

Preoptimization of the older elective patient

OXYGEN DELIVERY

Morbidity, and presumably mortality, in patients undergoing surgery for upper gastrointestinal malignancy is associated with higher levels of pro-inflammatory cytokines after surgery (Oka et al, 1992). This increases tissue demand for oxygen (O₂), and if the patient cannot increase cardiac output (CO) to match this increased demand, they will be less likely to survive. Preoptimization aims to match O₂ delivery (DO₂) to increased demand: 600–650 ml/min/m² is enough to significantly reduce mortality and morbidity.

Oxygen delivery is the product of the CO and the O₂ content of the blood (which tends to be stable). So optimization of DO₂ usually means optimizing cardiac index, which requires placement of a pulmonary artery flotation catheter (PAFC). True preoptimization involves admission to a high-dependency bed before surgery for insertion of relevant monitoring and fluid administration lines. CO is initially optimized with fluid boluses; an inotropic agent may then be used to achieve the target DO₂.

Dopexamine has been used as an inotrope in this setting in 2 major controlled trials, and has been shown to be superior to adrenaline (Boyd et al, 1993; Wilson et al, 1999). This may be the result of its anti-inflammatory and vasodilatory effects, as well as its inotropic action.

This approach is continued during surgery and for 12–24 hours afterwards. This protocol has been shown to reduce mortality, morbidity and hospital length of stay in two UK trials, in patients with similar risks (age and type of surgery) to the patient described here (Boyd et al, 1993; Wilson et al, 1999).

THE DILEMMA

How would you preoptimize a fit 75-year-old male undergoing elective gastrectomy?

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PREOPERATIVE OPTIMIZATION

Advanced age, reduced physiological reserve, possible co-existing disease and poor nutritional status increase the perioperative risk for this patient (Nimmo et al, 1994). Major upper abdominal surgery and the possibility of large blood loss and fluid shifts may seriously impair cardiorespiratory function.

This patient must be in optimum condition before surgery as he has the potential for significant perioperative morbidity. There is growing evidence that adequate perioperative fluid resuscitation contributes to successful outcome in high-risk patients (Sonneveld et al, 1999).

Minimum investigations are full blood count, urea and electrolytes, cross match, chest X-ray and electrocardiogram (Nimmo et al, 1994), depending on clinical findings. Vitalograph and arterial blood gas analysis may also be indicated, along with medical therapy,

nutritional support and physiotherapy before surgery. The aim is for the patient to be normothermic throughout the operation, with good peripheral perfusion and adequate vital signs (heart

rate, BP, urine output and O₂ saturation).

Intravenous fluid infusion should be commenced before surgery and invasive monitoring may be required during and possibly before surgery, to guide this. However, in this case, and in the absence of other risk factors, clinical indices and observation should be adequate in the preoperative period.

The debate over PAFCs and goal-directed therapy has continued over the last 20 years. Wilson et al (1999) suggested that outcome after major surgery is improved if calculated DO₂ is increased using inotropes, fluids and other measures. However, these studies have several flaws, and various well-designed studies have found no benefit. We do not believe there is convincing evidence that rigid protocol preoptimization is beneficial (Brazzi and Gattinoni, 1998; Sonneveld et al, 1999); it may contribute to morbidity and further studies are required.

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