Influence of Acute Normovolaemic Hemodilution on the Dose-Response Relationship and Time Course of Action of Cisatracurium Besylate

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Acute normovolaemic hemodilution (ANH) is an efficacious and cost-effective blood conservation strategy to avoid allogeneic blood transfusion. The potencies of succinylcholine, pancuronium, vecuronium, atracurium, and rocuronium are augmented with ANH. A neuromuscular blocking drug that is not influenced by ANH, thus requiring no dose adjustments, could be beneficial in patients undergoing surgery with ANH. This prospective, controlled, clinical, consecutive study investigated whether the potency of cisatracurium besylate is altered with ANH. The dose-response relationship and time course of action in patients undergoing surgery with and without ANH were assessed.

Sixty patients undergoing radical cystectomy, radical hysterectomy, or retropubic radical prostatectomy were randomly allocated to receive initial cisatracurium doses of 30, 40, or 50 µg/kg followed by a second supplemental dose to reach a total dose of 100 µg/kg. Standard blood parameters were measured before and after ANH. A volume of 15 mL/kg blood was obtained from the cubital vein and stored to be simultaneously replaced by an equal volume of 6% HES. The patient’s blood was ideally reinfused toward the end of the operation after the phase of major blood loss, or sooner if clinically indicated. Thereafter, anesthesia was induced with fentanyl and propofol and the trachea was intubated without using neuromuscular blocking drugs. Neuromuscular block at the adductor pollicis and the trachea was intubated without using neuromuscular blocking agents.

The ulnar nerve was stimulated supramaximally at the wrist with many unanswered questions concerning the mechanism(s) of the lack of enhanced effect of cisatracurium during hemodilution that differs from observations with other neuromuscular-blocking agents.

**COMMENT**

It has been shown previously with several neuromuscular-blocking agents that hemodilution increases the potency of these drugs. Based on the results of the current study, the authors suggested that cisatracurium, in contrast with other neuromuscular-blocking agents, has a different volume of distribution. The authors’ conclusion was based solely on the evaluation of the neuromuscular blocking effect of cisatracurium rather than blood concentrations of the drug, which were not provided. Until there are other data to support these results, this study leaves us with many unanswered questions concerning the mechanism(s) of the lack of enhanced effect of cisatracurium during hemodilution that differs from observations with other neuromuscular-blocking agents.

Comment by Reuven Pizov, MD