Blind Nasotracheal Intubation.

Noel A. Gillespie, D. M. (Oxon.), F.F.A., D.A. (R.C.S. Eng.),
Madison, Wisconsin
Associate Professor of Anaesthesia, University of Wisconsin

THE FUNCTION OF A TEXTBOOK is to state established doctrine. It is therefore the duty of the author to weigh and sift the evidence to be found in original papers, and then to convey to his readers its consensus. It is, of course, perfectly legitimate for a book to be the means of publishing a new and revolutionary personal theory; but such a work is not usually classified as a "textbook." On the other hand there should be a sharp distinction between medical monographs and autobiographies! It is because of a sense of this duty of an author that my book does violence to my own strong advocacy of the blind technique of nasal intubation; and in this paper, I would like to enlarge upon the reasons for this. Since experience is the only valid claim to a personal opinion, this paper must of necessity contain some autobiographical facts.

The blind nasal technique is still much too little practised in this country. The reasons which have usually been urged against it are as follows:

1. It is difficult and uncertain
2. It is traumatic and liable to infect the respiratory tract.
3. The larynx should always be examined lest it should happen to be diseased.
4. Larger tubes can be passed orally than nasally.

Let us consider these objections in detail.

1. The first objection is that blind intubation is difficult and uncertain. It would be invidious to single out specific authors, yet when reading the literature one notices that this objection is always raised by those with little practical experience of the method. There is only one way to become a skilled intubator: to intubate patients. Not ten or fifty cases—but thousands. This is true of any method, but it applies with especial force to the blind technique. To illustrate the point from my own experience: In the

TABLE 1
1932 - 1939

Route	Number
Oral intubation	162
Visual nasal intubation	57
Blind nasal intubation	441
The blind nasal technique appears to have succeeded in 88.7% of cases.	

eight years from 1932-39 inclusive, I anaesthetized 11,251 patients of whom 2,469 were intubated. Although my records are incomplete, I know that 30 per cent of these were oral. We can safely assume that at the end of 1939 I had performed 1,700 nasal intubations. I have accurate records of 660 intubated cases during this period, and of these 498 were by the nasal route. The blind technique was successful in 85.6 per cent of cases. A certain number of cases call for special consideration, and they are shown

TABLE 2

The following cases, however, call for correction of the above figure:—

Blind intubation failed; intubated nasally by vision	52 cases
Blind intubation failed; intubated orally by vision	21 cases
Blind nasal intubation before thyroidectomy failed, Intubation abandoned since laryngoscopy was not considered desirable	3 cases
Blind nasal intubation failed; blind oral succeeded	3 cases
Blind nasal intubation for relief of obstruction in Ludwig's angina; 1 success, 1 failure	2 cases
Nasal intubation for endobronchial suction; blind 3 cases, visual 1 case	4 cases
Blind intubation attempted for demonstration or convenience, failed, not pursued	6 cases
Nasal intubation deliberately performed visually	5 cases

Corrected for these cases, the figure for the success of the blind technique becomes 85.6%.

in table 2 to give some idea of the frequency of unusual occurrences. If they are not considered, however, the figure for the success of blind intubation appears as high as 88.7 per cent. My use is to attempt blind intubation in every case save where some pathological condition makes this unwise. I refer to infective or neoplastic lesions of the pharynx or larynx, or a sharp foreign body lodged high in the oesophagus. Only five such cases were encountered in this series of 498—an incidence of about 1 per cent. Until the end of 1939 then, of my first 1,700 nasal intubations the blind technique succeeded in 85 per cent of the cases.

Since 1939, of 3,653 patients anaesthetized, 1,012 have been intubated. Six hundred and thirty of these were by the nasal route, and among these the blind technique was successful in 597, or 94.7 per cent. In other words, even after eight years experience of 1,700 cases, one's skill is still susceptible of an improvement of 10 per cent in the next decade.

TABLE 3

1939 - 1948

Intubated Cases

Oral visual	382
Nasal visual	33
Nasal blind	597*
Total	1012

*94.76% of nasal cases.

So much for difficulty. Some authors have urged that blind intubation cannot be undertaken with the certainty that it will at once be successful. The only circumstances in which this is important are when a patient nearly dead should be intubated as a therapeutic measure. The figures quoted above refer solely to intubation during anaesthesia, and do not include therapeutic intubation. Patients *in articulo mortis* exhibit complete "pre-cadaverous" relaxation. In them, therefore, laryngoscopy presents no difficulties and is obviously the method of choice. Moreover, for this purpose the nasal route has no advantages and several drawbacks.

The answer, then, to the first objection is that blind intubation is no more difficult than any other variety of intubation, nor is it any more uncertain, for no man can say with certainty that visual intubation will succeed at any given moment in any given patient.

