
DIFFICULT AIRWAY SOCIETY

Issue 1

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Newsletter

This newsletter was written by members of the Difficult Airway Society. The opinions expressed are those of the individual members and do not represent necessarily the view of the Society.

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Society News

Charitable status

The Society has made an application for Charitable status. This move required amendment of the Constitution of the Society and these amendments were ratified by the Extraordinary Meeting held at the November meeting of the Society. The changes do not alter the purpose or function of the Society but do allow it to operate within the beneficial framework of Charitable status. The income tax owed by the Society has been paid but no further tax will be payable if Charitable status is gained.

Projects

The airway CD-Rom is nearly completed and a demo version is now being reviewed. Duncan Hancox, Tim Strang and others in Manchester have worked extraordinarily hard to produce this. The plans are to correct any mistakes, show it at the DAS meeting in Belfast, and then circulate it to DAS members and hospital representatives. It should form part of an airway training module and the contents of this are being tested and revised by Peter Latta and Tony Turley. The Society's plan is the introduction of an agreed airway syllabus or module within Calman-style training. This needs a well thought out, coherent plan which has broad acceptance by the members of the Society who are, after all, the people who will be required to implement the scheme. College approval and help will be sought for the introduction of more formal, comprehensive airway training and the Society has made initial contact in this area. It is worth remembering that at last November's meeting a survey was presented which showed that only a single hospital in the UK claimed to have a schedule of airway training for all trainees. It was no surprise that Rosemary Mason was involved at that hospital.

A national database, linked with Medic Alert, of difficult airway patients is being set up at St George's. It was hoped that this might be ready by now, but it is important to realise that no other country has managed to establish a working database accessible by any anaesthetist and it is worth waiting until the system works properly. In particular the links for data entry and retrieval must be secure and confidential. The data entry forms will be circulated as soon as the database is running.

Hands-on fiberoptic intubation courses

Oxford 22/23rd October, Joanne Tully 01702 616333

Liverpool 14/16th September, Tracy Bray 01702 616333

Book Review

The laryngeal mask airway; a review and practical guide. Brimacombe and Brain, Saunders 1997 ISBN 0-7020-2321-3

Few authors could have written such an authoritative and well referenced text and there is little surprise that Brimacombe and Brain have produced an extraordinarily detailed account of the laryngeal mask. Eighteen chapters cover all aspects of development, design, construction and clinical usage in normal and difficult airways. Numerous tables, line drawings and photographs aid comprehension of the enormous amount of data contained in the text.

Both authors are, of course, uncompromising advocates of the mask and the prose might be said to be gushingly enthusiastic. The review style of writing (some individual chapters have 250 references) inevitably leads to bald statements which, in the interests of impartiality, really require further explanation. For example, Alison and McCorry did not claim an 84% success rate with blind bougie insertion through the LM, it was fibreoptic-guided bougie insertion.

These niggles palls in the face of the mass of information presented, and the effort which has gone into making it accessible. I cannot remember performing any preoperative checks on a LM beyond a cursory visual check, but Table 5.4 explains the seven pre-use checks I should do. Having trouble inserting it? – read Chapter 6 for a detailed account of the standard insertion technique and comments on 32 alternative techniques. Writing protocols for management of the LM in Recovery? – the authors have done all the work for you and PACU guidelines are detailed in Chapter 6, and summarised in the quick reference section at the end of the book.

This brilliant book should be available in all department libraries and in the hands of all anaesthetists interested in airway management. The LM has proved to be a revolutionary, life-saving airway device whose popularity may be due, in part, to the apparently negligible instruction needed to use it. But to use it correctly, in the correct situations with the most favourable patient outcome does require detailed instruction. This book provides new trainees with the required instruction, challenges experienced trainees to define the role of the LM within difficult airway algorithms and provides Consultants with the instruction they never received and a ready source of material for formal and informal teaching.

