

With paper on laryngoscopy  
within R Colod.

# DIFFICULT AIRWAY SOCIETY

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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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## INSIDE THIS ISSUE

CEPOD

In praise of straight blade laryngoscopy

Airway CD-Rom

Case history analysis

Diabetes and difficult airways

Charitable status

Society Website



## BELFAST MEETING

26-27<sup>th</sup> November 1998

The Annual DAS meeting was well attended, highly successful and very enjoyable. The scientific programme consisted of seven sessions and opened with a multidisciplinary approach to obstructive sleep apnoea, affecting 2-4% of men and rather fewer women. Was OSA a predictor of difficult intubation, and was difficult intubation a predictor of OSA? Should all patients found to be difficult to intubate be referred for sleep studies? The physicians were alarmed at the numbers involved. The sensible approach was to screen DI patients for signs and symptoms of OSA and refer on those affected. The surgeon described the operations available, sometimes described by patients who have had them as 'unsuitable for use in humans'. The second session contained one slide wonders of interesting cases. A benign calm had settled on the audience as some slightly dodgy but successful techniques were described. The workshops over the lunch period were a new feature, but much enjoyed by delegates and must surely be repeated. The project update after lunch heard that the St George's database is ready to receive patient details but some work is still needed for ready access by anaesthetists from any hospital at any time. Several speakers spoke of time abroad, clearly moved by their experiences; most moved was the Treasurer on hearing Peter Farling's account of the SAM meeting in Boston.

The review lecture on FOI was from our guest Dr T Randell from Helsinki, who has published a comprehensive account of the literature, followed by the free paper session. This part of the programme was as entertaining as ever. Friday started with a wonderful session on training and education, hearing views from the College, REA, trainee and trainer. A lively discussion started which had to be terminated to keep on schedule. The lower airway featured in session 6 and we heard also from Elizabeth Behringer (California) on airway problems in ICU. The final session after lunch on Friday showed the Society at its best – thoughtful and interested people able to argue without rancour over best practice, with Rosemary Mason in the thick of it. There is no other forum like it. This glorious session concluded an outstanding academic meeting.

Of course, memories of the meeting are as much of the social programme. Few people arrived early enough to play golf on Wednesday afternoon but the reception that evening in the Europa hotel allowed all delegates, speakers and organisers to meet over dinner. The Annual Dinner on Thursday evening in Belfast Castle was a sumptuous affair enlivened by a cabaret of piano accompanied singing. We all waved goodbye.

Thanks to Peter Farling, Sharon Logan, Damien Carson, Eamon McCoy and all organisers who worked so hard.

## SOCIETY WEBSITE

<http://www.umds.ac.uk/airway>

The website has been set up by Keith Williams, an anaesthetist at Guy's and St Thomas' Hospital, more easily contacted at [knw@msn.com](mailto:knw@msn.com)

The home page links are to;

- Officers of the Society
- Newsletter
- Commercial links
- Professional links
- Next Meeting
- Constitution (abridged)
- Hospital representatives
- Last meeting review

The website is developing into, and will be maintained as, an extremely important meeting place for members of the Society. We hope to include clinical problems and are investigating links to the airway CD-Rom. Please visit the site and let Keith know your views and ideas. To build a website from nothing has been an enormous undertaking and the Society is very appreciative of his work and energy.

## AIRWAY CD-Rom

Tim Strang and Duncan Hancox in Manchester have produced an airway CD-Rom from their own work and that submitted by other members of the Society. A batch of 100 were hand-pressed, very laboriously, on a home machine and distributed in Belfast. Now a glass master is being prepared to produce CDs of professional quality, which will be distributed to all members of the Society. An article in a future Newsletter will describe the CD-Rom in detail. It is designed to be used on reasonably fast machines (200 Mhz, 32 Mb RAM with an 8-speed CD-Rom drive) but all machines purchased in the last few years ought to have this minimum specification. It uses an Internet browser and requires Microsoft Internet Explorer 3 or above to view the video clips (versions 3 and 4 are included on the disk). It is a 'world-first' in producing a fairly comprehensive CD on airway management which actually works and does not promote one manufacturer. The work put in by these two members in producing this has been extraordinary (and unpaid) and indicative of their very great enthusiasm.

## *IN PRAISE OF .....*

### **STRAIGHT BLADE LARYNGOSCOPY**

**John J. Henderson, Western Infirmary, Glasgow**

Tracheal intubation under direct vision started with the use of straight laryngoscopes in 1912. Following its introduction in 1943, anaesthetists have been seduced by the ease of use of the Macintosh curved laryngoscope - in most patients. At present, tracheal intubation in adults is attempted almost exclusively with the Macintosh laryngoscope. It is easier to master than the straight laryngoscope, and initial training in tracheal intubation should be based on the Macintosh laryngoscope.

