Naša iskustva s veno-arterijskom ekstrakorporalnom membranskom oksigenacijom za hemodinamsku potporu kod perkutanih koronarnih intervencija visokog rizika i u kardiogenom šoku

Single center experience with veno-arterial extracorporeal membrane oxygenation for hemodynamic support during high-risk percutaneous coronary interventions and in cardiogenic shock

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Perkutana mehanička cirkulacijska potpora (MCS) koristi se već više desetljeća za hemodinamsku stabilizaciju tijekom perkutanih koronarnih intervencija visokog rizika.^{1,2}

Ovdje prikazujemo naša nedavna iskustva s uporabom veno-arterijske ekstrakorporalne membranske oksigenacije (VA-ECMO) za hemodinamsku potporu kod perkutanih koronarnih intervencija visokog rizika (HR-PCI) i u kardiogenom šoku.

Od 2014. godine 13 bolesnika (11 muškaraca, prosječne dobi $66,8 \pm 11,5$ godina) podvrgnuto je u koronarografiji uz potporu s VA-ECMO-om, od toga 10 bolesnika u kardiogenom šoku i 3 kao elektivni HR-PCI. Prosječan SYNTAX score je iznosio $24,1 \pm 11,0$. U 11 bolesnika je učinjena uspješna PCI, jedan je bolesnik uspješno premošten do hitnog kardiokirurškog zahvata, a drugi do hitne transplantacije srca. Medijan vremena proveden na VA-ECMO-u iznosio je 24 h. Šestero bolesnika pretrpjelo je veće kardio- ili cerebrovaskularne neželjene događaje (MACCE), definirane kao smrt, akutni infarkt miokarda, moždani udar, plućnu emboliju ili potrebu za dodatnom revaskularizacijom, svi oni u skupini bolesnika u kardiogenom šoku. Do listopada 2016. preživjelo je 8 bolesnika, što troje iz elektivne HR-PCI skupine, koji nisu imali MACCE, dok je preživljenje u skupini bolesnika u kardiogenom šoku bilo 50%. Iako još uvijek nema jakih dokaza, potpora s VA-ECMO-om predstavlja korisnu opciju za potporu kod HR-PCI te kod PCI u kardiogenom šoku. U HR-PCI skupini ispravno prepoznavanje i odabir bolesnika te pažljivo planiranje od ključne su važnosti, dok je u skupini s kardiogenim šokom odlučujući dovoljno rani početak potpore.

Uvođenje VA-ECMO-a kao MCS u naš laboratorij za intervencijsku kardiologiju za uporabu u kompleksnim kliničkim situacijama, izrazilo je poboljšao izgleda za preživljenje najkritičnijih bolesnika.

Percutaneous mechanical circulatory support (MCS) has been used to stabilize patients in cardiogenic shock and provide hemodynamic support during high-risk percutaneous coronary interventions (PCI) for several decades.^{1,2}

We report our recent experience with veno-arterial extracorporeal membrane oxygenation (VA-ECMO) use in patients with HR-PCI and cardiogenic shock.

Since 2014 thirteen patients (11 males, mean age 66.8 ± 11.5 years) have been referred to coronary angiography with ECMO support in our institution, 10 patients in cardiogenic shock and 3 as elective high risk (HR) PCI. The mean SYNTAX score was 24.1 ± 11.0 . Eleven patients underwent a successful PCI, one patient was successfully bridged to emergency CABG and another to a high urgent heart transplant. Median time spent on ECMO was 24 hours. Six patients suffered in-hospital major adverse cardiac and cerebrovascular events (MACCE), defined as a composite of death, acute myocardial infarction (MI), stroke, pulmonary embolism or further need for revascularization, all of them in the cardiogenic shock group. Up to October 2016 eight patients survive, all three from the elective HR-PCI group, who also did not suffer any MACCE, while in the cardiogenic shock group one-year survival rate was 50%.

Although strong and convincing evidence is still lacking, VA-ECMO support represents a viable option for delivery of care and support in patients with HR-PCI and cardiogenic shock. In HR-PCI identification of critical patients and careful pre-procedural planning are paramount. In patients in cardiogenic shock, it is essential to initiate the support early enough. Introduction of VA ECMO as MCS in our catheterization laboratory for use in complex clinical situations has dramatically improved the survival of the most critical patients.

LITERATURE

- Atkinson TM, Ohman EM, O'Neill WW, Rab T, Cigarroa JE; Interventional Scientific Council of the American College of Cardiology. A Practical Approach to Mechanical Circulatory Support in Patients Undergoing Percutaneous Coronary Intervention: An Interventional Perspective. *JACC Cardiovasc Interv.* 2016;9(9):871-83. **DOI:** <http://dx.doi.org/10.1016/j.jcin.2016.02.046>
- Myat A, Patel N, Tehrani S, Banning AP, Redwood SR, Bhatt DL. Percutaneous circulatory assist devices for high-risk coronary intervention. *JACC Cardiovasc Interv.* 2015;8(2):229-44. **DOI:** <http://dx.doi.org/10.1016/j.jcin.2014.07.030>

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