

Effective Apixaban Clearance with Cytosorb Extracorporeal Hemoadsorption

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Abstract : Introduction: Pre-operative coagulation management of Apixaban prescribed patients, a new oral anticoagulant (a factor Xa inhibitor), is difficult, especially when chronic kidney disease (CKD) causes drug overdose. Apixaban is not dialyzable due to its high level of protein binding. An antidote, Andexanet α , is available but expensive and has an unfavorable short half-life. We report the successful extracorporeal removal of Apixaban prior to emergency surgery with the CytoSorb® Hemoadsorption device. Methods: A 89-year-old woman with CKD, with an Apixaban prescription for atrial fibrillation, was presented at the ER with traumatic rib fractures, a flail chest, and an unstable spinal fracture (T12) for which emergency surgery was indicated. However, due to very high Apixaban levels, this surgery had to be postponed. Based on the Apixaban-specific anti-factor Xa activity (AFXaA) measurements at admission and 10 hours later, complete clearance was expected after 48 hours. In order to enhance the Apixaban removal and reduce the time to operation, and therefore reduce pulmonary complications, CRRT with CytoSorb® cartridge was initiated. Apixaban-specific anti-factor Xa activity (AFXaA) was measured frequently as a substitute for Apixaban drug concentrations, pre- and post adsorber, in order to calculate the adsorber-related clearance. Results: The admission AFXaA concentration, as a substitute for Apixaban drug levels, was 218 ng/ml, which decreased to 157 ng/ml after ten hours. Due to sustained anticoagulation effects, surgery was again postponed. However, the AFXaA levels decreased quickly to sub-therapeutic levels after CRRT (Multifiltrate Pro, Fresenius Medical Care, Blood flow 200 ml/min, Dialysate Flow 4000 ml/h, Prescribed renal dose 51 ml·kg·h) with Cytosorb® connected in series into the circuit was initiated (within 5 hours). The adsorber-related (indirect) Apixaban clearance was calculated every half hour ($Cl = Q_e \cdot (AFXaA_{pre} - AFXaA_{post}) / AFXaA_{pre}$) with $Q_e = \text{plasma flow rate}$ calculated with $Ht = 0.38$ and system blood flow rate 200 ml·min): 100 ml/min, 72 ml/min and 57 ml/min. Although, as expected, the adsorber-related clearance decreased quickly due to saturation of the beads, still the reduction rate achieved resulted in a very rapid decrease in AFXaA levels. Surgery was ordered and possible within 5 hours after Cytosorb initiation. Conclusion: The CytoSorb® Hemoadsorption device enabled rapid correction of Apixaban associated anticoagulation.

Keywords : Apixaban, CytoSorb, emergency surgery, Hemoadsorption

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