UNUSUAL RESISTANCE TO PANCURONIUM IN SEVERELY BURNED PATIENTS: CASE REPORTS

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KEY WORDS: NEUROMUSCULAR RELAXANTS, pancuronium; COMPLICATIONS, burns.

BURNED PATIENTS have been reported to show resistance to d-tubocurarine,¹⁻⁴ and metocurine,⁵ but resistance to pancuronium in severely burned patients has not been reported as far as we know.

This is a report of severely burned patients who demonstrated a marked resistance to pancuronium.

Case 1

The patient was a 36-year-old female, weight 54 kg, height 155 cm. On the 8th day following a burn to 70 per cent of the body surface area due to an LP gas explosion, the patient had debridement and skin grafting under general anaesthesia. Thiамylal 300 mg intravenously was used for induction of anaesthesia, and tracheal intubation was facilitated by pancuronium 6 mg intravenously. Anaesthesia was maintained with droperidol 8.8 mg, pentazocine 75 mg (total dose) and pancuronium, with nitrous oxide 4 l/min and oxygen 2 l/min. A slight bucking was observed 40 minutes after the initial pancuronium administration, and 2 mg of pancuronium was added intravenously. After that, in 6 hours 15 minutes of anaesthesia, a total of 25 mg of pancuronium was needed to prevent her from fighting the ventilator. Extubation was possible immediately after the operation without reversal of muscle relaxant.

Case 2

The patient was a 39-year-old male, weight 64.5 kg, height 168 cm. On the 13th day following burn of 50 per cent of the body surface area due to LP gas explosion, the patient underwent surgical debridement and skin grafting under general anaesthesia. Anaesthesia was induced with pentazocine 60 mg, droperidol 10 mg, thiамylal 250 mg intravenously, and tracheal

intubation was facilitated by pancuronium 6 mg intravenously. In 20 minutes after the initial dose of pancuronium, spontaneous respiration reappeared, and in 30 minutes movements of the extremities were observed, so pancuronium 2 mg was administered. During operation the patient moved the extremities or grimaced in response to surgical stimuli and pentazocine (total dose 135 mg) and thiамylal (total dose 600 mg) were administered intravenously in divided doses. The total dose of pancuronium required during 8 hours and 22 minutes of operation was 13 mg, but spontaneous respiration did not disappear. Minute volume with spontaneous ventilation during the surgical procedure was 16 litres and pancuronium was just given to prevent bucking. In this way, anaesthesia was maintained with spontaneous ventilation, and immediate post-operative extubation was possible without reversal of the muscle relaxant.

DISCUSSION

We experienced marked resistance to pancuronium in two severely burned patients. Resistance to d-tubocurarine in severely burned patients was reported by Matsuki¹ in 1979 and by Martyn, *et al.* in 1980.² Matsuki described a 19-year-old male, 45 kg of body weight, who suffered burns over 65 per cent of his body surface and who required a total dose of 78 mg of d-tubocurarine during a three hour operation. Neither metabolic disturbance nor electrolyte imbalance was observed. Martyn, *et al.* reported that burned patients required approximately five times higher plasma concentration of d-tubocurarine to attain a given percentage of twitch depression, compared with normal subjects.

This hyposensitivity to d-tubocurarine in burned patients cannot be fully explained by elevated plasma binding capacity for d-tubocurarine,³ or by the pharmacokinetics of d-tubo-

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curarine.⁴ Speculations such as an increase in the number of acetylcholine receptors at the neuromuscular junction⁴ or an altered affinity for d-tubocurarine by these receptors⁴ in burned patients need validation in the future.

It is of interest that resistance to the non-depolarizing muscle relaxant metocurine has recently been reported in burned patients.⁵ As with d-tubocurarine, compared with the normal patient, a five-fold increase in plasma concentration of metocurine was required to produce the same degree of twitch depression in the burned patient.

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