

unreliable, ventilation should be controlled until the block dissipates spontaneously and standard criteria for extubation of the trachea are met.

Amikacin sulfate, the other antibiotic in our patient's sternal irrigation, is structurally related to the aminoglycoside group of antibiotics. The aminoglycosides decrease sensitivity to acetylcholine. Hashimoto *et al.*, however, reported that an amikacin block could be effectively reversed with calcium chloride, which augments presynaptic quantal release of acetylcholine. This would implicate a presynaptic site of action for amikacin sulfate.^{4,7}

The reanalysis seen during sternal irrigation containing one million units of polymyxin and one g of amikacin was quite dramatic. The failure of our trial at reversal was not unexpected, but had been unreported with this combination of antibiotics and vecuronium. Calcium was not used to effect reversal because it is an unpredictable antagonist and, when successful, the reversal is unlikely to be sustained.

It is unknown why the prolonged paralysis seen in our patient lasted only 4 h compared with 21 h reported with pancuronium. At first one is tempted to attribute this to the shorter duration of vecuronium compared with pancuronium. However, a recent case report described a prolonged neuromuscular block with vecuronium and gentamicin to have lasted 49 h.¹²

In conclusion, this is the report of a patient whose neuromuscular blockade reappeared and was prolonged after apparent reversal of a vecuronium neuromuscular block. This occurred during sternal irrigation with polymyxin and amikacin in lactated Ringer's solution. The neuromuscular block in our patient lasted approximately 4 h.

§ Viby-Mogensen J: Interaction of other drugs with muscle relaxants. *Sem Anesthesiol* 4:52-64, 1985.

Based on this case, the possibility of unsuccessful reversal of the combination of vecuronium and these antibiotics should be considered. If this occurs, the patient should be ventilated until the block dissipates and standard tracheal extubation requirements are met. With our use of this regimen, our patient did well with no untoward sequelae.

REFERENCES

1. Singh YN, Marshall IG, Harvey AL: Pre- and post-junctional blocking effects of aminoglycosides, polymyxin and lincosamide antibiotics. *Br J Anaesth* 54:1295-1306, 1982
2. Miller RD, Savarese JJ: Pharmacology of muscle relaxants, *Anesthesia*, vol 1. Edited by Miller RD. New York, Churchill Livingstone, 1981, pp 523-524
3. Miller RD: Antagonism of neuromuscular blockade. *ANESTHESIOLOGY* 44:318-329, 1976
4. Hashimoto Y, Shima T, Matsukawa S, Satou M: A possible hazard of prolonged neuromuscular blockade by amikacin. *ANESTHESIOLOGY* 49:219-220, 1978
5. Lee C, Chen D, Nagel EL: Neuromuscular block by antibiotics: Polymyxin B. *Anesth Analg* 56:373-377, 1977
6. Fieckers JF: Neuromuscular block produced by polymyxin B: Interactions with end-plate channels. *Eur J Pharmacol* 70:77-81, 1981
7. Durant NN, Lambert JJ: The action of polymyxin B at the frog neuromuscular junction. *Br J Pharmacol* 72:41-47, 1981
8. Van Nyhuis LS, Miller RD, Fogdall RP: The interaction between *d*-tubocurarine, pancuronium, polymyxin B, and neostigmine on neuromuscular function. *Anesth Analg* 55:224-228, 1976
9. Fogdall RP, Miller RD: Prolongation of a pancuronium-induced neuromuscular blockade by polymyxin B. *ANESTHESIOLOGY* 40:84-87, 1974
10. Small GA: Respiratory paralysis after a large dose of intraperitoneal polymyxin B and bacitracin. *Anesth Analg* 43:137-139, 1964
11. Hsu Chen CC, Feingold DS: The mechanism of polymyxin B action and selectivity toward biologic membranes. *Biochemistry* 12: 2105-2111, 1973
12. Shanks AB, Long T, Aitkenhead AR: Prolonged neuromuscular blockade following vecuronium. *Br J Anaesth* 57:807-810, 1985

Erratum

In the article "Postoperative Hepatic Dysfunction after Halothane or Enflurane Anesthesia in Patients with Hyperthyroidism" by H. Seino, S. Dohi, Y. Aiyoshi, T. Mizutani, K. Nakamura, and H. Naito (*ANESTHESIOLOGY* 64:122-125), under Materials and Methods, fifth line in the third paragraph, the correct dose of diazepam is 10 mg, not 100 mg.