

cardiopulmonary bypass following ischaemic cardiac arrest [5]. More recently, Stehr and colleagues [6] have demonstrated an independent positive inotropic effect for lipid emulsion in bupivacaine-induced cardiac depression in rat hearts. Given that myocardial substrate preference under conditions of increased lactate concentration is known to shift toward oxidation of free fatty acids [7], improved outcomes with lipid infusion in cardiac arrest secondary to generalized myocardial ischaemia may not be unexpected. Further studies addressing the beneficial mechanism of action of lipid emulsions in local anaesthetic and non-lipophilic toxin-induced arrest models are warranted.

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Propofol for the management of glycine-mediated excitatory symptoms of TURP syndrome

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EDITOR:

Fluid overload and hyponatraemia are central to the development of the TransUrethral Resection of Prostate (TURP) syndrome after transurethral prostate surgery [1]. Hyperammonaemia and hyperglycinaemia can also be part of this syndrome [2,3]. Hyperammonaemia or hyperglycinaemia usually presents with central nervous system (CNS) depression although hyperglycinaemia exhibits a CNS excitatory action through its positive action on *N*-methyl *D*-aspartate (NMDA) receptors [4]. We describe a patient who developed CNS excitation following

TURP surgery possibly because of hyperglycinaemia and responded to propofol sedation.

A 72-yr-old male weighing 65 kg and with a history of controlled hypertension for 15 yr underwent TURP surgery under a subarachnoid block. His medication (diltiazem 30 mg and metoprolol 50 mg each once daily) was continued till the day of surgery. He fasted overnight and was premedicated with alprazolam 0.25 mg on the night before and the morning of the day of surgery. On examination, his heart rate was 64 beats min⁻¹ and blood pressure 140/70 mmHg. He had a normal electrocardiogram (ECG) and haematology, biochemistry and coagulation profiles were within the normal limits. Transthoracic echocardiogram revealed an ejection fraction of 65% with normal pulmonary arterial pressure and elevated left ventricular filling pressure.

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Following preloading with 500 mL of lactated Ringer's solution, a subarachnoid block was performed with 2 mL of 0.5% hyperbaric bupivacaine and 25 µg fentanyl administered through a 25-G Quincke needle at the L3–L4 intervertebral space in the left lateral position, which produced a block to T₈. Surgery was started and 1.5% glycine was used for irrigation. The surgery lasted for 1.5 h and 8 L of fluid were used for irrigation intraoperatively. After the surgery, the patient was transferred to the post-anaesthesia care unit. His vital parameters were stable and he was conscious and oriented.

His initial postoperative course was uneventful. After 6 h, however, he became restless and apprehensive. He was initially given sedation with incremental doses of intravenous (i.v.) midazolam (5 mg in total) without effect. Pain was thought to be the cause, hence incremental i.v. morphine (6 mg in total) was administered also without effect. He did not have chest pain and the ECG was normal. His pupils reacted to light and were of normal size bilaterally; visual field examination was not possible because of agitation. Postoperative serum electrolyte showed marginally lowered serum sodium (133.7 mmol) and arterial blood gas analysis results were within the normal ranges. Meanwhile, the patient became more agitated and started to shout and talk irrelevantly. I.v. haloperidol 5 mg and midazolam 6 mg (in incremental manner) were given, but still the patient continued to be restless, agitated and started using abusive language. It was then noticed that mistakenly the surgeon had continued glycine as the irrigating fluid in the postoperative period, and hence the irrigation was changed to normal saline. During these 7 postoperative hours, 12 L of glycine had been used for irrigation (a total of 20 L in the whole perioperative period). We could not measure the serum glycine level; however, the serum ammonia level was found to be 91 µmol L⁻¹ (normal 5–50 µmol L⁻¹). A diagnosis of glycine toxicity was considered as the cause of the violent behaviour. The patient was given a bolus of 30 mg propofol followed by infusion of 25 µg kg⁻¹ min⁻¹. This produced an immediate response with progressive decrease in his agitation. The infusion was increased gradually over a period of 15 min to a maximum of 40 µg kg⁻¹ min⁻¹, which was continued for a further 3 h. He slept overnight and the next morning he had no agitation nor a recall of the events from the previous night. The serum ammonia level fell to 13 µmol L⁻¹ by the morning.

