

Complete percutaneous angio-guided implantation and explantation of VA-ECMO using preclosing for cardiogenic shock or cardiac arrest

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Background. The approach for veno-arterial extracorporeal membrane oxygenation implantation (VA-ECMO) in patients with cardiogenic shock can be either surgical or percutaneous. Angio-guided percutaneous implantation and explantation could decrease vascular complications.

Purpose: We sought to describe the feasibility and safety of complete percutaneous angio-guided ECMO implantation and explantation using preclosing.

Methods. All consecutive patients who underwent peripheral femoro-femoral VA-ECMO percutaneous implantation for refractory cardiogenic shock or cardiac arrest were enrolled in a prospective registry (03/2018-09/2020). Percutaneous preclosing using two closing devices (Perclose ProGlide, Abbott) inserted before cannulation was used in both femoral artery and vein. Explantation was performed using a crossover technique under fluoroscopic guidance. The occurrence of vascular complication was recorded.

Results. Forty-nine patients underwent percutaneous VA-ECMO implantation for cardiogenic shock ($n = 36$) or refractory cardiac arrest ($n = 13$). Femoral vessel cannulations were successful in all patients and total cannulation time was 21 ± 8 min. Weaning from ECMO was possible in 23 patients (47%) and 11 (22%) patients were alive at 30-day. Significant vascular complications occurred in 3 patients (6%); all were related to distal perfusion line. One patient experienced major bleeding, and 2 experienced lower limb ischemia requiring vascular intervention (one failure of distal perfusion sheath implantation and one self-uprooting of the reperfusion cannula). Percutaneous decannulation was performed in 17 patients with 16/17 technical success rate. All femoral arteries and veins were properly closed using the pre-closing devices without bleeding on the angiographic control except for one patient in whom surgical closure of the artery was required. Among these patients, none required transfusion for access related significant bleeding and no other vascular complication occurred. Furthermore, no groin infection was observed after full percutaneous implantation and removal of ECMO.

Conclusion. Emergent complete percutaneous angio-guided VA-ECMO implantation and explantation using pre-closing technique is an effective and safe strategy in patients referred for refractory cardiogenic shock or cardiac arrest.