

Response to the Reviewer

I read with great interest the article entitled "Long-term outcomes of complex high-risk percutaneous coronary interventions under extracorporeal membrane oxygenation support: an observational study" by a group of Beijing authors. It is a unicentric, retrospective, and observational cohort study that analyzed the effect of using VA-ECMO devices as support during high-risk PCI. This is a potentially valuable article and results that establish the use of VA-ECMO devices in high-risk PCI, especially in cases of hemodynamic instability of the patients. In-hospital mortality is expectedly high, especially in the rescued group using VA-ECMO devices. Also, mortality is relatively low after discharge from the hospital in a one-year follow-up period, which encourages further research and the wider use of VA-ECMO in practice.

Response: We agree with the reviewer's comments. This article involved the high-risk patients who have the indications for percutaneous coronary intervention. In fact, a large portion of these patients had been admitted to other hospitals before coming to our hospital. They were turned down by interventional cardiologists and cardiothoracic surgeons due to various risk factors. However, they still suffered from recurrent angina pectoris or heart failure during optimal medical therapy. They were classified as "no option", and transferred to our hospital to seek further help. We decided to perform ECMO-supported PCI after a discussion by a multidisciplinary heart team. The in-hospital mortality was 23.0%, and the overall survival was 45.9%, with the median follow-up period of 38.6 (8.6-62.1) months. Therefore, VA-ECMO can be considered to use as support among cases receiving high-risk PCI.

Before considering the publication of this article, I advise to exclude the term "complex" from the title and text because it is a high-risk PCI, but not always complex lesions of the coronary arteries due to anatomical and other reasons.

Response: Thank you for this suggestion. We agree to remove the term "complex". As described before, complex lesion contains (1) unprotected left main (LM) disease or ostial left anterior descending artery lesion; (2) chronic total occlusion; (3) severe calcification requiring atherectomy; (4) true coronary bifurcation lesions; (5) important coronary tortuosity; (6) degenerated saphenous vein graft disease; (7) last remaining conduit; (8) multivessel CAD (Syntax Score in the second or third tertile), and (9) high myocardial jeopardy score (APPROACH Myocardial Jeopardy Score >55).

Our study enrolled patients with multivessel CAD (mean SYNTAX score 42.5 ± 10.0) and poor prognosis (median GRACE score 163). It can be classified as high-risk, but not all the lesions were complex.

Are ECMO parameters determined before or after the PCI procedure?

Response: The ECMO parameters were determined before the PCI procedure. ECMO flow of arterial line was maintained at 1.5 ~2 L/min during the PCI procedure. If the patient had severe hypotension, a higher flow of ECMO was considered. The main role of ECMO in high-risk PCI is to prevent profound hypotension or low cardiac output episodes and allow sufficient time to achieve optimal and complete revascularization.

How the authors explain the relatively high percentage of patients with UA vs. NSTEMI / STEMI?

Response: As mentioned above, about half of these patients had been admitted to other hospitals before coming to our hospital. They had received conservative pharmacotherapy for a period. The acute phase of myocardial infarction has passed. Therefore, the proportion of UA is relatively high.

It should be further noted that 42% of pts. had IABP which certainly affected the results and makes an additional bias.

Response: The IABP can reduce cardiac afterload and myocardial oxygen consumption, and improve coronary blood flow. It is easy to use, relatively inexpensive, and overall has a low complication rate. Furthermore, the IABP is useful for left ventricular unloading in patients treated with extracorporeal life support. Accordingly, nearly half of our patients received IABP support. However, the IABP failed to provide any clinical benefit in recent randomized trials. The Joint EAPCI/ACVC expert consensus document on percutaneous ventricular assist devices suggests that the IABP should not be used in high-risk PCI based on the evidence of BCIS-1. Thus, the IABP has little impact on the result of high-risk PCI.

Special thanks to you for your good comments.