CASE HISTORIES

To be discussed in future issues

An anaesthetic SHO is anaesthetising a patient on the emergency list in the evening; the registrar is tied up in the labour ward. The 70 yr old patient was admitted earlier in the day with a history of abdominal pain and vomiting and a diagnosis of bowel obstruction has been made. The patient does not have any particular medical problems, an anaesthetic assessment has not detected any problems beyond fluid and electrolyte deficiency, and fluid resuscitation during the day has been well managed. The ward staff have not managed to pass a nasogastric tube but the patient has not vomited since admission. The SHO plans to do a rapid sequence induction and prepares correctly all equipment and drugs needed to do this. Following preoxygenation, thiopentone and suxamethonium are administered and cricoid pressure applied. On direct laryngoscopy with a large Macintosh blade, only the tip of the epiglottis can be visualised and the SHO tries to pass a bougie. The bougie passes (blindly) but the tube cannot be railroaded over the bougie. The SHO asks the anaesthetic assistant to release the cricoid pressure transiently and the tube is advanced. Capnography confirms the clinical impression that oesophageal intubation has occurred. The saturations are beginning to fall. What should the SHO do now?

A Consultant with a flexible session on Wednesday morning is asked to cover the dental/maxillofacial list in Theatre 10. All patients are seen on Tuesday and no problems are envisaged. However, in the morning he/she is asked whether a difficult patient with a dental abscess can be added to the list. The patient is mentally and physically challenged, and is known to the dental school having proved to be difficult to manage in the past. Unable to cooperate, all previous conservative work has been carried out under general anaesthesia with the last GA being 5 years ago. The Consultant goes to see the patient before the list starts and finds a short, obese patient with a short neck, very little apparent mouth opening and swelling typical of a dental abscess over the lower jaw, extending into the neck. The patient is uncommunicative, even with his carer, and is shaking his head from side to side. Surprisingly, the notes of the previous GA five years ago are available and reveal that the anaesthetist had considerable difficulty with mask ventilation, was unable to pass a nasopharyngeal tube through either nostril, was unable to see any part of the larynx with direct laryngoscopy but managed to pass a laryngeal mask which allowed the surgery to proceed. Mouth opening now appears minimal - what plans should the Consultant make?

The patient is well known to the anaesthetic department and is scheduled to undergo an abdominal hysterectomy. A medical practitioner, she carries a letter from a distinguished, now retired, anaesthetist saying that she is the most difficult intubation that he encountered. In the previous year she spent several days in the ITU with a perforated oesophagus secondary to intubation attempts at another hospital. The notes from this hospital are obtained and detail that the patient was easy to mask ventilate but direct laryngoscopy revealed only the tip of the epiglottis pressed firmly against the posterior pharyngeal wall. A plan is made to induce anaesthesia and check that mask ventilation is easy (it is) before undertaking an oral fiberoptic intubation. This proves easy to do and is completed within 45 seconds.

Three weeks later the patient presents with subacute bowel obstruction which does not settle with conservative management, including nasogastric drainage. A laparotomy is scheduled on a normal operating list, with the same anaesthetist. The anaesthetist argues that intubation was easy before and plans a rapid sequence induction with the application of cricoid pressure and oral fiberoptic intubation. This plan works well and the anaesthetist feels pleased with his management. However, at the next department meeting, he is severely criticised for not performing an awake intubation for the first and second operations. Has the anaesthetist acted logically or foolishly?

Vision obscured by Blood

Blood interferes with the view of the airspace by its physical presence and also by internal reflections. Bleeding may be caused by the fibroscope tip touching the tissues and is prevented by an endoscopic technique where the airspace is constantly identified under direct vision. Gentle suction will help but the endoscopy may have to be abandoned in cases of massive haemorrhage. A larger bronchoscope (5.5 - 6.0mm) with better suction facility or direct laryngoscopy may then be appropriate. In case of unexpected difficult direct laryngoscopy and tracheal intubation, fiberoptic intubation should be instituted as soon as possible prior to causing trauma and bleeding of the airway.

Vision obscured by Secretions

Secretions may be thin or thick. Secretions cause vision difficulties both directly and by increasing internal reflections. It is advisable to give an anticholinergic before FOI (4). Anticholinergics prolong the effects of local anaesthetics (5). Intravenous glycopyrrolate 0.2mg has a rapid onset of action. Gentle suction before endoscopy is useful because the suction channel of the fibroscope is weak. If secretions are thick, the fibroscope should be removed and external suction used. The awake patient can however be asked to swallow the secretions. High flow oxygen through the suction channel of the fibroscope helps to clear secretions and improves vision (6). However care must be taken as this has been associated with gastric distension and rupture (7). Fogging of the lens will also interfere with vision and can be avoided by inserting the fibroscope tip in warm water or cleaning it with a sterile or demisting solution before endoscopy.

