Management and outcome in patients with non-ischemic cardiogenic shock and Impella CP use

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Background and purpose: From the various mechanical cardiac assist devices and indications available, use of the percutaneous intraventricular Impella CP pump is usually restricted to acute ischemic shock or prophylactic indications in high-risk interventions. In the present study, we investigated clinical usefulness of the Impella CP device in patients with non-ischemic cardiogenic shock as compared to acute ischemia.

Methods: In this retrospective single-center analysis, patients who received an Impella CP between 2013 and 2017 due to non-ischemic cardiogenic shock were age-matched 2:1 with patients receiving the device due to ischemic cardiogenic shock. Inclusion criteria were therapy refractory hemodynamic instability with severe left ventricular systolic dysfunction and serum lactate >2.0 mmol/l at implantation. Basic clinical data, indications for mechanical ventricular support, and outcome were obtained in all patients with non-ischemic as well as ischemic shock and compared between both groups. Continuous variables are expressed as mean ± standard deviation or median (quartiles). Categorical variables are presented as count and percent.

Results: 25 patients had cardiogenic shock due to non-ischemic reasons, and were compared to 50 patients with cardiogenic shock due to acute myocardial infarction. Resuscitation rates before implantation of Impella CP were high (32 vs 42%; P=0.402). At implantation, patients with non-ischemic cardiogenic shock had lower levels of HS-TNT (110.65 [57.87–322.1] vs 1610 [450.8–3861.5] pg/ml; P=0.001) and LDH (377 [279–608] vs 616 [371.3–1109] U/I; P=0.007), while age (59±16 vs 61.7±11; P=0.401), GFR (43.5 [33.2–59.7] vs 48 [35.75–69] ml/min; P=0.290), CRP (5.17 [3.27–10.26] vs 10.97 [3.23–17.2] mg/dl; P=0.195), catecholamine-index (30.6 [10.6–116.9] vs 47.6 [11.7–90] μg/kg/min; P=0.663), and serum lactate (2.6 [2.2–5.8] vs 2.9 [1.3–6.6] mg/dl; P=0.424) were comparable between both groups. There was a trend for longer duration of Impella support in the non-ischemic groups (5 [2–7.5] vs 3 [2–5.25] days, P=0.211). Rates of hemodialysis (52 vs 47%; P=0.680) and transition to ECMO (13.6 vs 22.2%; P=0.521) were comparable. No significant difference was found regarding both 30-days survival (48 vs 30%; P=0.126, Figure 1) as well in-hospital mortality (66.7 vs 74%; P=0.512) although there was a trend for better survival in the non-ischemic group.

Conclusions: The current results position short-time use of the Impella CP as an alternative in the treatment of patients with cardiogenic shock due to underlying non-ischemic cardiomyopathy and/or complicating additional factors. However, additional studies are needed to test whether these findings can be confirmed in larger patient populations and which subgroups might benefit most from Impella therapy.
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