Elective Venovenous Extracorporeal Membrane Oxygenation for the placement of a tracheal stent

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Background: The extracorporeal oxygenation membrane (ECMO) is an advanced support device in critical patients that allows the oxygenation of the blood through an artificial membrane(1). It is frequently used in procedures in which there is a high potential for hemodynamic instability or as a rescue in emergency situations(2).

Case report: We present the case of a 62-year-old woman, diagnosed with unresectable right pulmonary adenocarcinoma, with extrinsic tracheal compression in the supine position that compromises spontaneous ventilation, which was followed by placement of a tracheal stent by rigid bronchoscopy, with the help of VV-ECMO as a support.

The patient was brought to the operating room from the critical care unit, connected to non-invasive mechanical ventilation, with the right radial artery cannalized and two peripheral venous lines. After monitoring, the left internal jugular vein was cannalized with a high-flow catheter and cannulated through a high-femoral vein support cannula, reaching the right atrium. Left femoral vein was guided and placement of cannula in right iliac vein was performed.

Respiratory assistance was then started by extracting blood from the right atrium and reinjecting it into the iliac vein. After checking improvement in both SpO₂% and arterial blood gases, anesthetic induction was performed. After a few minutes we observed a deterioration in oxygenation, requiring inversion of the flow to improve it.

	Start ECMO	Few Minutes	Inversion flow	ECMO weaning
pH	7,47	7,45	7,46	7,41
pCO ₂	45	38	31	40
pO ₂	136	34	216	325
Lac (mmol/l)	1,6	2,7	2,4	2
Hb	13,5	11,5	10,2	9
HCT	41	33	30	29

Tracheal stent placement is performed without further incidents. Once the situation of hemodynamic stability and correct oxygenation was assessed, ECMO weaning was performed, with good tolerance and the patients was transferred sedated, intubated and connected to mechanical ventilation to reanimation unit.

Discussion: ECMO is an advanced and invasive tool that can allow survival in extreme situations but that carries a great risk and potential complications. These can be from thrombosis, bleeding, coagulopathy and vascular injury in the cannulation regions. The choice of VV-ECMO over cardiopulmonary bypass minimizes this risk(3).

There are numerous strategies for the cannulation of VV-ECMO, which include cannulation of the femoral, axillary or internal jugular veins. Femoral access was preferred in this case because it was well tolerated with minimal sedation and was at a considerable distance from the area of intervention with bronchoscopy.

References:

1. Gourdin M, Dransart C, Delaunois L, Louagie YAG, Gruslin A, Dubois P. Use of venovenous extracorporeal membrane oxygenation under regional anesthesia for a high-risk rigid bronchoscopy. J Cardiothorac Vasc Anesth [Internet]. Elsevier Inc.; 2012;26(3):465–7. Available from: <http://dx.doi.org/10.1053/j.jvca.2011.02.013>
2. George TJ, Knudsen KP, Sodha NR, Beaty CA, Feller-Kopman D, Shah AS, et al. Respiratory support with veno-venous extracorporeal membrane oxygenation during stenting of tracheobronchomalacia. Ann Thorac Surg. 2012;94(5):1736–7.
3. Dunkman WJ, Nicoara A, Schroder J, Wahidi MM, Manafi A El, Bonadonna D, et al. Elective Venovenous Extracorporeal Membrane Oxygenation for Resection of Endotracheal Tumor: A Case Report. Anesth Analg. 2017;9(4):97–100.

Learning points: ECMO should be considered in situations in which oxygenation may be compromised.