This seems the place to stress one vital point, which depends on something that can be classed either under "difficulty" or "trauma." Blind intubation can be performed when laryngoscopy can not. The most obvious example is the patient with ankylosis of the mandible, but occasions arise when intubation is highly desirable during the second stage of anaesthesia when the jaws are still tightly clenched. Certain mechanical respirators are so constructed that there is no room for a hand holding a laryngoscope between the machine and the face of the patient. Some sufferers from Ludwig's angina, subcutaneous emphysema or infections deep in the neck develop so much oedema of the submandibular region that it is impossible to make the opening of the mouth sufficient for laryngoscopy. The late J. H. Bennett[1] felt that blind intubation usually failed in such patients whereas by using a special laryngoscope (which he describes in that article) visual nasal intubation could be accomplished. My own experience is limited to 4 cases of this variety; blind intubation succeeded in 3 of the 4. There are obviously cases in which a laryngoscope cannot be used: none in which blind intubation is *impossible*. For it is never certain that, given sufficient skill, blind intubation cannot succeed. If I fail to intubate a given patient by the blind nasal technique, it is still probable that a worker of the skill of a Magill might succeed. Yet in the future there will be few men possessed of high skill if today they do not use the method constantly and painstakingly.

2. The second objection usually advanced is that blind intubation is traumatic and liable to cause infective respiratory complications. Trauma during intubation is the chief objection to all intubation; and we all know by bitter experience that the usual cause of trauma is inadequate anaesthesia at the time of intubation. All laryngoscopes, however, are made of metal whereas the tubes most commonly used are made of soft rubber. Other things being equal, it has always seemed axiomatic to me that the likelihood of doing harm must be less with a piece of flexible rubber than with a piece of metal. I find it difficult to imagine how a rubber tube could inflict damage on pharynx or larynx. If roughly manipulated it can, of course, excoriate the nasal mucosa, and cause epistaxis. Cases are on record[2] in which the tube penetrated the nasal mucosa, and passed into the pharynx stripping the mucous membrane before it, but they are extremely rare.

On the other hand, damage to both by a laryngoscope is common. If the blade is examined when withdrawn, as often as not some blood will be seen on it, showing that the pharynx has been made to bleed. In my opinion, then, any method which involves the use of a laryngoscope is potentially more traumatic than blind nasal intubation. The experience of witnessing a certain number of intubations in conscious patients has strengthened this conviction. It is not pleasant to have a tube inserted into one's trachea during consciousness; but it has been made very clear to me by the patients, that their discomfort is much less with blind intubation than when a laryngoscope is used. This alone should be a sufficient argument to persuade any anaesthetist who practises therapeutic intubation to become skilled in blind intubation.

Thanks to the Hollerith system of keeping records, I need not argue about the statement that blind intubation causes more respiratory compli-

TABLE 4
Respiratory Morbidity by Route of Intubation
(Author)
1932 - 1948

	Total Cases	Major Complications Number	Per Cent	Minor Complications Number	Per Cent
Oral intubation	544	41	7.5	113	20.7
Visual nasal intubation	90	6	6.6	20	22.2
Blind nasal intubation	1038	57	5.5	254	24.5
Total	1672	104	6.2	387	23.1

cations. All I need do is to show you, in table 4, what has been the incidence of these in 1,672 cases of mine of which I have accurate records. When these results were submitted to statisticians they declined to subject them to statistical analysis on the ground that without doing so it was evident that none of these differences would be statistically significant.

It is interesting to compare and contrast table 4 with the one on page 161 of my book[3] which gives an identical survey of a larger number of

TABLE 5
Respiratory Morbidity by Technique of Intubation
(Wis. Gen. Hosp. 1940-44).

Method of Intubation	Total Cases	Major Complications Number	Major Complications Per Cent	Minor Complications Number	Minor Complications Per Cent
Oral	2262	158	6.98	317	14.01
Nasal (visual)	444	31	6.98	62	13.96
Nasal (blind)	1038	62	5.97	154	14.83
Total	3744	251	6.70	533	14.24

cases and is reproduced here as table 5. In this series the figures are almost identical. It is remarkable indeed that the results should be so constant over so large a number of cases. These figures I believe justify the statement that the blind nasal technique is followed by slightly fewer *major* but slightly more minor respiratory complications than the laryngoscopic techniques. This observed difference is so slight as to have no statistical significance: what difference there is, favors blind intubation.

The only considerable difference between these two sets of figures is found in the incidence of minor complications. This difference—between 14 and 23 per cent—well illustrates the aphorism that no system of recording can be more accurate than its most casual user. It may well be that my own cases show a third as many more minor complications than those of all members of the Department. I console myself with the assumption that my cases have been more completely and accurately recorded!

3. The third argument—that the larynx should always be examined—is one with which I cannot agree. A similar course has been urged for many organs in the body. Personally, I see no reason for the performance of gastroscopy, sigmoidoscopy or cystoscopy unless there is cause to suspect disease in the viscera concerned. It was a distinguished bronchologist who first suggested that every larynx should be inspected. In his hands, it is probably an excellent and atraumatic practice, but no anaesthetist possesses his diagnostic or manipulative skill. For an anaesthetist, I

believe that the proper view is that when disease is thought to exist in pharynx or larynx, then intubation should be visually accomplished.

