). The growing MCS use during the two study phases was associated with an increased overall survival at 30 days and 1-year follow-up (respectively 79,6% vs 88,7%, $p = 0,079$, and 74,6% vs 83,0%, $p = 0,129$). In patients presenting with CS, the wider use of MCS over time (particularly Impella System), mostly impacted on 30-days mortality (57,1% vs 69,6%, respectively), with similar 1-year mortality rate. Also in patients presenting without CS, we observed a reduction trend in 1-year mortality during the second phase of the study where MCS was widely use in this population (survival of 84,8% in 2012-2013 vs 92,3% in 2014-2016, $p = 0,106$).

Conclusion. In this retrospective study we described a progressive change in high-risk STEMI management in our centre towards a wider use of MCS, also in patients presenting without overt CS. This management shift was associated with a reduction trend in short and mid-term mortality. Further studies are needed in order to assess whether early MCS impacts on high-risk STEMI clinical outcomes.