Difficult tracheal intubation can result in serious complications. Death and brain damage still occur (1,2), even in private patients anaesthetised by consultants (MDU confidential document). When difficulty with tracheal intubation occurs unexpectedly, the best course is often to postpone surgery and awaken the patient. However, it is sometimes essential to proceed with surgery. How should the anaesthetist secure the airway with a cuffed tracheal tube in such patients?

When anaesthetists in the UK fail to see the larynx with the Macintosh laryngoscope, most then rely on blind techniques. These are usually successful, but all have a failure rate, and can cause considerable trauma. Use of a bougie (introducer) is the most popular technique, but when the epiglottis cannot be seen, success may be a matter of luck (3). The failure rate of this technique in such patients may be as high as 33% (4). Trauma caused by repeated attempts at intubation is underreported. Severe laryngeal oedema can result from as few as five attempts to pass a bougie (5). Serious respiratory tract (6,7) and pharyngeal and oesophageal damage may be produced (8-10). Obstetric anaesthetists stress the importance of limiting the number of attempts at intubation (11) and some recommend a limit of three attempts (3). Benumof (AAGBI ASM1997) has indicated that a limit of four attempts is likely in the next version of the ASA practice guidelines. Similar recommendations are made by a Canadian Interest Group (12), who also recommend that alternative techniques of airway management are included in training programmes. Tracheal intubation under vision is always preferable to the use of blind techniques, and the practice of making repeated blind attempts at intubation should be consigned to the history book. There are alternative techniques of tracheal intubation, under vision. However, the huge increase in knowledge of mechanisms and management of airway problems has not been matched by improved practice and training. The failure of anaesthetists to master a range of these techniques implies that rare, serious complications of tracheal intubation are regarded as an "acceptable" or "unavoidable" risk of anaesthesia. Can we justify such attitudes? Surely our aim should be safe and atraumatic airway management for all our patients.

Techniques which can facilitate tracheal intubation under vision, when the larynx cannot be seen with the Macintosh laryngoscope, include:

- 1) Fiberoptic intubation through intubating laryngeal mask airway
- 2) McCoy laryngoscope
- 3) Bullard-type laryngoscopes
- 4) Paraglossal straight laryngoscope techniques (incl. Belscope)

These techniques have been developed or rediscovered within the last 20 years. Each technique has advantages and disadvantages. In particular, they have different success rates, ease of learning, and cost. Only the use of straight laryngoscopes will be considered further here.

Since ENT surgeons rarely fail to see the larynx with straight laryngoscopes, difficult tracheal intubation may be a consequence, in part, of exclusive use of the Macintosh laryngoscope. In anaesthetic practice, the results of six series show that the paraglossal technique of straight laryngoscopy (the technique originally used by Magill (13)) frequently allows tracheal intubation under vision when the Macintosh technique has failed (14).

The straight laryngoscope has disadvantages. The technique is completely different from the Macintosh technique, and some commitment is required for its mastery. A new teaching video (work in progress) may help. Other disadvantages relate to the design of currently-available straight laryngoscopes, and include difficulty in passing the tracheal tube. These disadvantages may be overcome by an improved straight laryngoscope, which is currently being evaluated. No single technique is ideal for every situation, and direct laryngoscopy is not the technique of choice in patients with unstable necks, or in whom seriously difficult tracheal intubation is anticipated. Indirect fiberoptic laryngoscopy should be used in both these situations.

However, the straight laryngoscope has real advantages. I believe that it facilitates tracheal intubation under vision more frequently than does the Macintosh laryngoscope. It is a more reliable, less traumatic, and hence safer option than use of blind techniques. The equipment is simple, robust and inexpensive. The straight laryngoscope should return to its rightful place of regular use, so that complications of unexpected difficult tracheal intubation become less frequent. An audit of practice in the last 18 months in the Western Infirmary, Glasgow revealed that 44% of consultant anaesthetists had achieved a view of the

larynx with a straight laryngoscope, in patients in whom they had failed with the Macintosh. The straight laryngoscope can help you achieve rapid, atraumatic tracheal intubation under vision - if you make the commitment to master the technique during routine practice!

