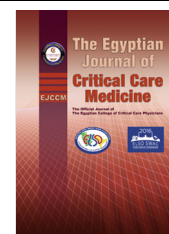




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CASE REPORT

Unusual drug response and hemodynamics, VA – ECMO. A case report



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KEYWORDS

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Abstract Maintaining higher sedation in patients undergoing ECMO therapy is crucial. Currently no definite sedation strategy has been proposed in the literature, as the pharmacokinetics of the medications in these patients is still not clear. We would like to report a case of a patient with uncontrollable diverse clinical response to medications during arteriovenous (AV) compared to venovenous (VV) ECMO.

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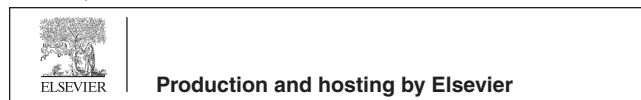
1. Case report

A 25 year old woman was on mechanical ventilation due to refractory respiratory failure possibly a H1N1 influenza infection. Her general condition worsened with decline in arterial pressure requiring escalating doses of noradrenaline with echocardiographic evidence of impaired right ventricle with severe pulmonary hypertension. She was also found to have moderate mixed mitral disease and mild aortic stenosis. Due to unstable hemodynamics in addition to worsening pulmonary function, ECMO A-V was commenced under general

anesthesia. An inflow catheter was inserted into the right femoral artery (19 Fr) and the left femoral vein (19 Fr) was used as the returning port. As expected heparin requirement for the treatment gradually rose over the next 2 days with an infusion rate of 3000–5500 units/h to achieve the target ACT. As days progressed the heparin requirement increased to astronomical figures up to a maximum of 7800 units/h to achieve the target with serum antithrombin levels remaining normal (110%). Frozen plasma was administered with no benefits. Her sedation requirement started to increase requiring a propofol infusion of 5000 mgm/h, midazolam 25 mg/h despite remifentanyl infusion. Sedation was supplemented with Dexametomidine and cisatracurium paralysis. She also developed irresistible severe hypertension requiring large doses of sodium nitroprusside leading to consequent bleeding from arterial catheter site further requiring multiple transfusions. To prevent the ongoing massive transfusion and the possibility of femoral arterial tear and avulsion of catheter, AV was swapped for the VV for the rest of the treatment. The inflow catheter was changed from the right femoral artery to the right internal jugular vein (Fr 19). Surprisingly, as soon as the VV

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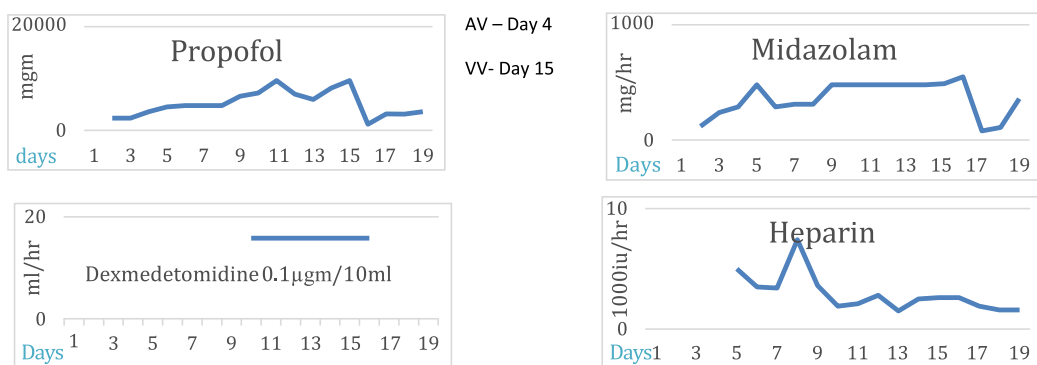


Figure 1 VV ECMO was discontinued after 4 days and returned to conventional ventilation.

was commenced her sedation requirement reduced drastically with better control of her arterial pressure requiring minimal doses of noradrenaline. She made a good progress from then on and the VV ECMO was discontinued after 4 days and returned to conventional ventilation (see Fig. 1).

2. Discussion

Few reports from the literature showed increased requirement to sedation due to differences in PKa, hemodilution, drug sequestration, tolerance, genetic factors...etc [1] and are mostly done in children. Heparin requirement has been variable for the similar reasons and the antithrombin deficiency due to prolonged use. It is also well known that perfusion and oxygenation are different in two extremities while on AV ECMO. Unfortunately most of these studies showed higher drug requirements for sedation and the hypertension is more pronounced in VV compared to AV ECMO [2]. Con-

trary to the above findings, our patient had hypertension requiring magnanimous doses of sedation and the risk of bleeding and vascular complication necessitating the change of VA to VV. The excessive heparin requirements with normal antithrombin levels slowed down after few days while on AV ECMO. The role of heparin sequestration is questionable as we have used heparin coated standard sized PVC tubes. Further research is necessary to understand the mechanism and to identify the most suitable drugs during ECMO.

References

- [1] Mulla H. Effects of neonatal extracorporeal membrane oxygenation circuits. *Curr Therapeut Res* 2000;61:838–48.
- [2] Shekar K. Increased sedation requirement inpatients receiving extracorporeal membrane oxygenation for respiratory and cardiorespiratory failure. *Anaesth Intensive Care* 2012;40:648–55.