The Journal of Laryngology & Otology
August 2005, Vol. **119,** pp. 634–638

Fibre-optic intubation in oncological head and neck emergencies

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Abstract

Objective: Although fibre-optic bronchoscopic intubation is well recognized as the most valuable adjunct for elective management of the difficult airway its precise role in oncological head and neck emergencies has not been evaluated.[1–3] The objective of this study was to evaluate the role of fibre-optic intubation in such emergencies.

Methods: This was a consecutive case series study by a single surgeon (the otolaryngologist) and anaesthetist team, taking place in a regional tertiary-referral head and neck surgical oncology centre. A series of 17 consecutive oncological head and neck emergency patients underwent fibre-optic intubation with a Portex endotracheal tube of inner diameter ≥7 mm, with the aid of a 6-mm (EB-1830T2) Pentax fibre-optic video bronchoscope. The study assessed occurrence of: avoidance of tracheostomy in bleeding emergencies; a well placed, uncomplicated tracheostomy in airway obstruction; and successful intubation.

Results: Two cases were decannulated completely. All cases were successfully intubated and a tracheostomy was avoided in all cases in which emergency intubation was required and the patient was bleeding. We conclude that fibre-optic bronchoscopic intubation is a viable option in head and neck oncological emergencies due to upper airway obstruction and tumour bleeding. Clinical and endoscopic judgement and operator experience are the key factors determining success.

Key words: Airway Obstruction; Laryngeal Neoplasms; Intubation; Bronchoscopy

Introduction

The role of fibre-optic bronchoscopic intubation in the airway management of head and neck emergencies due to cancer or its treatment sequelae is not well described in existing literature. These patients often present in the emergency room either with stridor warranting immediate tracheostomy or with uncontrollable haemorrhage requiring external carotid artery (ECA) ligation under local or general anaesthesia.

Head and neck cancer *per se*, or its surgical or radiological treatment sequelae, may produce major acute or chronic anatomical airway changes. Acute changes include laryngeal oedema, bilateral palsy of the vocal folds and laryngospasm. Chronic changes include laryngotracheal airway encroachment due to malignant growths, laryngotracheal stenosis and laryngomalacia. These changes often render airway access by mask ventilation, tracheal intubation or tracheostomy difficult. The authors present a clinical experience of fibre-optic endoscopic intubations in a series of emergencies in head and neck cancer patients.

Patients and methods

Intubations using a fibre-optic bronchoscope have been performed routinely in our institute during the past decade for the management of difficult airway in elective situations. Over the past one and a half years we have begun to use this technique for the management of emergencies also. Between 14 November 2002 and 1 May 2004 the medical data of consecutive patients selected for intubation facilitated by fibre-optic bronchoscopy were recorded in a computer database (Microsoft Excel) and studied. The follow-up period ranged from three to 18 months. Sixteen men and two women were included. Fifteen patients were treated and two were untreated.

All patients were selected on the basis of a formulated management protocol and were intubated with a Portex endotracheal tube (ETT) of inner diameter greater than or equal to 7 mm, with the aid of a 6-mm (EB-1830T2) Pentax fibre-optic video bronchoscope (Figure 1). A quick pre-procedural evaluation was done for all head and neck cancer patients presenting to the emergency room. This included elicitation of a brief clinical history, general systemic evaluation and airway assessment regarding the ease of endotracheal intubation under laryngoscopy. The following patients were considered for aided intubation: all cases with airways identified as difficult by a previous direct laryngoscopy; patients who were bleeding torrentially; and those with impending laryngospasm as well as those with moderate stridor. Fibre-optic bronchoscopic intubation was ruled out for patients known to have progressive oropharyngeal, supraglottic and subglottic tumours obstructing the laryngeal outlet and limiting the negotiation of the fibrescope into the glottis.

In the operating room, intravenous (IV) access was secured with a large-bore IV cannula (16 G) in all cases. Intravenous ranitidine 50 mg and metoclopramide 10 mg were administered as anti-aspiration prophylaxis and

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Accepted for publication: 2 January 2005.