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Note: A limited number of prototypes of a new straight laryngoscope should soon be available for evaluation. Anyone interested is invited to get in touch with me (Fax: 0141 956 5993; e-mail: john.henderson@dunellan.prestel.co.uk)

## CEPOD 1996/1997

In one section of this report are the findings from analysis of forms relating to 30 patients who had been referred for management of lesions in the upper airway or who presented with stridor. The lead anaesthetist for this section was Kath Sherry. The key messages are concise, sensible and deserve wide dissemination;

- Management of the partly obstructed airway should be a carefully planned procedure between senior surgical and anaesthetic staff – a local protocol could be devised.
- Wherever possible the level and the full extent of the airway difficulty should be defined by preoperative investigations including the use of fiberoptic nasendoscopy.
- Early consultation between surgeons and anaesthetists is essential, with consideration of all options and the formation of a management plan.
- Awake fiberoptic intubation and tracheostomy using local anaesthesia should be considered amongst the options.
- Appropriately trained assistance should be available for anaesthetists and surgeons preparing for a difficult intubation.
- Fiberoptic intubation is an established part of anaesthetic practice. Several individuals within a department need to ensure that they maintain these skills.
- A fiberoptic intubating laryngoscope should be readily available for use in all surgical hospitals.

The section notes that the trachea was intubated in the anaesthetic room in 19 cases and in the operating theatre in nine. The third key message is ‘.. the formation of a management plan’ and this plan must obviously incorporate both an initial plan A and back-up plan B. Whenever urgent surgical intervention is a component of plan B, plan A needs to be conducted in a suitably sized, lit and equipped room with the surgeon, assistant and all necessary surgical equipment ready to go. There are few anaesthetic rooms which are suitable for surgery and it is much better to start anaesthesia for a patient with an obstructed airway in the operating theatre.

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# CASE HISTORY AND ANALYSIS

## Failed intubation scenario

An anaesthetic SHO is anaesthetising a patient on the emergency list in the evening; the registrar is tied up in the labour ward and no other senior anaesthetist is present on-site. 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?

### ANALYSIS by Dr Richard Grummitt, York District Hospital

The organization of an anaesthetic service that allows an inexperienced SHO to work alone in isolated situations is beyond the scope of this article. Similarly, correct positioning of patients and intubation technique merit further discussion. All patients with a diagnosis of intestinal obstruction must have a nasogastric tube passed and the anaesthetic SHO should do this first. A good technique is to place the n/g tube until the tip reaches the nasopharynx. Twenty ml of tap water is then squirted into the mouth forcing the act of swallowing, with relaxation of cricopharyngeus. The tube is advanced with the onset of swallowing. The operation is not immediately vital and can wait for the 30 minutes it might take to muster senior assistance.

SHO experience varies enormously from the trainee doing their first unaccompanied night on call to the SHO with the FRCA about to enter the Specialist Registrar grade. However they remain our most inexperienced anaesthetists and when intubation has failed they should all follow the same path to avoid confusion. Several algorithms exist for this situation which offer sound general guidance but tend to lack instructions that are absolutely clear for novices. This article suggests a simple, 3 step, approach that adopts those procedures that are most likely to succeed whilst bypassing some intermediate steps.

A failed intubation in an emergency patient presents the trainee with 3 problems. It is unknown whether the airway can be maintained and the SHO must handle the immediate problem of desaturation whilst preventing the potential threat of aspiration of stomach contents. There is no need for confusion regarding priorities as oxygenation is always paramount.

In this situation the basic tenets of safest practice in all airway control problems apply:

- do ensure oxygenation
- do call for help
- do maintain the patient in whatever position you feel most confident (generally supine)
- do wake the patient
  
- do NOT continue to try to intubate
- do NOT give further doses of muscle relaxant
- do NOT use unfamiliar equipment
- do NOT linger at any stage, move on if that manoeuvre does not work
- do NOT compromise a clear airway by further procedures

### Step 1: Oxygenate with oral airway, bag and mask

The trainee should remove the incorrectly placed tube as it may hinder subsequent airway manipulations. An argument that it should be left in situ to allow stomach contents to drain harmlessly, but messily, is far outweighed by the problems it might cause if maintaining the airway proves difficult. Remind the anaesthetic assistant to maintain cricoid pressure. Insert an appropriately sized oropharyngeal airway, ensure the head is in the optimal position and try to oxygenate the patient by bag and mask ventilation with 100% oxygen. Inserting an airway at the outset makes successful ventilation more likely than

using a bag and mask alone. Trainees who elect not to use an airway initially may find ventilation impossible and spend valuable time inserting one later. There is no place for nasopharyngeal airways as they will not be more effective than oral airways and may cause troublesome bleeding. If ventilation is possible, it should be continued with cricoid pressure maintained until the patient starts to breathe adequately when they should be allowed to wake up. It may be necessary to hold the mask with both hands whilst the second assistant squeezes the bag. **Senior assistance should be summoned**, for the responsibility to make decisions about further management must rest with senior anaesthetists.

