TREATMENT OF LARYNGEAL DIPHTHERIA*

BY

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In our discussion on diphtheria and its treatment we are promised several contributions from authorities of large experience in special branches of this important subject. In opening the discussion I shall not make any attempt to review this wide field, but will confine my remarks to the treatment of laryngeal diphtheria of such severity as to require operative intervention.

Methods of Treatment

Of the three methods of dealing with such cases—namely, tracheotomy, O'Dwyer's intubation, and electric suction—I think it will be agreed that only the first two are of much practical importance. Electric suction is comparatively new, and I believe that the general opinion now is that this method has a very small field of usefulness. I think the time has arrived for those of us who are called upon to treat large numbers of cases requiring operation to pool our experience and our results with the view of deciding which method—tracheotomy or intubation—as a routine procedure in ordinary cases does give the better total results. Evidence on which to form a correct judgement on this point is very difficult to obtain. In visiting large fever hospitals and making inquiries on this point one generally finds that the physicians in charge have a wide experience of one of these two methods and a very limited experience of the other—a large experience of tracheotomy and small experience of intubation, or vice versa. Were it possible to collect the views of a considerable number of authorities having extensive experience of both methods it might be possible to arrive at a correct conclusion.

The other means by which we may attempt to make a correct valuation is by comparing the total results obtained in large hospitals in which tracheotomy is the "operation of choice" with the total results in hospitals in which intubation is the routine method. But here we meet with several difficulties. The published reports of many hospitals do not give the total results; too often the case-mortality rates following operation are calculated after excluding cases "moribund on admission" or cases in which the patient has "died within twenty-four hours (or forty-eight hours) of operation." And as frequently the number of such exclusions is not stated these statistics are of no value for our purpose.

Comparison of Results

In the hope of contributing something to the evidence on which an opinion of the relative value of these two operative methods can be formed, I propose to give the total results obtained in the Belfast City Fever Hospital, Purdysburn, since its opening thirty years ago. These figures include all the cases of laryngeal diphtheria in which operation by any method—(a) intubation only; (b) intubation followed by tracheotomy; (c) tracheotomy only—was performed.

In the sixty-one cases in which tracheotomy secondary to intubation was performed the necessity for this was

nearly always caused by failure to retain the intubation tube after very many re-intubations. In a few instances tracheotomy was done in the hope of getting rid of the intubation tube, which could not be dispensed with. The reasons why tracheotomy was chosen in the thirty-three cases were: (1) the trachea was not large enough to take the smallest-sized intubation tube readily; (2) so much oedema was present that there did not appear to be any

TABLE I.—*Results obtained by Intubation and Tracheotomy*

Method	Cases	Deaths	Mortality per cent.
Intubation only	951	233	24.7
Intubation followed by Tracheotomy ..	61	37	60.6
Total	1,012	270	26.6
Tracheotomy only	33	13	39.3
Total, all methods	1,045	283	27.0

TABLE II.—*The Age Periods of Cases with Intubation Only*

Age	Cases	Deaths	Mortality per cent.
Under 1 year	70	35	50.00
1-2 years	230	86	37.39
2-3 "	165	35	21.21
3-4 "	178	24	13.48
4-5 "	132	24	18.18
Over 5 years	176	29	16.45

prospect of an intubation tube being retained; (3) the intubation tube did not fit home comfortably; and (4) in a small number of cases, in the early years, there was no one at hand with the necessary experience of intubation.

Now I do not claim that these total results are exceptionally good, but I am very definitely of opinion that they are better than they would have been had we adopted tracheotomy as a routine method of treatment. Before the opening of Purdysburn Fever Hospital I had, in the old Belfast Fever Hospital, a considerable experience of tracheotomy. The figures given by that experience are not available unfortunately, as most of the records have been destroyed.

As stated, I have found difficulty in getting figures of total results obtained in other places, but I should like to give you the excellent figures in a large series of such cases treated mainly by intubation in Melbourne Infectious Diseases Hospital. I have recently received these figures through the kindness of Dr. F. V. G. Scholes, medical superintendent. Dr. Scholes's figures are:

TABLE III.—*Results obtained at Melbourne Infectious Diseases Hospital*

Method	Cases	Deaths	Mortality per cent.
Suction only	11	—	—
Intubation only	1,685	271	16.1
Tracheotomy	209	126	60.0
Total operation cases	1,905	397	20.8

These are total figures without any exclusions. The series is a very large one, and I think you will agree that the results are exceedingly good.