4. The last argument that larger tubes can be passed orally than nasally is one with which one cannot disagree for its truth is obvious. It is important not only because larger tubes restrict the patient's airway less, but also because catheters for drainage by suction can be passed with greater facility through a wider tube. If the tube becomes kinked it may be impossible to pass such a catheter; but oral tubes as well as nasal ones may develop a kink. Restriction of the airway is of practical importance only when respiration is confined to the tube by the use of a pharyngeal pack or an inflatable cuff. When these are not in use the patient can "breathe around the tube." Moreover, when maintenance of anaesthesia is by the "semiclosed" technique, the expiratory valve should be set in such a way that, because of a slight positive pressure, an element of insufflation is added to an inhalational technique. In these circumstances I never use tubes larger, by the Magill scale, than size 8 in women and 9 in men. More usually I use one size smaller than that. The tube should pass freely through the nose: if it does not it is more difficult to insert blindly and more likely to cause epistaxis. It may well be that the tendency to use tubes of too great width has, by increasing the number of failures, deterred many workers from using the blind technique.

In practice, I feel that this last objection is chiefly valid in those cases in which copious secretion is present in the lungs, and will probably require efficient removal. Intrapleural operations provide us with the bulk of these cases. Induction is often difficult by reason of the chronic irritation of the bronchi and glottis to which disease has given rise. If glottic spasm proves troublesome during induction, blind nasal intubation, performed during the second stage, may make deep anaesthesia easier to attain. Then, when ideal conditions have been procured, a wide oral tube can be substituted visually for the nasal one.

Because of the clinical importance of the fact, may I stress again the fact that blind intubation is usually easy in subjects in whom laryngoscopy is difficult, and vice versa. The robust healthy male, who weighs over two hundred pounds, and has well developed muscles, a "bull" neck, and a full set of healthy teeth, is a formidable candidate for laryngoscopy. But he usually has large nares free from obstruction, and with gratifying frequency a tube passed through the nose enters the glottis at once. On the other hand, blind intubation is difficult in the frail, wasted, edentulous woman of 70. Extraction of the teeth appears to cause changes of shape in the mandible, and to alter the relationship of structures in the pharynx, so that either the base of the tongue or the epiglottis impedes the passage of the tube. On the other hand, laryngoscopy is at its easiest in these patients, and therefore trauma is less likely to occur. It is wise to use the method that promises the greatest ease and facility.

It is pertinent to speculate why America has been so slow to accept the blind technique of intubation. I believe it is because here we have been more partial to drugs and methods which make for quiet breathing than has been the case in England. Morphine given before anaesthesia, morphine,

barbiturates, or curare during induction or maintenance, agents such as cyclopropane, and the absorption technique—they are all conducive to quiet shallow breathing. Now the ease of blind intubation varies directly as the vigor of respiration. During hyperpnoea it is easy to "follow the stream of air" and insert the tube. Though I know nothing of the last ten years, during the previous decade our colleagues in England were very diffident in adopting the absorption technique. I am convinced that one of the reasons for this is the fact that it renders blind intubation more difficult. I have reason to believe that England has now mastered the absorption technique; whereas I doubt whether or no we can justly claim to have mastered the technique of blind intubation. May I beg of you this effort? I can promise you that it will be amply rewarded. In my judgment the most useful "trick of the trade" for an anaesthetist is the ability to insert a tube in the trachea without recourse to laryngoscopy whenever this is desirable.

References

1. Bennett, J. H.: *Anesthesiology*, 4:25, 1943.
2. Barnard, J.: *Anaesthesia*, 3:126, 1948.
3. Gillespie, N. A. Endotracheal Anaesthesia. Second Edition. p. 161, 1948.

Massive Picrotoxin Therapy in Treatment of Acute Barbiturate Poisoning. E. A. Newman and M. Feldman, Jr. *Archives of Internal Medicine*, 81:690 (May) 1948.

ELEVEN PATIENTS with severe barbiturate poisoning Newman and Feldman treated with massive doses of picrotoxin. Amounts ranging from 9 to 45 mg. per dose were given intravenously at fifteen-minute intervals. The total dose of the drug administered was 5,139 mg. in one case and 14,196 mg. in another case, much larger doses than those usually recommended. The amount of picrotoxin given must be varied according to the depth of coma, which can be judged not only by the amount of intoxicant ingested and the time elapsed before treatment is instituted, but also by the patient's response to the previous dose of picrotoxin. Pentamethylenetetrazol is a valuable aid in the estimation of the depth of coma. There is no toxic dose of picrotoxin until a preconvulsive state is reached. After the patient begins to respond to smaller and smaller doses of picrotoxin with preconvulsive twitchings, indicating an awakening of lower brain centers, therapeutic stimulation of the cortex by amphetamine is indicated, since pictrotoxin is not primarily a cortical stimulant. Maintenance of fluid balance, constant vigilance in keeping the air passages clear and immediate administration of antibiotic substances to help prevent pulmonary infection are necessary if the analeptic agents are to have a chance to reverse the intoxication. Bronchopneumonia developed in 4 of the patients while they received penicillin; 1 patient had a complicating encapsulated empyema, which responded to local instillation of penicillin into the thoracic cavity. Ten patients recovered and 1 patient died. Treatment should in all cases be continued by placing the patient in the hands of a psychiatrist.