## Step 2: Release cricoid pressure and insert LMA

If Step 1 is unsuccessful in establishing oxygenation, cricoid pressure should be released. The trainee should try and insert an appropriately sized laryngeal mask airway and gently ventilate. Releasing cricoid pressure may allow regurgitation of stomach contents but it also increases the chances of placing the laryngeal mask airway correctly. Vital seconds count in this situation and it is worth accepting a small risk of aspiration to gain a clear airway. It also allows the trained anaesthetic assistant to be more available at a time when the second assistant may be away gathering help. Once a clear airway is established and oxygenation possible should cricoid pressure be reapplied? The benefits of better airway protection with cricoid must be weighed against the risk of displacing the laryngeal mask and losing this precious airway. In all difficult airway situations SHO's should not fiddle with a clear airway and on balance should not reapply cricoid pressure. Ventilation is then continued until adequate spontaneous respiration occurs, the patient allowed to wake up and placed in the recovery position.

## Step 3: Cricothyroid puncture when saturation falls to less than 85%

In very rare circumstances it is impossible to maintain a clear airway with these adjuncts and the SHO should try and oxygenate via a needle or cannula inserted into the trachea. When should they try? Tracheal punctures are not always easy nor free of risk and suxamethonium may wear off at any time leaving the patient breathing adequately. Whilst the oxygen saturation level remains above 85% conventional airway control techniques should be continued but when the saturation falls below 85% cricothyroid puncture should be attempted. Dedicated cannulae and cricothyroidotomy sets are available and oxygen may be given in a number of ways. Methods involving bags, tubing and high oxygen flow rates will deliver sufficient oxygen to the patient but will not clear carbon dioxide. Oxygenation remains the most important factor and this hypercapnia can be tolerated temporarily. Oxygen jet systems are more efficient and can clear carbon dioxide but they carry a greater risk of causing barotrauma and must never be used without a pressure regulator. Each department must decide what equipment it wishes to use but it is imperative that trainees practice using the apparatus regularly. **SHO's should avoid using unfamiliar equipment.** When direct tracheal oxygenation is used following a failed intubation, gas can escape via the open paralysed larynx and it is unnecessary to make other arrangements. Anaesthetic trainees should not forget that the surgeon may be more experienced in securing a surgical airway and this expertise should not be overlooked.

### Calling for help

Ideally a senior colleague would be summoned as soon as the trainee failed to intubate, providing that at least two assistants remain in the anaesthetic area. One continues to apply cricoid pressure and a second is required to squeeze the bag or assist in other ways. With only two assistants (in most circumstances only one will be a skilled anaesthetic assistant) it is better to attempt bag, mask and airway manoeuvres before seeking help as both assistants may be required. Remember that surgeons and scrub staff are next door and should be asked to help. A good solution is to ensure that there are telephones in all anaesthetic areas so that the second assistant may send for help early whilst still remaining available. When simple ventilation measures are not adequate senior assistance should be sought urgently and the failed intubation equipment collected if this is not already available.

### Turning patients and tilting trolleys

Turning the patient onto their side may appear sensible at some stage but when should this be done? Several people are required, cricoid pressure is almost impossible to maintain, few SHO anaesthetists prefer to maintain airways in this position and if unsuccessful the patient must be turned again for further manoeuvres. **Patients should remain supine until awake and breathing adequately.** When awake and whilst awaiting senior assistance it is wise to place them in the recovery position as airway protective mechanisms are blunted by the recent induction and the patient remains at risk of aspiration. Tilting the trolley is similar. There is no proven benefit, regurgitation might be more likely and cricoid pressure may be dislodged. Why do it?

- The only responsibility of the SHO, the most junior training grade, is to deliver a live patient from this scenario
  - All trainees must know, and rehearse, what they will do in 'common' difficult airway situations
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## IS DIABETES A RISK FACTOR FOR DIFFICULT AIRWAY MANAGEMENT?

Dr Ellen O'Sullivan, Aintree

Severe diabetes mellitus can result in glycosylation of the joints resulting in limited joint mobility (LJM). This syndrome is thought to occur in 25-45% of patients with long-standing diabetes, the incidence increasing with increasing age. Atlanto-occipital joint involvement may limit adequate positioning of the head and neck during laryngoscopy and intubation. Symptoms typically begin in the metacarpo-phalangeal and proximal interphalangeal joints of the 5<sup>th</sup> fingers and spread medially. The inability to approximate palms and fingers in diabetics with LJM was described as the "Prayer Sign" and was extended by Reissell et al (Anaesthesia 45; 1024-7, 1990) to a graded evaluation by 'scoring' the ink print made by the palm of the hand (palm print). It is suggested that glycosylation of the joints of the larynx and cervical vertebral regions may be responsible for the increased incidence of difficult direct laryngoscopy reported in diabetics.

