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# Aortic regurgitation and extracorporeal membrane oxygenation: An undiscussed topic

Fabrizio Sansone\*

Division of Cardiac Surgery, Mauriziano Umberto I Hospital, Turin, Italy

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## ABSTRACT

The aim of this short discussion is to open the question of the AR in case of ECMO implantation. This is the case of a young male admitted to the hospital for acute cardiac failure in chronic dilated cardio-myopathy due to aortic regurgitation (AR): the patient had previously refused aortic valve replacement (AVR) for the fear of postoperative outcome. Further studies are required to assess this topic and the perspectives to increase the use of the peripheral ECMO and the percutaneous ventricular venting through the interatrial septum may be of interest to improve the outcome of such ill patients.

## 1. History

This is the case of a young male admitted to the hospital for acute cardiac failure in chronic dilated cardio-myopathy due to aortic regurgitation (AR): the patient had previously refused aortic valve replacement (AVR) for the fear of postoperative outcome. He suffered from ongoing dyspnea and peripheral edema with a serious asthenia. Clinical conditions were poor with seriously impaired biventricular function (ejection fraction of about 10%–15% and moderate dilation of the right ventricle with TAPSE of about 12 mm) associated to severe AR and pulmonary edema. The question was: what could we do? Surgery, “watch and see” or biventricular support? The AVR could have been affected by high mortality rate for the risk of failure of the

extracorporeal circulation weaning; the “watch and see” approach could have been inadequate for the hemodynamic instability (systolic pressure of about 90 mmHg, low urine output, impaired consciousness due to low cardiac output, increase of lactates) and for the young age of the patient; the biventricular support was considered with several criticism for the severe AR. The possibility to unload the left ventricle by the use of trans-atrial vent was disqualified because the entity of regurgitant volume was higher than the drainable entity allowed. The patient was then treated by mechanical ventilation and amine infusion (Dobutamine 7.5  $\mu$ g/Kg/min and adrenaline about 0,2  $\mu$ g/Kg/min): despite intensive medical treatment the patient died three days later.

We know that severe AR is a clear contraindication for ventricular support but what can we affirm about mild or moderate AR. Moreover, what is the best management in case of acute dysfunction due to severe AR? In the series presented in literature, there are no information about the entity of AR<sup>[1]</sup> and this topic has been discussed mainly in the field of left ventricular assist devices<sup>[2–6]</sup> where the aortic valve dysfunction is frequent in long term follow up<sup>[7–</sup>

\*Corresponding author: Fabrizio Sansone, MD Division of Cardiac Surgery, Mauriziano Umberto I Hospital, Largo Turati 62, 10135 Turin, Italy.  
Tel: 0039115082812  
Fax: 0039115082860  
E-mail: [fabrisans@katamail.com](mailto:fabrisans@katamail.com)

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The topic of AR in case of acute biventricular dysfunction is really interesting since the time available to decide is short and the hemodynamic condition impaired. What degree of AR may disqualify a patient from the ECMO implantation? Probably, mild–moderate (2+) AR is the highest degree allowed since in case of more significant regurgitation, the risk of ventricular overloading is too high even in case of ventricular venting.

## 2. Conclusion

In conclusion we can speculate that:

- Mild–moderate 2+ AR is the highest degree allowed in case of ECMO establishment;
- Ventricular venting is mandatory even in case of trivial AR and is always preferable in case of ECMO support to prevent the ventricular distension;
- More than moderate AR is a contraindication for ECMO implantation: an acceptable strategy could consider AVR followed by ECMO implantation. Even if the mortality rate is quite high, valvular patients are usually young and every efforts must be done.

The aim of this short discussion is to open the question of the AR in case of ECMO implantation: further studies are required to assess this topic and the perspectives to increase the use of the peripheral ECMO and the percutaneous ventricular venting through the interatrial septum may be of interest to improve the outcome of such ill patients.

## Conflict of interest statement

We declare that we have no conflict of interest.

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