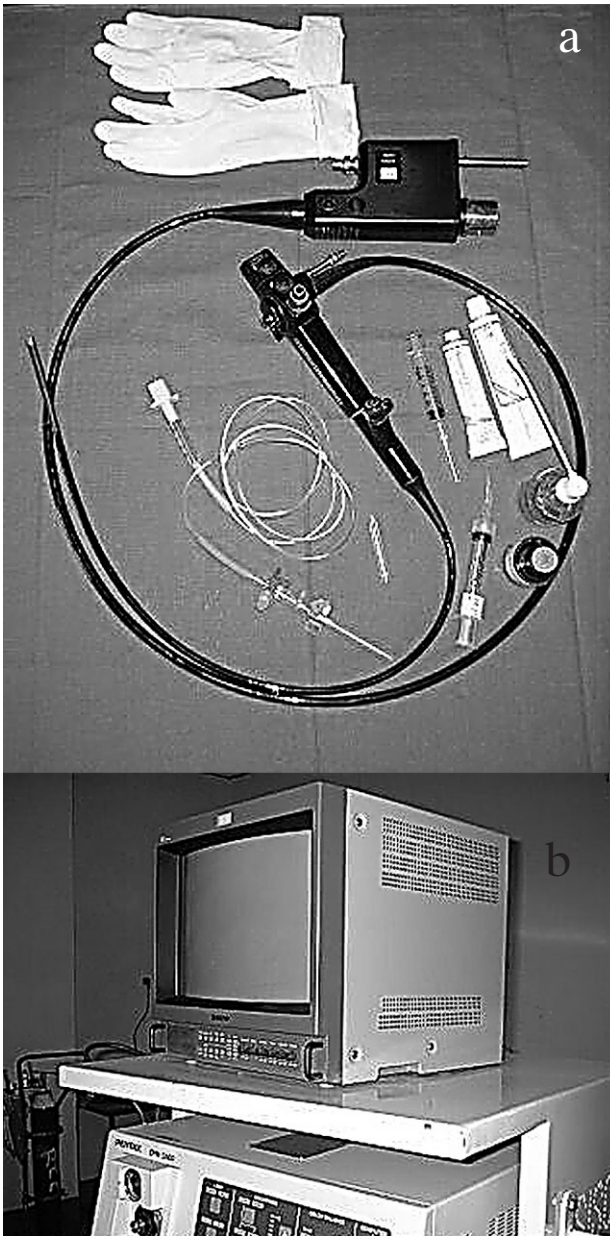

FIG. 1

Instrumentation for fibre-optic endoscopy: (a) scope and accessories; (b) video monitor.

glycopyrollate 0.2 mg was injected for its antisialogogue effect. Topical anaesthetic was also administered according to a 'spray-as-you-go' technique whereby 0.5-ml squirts of 4 per cent lignocaine were sprayed into both nostrils and via the fibrescope to the regions of the posterior tongue, epiglottis, vocal folds and also into the trachea. A transtracheal spray was given only to those patients with a relatively normal airway and without active bleeding. The tip of the Portex ETT used for intubation was softened by immersing it in hot sterile water and well lubricated with lubricating jelly made of synthetic vegetable gums. We adopt the 'scope first' method whereby the ETT was preloaded over the fibrescope, which was then passed into the trachea.

Results

Out of a total of 17 patients, 10 had moderate to severe stridor and nine had bleeding from a tumour, of which two had concomitant upper airway obstruction (Table I). Intubation was successful in all the patients selected. In one of the patients, with severe stridor due to bilateral vocal fold fixation resulting from postcricoid tumour, a cricothyrotomy was required to relieve acute airway obstruction before the portable fibrescope could be made available in the emergency room (Figure 2). In another

FIG. 2

Postchemoradiotherapy, postcricoid malignancy with bilateral vocal fold fixity and absolute stridor. Airway secured by cricothyrotomy followed by fibre-optic intubation and tracheostomy. Cricothyrotomy closed immediately by a single deep suture.

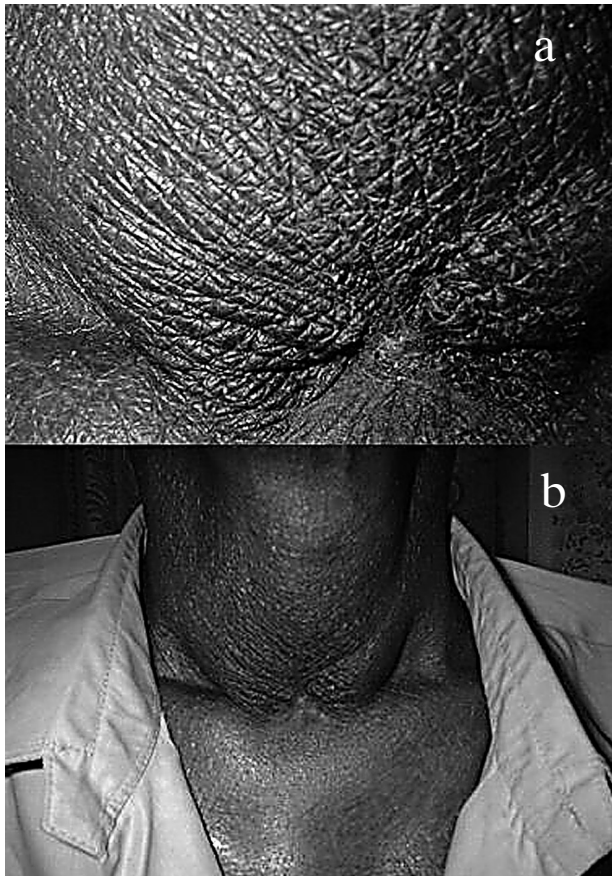

FIG. 3

Neck of the patient in Figure 2 after decannulation following further chemotherapy. Scars are completely hidden in the skin creases.

