

curonium by the liver, since biliary secretion occurs at a slow rate. After the drug has been taken up by the liver, it is partially metabolized, stored, and secondarily released slowly in the bile or in the hepatic venous blood. Therefore, in patients with biliary obstruction, hepatic uptake may still continue despite the absence of biliary secretion.³ However, an increase in the plasma concentration of bile salts has been shown to inhibit the hepatic uptake of vecuronium.⁷ Also, the vecuronium taken up by the liver may be redistributed back into the circulation.

The present report suggests prolongation of neuromuscular block following vecuronium in two patients with malignant severe obstructive jaundice. The prolonged block may be attributed to decreased uptake of vecuronium by the liver and/or delayed elimination in the bile. A smaller dose of vecuronium may be required to maintain neuromuscular block in such patients, and continuous monitoring of the level of neuromuscular blocks is important.

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REFERENCES

- 1 Miller RD, Rupp SM, Fisher DM, Cronnelly R, Fahey MR, Sohn YJ. Clinical pharmacology of vecuronium and atracurium. *Anesthesiology* 1984; 61: 444-53.
- 2 Lebrault C, Berger JL, D'Hollander AA, Gomeni R, Henzel D, Duvaldestin P. Pharmacokinetics and pharmacodynamics of vecuronium (ORG NC45) in patients with cirrhosis. *Anesthesiology* 1985; 62: 601-5.
- 3 Lebrault C, Duvaldestin P, Henzel D, Chauvin M, Guesnon P. Pharmacokinetics and pharmacodynamics of vecuronium in patients with cholestasis. *Br J Anaesth* 1986; 58: 983-7.
- 4 Bencini AF, Houwertjes MC, Agoston S. Effect of hepatic uptake of vecuronium bromide and its putative metabolites on their neuromuscular blocking action in the cat. *Br J Anaesth* 1985; 57: 789-95.
- 5 Bencini AF, Scaf AHJ, Sohn YJ, Kersten-Kleef UW, Agoston S. Hepatobiliary disposition of vecuronium bromide in man. *Br J Anaesth* 1986; 58: 988-95.
- 6 Upton RA, Nguyen T-L, Miller RD, Castagnoli N Jr. Renal and biliary elimination of vecuronium (ORG NC45) and pancuronium in rats. *Anesth Analg* 1982; 61: 313-6.
- 7 Westra P, Keulemans GTP, Houwertjes MC, Hardonk MJ, Meijer DKF. Mechanisms underlying the prolonged duration of action of muscle relaxants caused by extrahepatic cholestasis. *Br J Anaesth* 1981; 53: 217-27.

Death and the oculocardiac reflex

To the Editor:

I read the interesting paper by Arndt and Stock describing bradycardia during cold ocular irrigation under general anaesthesia;¹ and the correspondence from Lang entitled "death from the oculocardiac reflex."² Lang was able to quote the reference of one death attributed to the oculocardiac reflex by Sorenson and Gilmore.³ I can add references of two more deaths attributed to this reflex. In 1957 Kirsch *et al.*⁴ reported the death of a patient during surgery for retinal detachment in whom "fatal cardiac arrest developed shortly after the preliminary manipulation of two extraocular muscles." The other death was reported by Bietti,⁵ who in 1966, experienced "a case of irreversible cardiac arrest in general anaesthesia in a boy of eight years (operated upon for recession of the medial rectus)."

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REFERENCES

- 1 Arndt GA, Stock MC. Bradycardia during cold ocular irrigation under general anaesthesia: an example of the driving reflex. *Can J Anaesth* 1993; 40: 511-14.
- 2 Lang SA, Van der Wal M. Death from the oculocardiac reflex (Letter). *Can J Anaesth* 1994; 41: 161.
- 3 Sorenson EJ, Gilmore JE. Cardiac arrest during strabismus surgery. *Am J Ophthalmol* 1956; 41: 748-52.
- 4 Kirsch RE, Samet P, Kugel V, Axelrod S. Electrocardiographic changes during ocular surgery and their prevention by retrobulbar injection. *AMA Archives of Ophthalmology* 1957; 58: 348-56.
- 5 Bietti GB. Problems of anesthesia in strabismus surgery. *Int Ophthalmol Clin* 1966; 6: 727-37.

Asystole induced by right atrial injection of thiopentone

To the Editor:

Various cardiac dysrhythmias: bradycardia,¹ atrial fibrillation,² and ventricular fibrillation³ have been reported during injection of ice-cold fluid for thermodilution cardiac output determination. Recently, a case of asystole