

# Flexible fibre-optic intubation

Sandi Wylie

Ian Calder

## Abstract

Flexible fibre-optic intubation has been practised for 40 years. It is an enormously useful skill, but it is not always the most appropriate tactic to deploy. The great advantage of flexible endoscopy is that the passage of an endoscope is acceptable to conscious patients, so that a tracheal tube can be placed easily when face-mask ventilation or direct laryngoscopy is likely to be difficult. The best position for the endoscopist is by the patient's side (whether the patient is conscious or not) and the patient should be semi-sitting when possible. Disorientation because of premature entry is the most frequent source of difficulty in the authors' experience. 'Railroading' the tracheal tube can also cause difficulty. In the authors' experience flexible reinforced tubes are the easiest to use, and it is vital to refrain from *pushing* the tube – it must be advanced gently while being *constantly* rotated. Lidocaine in generous doses (< 9 mg/kg) is used for topical anaesthesia, but can cause airway obstruction as a result of glottic irritation. It must be applied cautiously. There are several successful methods of sedation available, with remifentanyl infusion probably being the most popular in the UK at present.

**Keywords** Airway; fibre optic; tracheal intubation

**Royal College of Anaesthetists CPD matrix:** 1C02, 2A01, 2A10, 3A01

Airway morbidity is of great concern to the anaesthetist. As a consequence of this, there has been an explosion in new airway equipment in recent years. Flexible fibre-optic endoscope-aided intubation (FFI) is a relatively old technique (first reported in 1967) but remains the tactic of choice in many situations. The Royal College of Anaesthetists (UK) recommends FFI as a core skill for the trainee anaesthetist, and it also forms part of the difficult intubation guidelines of the Difficult Airway Society.<sup>1</sup>

FFI is a very desirable skill, but it is not a panacea, and there are occasions when it may not be the technique of choice because:

- it is a relatively slow technique, which is not ideal when rapid airway management is required
- blood and secretions in the airway can obscure vision, making FFI impossible
- an air space is required, which may be absent when there is soft-tissue swelling
- it can be impossible to access the glottis if it is grossly deviated from the midline
- airway obstruction at the glottic level can be exacerbated by endoscopy and topical anaesthesia; FFI should be used cautiously
- FFI is inappropriate when prion disease is suspected.

*Sandi Wylie, FRCA, is a Specialist Registrar in Anaesthesia and Intensive Care at University College Hospital, London.*

*Ian Calder, FRCA, is a Consultant Anaesthetist at the National Hospital for Neurology and Neurosurgery, Queen Square, London.*

## Indications for flexible fibre-optic endoscope-aided intubation

The major advantage of FFI is that a tracheal tube can be placed, with minimal discomfort for the patient, before induction of general anaesthesia. FFI should be considered for patients who appear likely to be difficult to ventilate using a face mask and/or intubate by direct laryngoscopy. FFI can of course also be used as a rescue procedure when direct laryngoscopy proves difficult.

Instability of the cervical spine may be an indication (not evidence based) for FFI in the hope that cervical movements are minimized compared with direct laryngoscopy.

The decision-making process involved in choosing those patients whose interests are best served by awake intubation is not simple. However, it is probably true that in most cases the need is obvious 'from the end of the bed'.

## Equipment

The endoscope must be focused, white balanced and properly orientated on the TV screen. The use of a camera and screen is very desirable, and virtually essential for training. Practising manipulating the endoscope on a manikin is very helpful.

## Preparation of patient

If endoscopy is to be performed prior to induction, the procedure should be explained to the patient along with the reasons for choosing it. We usually couch this in terms of 'reconnaissance', and reassure the patient that suitable sedation will be available.

A drying agent is useful if topicalization is to be performed. If a nasogastric tube is needed, it is sensible to introduce it before endoscopy.

## Positioning

In our opinion, the endoscopist should always be at the patient's side. This is because awake patients are more comfortable when semi-sitting and gravity assists the endoscopy. A slightly head-up position should also be used for anaesthetized patients. An assistant can stand at the patient's head and apply any necessary airway manoeuvres (such as chin lift) without disturbing the endoscopist. The TV monitor must be placed in the endoscopist's line of sight (Figure 1).

## Route

In general, the nasal route is easier in conscious patients because both the gag reflex and the risk of the patient biting the endoscope are avoided. Gagging (due to stimulation of the back of the tongue) can be a problem with oral endoscopy. However, a remifentanyl infusion and topical anaesthesia can prevent gagging in many cases.<sup>2</sup> Some form of bite block should be used to prevent damage to the endoscope; a dental prop is ideal.

## Topical anaesthesia

Lidocaine is an irritant and can cause complete airway obstruction as a result of laryngospasm.<sup>3</sup> A 'softly, softly' approach is required. Lidocaine is relatively poorly absorbed (much is swallowed) from the nasopharynx. Doses of up to 9 mg/kg have been used (the British Thoracic Society<sup>4</sup> recommends an upper limit of 8.2 mg/kg).