Several retrospective reports seem to support the assertion that long-standing type 1 diabetes mellitus is associated with difficult direct laryngoscopy. Hogan et al (Anesth Analg 67; 1162-1165, 1988) reported that 32% of 115 diabetic patients who underwent renal and/or pancreatic transplant had a difficult laryngoscopy. In 1995, Beebe et al (Am J Anesthesiol 22; 237-43, 1995) found that 13% of 55 patients undergoing pancreatic transplantation had this problem. However, Warner et al (Anesth Analg 86; 516-9, 1998) performed a detailed retrospective review to determine the frequency of difficult laryngoscopy in 725 patients who underwent renal and/or pancreatic transplantation over a ten year period. Only insulin dependent patients were considered to be diabetic and the prevalence of diet or tablet controlled diabetes in the study group is unknown. It is unfortunate that the grading of difficult direct laryngoscopy, although used at the Mayo clinic for many years, is a poor one with only three grades – no difficulty, minimal to moderate difficulty or moderate to extreme difficulty. Of the 725 patients in the study group, 2.1% were identified as minimal to moderate difficulty. The diabetic patients (209) had a higher difficulty rate (4.8%, 95% CI 2.3-8.6%) compared to the non-diabetic group (1.0%, 95% CI 0.3-2.2%). It is unfortunate that one patient had a planned FOI without detailing the grade of laryngoscopy, and that two of the five non-diabetic patients were difficult laryngoscopies due to previous head and neck cancer surgery. Whilst flawed, Warner's study suggests that patients with diabetes do have a moderately increased difficulty of laryngoscopy compared with those without diabetes but does not support the findings of greatly increased difficulty which have been reported previously. Also, they did not find an increasing number of years of renal dialysis (a surrogate for severity of diabetes) to be associated with an increased frequency of difficult laryngoscopy in their patients. The study could not find any association between quality of blood sugar regulation and difficult laryngoscopy.

Overall the studies to date suggest that long-standing insulin-dependent diabetic patients may have a moderately increased prevalence of difficult direct laryngoscopy compared with those patients without diabetes. Prospective studies involving large numbers of patients, a sensitive grading score for direct laryngoscopy and robust definition of difficult intubation will quantify any increased risk of airway problems in this group. Unfortunately, the low prevalence of both difficult direct laryngoscopy and long-standing Type 1 diabetes means that definitive studies will be uncommon. Readers' views will be welcomed.

### CHARITABLE STATUS

The 'Difficult Airway Society' is now Charity No 1071732. The Charitable Objects are listed in the Charity Commission Index Report;

A] The advancement of public education in the science and practice of the management of patients with difficult or unusual airway problems, by the conduct of courses, lectures, demonstrations and by ensuring that due attention is paid to airway management techniques in the training curricula of medical and paramedical practitioners.

B] To promote research and the development of new techniques in dealing with airway problems, and to publish the useful results of such research.

Thanks to the Officers of the Society and Allan Hargreaves for completion of this project.

## AIRWAY MEETINGS

The Newsletter has been informed of the following meetings;

**DAME Cardiff** on 5-7th May and 6-8th October 1999 - contact Tony Turley 01222 716860

**Fibreoptic intubation at the Association of Anaesthetists**, London on 27<sup>th</sup> May

**Difficult Airway Management at the Royal College of Anaesthetists** on 20<sup>th</sup> May

There are **fibreoptic intubation** courses in **Edinburgh** (March/October 0131 536 3652 see Edinburgh website on this page), **Oxford** and **Liverpool** (September Dr S Mostafa, 0151 706 3191); Steve Yentis runs a **North London** course from the Chelsea and Westminster hospital. The Newsletter and website will advertise these and any other airway meetings if contact numbers and dates are supplied.

## 1999 DAS ANNUAL MEETING

### EDINBURGH

THURSDAY 25<sup>TH</sup> AND FRIDAY 26<sup>TH</sup>  
NOVEMBER 1999

Organiser Geoff Sharwood-Smith

Book your study leave now!

Further details: [www.ed.ac.uk/~gss/DAS99.htm](http://www.ed.ac.uk/~gss/DAS99.htm)

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