

ROCURONIUM INTOXICATION IN INTENSIVE CARE PATIENTS WITH SEVERE RENAL IMPAIRMENT: THE SYNERGISTIC EFFECT OF SUGAMMADEX DURING DIALYSIS TREATMENT WITH HIGH FLUX MEMBRANES

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OBJECTIVE

Curarics are muscle relaxant drugs used for tracheal intubation, intraoperative muscle relaxation and to facilitate mechanical ventilation. Rocuronium is a non-depolarizing steroidal curare. The antagonization of the neuromuscular block induced by Rocuronium is obtained with Sugammadex, a modified gamma-cyclodextrin. The Sugammadex-Rocuronium complex is hydrophilic and it is eliminated only by the kidney. This case report shows the efficacy of Sugammadex administration during hemodialysis with high-flow filters.

PRESENTATION

71 year old male, obese, affected by Type 2 Diabetes Mellitus, Ischemic Heart Disease, Chronic Renal Failure (serum creatinine: 2.6 mg/dl), was admitted to Intensive Care for Respiratory Failure caused by Legionella Pneumoniae infection. He was treated with ExtraCorporeal Membrane Oxygenation (ECMO) and maintained in a regimen of treatment with Rocuronium in continuous infusion for 8 days.

Laboratory tests revealed a condition of liver failure. 24 hours after the suspension of Rocuronium, failure to resume spontaneous breathing without signs of lateralization. TOF (Train of Four) and Post Tetanus stimulation showed an absent neuromuscular activity. Suspecting Rocuronium intoxication, Sugammadex was administered at an increasing dose (Figure 1).

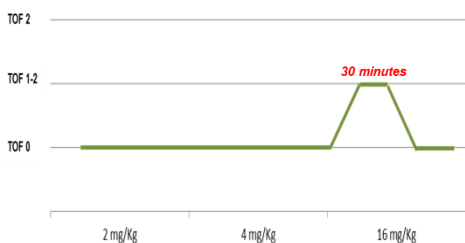


Figure 1. Trend of TOF in relation to the dose of Sugammadex

METHOD

During the following day, development of Acute Renal Failure with anuria. Sustained Low-Efficiency Dialysis (SLED) with high flux membranes was started administering Sugammadex 16 mg/kg every 15 minutes.

Dialysis features	
Blood flow rate (Qb)	200 ml/min
Dialysate flow rate (Qd)	300 ml/min
Ultrafiltration volume (UF)	200 ml/h
Dialysate	Potassium 3.0 mmol/l Calcium 1.5 mmol/l Bicarbonate 32 mEq/l
Filter	HF17G Bellco UFR 53 ml/h/mmHg 1.7 m ² TPM max 80 kPa (600 mmHg)
Anticoagulation	Unfractionated heparin 1000 UI + washing of the dialysis circuit (100 cc of SF 0.9% every 15 min)

RESULT

After 260 minutes of treatment, TOF monitoring showed a lasting resumption of neuromuscular activity (Figure 2).

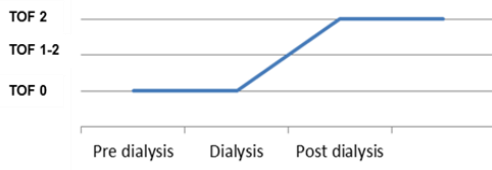


Figure 2. Trend of TOF in relation to SLED associated with repeated administration of Sugammadex (16 mg / kg)

CONCLUSION

Sugammadex induces the elimination of Rocuronium via the kidney rather than via the liver. In case of severe renal impairment, the reduced excretion of the Sugammadex-Rocuronium complex justifies the ineffectiveness of Sugammadex and the failure to reverse the neuromuscular block. In case of severe renal impairment, the administration of Sugammadex during SLED with high-flux membranes, favors the clearance of Rocuronium, enhancing the effectiveness of the dialysis treatment.

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