https://doi.org/10.1258/0022215054516160 Published online by Cambridge University Press

patient a nasopharyngeal airway was introduced through the other nostril to aid respiration. All patients who had a subsequent tracheostomy for stridor were discharged with Jackson's metal tracheostomy tubes for further management. Two patients were subsequently decannulated after demonstration of normal airway by flexible endoscopy following treatment (chemotherapy/radiotherapy) for the primary disease (Figure 3). One patient received a composite tumour resection and post-operative radiotherapy and another patient with progressive disease following chemotherapy received radical surgery and post-operative radiotherapy and was referred for palliative treatment (this patient died two months later). All other patients were available for follow up.

Discussion

Airway obstruction and haemorrhage are the commonest head and neck oncological emergencies encountered in our unit. Fibre-optic bronchoscopic examination in head and neck cancer patients presenting with signs and symptoms of a compromised airway reveals a variety of pathologies. These may include adducted vocal folds, proliferative tumours in the upper air passages, extrinsic pressures from the malignancy causing tracheal compression, glottic oedema secondary to radiotherapy, acquired tracheomalacia or loss of integrity of the trachea due to previous surgery or thyroid malignancies.

Head and neck malignancies causing stridor often require a tracheostomy as a permanent or temporary remedial measure. These patients are often hypoxaemic, panic-stricken and unable to lie supine with the neck extended for a tracheostomy under local anaesthesia. A tracheostomy in a struggling patient is always disorderly and carries a higher risk of complications. Very often it may be necessary to ensure oxygenation by performing a cricothyrotomy before proceeding to a formal tracheostomy.[1,4,5] A properly executed fibre-optic bronchoscopic intubation in selected cases circumvents all this and helps to achieve a well placed, uncomplicated tracheostomy. Such facilitated intubation not only plays a major role as a quick and definitive method of securing the airway under vision but also serves as a diagnostic tool to locate the lesion, gauge the size of the glottic space, and, if possible, to assess the distal extent of the lesion and thereby plan the best possible site for tracheostomy. By this approach the surgeon and the anaesthetist can work out the best possible technique for quick restoration of a normal airway. Except in cases of near-total obstruction of the airway it is possible to intubate all cases with a 7-mm ETT. By ensuring patency of the airway and adequate oxygenation we have found that fibre-optic bronchoscopic intubation buys time for the surgeon, thereby enabling extensive surgical dissection in an area which is very often distorted anatomically by presence of tumour, previous surgery or fibrosis, and oedema secondary to radiotherapy.

Torrential bleeding is frequently seen in our hospital and ligation of the ECA under local or general anaesthesia can only be accomplished after securing the airway. The presence of a cuffed ETT in situ facilitates administration of oxygen or general anaesthetic, if necessary, and offers protection from aspiration of blood or gastric contents.

Published reports regarding emergency use of this technique have attributed failures to bleeding, secretions, inadequate topicalization of airway, lack of patient cooperation or operator inexperience.[1,6] The presence of blood covers the objective lens at the tip of the fibrescope and interferes with visualization of laryngeal structures. For these reasons it is generally recommended that a fibrescope be used as early as possible in cases of difficult airway to avoid causing trauma to and oedema of the periglottic tissues. In addition to this, during emergencies instrumentation must be quick and precise as the patient is usually distressed and hypoxaemic. Although intubations can be safely performed in an awake patient with a fibrescope, occasionally other airway devices such as a laryngeal mask airway, oropharyngeal airway[7] or nasopharyngeal airway may also be needed, particularly if it becomes necessary to anaesthetize the patient. We needed to use a nasopharyngeal airway for airway control in one of our patients.

- **This paper discusses the airway management of patients presenting with obstructing head and neck neoplasms**
- **Fibre-optic bronchoscopic intubation was used successfully in all 17 cases**
- **The details of the authors' technique for intubation are described**

Oncological head and neck emergencies often present to us without previous medical records and the clinician is frequently unaware of the stage and extent of the disease. In addition the patient is frequently hypoxic and may not be fasted. We have found the fibre-optic bronchoscope to be a valuable adjunct to the routine management of such airway emergencies. In our hands it has reduced complications associated with surgical management of airway obstruction and has also facilitated surgical airway access in patients who have excessive bleeding.

