A case for routine oesophageal Doppler fluid monitoring during major surgery becoming a standard of care

Editor—Perioperative fluid optimization is an established technique in reducing morbidity after major surgery. Hypovolaemia is associated in particular with increased gut morbidity and increased length of hospital stay.1 Excessive fluid administration produces the clinical picture of pulmonary, peripheral, and gut oedema with associated morbidity and mortality.2 Intraoperative determination of fluid requirement traditionally incorporates clinical evaluation, measurement of heart rate, arterial pressure, and central venous pressure (CVP), which are insensitive to detection of hypovolaemia.3 Fluid requirements necessarily vary according to individual physiology and specific circumstances of surgery. Therefore, fixed or formula-based filling regimes dependent on patient weight or length of operation are inappropriate, may be unable to detect occult hypovolaemia, and take no account of intrinsic cardiac function.

In contrast, a ‘goal directed’ dynamic management approach uses regular fluid boluses and non-invasive stroke volume measurement to monitor their effect on the cardiovascular system, by utilizing the patient’s Starling curve to optimize preload. In a recent randomized-controlled trial of 128 patients undergoing colorectal surgery,4 significant improvements in cardiac output, stroke volume, and oxygen delivery intraoperatively were described using oesophageal Doppler to guide colloid administration. This led to reduced morbidity and hospital stay after operation compared with a CVP-controlled group. Interestingly, despite often large increases in these variables, CVP remained largely unchanged, demonstrating the lack of sensitivity to hypovolaemia of the CVP (Fig. 1). CVP reflects combinations of influences, including cardiac performance, blood volume, and vascular tone, and is affected by the physiological changes associated with pneumoperitoneum and frequent adjustment of the operating table tilt. Not only can CVP be inaccurate in the determination of fluid status, but as with any invasive monitor is associated with cost, complications, and morbidity.

Oesophageal Doppler is increasingly popular for guiding intraoperative fluid therapy. As it displays the output of each cardiac cycle, it allows the reaction to fluid boluses to be assessed. This approach to fluid management identifies and treats hypovolaemia and has been associated with improved outcome in patients having major surgery.

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Dexmedetomidine sedation for the treatment of tetanus in the intensive care unit

Editor—In tetanus, the severe muscle spasms and autonomic instability affect the respiratory and cardiovascular systems, generally requiring treatment in the intensive care unit (ICU).1,2 Treatment is directed at suppressing rigidity, muscle spasms, and sympathetic activation, and controlling autonomic instability. A range of drugs including adrenergic blockers have been used.3–7 Dexmedetomidine is a lipophilic imidazole derivation with high affinity for \(\alpha_2\) adrenoceptors, having analgesic and anti-sympathetic properties.8 Dexmedetomidine, also, reduces plasma levels of catecholamines and maintains haemodynamic stability through its
anti-sympathetic properties. Recently, infusion protocols lasting more than 24 h have been reported. We present our management of six cases of tetanus in whom dexmedetomidine infusion was given for 7 days, with particular reference to the effects of dexmedetomidine on muscle spasms and autonomic instability. Six patients with tetanus (age 53–72 yr, three male, Apache score 5–19) were treated in our ICU (total stay 23–45 days, ventilated 12–37 days) with dexmedetomidine plus the standard tetanus therapy, including antibiotic, antitoxin, and tetanus immunization. All patients were treated with the same protocol. Dexmedetomidine infusion was started with a loading infusion of 1 g kg⁻¹ more than 10 min followed by a maintenance infusion rate of 0.2–0.7 g kg⁻¹ h⁻¹. If supplementary sedation and muscle relaxation were required, diazepam was infused at 10–20 mg h⁻¹, vecuronium was given as bolus at 0.1 mg kg⁻¹, respectively. The level of sedation was measured hourly using the Ramsay sedation score. The haemodynamic variables before dexmedetomidine infusion, after loading dose, during dexmedetomidine infusion, and after discontinuation of dexmedetomidine infusion showed good stability (Table 1).

To our knowledge, these are the first cases in which dexmedetomidine has been used in the treatment of tetanus. It appears that dexmedetomidine is a safe and effective option for these patients. Its administration did not fully control the muscle spasms but decreased their frequency and severity, and reduced the use of sedative, analgesic, and muscle relaxant drugs to control muscle spasms and cardiovascular instability. We believe that dexmedetomidine could be a useful adjunct in the management of tetanus and is worthy of further evaluation.

<table>
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<tr>
<th>Patient number</th>
<th>Before dexmedetomidine infusion</th>
<th>After loading dose (7 days) [mean (sd)]</th>
<th>During dexmedetomidine infusion</th>
<th>During the first day after discontinuation of dexmedetomidine infusion [mean (sd)]</th>
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