Unable to advance fibroscope due to reduction in airspace

During general anaesthesia the soft palate, tongue and the epiglottis fall backwards onto the posterior pharyngeal wall (8). Little airspace is thus left in the oropharynx for manoeuvring the tip of the fibroscope and the view tends to be obscured by tissues. Other causes include pathology which will reduce the airspace from within e.g. floppy epiglottis, oedema or cellulitis of the pharyngeal tissues and from pressure outside e.g. deformity of cervical spine, supraglottic mass etc.

The remedy then is to try and increase the airspace by certain manoeuvres:

- Asking an assistant to provide jaw thrust
- Neck extension (cf. direct laryngoscopy) by removing the pillow or placing a pillow under the shoulder (9).
- Tongue protrusion with a gauze piece (10,11)
- The larynx may be pushed posteriorly by external pressure (12).
- A Macintosh laryngoscope may be used to lift the epiglottis/tongue (13,14)
- Changing the position of the patient to lateral or sitting will help and FOI has even been performed in the semi-prone position (15).
- If awake then asking the patient to sniff, swallow or breathe deeply.

The angle required to reach the larynx in oral endoscopy is more acute than in nasal endoscopy and there is a tendency of the tip to hit the base of the tongue. This is avoided by using airway aids which displace the tongue away from the posterior pharyngeal wall, permit the concentric insertion of the fibroscope and also keep the tip of the scope in the midline. Some airway aids for oral fiberoptic intubation are the Ovassapian airway (16), Williams airway (17) Berman II airway (18) Laryngeal mask airway (19-23) and even a nipple! (24).

Able to see epiglottis but can't get the fibroscope through the cords

Distorted anatomy around the laryngeal structures is the usual cause. The problem here is that the intubating fibroscope has a limited angle of deflection and field of vision. Basically you can see where you want to go but can't get there. All the manoeuvres described above are worth trying, but if the problem is anatomical and due to fixed tissues then intubation may be difficult despite a successful endoscopy.

During nasal endoscopy, if the larynx is deviated to the left then passing the scope into the left nostril will help and vice versa. Failing this the two wire techniques described below may be useful

• Anterograde wire technique

Only the proximal 2cm of the insertion cord of the fibroscope bend and the idea of the anterograde wire technique is to increase this to allow the tip of the fibroscope to be inserted into the glottis. Any guide wire of a sufficient diameter able to pass through the suction channel of the fibroscope and longer than 110cm can be used. An example is cardiac catheter wire (0.038 in. diam, 150 cm guidewire REF J3FC150-038, Kimal Scientific products Ltd, Arundel Road, Uxbridge UBB 2SA Tel 01895 270951). The wire is lubricated and passed through the channel before the tip is bent. As the wire comes out through the channel, it is manipulated and the tip bent so that the wire enters the glottic opening. The fibroscope is railroaded over the wire into the trachea and the wire withdrawn. If this fails then the retrograde wire technique may be used (see below)

Unable to see any airspace

Any of the manoeuvres described above may be tried. Deep breathing may be useful and an air bubble may be seen indicating an airspace. It is worth guiding the fibroscope tip in any hole and hope that it may be the correct one. If all else fails then a retrograde wire technique may be useful.

- **Retrograde wire technique**

A suitable cannula is inserted into the trachea through a cricothyroid or transtracheal puncture. A guide wire is passed through the cannula so that it comes out of the mouth. The tip of the wire is then inserted into the distal end of the suction channel of the fibroscope and threaded upwards until it comes out from the proximal end. The fibroscope is then railroaded over the wire until the tip of the endoscope passes through the glottic opening when the cannula and wire are slowly pulled back. If there is any doubt about maintaining an airway, transtracheal access should be secured electively. A wire can then be passed through this cannula.

- **Reactive airway (Inadequate topical anaesthesia - the difficult awake intubation)**

In general FOI is easier to perform with the patient awake because it avoids the problems of general anaesthesia. A co-operative patient will also assist by sniffing, taking deep breaths and positioning himself, all manoeuvres which make endoscopy easier. However difficulties arise despite a good endoscopic technique if topical anaesthesia of the airway or sedation are inadequate. The movements of the larynx are excessive and may be accompanied by coughing, vomiting and laryngospasm. Additional lignocaine should be sprayed through the suction channel of the scope. A small dose of intravenously administered opioid will depress the cough centre. The inside of the tracheal mucosa upto the level of the carina should be anaesthetised to avoid coughing. The introduction of the endotracheal tube is the most unpleasant part of the procedure and sedation must be adequate before introducing the tube.