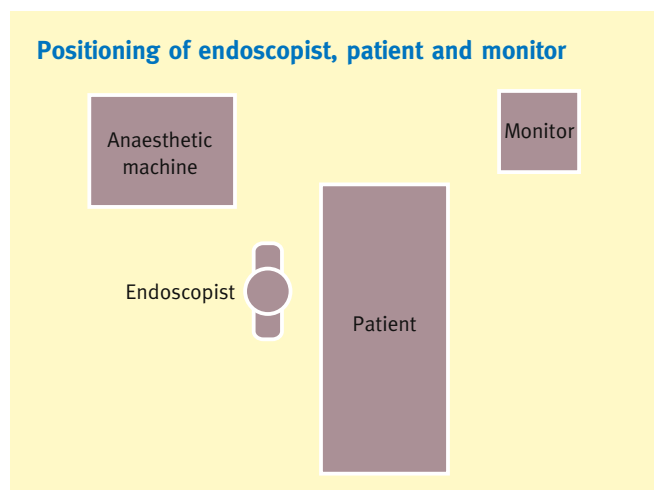


Figure 1

- 1 Drying the mucosa with glycopyrrolate (5 µg/kg) makes topicalization more effective, but increases absorption.
- 2 Nasal mucosa is very vascular. A vasoconstrictor such as cocaine (0.5% phenylephrine in 5% lidocaine) is useful and has the advantage of being non-irritant in atomizer form. Cocaine has been used, but reports of myocardial ischaemia even with low doses have contributed to a decline in its use.
- 3 Place 2% lidocaine gel into the nose or mouth. Sniffing or swallowing the gel will begin anaesthetizing the glottis.
- 4 If the oral route is being used, spray 10% lidocaine on the faucial arch, where it turns into the tongue, to block the lingual branch of the glossopharyngeal nerve.
- 5 'Spray as you go' can be used once the endoscope has passed into the pharynx. An epidural catheter (with the end cut off) is passed through the suction port of the endoscope before insertion into the airway. Considerable force is needed to inject through an epidural catheter. Coloured anaesthetic solution is useful so that the endoscopist can see the solution has reached the glottis.
- 6 Formal nerve blocks are rarely required. Glossopharyngeal blocks (to minimize gagging) are less efficacious than topicalization. Cricothyroid puncture and injection is effective but can result in severe coughing and laryngospasm.

### Sedation

Fibre-optic laryngoscopy in an awake patient is easier than in an anaesthetized subject so that, perhaps counterintuitively, the less experienced an endoscopist is, the more inclined to an awake technique he or she should be. Amnesia is important in some patients – if a patient refuses a repeat procedure there could be serious consequences. Midazolam appears to be the most reliable agent and should probably be given to most patients (1–2 mg). Ketamine is enjoying a surge in popularity in the UK, largely because of its profound analgesic properties, and FFI is one area of increased use (mix 10 mg of midazolam and 100 mg of ketamine, dilute to 20 ml and give in 2 ml boluses).

### Remifentanyl

Remifentanyl is a very useful drug because of its profound analgesic and antitussive effects. A µ-opioid agonist, it is most commonly

given as a continuous infusion. Machata and colleagues<sup>5</sup> compared 'low-dose' (0.75 µg/kg bolus then 0.75 µg/kg/min) and 'high-dose' (1.5 µg/kg bolus then 1.5 µg/kg/min) regimes. Excellent conditions were obtained with both regimes, but there was more profound sedation with the higher dose.

Rai *et al.*<sup>6</sup> compared target-controlled infusion (TCI) remifentanyl (3 ng/ml) with propofol (1 µg/ml). The TCI targets were adjusted as required. Intubation conditions were better and intubation achieved sooner with remifentanyl.<sup>6</sup>

Remifentanyl does have potentially serious side effects, including respiratory depression (more common with rates greater than 0.2 µg/kg/min), bradycardia, hypotension and skeletal muscle rigidity, which can be profound, particularly with boluses.

### Dexmedetomidine

This α<sub>2</sub> agonist has been shown to be an excellent sedative for FFI. This drug is still awaiting a licence in Europe but is being used for FFI intubation in USA and Asia. One study has shown good effects when used in combination with ketamine.<sup>7</sup>

### Endoscopy: 'orientation, orientation, orientation!'

Ensure the camera is focused and correctly orientated. Endoscopy by the oral route is simply a matter of keeping in the midline, but nasendoscopy is an unfamiliar visual experience for the beginner. In anaesthetized patients it is useful to apply jaw thrust during both nasal and oral endoscopy as this lifts the soft palate, tongue and the periglottic tissue.

It is common to lose vision because of secretions or mist on the lens. This can often be cleared by asking the patient to take a deep breath or 'wiping' the lens against mucosa, but sometimes the endoscope must be withdrawn and the lens cleaned.

When performing endoscopy in patients with partly obstructed airways, it is usual to find that vision is lost during inspiration because the soft tissue of the pharynx collapses, but it is also usually possible to obtain a view during expiration.

Some practitioners have suggested that it is useful to keep the part of the endoscope that is outside the patient straight. We do not advocate this because it is fatiguing and unnecessary. The endoscope is directed by moving both hands together. In general, do not try to think about which way to turn the endoscope or push the tip control lever – try one way and, if it is wrong, go the other way.

### Nasendoscopy

The most patent nostril is selected and supplemental oxygen is given via a nasal sponge to the other nostril. End-tidal carbon dioxide (ETCO<sub>2</sub>) can be measured via a cannula (needle removed) through the sponge. This is a useful means of monitoring respiratory rate during conscious sedation.

Remember that the axis of the nasal passage is *at a right angle to the plane of the face*, so the endoscope must be introduced as though aiming for the back of the head. The nose has three 'compartments': the nostrils, the turbinates and the posterior nasal space. The airway through the turbinates is multi-channelled and each channel is narrow. It is easy to lose orientation. The aim is to identify the septum, inferior turbinate and nasal floor, and to establish orientation, before leaving the nostril. The best route through the turbinates is usually along the

Download English Version:

<https://daneshyari.com/en/article/2742316>

Download Persian Version:

<https://daneshyari.com/article/2742316>

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