

When train-of-four and reversal fail. Recurarization and suggamadex rescue in a pediatric patient undergoing allogenic renal transplantation



Children's National.

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Introduction

Rocuronium is known to have an increased duration of action in patients with severe renal disease, particularly at repeat or higher doses. It is important to recognize that patients with renal impairment are at an increased risk of residual postoperative paralysis or recurarization. The incidence of recurarization ranges between 4-50%, which can be mitigated by the use of acetylcholinesterase inhibitors such as neostigmine. However, despite appropriate reversal of neuromuscular blockage, recurarization and residual paralysis can still persist. A novel γ -cyclodextrin, suggamadex, has been shown to be effective in reversing residual neuromuscular blockade. We present a case of rocuronium recurarization despite appropriate reversal with neostigmine, and suggamadex rescue of residual paralysis in a pediatric patient undergoing renal transplantation.

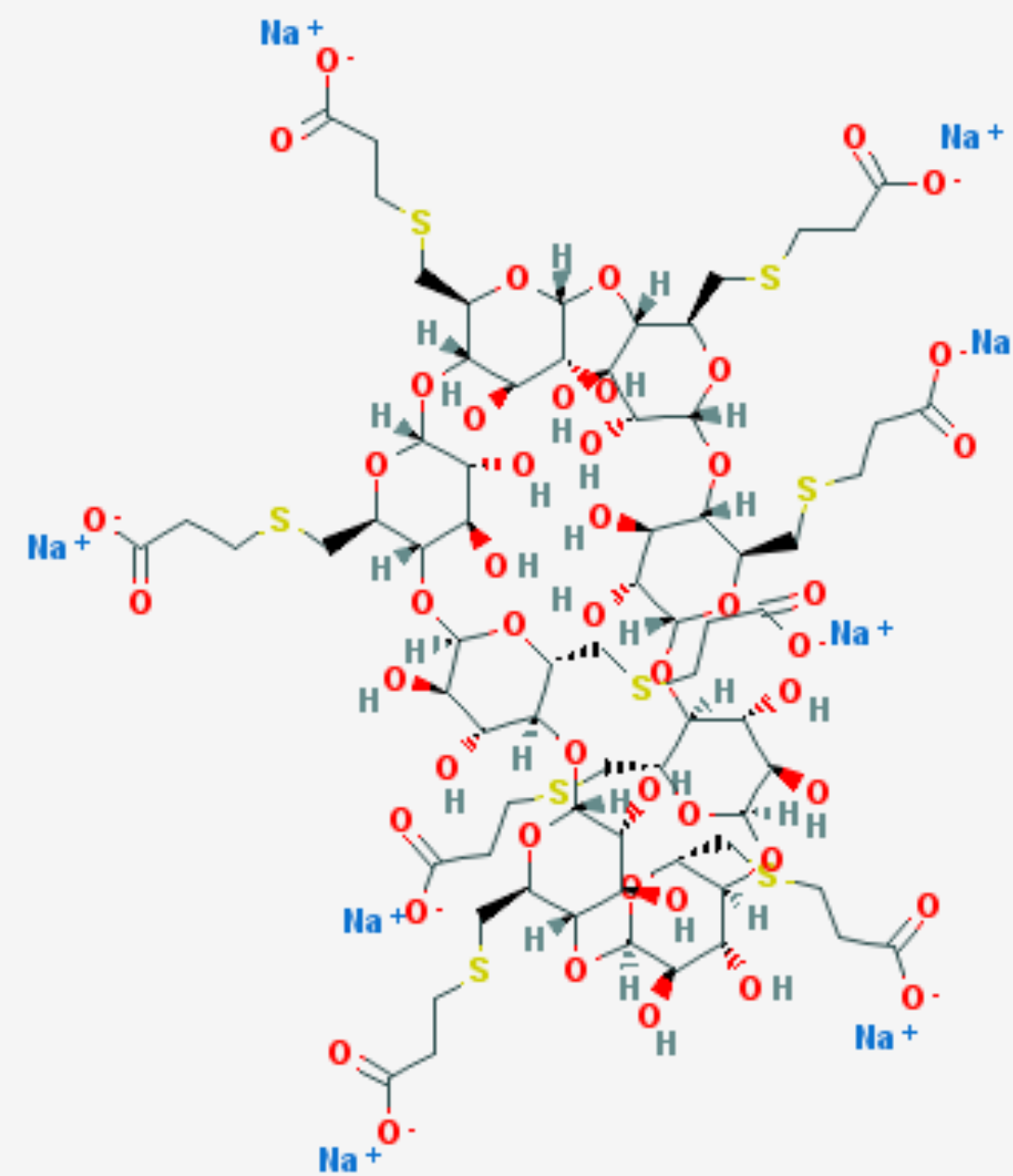
Case Description

An 18 year old 74 kg female patient with a history of obesity, hypertension, and end-stage renal disease secondary to focal segmental glomerulosclerosis was scheduled for allogenic renal transplantation. General anesthesia was induced with propofol, fentanyl, and rocuronium, and maintained with desflurane. Two large bore IVs and an arterial line were placed post-induction. Her hemodialysis catheter was used for central venous access. Throughout the duration of the case, three additional doses of rocuronium were administered for a total of 140 mg.

Qualitative TOF was assessed 120 minutes following the last rocuronium dose, which revealed 2/4 twitches. Reversal of neuromuscular blockade was administered, with 5 mg neostigmine and 0.6 mg of glycopyrrolate. At this time, the patient was on pressure support ventilation, triggering breaths with adequate tidal volumes. Approximately ten minutes after the administration of neostigmine, TOF was rechecked and revealed 4/4 twitches. The patient was transitioned to spontaneous ventilation during the conclusion of the procedure and desflurane was discontinued. She continued to take adequate tidal volumes while breathing spontaneously and was following commands. She was extubated 35 minutes after reversal agents were given.

However, post-extubation before transitioning off of the OR table, the patient had poor respiratory effort and began to desaturate. She was assisted with manual bag mask ventilation. She intermittently followed commands and appeared weak with poor muscle strength. TOF assessment revealed 4/4 twitches. Suggamadex 500 mg was administered one hour after the initial neostigmine dose. Within thirty seconds, her respiratory effort and muscle strength improved. She no longer required manual assistance of her respirations and she was transferred to the pediatric ICU in stable condition.

Structure of Suggamadex



<https://pubchem.ncbi.nlm.nih.gov/image/imagefly.cgi?cid=6918584&width=500&height=500>

Discussion

Prolonged neuromuscular blockade in patients with renal failure has been reported in the literature, some with recurarization at 3 hours post-operatively. Despite apparent full neuromuscular recovery with TOF 4/4, unexpected rocuronium reparable paralysis can occur, as demonstrated in our case.

By using a strategic approach to neuromuscular blockade in patients with renal failure, recurarization rates can be attenuated. In patients with renal failure, non-steroidal neuromuscular blocking drugs should be carefully titrated based on intraoperative TOF assessment, and lower doses should be considered. In addition, benzylisoquinolines may be a better choice in patients with severe renal disease.

The use of reversal agents has significantly decreased the rates of residual neuromuscular blockade and should be administered. Acetylcholinesterase inhibitors such as neostigmine have a ceiling effect, and thus their efficacy is limited when the block is too intense.

Therefore, it is recommended that 4/4 twitches should be recovered before administering neostigmine. In cases such as this, where there is an increased potential for recurarization, suggamadex is a novel agent that is effective reversing prolonged rocuronium blockade in severe renal impairment.

References

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