The recognition and management of the difficult airway has been a source of great discussion in the anaesthetic literature. If all difficult airways could be predicted confidently in the preoperative period, anaesthetists could plan the safest and most effective way of managing tracheal intubation. This would identify a patient whose trachea could not be intubated and perhaps obviate the possible disastrous consequences of failure to intubate, particularly in a patient presenting for emergency surgery.

Currently, in the majority of cases, a clinical history and examination of the patient remain the major method of alerting the anaesthetist to possible difficulty in performing tracheal intubation. However, in the past decade considerable strides have been made in predicting difficult intubation.

Mallampati and his associates [1] have developed a useful clinical test. The patient was seated at 90° to the horizontal, facing the anaesthetist, and invited to extrude the tongue as far as possible, permitting allocation of the patient to one of three classes. In class one, the faucial pillars, soft palate and uvula were seen. In class two the pillars of the fauces and soft palate were seen, but the uvula was masked by the base of the tongue. In class three, only the soft palate was seen. At subsequent tracheal intubation, the amount of glottis visible was graded according to the classification of Cormack and Lehane [2]. In essence, Mallampati found that the less that was visible at the back of the mouth, the more difficult was the subsequent tracheal intubation. Samsoo and Young [3] developed this theme further and introduced a class four in which the soft palate was not visible. In their retrospective study they found a positive correlation between abnormal anatomy of the oro-pharynx and the degree of difficulty at subsequent intubation.

In these two studies, it was suggested that either the tongue was enlarged considerably or the surrounding structures were unusually small. Whichever is correct is irrelevant, because in both cases the tongue overhangs the entrance to the glottis, thereby making it more difficult to accomplish easy intubation.

Wilson and his colleagues [4] measured 14 variables in the head and neck. After application of discriminant analysis to the accumulated data, five risk factors were identified. These included body weight, extent of head, neck and jaw movement, and presence of a receding mandible and buck teeth. These risk factors were accorded scores of between 0 and 2 and the net sum, termed the risk score, varied between 0 and 10. The greater the risk score, the greater is the potential for difficulty in intubation. Most anaesthetists would certainly recognize these factors as causes of potential difficulties, and it is pleasing to note that what has been taught in clinical practice bears a strong relationship to scientific studies in this field.

In this issue of the Journal, Horton, Fahy and Charters [5] have defined the angles of the head and neck for optimum positioning to perform tracheal intubation. These particular values may ultimately become the standard measurements for future research in this field.

Although these observations and measurements do not always predict difficult intubation, they are useful in approximately 80% of patients. What is more crucial is that these data may be obtained at the bedside and augment the history and clinical examination. It is clear, therefore, that the best prediction of difficult intubation is achieved when the anaesthetist visits the patient before operation. It would also seem prudent that the anaesthetist who is directly responsible for anaesthesia should personally visit the patient. In addition, training young anaesthetists to make these observations and measurements at their preoperative visits would be important, as they could request the help of a senior colleague before and not after attempting to perform tracheal intubation.

How should we manage a difficult intubation?
In general, if a difficult intubation is predicted, most anaesthetists would prefer to intubate the trachea using local anaesthetic techniques. The advent of the fibreoptic bronchoscope has made access relatively easy through either the nose or mouth into the larynx. Various aids to assist this process are also available commercially. Retrograde intubation, based on the original technique of Waters [6], from below the larynx has been well documented, while transtracheal ventilation follows the technique developed by Leyman [7]. However, these latter two techniques are not taught widely in the United Kingdom, possibly because it is considered unethical to perform retrograde intubation or establish transtracheal ventilation in a normal patient. The lack of teaching of fibreoptic techniques is almost certainly the result of the high costs involved in purchasing these bronchoscopes and the paucity of anaesthetists who have obtained training in their use.

Despite correct preoperative assessment, there still remains a number of patients whose trachea cannot be intubated following induction of anaesthesia and the administration of neuromuscular blocking drugs. If the airway is not managed correctly under these circumstances, the results may be disastrous. Many failed intubation regimens have been proposed, for example those of Tunstall [8] and Rosen [9]. Although these recommendations are designed primarily for obstetric patients, they are applicable equally to other types of patients undergoing emergency procedures.

These circumstances occur only rarely, which carries disadvantages in terms of training and experience. Traditionally, the anaesthetist is trained to intubate the trachea during his early career on elective theatre lists and only very rarely does s/he encounter a very difficult intubation (between 1 and 3% of all patients). It is important, therefore, that the trainee should be instructed to cope with a difficult airway as part of routine early training.

How can such a programme be achieved? Certainly, to wait for difficult intubations to present themselves on elective lists would be unproductive. The solution may be to use models which can simulate such circumstances [10], traditional teaching methods, simulated difficult intubation in normal patients [11] and the preparation of suitable video programmes. Each training department should possess such aids so that young anaesthetists and, indeed, experienced anaesthetists would be able to develop, practise and refresh their skills. In addition, algorithms have been produced to indicate what alternative courses of action are available [12] in an emergency situation.

