

Anaesthesia for endoscopic surgery

Michael H MacMillan

Marie Davidson

Abstract

Anaesthesia for endoscopic airway surgery involves unique challenges. The anaesthetist and surgeon are working in close anatomical proximity and the concept of shared airway is never more relevant. Understanding the planned procedure and the needs of the surgeon for access to the surgical field will enable the provision of anaesthesia and airway management using a variety of techniques. Planning for safe induction, maintenance and emergence of anaesthesia will also be guided by the specific pathology and patient characteristics and requires effective communication between the surgeon and anaesthetist.

Keywords Airway; endoscopy; jet ventilation; laser; micro-laryngoscopy; panendoscopy

Royal College of Anaesthetists CPD Matrix: 3A01, 3A02

Providing anaesthesia for endoscopic surgery involving the airway carries unique challenges for the anaesthetist. Unlike most other surgeries, the anaesthetist and surgeon are working in close anatomical proximity and the concept of shared airway is never more relevant.

The surgery

Endoscopic surgery encompasses both diagnostic and therapeutic procedures and may involve base of tongue, pharynx, larynx and upper oesophagus for both benign and malignant disease. Procedures range from endoscopic visualization such as panendoscopy to laser procedures and resections of obstructing tumours.

The challenge

The anaesthetist is faced with the challenge of providing a means of oxygenation, carbon dioxide removal, adequate depth of anaesthesia and smooth emergence from anaesthesia with intact airway reflexes, all while having an appreciation of the needs of the surgeon for surgical access. For this reason, effective and concise communication is key and a good working relationship between the anaesthetist and ENT surgeon is paramount.

Michael H MacMillan *MBChB FRCA DICM* is a Consultant Anaesthetist at Queen Elizabeth University Hospital in Glasgow, UK. Conflicts of interest: none declared.

Marie Davidson *MBChB FRCA* is a Specialty Registrar in Anaesthesia in the West of Scotland Deanery, UK. Conflicts of interest: none declared.

Learning objectives

After reading this article, you should be able to:

- define ENT endoscopic surgery
- classify the relevant choices for airway management based on surgical procedure proposed
- explain the importance of preoperative assessment, planning and communication prior to induction of anaesthesia
- recognize the benefits and limitations of the different anaesthetic techniques
- describe the practicalities of performing these anaesthetic techniques

The patients

This patient group can be diverse. Patients may be young, otherwise fit and healthy. However, due to the risk factors of tobacco smoking and alcohol intake for head and neck cancers, these patients may also have extensive co-morbidities including ischaemic heart disease and obstructive airway disease.

Preoperative assessment and planning

Preoperative assessment is an invaluable opportunity to discover potential challenges and allow for advanced planning. Particular attention should be paid to the signs and symptoms under investigation. A hoarse voice or voice change may occur with even minor vocal cord lesions. The presence of stridor suggests a degree of airway obstruction and the inability to lie flat provides further evidence of a significant airway obstruction.

Examination

A thorough examination of the airway will aid in predicting the ability to manage the airway. It will also provide information about the ability to optimally position the patient for surgery. Restricted neck movement for example will hinder both the anaesthetist and the surgeon.

Previous intubation grade and ease of bag mask ventilation may be sought by reviewing previous anaesthetic records, but it should be borne in mind that malignant lesions may change in size and appearance over a relatively short period of time and a previously uneventful anaesthetic record may provide false reassurance.

Investigations

Radiological studies such as computed tomography images will give information about tumour location, size and resultant airway narrowing if present. This is however not a dynamic study and will therefore only give a static image.

Nasendoscopy is carried out routinely by the ENT surgeon and gives real-time images of vocal cord movement and the investigated lesion during respiration. If necessary this should be repeated before induction with the anaesthetist present.

Formulating an anaesthetic plan

A plan for induction of anaesthesia, airway management, ventilation and maintenance of anaesthesia and emergence should be formulated in advance. For this reason a preoperative brief with

the whole surgical and theatre team is invaluable. Knowing the needs of the surgeon for surgical access will directly affect the anaesthetic management. Questions to be answered during the brief will include:

- Will intubation impede surgical access?
 - Even a microlaryngoscopy tube (MLT) will obscure the posterior one third of the vocal cords and may impede surgical access.
- If a tubeless field is required how will oxygenation be maintained?
 - Supraglottic ventilation or transnasal humidified rapid insufflation ventilator exchange (THRIVE) may be appropriate options.
- Will surgery have altered the airway (for better or for worse)?
 - Planning for emergence of anaesthesia is as important as induction and in instances where postoperative airway obstruction is a risk, having a surgeon present for emergence should be planned.