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Dr B T Varghese takes responsibility for the integrity of the content of the paper.
Competing interests: None declared

TABLE I

SUMMARY OF OBSERVATIONS

Patient	Symptoms	Diagnosis	Endoscopic findings	Treatment (medical/surgical / radiological)	Airway management technique	Surgical procedure	Comorbid conditions/ complications
1	Stridor	Squamous cell carcinoma supraglottis	Right vocal fold fixed Growth (RT) ventricular band	Nil	FOB intubation with 7-mm NCETT	Tracheostomy under propofol sedation & oxygen supplementation	Full stomach
2	Stridor	Squamous cell carcinoma posterior cricoid	Both vocal folds fixed	RT	Cricothyrotomy to relieve acute airway obstruction followed by FOB intubation with 7-mm NCETT	Tracheostomy under propofol sedation & oxygen supplementation	Full stomach
3	Bleeding	Squamous cell carcinoma of lower alveolus	Normal	RT	FOB intubation with 7-mm NCETT	ECA ligation under general anaesthesia	Liver cirrhosis Full stomach
4	Stridor	Carcinoma of nasopharynx	Both vocal folds fixed	Bilateral modified neck dissection	FOB intubation with 7.5-mm NCETT	Tracheostomy under propofol sedation & oxygen supplementation	Full stomach
5	Stridor	Carcinoma of supraglottis	Left vocal fold fixed Glottic space compromised	RT	FOB intubation with 7-mm NCETT	Tracheostomy under propofol sedation & oxygen supplementation	Full stomach
6	Stridor	Carcinoma glottis (T4 lesion)	Growth involving anterior commissure and both cords	Nil	FOB intubation with 7.5-mm NCETT	Tracheostomy under propofol sedation & oxygen supplementation	Full stomach
7	Stridor	Bilateral neck nodes Unknown primary	Adducted vocal folds	Bilateral neck dissection RT	FOB intubation with 7.5-mm NCETT	Tracheostomy under propofol sedation & oxygen supplementation	Full stomach
8	Stridor & bleeding	Carcinoma base of tongue Post-RT locoregional recurrence	Fixed hemilarynx, laryngeal oedema, intralaryngeal spread of tumour	RT	FOB intubation with 7.0-mm NCETT	Tracheostomy & ECA ligation under general anaesthesia	Hypertension Full stomach
9	Bleeding	Carcinoma buccal mucosa	Glottic oedema	RT	FOB intubation with 7.0-mm NCETT	ECA ligation under local anaesthesia & propofol sedation	Stable angina Hypertension Ulceroproliferative growth intraorally Absolute trismus
10	Bleeding & stridor	Carcinoma lower alveolus	Glottic oedema	RT	FOB intubation with 7.0-mm NCETT	Tracheostomy & ECA ligation under general anaesthesia	Full stomach
11	Stridor	Carcinoma thyroid	Tracheomalacia	Total thyroidectomy & external beam RT	FOB intubation with 7.5-mm NCETT	Tracheostomy under propofol sedation & oxygen supplementation	Diabetes mellitus
12	Bleeding	Carcinoma buccal mucosa	Normal	RT	FOB intubation with 8.0-mm NCETT	ECA ligation under general anaesthesia	Trismus
13	Stridor	Carcinoma postcricoid	Adducted vocal folds	Chemotherapy RT	FOB intubation with 7.0-mm NCETT	Tracheostomy under general anaesthesia	Full stomach
14	Stridor	Carcinoma pyriform fossa	Adducted vocal folds	Chemotherapy RT	FOB intubation with 7.0-mm NCETT	Tracheostomy under propofol sedation & oxygen supplementation	Full stomach

15	Bleeding	Carcinoma tongue	Normal	RT	FOB intubation with 7.5-mm NCETT	ECA ligation under general anaesthesia	Ulceroproliferative growth intraorally Trismus
16	Bleeding	Carcinoma buccal mucosa	Normal	RT	FOB intubation with 8.0-mm NCETT	ECA ligation under general anaesthesia	Full stomach Trismus
17	Bleeding	Carcinoma tongue	Normal	RT	FOB intubation with 7.5-mm NCETT	ECA ligation under general anaesthesia	Ulceroproliferative growth intraorally Trismus

RT = radiotherapy; FOB = fibreoptic bronchoscope NCETT = nasal cuffed endotracheal tube