Anaesthesia for free-flap surgery

BY ADEL HUTCHINSON

Adel Hutchinson is one of those calm and controlled anaesthetists for whom nothing seems too difficult. In this article, she describes the key perioperative factors for one of the highest complexity operations in ENT; free-flap surgery. It makes good reading from someone who is... unflappable?

Free flap surgery refers to the surgical excision of skin, muscle and sometimes bone, along with its blood supply in order to repair a surgical defect, such as that found following tumour removal. In terms of function and cosmesis, this procedure is superior to primary closure. However, it requires a degree of microvascular expertise and is not without its complications.

The mainstay of anaesthesia for this group of patients is in providing and supporting the ideal environment for optimal flap perfusion and has been the subject of a number of papers over the years. Whilst there is no consensus on anaesthesia for this group of patients, there are a number of emerging themes which will be described.

The main determinants of flap success are patient and surgery specific and, while not influenced by the anaesthetic management alone, it is increasingly clear that complications of this type of surgery are due to a complex interaction between patient factors, surgical factors and perioperative factors. There are a number of variables the anaesthetist can aim to optimise perioperatively and to support both intraoperatively and postoperatively on the critical care unit.

Patient factors

Comorbid disease, such as peripheral vascular disease, cardiovascular disease and diabetes, are associated with increased complication rates. A high proportion of this cohort of patients smoke and drink to excess and therefore comorbidities such as COPD are common, as is poor nutrition, whether associated with excess alcohol intake or as a direct result of both the physical presence of the tumour and related pain as well as trismus and dysphagia. In addition, cachexia contributes directly to malnutrition and this serves to ensure less physiological reserve to fuel the catabolic phase of the surgical stress response, and, in the case of hypoalbuminaemia, is associated with decreased survival in patients with SCC [1].

Preoperative assessment

The first contact the patient has with the anaesthetist is as part of the multidisciplinary preoperative assessment. In this author's institution, MDT discussion is followed by MDT clinic whereby the patient is seen by each relevant member of the multidisciplinary team including surgeon, dietician, dentist and restorative dentist as well as the anaesthetist and oncologists. This is an ideal opportunity to encourage discussion between specialties regarding appropriate management and risk stratification and enables all aspects of the perioperative journey to be optimised in the, often short, time period between diagnosis and date of surgery. Priority is given to nutrition including preoperative insertion of feeding tubes, alcohol detoxification and optimisation of pre-existing conditions where appropriate. The short time period available to optimise the patient means that early identification of modifiable conditions is essential. Therefore, signs and symptoms to be aware of that may require further urgent investigation and treatment include but are not limited to, new or worsening cardiac chest pain, worsening debilitating breathlessness and new murmurs.

An investigation that helps inform overall perioperative risk is cardio-pulmonary exercise testing (CPET) which, with some exceptions, is a relatively easy investigation to arrange and gives a good general idea of the patient's ability to mount a cardio-respiratory response to surgery. In those patients for whom this is not an option, for example, patients with tracheostomy, severe obstruction by tumour or lower limb pain or disability where the institution is unable to provide modified CPET testing, the six-minute walk test, pulmonary function testing, echocardiography and cardiac stress testing and MR are options depending on the severity of the patients symptoms. It is important to remember that these tests are not definitive but instead to use them in context of the clinical picture in order to establish an overall quantification of risk and therefore to inform postoperative destination.

Anaemia

As preoperative anaemia and transfusion perioperatively are increasingly associated with poorer outcome [2], this relatively easily modifiable risk factor is important to identify and treat. Close liaison with haematology services can ensure IV iron treatment where appropriate. If this is not possible, even one dose of preoperative IV iron can, when combined with close attention to intraoperative blood loss and monitoring of haemoglobin, ensure lower transfusion load and enable the patient to start correcting for low haemoglobin during the perioperative period.

Enhanced recovery

Enhanced recovery programmes are commonplace for colorectal surgery patients but there is less evidence of its ability to prevent complications in head and neck patients [3]. Whilst the evidence is unclear, it is clear that the standardisation of care and best practice ERAS provides is an important factor in ensuring high-quality patient care. The main difficulty being that there is often a short window of time between decision and date of surgery – sometimes as little as two weeks – requiring excellent multidisciplinary communication.

Conduct of anaesthesia

The choice of anaesthetic should reflect the expertise of the anaesthetist and can consist of inhalational anaesthesia, total intravenous anaesthesia (TIVA) or a combination of both. There is no strong evidence to recommend either technique in terms of flap success rate.

Prolonged duration of anaesthesia and surgery is associated with overall increase in postoperative complications - in particular, surgical complications - and is an important modifiable risk factor, particularly of relevance to osseus flap which has a longer mean duration [4].

Fluid management

Type and volume of fluid administered is widely discussed throughout anaesthesia as a whole and, while full discussion of this topic is outwith the remit of this article, large volume fluid administration has been implicated in adverse medical and surgical outcome. This relationship is complex however, and it should be noted that this association is variable across the literature. In addition, larger volumes of IV fluid are associated with longer anaesthetic/surgical times which in themselves are linked to adverse outcomes. Attention should be paid to overall fluid balance and fluid administration should be guided by goal- directed fluid therapy and aim to ensure adequate flow by targeting haematocrit at around 30% to provide adequate forward flow whilst ensuring appropriate tissue oxygenation and preventing venous stasis within the flap, whilst also being mindful of the danger of tissue oedema in the flap.

Vasopressors

There is no good evidence that the clinical use of vasopressors is associated with adverse outcome in this cohort of patients. Vasopressors should be used in the context of goal-directed fluid management [5] .

Postoperative care

Attention should be paid to antibiotic prophylaxis, prevention of postoperative nausea and vomiting and to multimodal analgesia to minimise opiate administration. Patients should be nursed on the critical care unit and should receive close flap monitoring as well as critical care fundamentals such as DVT prophylaxis, ulcer prevention and early mobilisation with ongoing support for nicotine and alcohol withdrawal

References

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Declaration of Competing Interests: None declared.