DIFFICULTIES WITH THE ENDOTRACHEAL TUBE

Difficulty in railroadng the endotracheal tube into the trachea

Difficulty in removing the fibroscope out of the tube after intubation

- **Difficulty in railroadng the endotracheal tube into the trachea**

Difficulties in railroadng the ETT into the trachea are caused by tube tip impinging on the arytenoids (25) They are related to size of tube, the flexibility and design of the tube and the technique of railroadng.

- **Size of tube**

The larger the gap between the fibroscope and the tube the greater the difficulty in passing the tube through the cords. If larger size of tubes are required than larger endoscopes of 5-6mm diameter should be used (26). Another method is to interpose a smaller size 5.0mm uncuffed ETT (27) or a commercial ventilation exchange bougie (23) between the ETT and the fibroscope. By protruding the smaller tube beyond the larger ETT, the access to the trachea is gained in two smaller steps than one large one. I prefer 6.5mm ETT for females 7mm - 7.5mm for males.

- **Flexibility and design of tube**

Armoured ETT are best suited for FOI with a high success rate due to the flexibility of the tube conforming to the fibroscope (28,29). Brull et al had 19/20 successes with flexometallic tubes on first pass as compared to 7/20 successes with regular ETT (29). Jones et al have demonstrated that a newly designed tube with a conical, tapered tip without a bevel was superior to a standard tube during both oral and nasal railroadng(30). For nasal intubation the nasal preformed tubes (RAE Mallinckrodt) previously warmed are also satisfactory. For orotracheal intubation the airway aids described earlier improve endoscopy and railroadng of the tube because without them the fibroscope is deviated more from the midline causing it to catch on the side of the epiglottis or other hypopharyngeal tissues (1).

- **Technique of railroadng**

During railroadng, if the ETT is advanced in the neutral position i.e. with the tip of the tube to the right hand side and the bevel facing the left side, hold up occurs due to the resistance of the laryngeal structures. Schwartz et al have demonstrated that the right arytenoid is the commonest site for the tube to 'hang up' on when being threaded over the fibroscope. A 90 degree counterclockwise rotation of the tube turns the bevel of the tube to the 6 o'clock position and the Murphy eye to the 12 o'clock position, permitting the ETT tube to enter the trachea without resistance (31). The incidence of this hold up during orotracheal railroadng has been described as 35 -80% (26-28,30-32) and 11 - 71% during nasotracheal railroadng (30,33,34). Incidence is lower with nasotracheal railroadng than with orotracheal railroadng because the nasotracheal tubes are of smaller diameter and hence the bevelled tips project away from the insertion cord by a smaller degree. Important practical points to remember are that the tube must be slightly withdrawn before rotation is applied and a clear airway maintained by mandibular displacement (jaw thrust) while attempting to railroad the tube. Another way is to rotate the ETT continuously while advancing it over the fibroscope. A rigid laryngoscope blade may also be useful to elevate the epiglottis.(35)

- **Difficulty in removing the fibroscope from the endotracheal tube**

Difficulty arises if the fibroscope has not been lubricated before the ETT has been mounted on it. Some anaesthetists introduce ETT in the pharynx and then pass the fibroscope through it. This may lead to the fibroscope tip passing through the Murphy eye rather than the distal end of the ETT causing difficulty in removal of the fibroscope (36,37). This is avoided by passing the fibroscope under direct vision into the tube or loading the tube over the fibroscope prior to endoscopy. If the outer casing of the fibroscope is loose and force applied it may intussuscept over itself and occlude the ETT lumen causing obstruction (38)

The remedy in all the above situations is to withdraw the ETT and the fibrescope and start again rather than applying force and damaging the fibrescope.

Some useful points to remember

- Direct laryngoscopy and intubation are frequently easy when fibreoptic intubation is difficult in the presence of secretions and blood.
 - Always make detailed notes of difficult fibreoptic intubation in the patients notes
 - A previously difficult fibreoptic intubation should be done.
 - Difficult fibreoptic intubation cannot be predicted (cf. Direct laryngoscopy)
 - Always make a plan and keep airway aids, wires etc handy
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DIFFICULT AIRWAY SOCIETY MEETING

26TH AND 27TH NOVEMBER, 1998

BELFAST

Details soon to all members from Peter Farling

NEXT ISSUE

Are diabetic patients a high risk group?

What is the place of the COPA?

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