Interaction of Sisomycin with Pancuronium

YASUHIKO HASHIMOTO

Department of Anesthesiology, Tohoku University School of Medicine, Sendai 980

HASHIMOTO, Y. Interaction of Sisomycin with Pancuronium. Tohoku J. exp. Med., 1983, 139 (2), 217–218 — The effect of sisomycin sulfate (75 mg) on the neuromuscular junction was studied in anesthetized patients. Sisomycin sulfate alone did not depress twitch tension. When twitch tension after pancuronium had recovered to 50% of the control level, i.v. administration of sisomycin sulfate caused a decrease in twitch tension. The combined sisomycin-pancuronium-induced blockade was antagonized by calcium chloride (400 mg) or edrophonium (10 mg). Sisomycin; pancuronium; neuromuscular blockade

Aminoglycoside, tetracycline, polypeptide and monobasic amino-acid (lincomycin and clindamycin) group of antibiotics have been reported to induce neuromuscular blockade in man (Argov and Mastaglia 1979). Sisomycin sulfate is the aminoglycoside antibiotic related to gentamycin. The neuromuscular blocking effect of sisomycin sulfate in man has not been previously reported. The present study was undertaken to determine the possible neuromuscular blocking action of sisomycin sulfate in anesthetized patients.

METHODS

Twelve adult patients, ASA class 1–2, of both sexes, without known neuromuscular diseases, were studied during elective operation on extremities requiring the use of antibiotics. Informed consent was obtained from all patients. Premedication consisted of meperidine (50–70 mg) and atropine (0.5 mg) given i.m. approximately 1 hr before induction of anesthesia. Anesthesia was induced with thiopental sodium (5–7 mg/kg) and maintained with halothane (0.5–1.0%)-nitrous oxide-oxygen (4:2 1/min). Succinylcholine (1 mg/kg) was given and endotracheal intubation performed. Ventilation was assisted or controlled as necessary to provide an adequate respiratory exchange. The median nerve was stimulated at the elbow and wrist through subcutaneous needle electrodes with supramaximal square waves of 0.2 msec duration using a Nihon Kohden SEN-1101 stimulator and a stimulus isolation unit. The electrical stimuli were applied continuously with 0.2 Hz. The resultant force of adduction of the middle finger was measured with a force-displacement transducer and recorded on a Nihon Kohden polygraph.

When a steady control twitch was obtained, sisomycin sulfate (75 mg) was intravenously administered as a single rapid bolus to 4 patients. Eight other patients were given sisomycin sulfate (75 mg i.v.) when twitch height after pancuronium administration had recovered to 50% of the control level. The antagonizing effect of calcium chloride or edrophonium on combined sisomycin-pancuronium-induced neuromuscular blockade was also studied.
RESULTS AND DISCUSSION

Sisomycin sulfate (75 mg) alone did not depress twitch tension. When twitch height after pancuronium had recovered to 50%, i.v. injection of sisomycin sulfate resulted in a decrease in twitch tension (Fig. 1). The mean % depression in twitch tension after sisomycin sulfate in 8 patients was $57.9 \pm 1.9 \text{ (s.e.)} \%$. This combined sisomycin-pancuronium-induced neuromuscular blockade was antagonized by calcium chloride (400 mg) and by edrophonium (10 mg) (Fig. 1).

The present study failed to demonstrate a neuromuscular blocking effect of sisomycin sulfate alone in normal patients. However, the neuromuscular blockade produced by pancuronium was aggravated by sisomycin sulfate. The aminoglycoside group of compounds have a Mg$^{++}$-like inhibitory effect on presynaptic acetylcholine release and a stabilizing effect on the postjunctional membrane (Sokoll and Gergis 1981). This study suggests that the characteristics of neuromuscular blocking properties of sisomycin sulfate are similar to those of other members of the aminoglycoside group.

In conclusion, sisomycin could cause respiratory depression when administered in the perioperative period and could also cause transient exacerbation in patients with myasthenia gravis.

References
