Oral cyclosporine-vecuronium interaction

To the Editor:

Prolongation of the neuromuscular blocking effect of vecuronium with intravenous preparations of cyclosporine has been described.^{1,2} We observed this interaction in a 36-yr-old man two months after renal transplant receiving oral cyclosporine when he returned for internal urethrotomy. He was taking oral cyclosporine 180 mg bid, and azathioprine 75 mg and prednisolone 30 mg od. Physical examination and preoperative investigations were normal. On the morning of the operation, he took one dose of each of the three immunosuppressives. Premedication was with pentazocine 20 mg and phenergan 20 mg *im* and anaesthesia was induced with thiopentone 5 mg · kg⁻¹ followed by vecuronium 0.08 mg · kg⁻¹ *iv*, O₂ + N₂O (40:60) and halothane 0.5%. Neuromuscular function was assessed continuously. Haemodynamic stability was maintained throughout the one-hour operation. No additional vecuronium was given. Neuromuscular blockade was reversed with neostigmine 0.05 mg · kg⁻¹ and atropine 0.02 mg · kg⁻¹ *iv* after two definite and a faint third response to train-of-four stimulation were observed. Though the patient was awake and cooperative, incoordinated body movements, inability to sustain head lift, inadequate respiratory efforts and poorly sustained 50 Hz tetanus suggested residual neuromuscular blockade. The patient's temperature, serum electrolytes and arterial blood gas analysis were normal. Further neostigmine 1.0 mg and atropine 0.5 mg after ten minutes had no effect. Positive-pressure ventilation was continued for about three hours after which a satisfactory return of the neuromuscular function enabled extubation. In the absence of obvious renal, hepatic or metabolic derangement in this patient, the prolonged neuromuscular blocking effect of vecuronium was probably due to drug interaction. While azathioprine³ and chronic steroid therapy⁴ antagonize non-depolarizing neuromuscular blockade, cyclosporine appears to prolong it.^{1,2,5} Intravenous preparations of cyclosporine, however, contain cremophor as solvent, which may potentiate vecuronium-induced blockade⁵ and thus be partly responsible for this interaction. Oral cyclosporine (Sandimmun, Sandoz) does not contain cremophor. Thus, in light of the above interaction, continuous monitoring of neuromuscular block in post-transplant patients is reemphasized.

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Anaesthetists overestimate blood loss

To the Editor:

We wish to report the results of a study to determine the accuracy of anaesthetists' visual estimate of blood volume on surgical sponges. Known premeasured volumes of blood (diluted to a haematocrit of 30%) ranging from 5 to 125 ml were added to seven dry and three wet gauze sponges. Thirty-one randomly selected anaesthetists (mean years anaesthesia experience = 8) overestimated blood volumes on sponges by 86% (±7) (SEM). For the three different-sized sponges studied, overestimation was more pronounced with the smaller sponge (Raytex 4" × 4") than with the adult laparotomy tape (18" × 18", 4 ply) ($P < 0.025$) or the paediatric laparotomy tape (4" × 18", 4 ply) ($P < 0.03$). Also, overestimation (%) errors were larger when smaller quantities of blood were added to adult and paediatric laparotomy tapes ($P < 0.01$). Increasing number of years of anaesthesia experience did not correlate ($r = 0.16$) with more accurate estimation.

Previously published studies showed that both surgeons and anaesthetists tended to underestimate total intraoperative blood loss.^{1,2} We attempted to reproduce, in a controlled manner, the most practical method of blood loss assessment: visual estimation. The study confirmed that visual estimation of blood loss on sponges is inadequate. The amount of blood on surgical sponges can account for up to one-half the blood lost during an operation.³ Our findings may be especially relevant in pae-

diatric anaesthesia where smaller volumes of blood are absorbed by small sponges. In adult anaesthetic practice, the overestimation of blood on surgical sponges may not be clinically important as accuracy is increased on larger sponges with larger volumes of blood. If accurate measurements of this component of intraoperative blood loss are important, weighing sponges in addition to observing haemodynamic and haematocrit changes is necessary.

We were interested in a simple, inexpensive clinical aid to correct visual overestimation. Medical Action Industries, Inc. (Farmindale, NY), the manufacturer of surgical gauze sponges at our institution, reports an absorptive capacity per square inch of 0.23 ± 0.01 ml of normal saline for the 4-ply, 22×24 thread gauze sponge we studied. That implies a maximum absorptive volume of 75 ± 2 ml for the adult laparotomy tape and 16.7 ± 0.5 ml for the paediatric laparotomy tape. Educating operating room physicians about the maximum absorptive volume of surgical gauze sponges may reduce overestimation.

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