

Quantitative evaluation of hemodynamic parameters by echocardiography in patients with postcardiotomy cardiac shock supported by extracorporeal membrane oxygenation

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Abstract

Objective: To investigate the value of echocardiography in monitoring hemodynamics of postcardiotomy cardiac shock (PCS) patients before, during, and after weaning from extracorporeal membrane oxygenation (ECMO). **Methods:** Fifty-two patients were divided into a successful weaning group (Group A, n=23) and non-successful group (Group B, n=29). Hemodynamic parameters measured by echocardiography were collected before, during, and after ECMO. The intra-group changes and inter-group differences were analyzed. **Results:** In group A, the central venous pressure (CVP), proximal right ventricular outflow tract (RVOT), tricuspid annular plane systolic excursion (TAPSE), velocity of tricuspid valve (TVDV), and systolic velocity of tricuspid annulus (s'TV) during ECMO were significantly lower than before ECMO. After ECMO, left ventricular ejection fraction (LVEF), systolic velocity of mitral annulus (s'MV), and velocity-time integral of LV outflow tract (LVOT-VTI) were higher than pre-ECMO, and CVP, LVEF, s'MV, LVOT-VTI, RVOT, TAPSE, TVDV and s'TV were higher than during ECMO (all $p < 0.05$). In group B, compared to pre-ECMO, subjects exhibited decreased CVP, RVOT, TAPSE, TVDV and s'TV during ECMO. TAPSE, TVDV, and s'TV were continuously lower after ECMO, while CVP and RVOT became higher after ECMO (all $p < 0.05$). After ECMO, LVEF, s'MV, LVOT-VTI, TAPSE, TVDV and s'TV in group A were higher than those in group B (all $p < 0.05$). Multiple logistic regression analysis showed that LVEF (OR=1.387, 95%CI: 1.072-1.793, $p=0.013$) and Tei index (OR=-0.005, 95% CI: 0.000-0.939, $p=0.047$) were independent factors related to the successfulness of ECMO weaning. **Conclusions:** Quantitative assessment of both LV and RV by echocardiography is important for ECMO weaning.

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