Although TURP syndrome lacks a stereotypical presentation, typically it produces central nervous system and cardiovascular system manifestations

(altered mentation, tachypnoea, hypoxaemia, pulmonary oedema, convulsions and coma) because of hyponatraemia and fluid overload arising from excessive absorption of the irrigation fluid [1]. Our patient did not have any clinical features of fluid overload and his serum sodium was not so low so as to produce features of classic TURP syndrome. The features of ammonia toxicity start developing at 500 µmol L⁻¹ [2], so that in our patients it was too low to produce any symptoms of ammonia toxicity. Moreover, ammonia toxicity produces nausea, altered sensorium, drowsiness, lethargy and decreased alertness. Our patient was exhibiting violent behavior unresponsive to routine sedation.

The raised ammonia level, however, indicates that there was absorption of glycine. This may then be metabolized by the kidney and liver to produce glyoxylic acid and ammonia. Patients who do not have glycine as the irrigating fluid do not develop hyperammonaemia after prostate surgery [5]. If the absorption of glycine is of prolonged duration it may accumulate although the serum ammonia level may not rise at least for 12 h [6].

In the situation of continued glycine irrigation and high serum ammonia level, we presume that our patient was developing glycine toxicity symptoms, which include vomiting, nausea, headache, weakness and malaise through its inhibitory neurotransmitter activities. However, glycine may also act as an excitatory neurotransmitter on NMDA receptors, leading to the development of TURP encephalopathy [4]. We believe that our patient was developing early features of glycine encephalopathy. Midazolam and haloperidol do not act on NMDA receptors, therefore they failed to reverse such excitatory symptoms even with repeated administration. Propofol, however, is an NMDA receptor antagonist with effects on glycine receptors [7] and we believe that sedation with propofol was achieved not by its action on gamma-aminobutyric acid (GABA) receptors but with its effect on NMDA receptors. Therefore, we suggest that propofol should be considered in the management of excitatory manifestations of glycine toxicity following TURP surgery.

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A national survey of single-use and reusable laryngeal mask use in England

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EDITOR:

Single-use products, similar in design to the reusable classic laryngeal mask airway (cLMA: LMA-Classic™, Intavent Orthofix, Maidenhead, UK), have been available since 2003. In the UK, the Association of Anaesthetists, Royal College of Anaesthetists, Chief Medical Officer and Department of Health have recommended single-use equipment where appropriate as part of an infection-control policy. The impact of this advice on the uptake of single-use laryngeal masks (LMs) has not been well described.

We conducted a telephone survey of LM use by the 148 NHS Acute Hospital Trusts in England in September 2006. If a Trust comprised more than one hospital, the call was directed to the hospital predominantly performing general surgery. Up to three calls were made to reach theatre store managers and senior operating department practitioners (SODPs), or assistants were requested. If neither were reached in 15 min, the attempt was abandoned. If further details were required a further phone call was made.

Respondents were asked if their department used single-use and/or reusable LMs, which single-use LMs are stocked, do you have single-use and/or reusable LMs on your difficult airway trolley, what was the main factor affecting your choice of single-use LM, were anaesthetists involved in the choice and why do you still keep reusable LMs?

Responses were obtained from 129 (87%) operating theatre departments. Twenty-three (18%) departments only stocked single-use LMs. Twenty-six (20%) routinely used single-use LMs but also stocked reusable LMs. Forty (31%) had both types in routine use. Forty (31%) stocked single-use LMs but routinely used reusable LMs. The single-use brands in routine use were Intavent (31), Marshall (21), Intersurgical (14), Ambu (13), Portex (2) and ProAct Medical (1). One department routinely stocked more than one brand. Six departments were performing in-house evaluations of single-use LMs. On the difficult airway trolley, 14 departments had single-use LMs, 49 had reusable LMs and 23 had both. Forty hospitals had no LMs on their trolley, as they were reported to be available in the anaesthetic room.

The main reasons given for the purchase of a single-use brand were cost (34), anaesthetist's preference (30) (epiglottic bars were specifically mentioned by three respondents as desirable), result of an in-hospital evaluation (11), 'same manufacturer as the Classic™ (3), 'it was the first brand available' (1), 'concern over phthalates' (1), 'good salesperson' (1) and not known (4). Of the 89 departments stocking single-use LMs, 67 had involved anaesthetists in decision-making. Twenty-seven of these used anaesthetists' preference as the main factor determining the choice. In 40 departments another factor predominated. In 22, this was cost.

Thirty-three departments had performed evaluations of single-use LMs. Thirteen had made their choice after experiencing just one brand. Two were continuing to evaluate other single-use brands while purchasing another. Eight chose the cheapest

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