Intensive Care Med (2019) 45:559–560
https://doi.org/10.1007/s00134-019-05531-2

CORRESPONDENCE

Should we always use the peripheral cannula for distal leg reperfusion in femoro-femoral ECMO patients?

Francesco Formica[1*], Leonello Avalli[2], Fabio Sangalli[2], Pichoy Danial[3], Alain Combes[3] and Guillaume Lebreton[3]

Initial correspondence from Drs. Formica, Avalli, and Sangalli:

Dear Editor,

With great interest, we read the article by Danial and colleagues [1]. In this propensity score study of 266 matched pairs, the authors aimed to compare leg vascular complications and early survival rates in patients supported by femoro-femoral venoarterial ECMO (VA-ECMO), either by a surgical or totally percutaneous approach. The authors have to be commended for the very low incidence of leg vascular complications reported in both patient groups. These complications are always a source of great concern because they may negatively affect the early survival in these critically ill patients. The authors reported a systematic insertion of the distal leg reperfusion cannula, which was applied in more than 90% of cases.

In our consecutive series of 100 patients [2], the incidence of vascular complications was 35%, which is much higher than the incidence reported by Danial. The relatively large size of the arterial cannula and the cannulation during the cardiopulmonary resuscitation maneuvers might explain the high incidence of leg perfusion complications in our study. Nevertheless, we think that the distal cannula should not be considered systematically in each patient receiving femoro-femoral VA-ECMO. We observed that the placement of the distal cannula reverted the leg ischemia when it was inserted correctly. However, the distal cannula may have some associated complications such as hyperemia with following compartment syndrome, or poor distal perfusion with increasing leg ischemia, as we reported. For these reasons, we systematically assess the leg perfusion by narrow Doppler ultrasound examinations and insert a perfusion cannula when signs of leg ischemia occur.

Rebuttal from Drs. Danial, Combes, and Lebreton:

We read with great interest the comments by Formica and colleagues about our article [1], and we thank them. Their comments defend the fact that a reperfusion cannula should not be systematically implanted, given the important complications that they report in their experience [2].

We do not share this view. The rate of limb ischemia reported by Formica and colleagues seems extremely high and cannot be explained by only the sizes of cannula and implantation under cardiac arrest (in our series, some patients were also implanted under CPR). Moreover, in our experience, the ECMO compartment syndrome does not seem to us to be related to hyperperfusion, as suggested by Formica and colleagues, but rather to a lack of venous drainage, caused by the homolateral venous cannula.

In addition, in our opinion, a reperfusion cannula must always be implanted during the ECMO installation, except in exceptional or special cases. Indeed, it is well established that this strategy reduces the number of cases of limb ischemia, as also evidenced by our article [1]. Moreover, during the implementation of the ECMO, the implementation of a reperfusion cannula seems to us much easier than a posteriori. From a technical point of view, we proceed first to the establishment of the

*Correspondence: francesco_formica@fastwebnet.it
[1] Cardiac Surgery Unit, San Gerardo Hospital, Department of Medicine and Surgery, University of Milano-Bicocca, Via Cadore 8, 20900 Monza, MB, Italy
Full author information is available at the end of the article

reperfusion, then to the installation of the arterial cannula. In fact, once the arterial cannula is implanted, the reduction of the flow perfusing the superficial femoral artery makes the puncture (even under ultrasound guidance) and the cannulation much more difficult.

Si vis pacem, para bellum.

Author details
[1] Cardiac Surgery Unit, San Gerardo Hospital, Department of Medicine and Surgery, University of Milano-Bicocca, Via Cadore 8, 20900 Monza, MB, Italy. [2] Department of Anaesthesia and Intensive Care Medicine, San Gerardo Hospital, Monza, Italy. [3] Cardiac Surgery Department, Pitié-Salpétrière Hospital, Paris, France.

Compliance with ethical standards

Conflicts of interest
Guillaume Lebreton has a research grant from Abiomed, does lectures for Maquet, Abiomed, Abbot, Livanova, Medtronic, and Edwards, and is a proctor for Syncardia, Jarvik, Heartware. The other authors declare no conflict of interest.

Publisher's Note

Accepted: 11 January 2019
Published online: 6 March 2019

References

1. Danial P, Hajage D, Nguyen LS, Mastroianni C, Demondion P, Schmidt M, Bouglé A, Amour J, Leprince P, Combes A, Lebreton G (2018) Percutaneous versus surgical femoro-femoral veno-aterial ECMO: a propensity score matched study. Intensive Care Med. https://doi.org/10.1007/s00134-018-5442-z
2. Avalli L, Sangalli F, Migliari M, Maggioni E, Gallieri S, Segramora V, Camesasca V, Formica F, Paolini G, Pesenti A (2016) Early vascular complications after percutaneous cannulation for extracorporeal membrane oxygenation for cardiac assist. Minerva Anestesiol 82:36–43