Another approach is that suggested by Ovasapian and colleagues in this issue [13]. They have proposed a rather revolutionary way of dealing with patients considered to be at high risk of aspiration while removing the possibility of being unable to accomplish intubation. They intubated the trachea of 121 awake patients under direct vision using either oral or nasal fibreoptic techniques. These patients received local anaesthesia to the larynx and upper trachea either by direct spraying or by cricothyroid puncture. The aim was to produce analgesia in the upper respiratory tract, leaving the rest of the tract largely unaffected. Should such a patient subsequently inhale, the lower respiratory tract reflexes should induce coughing, thereby protecting the lower airway and lungs. It is interesting to note that, despite the one occasion when a patient vomited a large quantity of fresh and clotted blood, there was no evidence of pulmonary aspiration.

It seems that this method has potential. However, as only 121 patients were included in the study and the accepted incidence of difficult intubation varies between 1 and 3%, it may be premature to adopt this technique until its proponents have had experience of many thousands of cases. Their call for a controlled clinical trial comparing the three possible methods for achieving intubation in emergency cases is also premature, as anaesthetists must be able to use a fibreoptic bronchoscope as expertly as they use a laryngoscope. It is likely that this will take some time to achieve. However, chest physicians have quickly become very adept at fibreoptic bronchoscopy. There is no reason why anaesthetists should not achieve the same degree of skill very rapidly. Having gained much experience, a controlled clinical trial of intubation in the emergency patient might then be considered.

Irrespective of research potential, it is of paramount importance that anaesthetists learn to use a fibreoptic bronchoscope competently. To achieve this goal requires a great deal of investment in both training and equipment. The practice of anaesthesia has relied increasingly over the past decade on research and the application of modern technology. The fibreoptic bronchoscope
EDITORIAL

represents one of the latest developments and the
advantages that can be gained from its correct use
should be pursued vigorously.

Confirmation of successful intubation has also
been examined closely in the past few years. The
sight of the tracheal tube passing between the
cords, checking with a stethoscope that there is air
entry into both lungs and the absence of cyanosis
have been the traditional criteria for successful
intubation in the majority of patients. However,
even experienced anaesthetists have occasionally
found these criteria to be misleading. Other
methods of confirmation, such as the tactile
method recommended by Charters and Wilkinson
[14] and the aspiration method of Wee [15] have
been advocated recently, but increasing concern
regarding infection may render these methods less
acceptable. However, if a capnograph attached to
a tracheal tube shows repeated movements be-
tween zero and 4–6% carbon dioxide with
ventilation, the tracheal tube is in the correct
location. The fibreoptic bronchoscope is also of
great assistance with confirmation. If a fibreoptic
bronchoscope is passed through the tracheal tube,
visualization of the carina confirms that tube is in
the trachea.

An editorial on the recognition and man-
agement of a difficult intubation would not be
complete without repetition of the old adage that
a patient does not die from failure of tracheal
intubation but from failure of oxygenation. If the
anaesthetist is in any doubt that the tube is not in
the trachea, s/he should remove it and ventilate
the patient’s lungs with oxygen by whatever
means are available. Rapid and effective action to
achieve this aim will be pursued by the trainee
anaesthetist under conditions of potential stress
and panic only if s/he has received sound and
continuous training in the management of tracheal
intubation.

R. S. Vaughan

REFERENCES

1. Mallampati SR, Gatt SP, Gugino LD, Desai SP, Waraská
   B, Freiberger D, Lui PL. A clinical sign to predict
difficult tracheal intubation: a prospective study. Ca-
2. Cormack RS, Lehane J. Difficult tracheal intubation in
3. Samsoon GLT, Young JRB. Difficult tracheal intuba-
tion—a retrospective study. Anaesthesia 1987; 42:
   487–490.
4. Wilson ME, Spiegelhalter D, Robertson JA, Lesser P.
   Predicting difficult intubation. British Journal of Anaes-
5. Horton WA, Faby L, Charters P. Defining a standard
   intubating position using “Angle Finder”. British Journal
6. Waters DJ. Guided blind endotracheal intubation. Anaes-
7. Leyman PR. An alternative to blind intubation. Anaes-
thesia 1983; 38: 165.
8. Tunstall MW. Failed intubation drill. Anaesthesia 1976;
   31: 850.
9. Rosen M. Difficult and failed intubation in obstetrics. In:
   Latto IP, Rosen M, eds. Difficulties in Tracheal Intubation.
10. Ovassapian A, Yelich SJ, Dykes MHM, Golman ME.
    Learning fibreoptic intubation: use of simulators v.
    traditional teaching. British Journal of Anaesthesia 1988;
    61: 217–220.
    Use of the gum elastic bougie. Anaesthesia 1988; 43:
    437–438.
12. Latto IP, Management of difficult intubation. In: Latto
    IP, Rosen M, eds. Difficulties in Tracheal Intubation.
13. Ovassapian A, Krejcie TC, Yelich SJ, Dykes MHM.
    Awake fibreoptic intubation in the patient at high risk of
    aspiration. British Journal of Anaesthesia 1989; 62:
    13–16.
14. Charters P, Wilkinson K. Tactile orotracheal tube place-
    ment test. A bimanual tactile examination of the posi-
    tioned orotracheal tube to confirm laryngeal placement.
15. Wee MYK. The oesophageal detector device. Assessment
    of a new method to distinguish oesophageal from tracheal