It can sometimes be difficult in ENT endoscopic surgery for the less experienced practitioner to get an overview of what the different anaesthetic techniques are and when they are required.

The following sections will follow where possible a classical anaesthetic educational structure looking at induction, maintenance and emergence. As it progresses through procedures, only the differences from previous techniques may be included. We commence with the case most akin to our normal anaesthetic practice – panendoscopy with an MLT.

Panendoscopy

When an ENT surgeon lists a patient for panendoscopy they are generally trying to map a known tumour or exclude a tumour. They therefore may need access to visualize (and possibly biopsy) the entire upper airway including the post-nasal space and upper oesophagus.

Most commonly this is facilitated by the placement of an MLT by the anaesthetist. The resultant technique is therefore very similar to a standard anaesthetic intubation although there are some important differences.

Microlaryngeal tubes for adult ENT surgery traditionally come in sizes 4.0, 5.0, and 6.0 internal diameters. They differ from standard endotracheal tubes (ETT) of similar diameter by being longer to allow easier surgical access to the airway. Their smaller diameter can facilitate placement when the airway is narrowed by tumour and can allow better visualization of tumours on the larynx. It is not possible to simply use a paediatric ETT with a narrow diameter as they will not be long enough and may be uncuffed. If they do have a cuff the cuff may be too small to create a seal in an adult trachea. The narrow lumen of MLTs will increase resistance to flow. For example, a size 4 ETT will have 16 times the resistance of a size 8 ETT of similar length. This can increase airway pressures during positive pressure ventilation and can make spontaneous ventilation difficult for the patient.

Induction

For all ENT endoscopic inductions consideration should be given to airway obstruction. If in doubt it is prudent to induce the

patient in theatre rather than the anaesthetic room with the ENT surgeon present in case surgical rescue is needed.

The operation may be short but stimulating and requires adequate analgesia and paralysis. Muscle relaxation must be adequate not just for intubation but also to provide a good surgical field. Whilst mivacurium is short acting, rocuronium can provide a dense block and with the advent of sugammadex is readily reversible, increasing safety if complete reversal is achieved prior to emergence.

The MLT should be taped to the left hand side of the mouth and ventilator tubing attached on this side to keep it out of the way of the surgeon's approach.

Maintenance

Maintenance can be achieved with total intravenous anaesthesia (TIVA) or volatile anaesthesia. Our standard practice is to use desflurane where possible to aid rapid emergence.

The passing of the rigid endoscopes can be extremely stimulating and a bolus of chosen short-acting opioid, or increasing a remifentanyl target-controlled infusion prior to endoscopy reduces the stress response. If a biopsy is likely then fentanyl is a suitable choice providing more postoperative analgesia.

Positive pressure ventilation throughout the case removes any risk of the patient struggling to breathe against the resistance of the MLT.

Establishing train of four monitoring will aid decision making at emergence.

Emergence

If there is any risk of post extubation airway obstruction then extubating in theatre with ENT colleagues present is sensible. If the technique has involved a sugammadex reversal then an alternative option than rocuronium for paralysis (such as suxamethonium) should be prepared.

Our practice is to provide suction to the airway, reverse paralysis, ventilate off desflurane (rather than encouraging spontaneous ventilation), and extubate sitting up and awake.

Microlaryngoscopy

When an ENT surgeon lists a patient for microlaryngoscopy they are generally focussing purely on the larynx and vocal cords for a variety of pathologies including polyps, nodules, and vocal cord carcinoma.

An MLT technique as described above may be adequate. However often a better view is required, depending exactly where on the larynx the pathology is. Communication with the surgeon will help formulate the correct plan for the team. Options most commonly employed include:

Subglottic jet ventilation

The use of a Hunsaker or alternative is an example of subglottic jet ventilation.

A Hunsaker is a narrow tube about 30 cm long with two lumens (Figure 1). The distal lumen is used for jet ventilation. This can be with a standard Sanders Injector with manual jet ventilation injection by the anaesthetist.

Alternatively a high frequency jet ventilator can be used allowing the proximal lumen of the Hunsaker to measure airway pressure and decrease the risk of barotrauma. Although the tube

Download English Version:

<https://daneshyari.com/en/article/5580211>

Download Persian Version:

<https://daneshyari.com/article/5580211>

[Daneshyari.com](https://daneshyari.com)