* Read in opening a discussion at a meeting of the Section of Hygiene and Public Health at the Annual Meeting of the British Medical Association, Belfast, 1937.

Can such results be obtained if tracheotomy is adopted as the routine method of treating such cases?

Dr. Scholes does not state in what proportion of the cases tracheotomy was performed secondary to intubation.

How the virulence of diphtheria as met with in Australia compares with that obtaining in Britain I do not know. In the first edition of his book (1920) Dr. Scholes gives a very careful analysis of 19,150 cases of diphtheria treated by him with a case mortality rate of 4.2 per cent. A striking point is that of these 19,150 cases over 50 per cent. were admitted to hospital within forty-eight hours of the onset of the disease. I am sure all of us who are called upon to treat large numbers of cases of diphtheria must envy him this.

The Case for Intubation

The main objections sometimes made to intubation are: (1) the danger of the pushing down loose membrane with consequent obstruction to the breathing; (2) the danger of the tube being coughed out and suffocation occurring before it can be replaced. The risk of the former is very slight. It did occur, however, in three cases in O'Dwyer's first 200 cases. In two of these three removal of the tube was immediately followed by the coughing up of the obstructing loose membrane. I have met with this trouble in a few cases, but in all of them the loose membrane was coughed up on withdrawal of the tube. The second of these objections is a more serious one, which may lead to disaster. In all cases in which coughing up of the tube has become a habit, and where many re-intubations have been required, it is necessary to have within call someone capable of quickly replacing the tube, and in some of these cases it will be found safer to perform a secondary tracheotomy.

Again, it is sometimes urged that without previous experience intubation is much more difficult than tracheotomy and less likely to be successful under such circumstances. This is true, but the necessary technique is easily and quickly gained. When anyone who has not had experience of intubation is making his first attempt to introduce an intubation tube he should always have standing by someone of experience ready to take over and complete the operation.

Much of the disappointment with the results in intubation has been due to the use of instruments and tubes which are not of good pattern. This was emphasized long ago by Professor Northrup, who urged that if only tubes, etc., of O'Dwyer's approved type were employed intubation would quickly supersede tracheotomy. My own experience confirms this.

The position in which the child is placed for the operation is most important. The best position is as near as possible to the edge of a low cot, so that the operator can stand almost directly over the patient. Attempts to insert an intubation tube in a struggling child on an operating table at the usual height will be found exceedingly difficult by anyone who has not had much experience.

Conclusion

From inquiries I have been able to make it would appear that intubation is now the method favoured in the United States, Canada, Germany, and Australia, and that primary tracheotomy is done in but a comparatively small proportion of these cases, and then only because for some reason intubation was considered unsuitable. We all know that the late Dr. Claude Ker, with his

extensive experience in Edinburgh Fever Hospital, was an enthusiastic advocate of intubation.

I am at present convinced that intubation has many advantages over tracheotomy in laryngeal diphtheria requiring operation.

I shall be very grateful to anyone who will be kind enough to send me reports of results obtained in any considerable series of consecutive cases treated by either method.

Clinical Memoranda

Acute Torsion of the Gall-bladder

This condition is, I think, of sufficient rarity to warrant a record being made of the case, which occurred at the Hertford County Hospital some few weeks ago.

CASE REPORT

The patient, a woman of 79, was admitted to the private wards of this hospital as an emergency on December 29, 1936, with a history of pain encircling the body at the level of the epigastrium which began four days previously. She had felt sick but had not vomited, and the bowels had been open. There had been no jaundice, but the urine was dark, though no change had been noticed in the colour of the stools. On the first day of the illness there was generalized abdominal tenderness, slightly more in the right hypochondrium than in the left, but no other physical signs.

The next day the pain was definitely on the right side, and was also felt in the right shoulder. The abdomen showed some general distension, and a tender fluctuant mass was evident below the right costal margin. The pain was better the following day, and the bowels were again open. No vomiting occurred, but flatulence was troublesome. The patient was given an enema, with poor result.

On December 29, the fourth day, the pain was worse again and the temperature rose for the first time to 100° F. The swelling was now the size of a small orange, and it was possible to get one's fingers between it and the costal margin. She was then admitted for operation. The abdomen was opened with a Kocher's subcostal incision; this gave a very good exposure of the gall-bladder, which was found to be very distended and black in colour. It appeared to be attached to the liver by a short mesentery in its lower part, the fundus being freely movable and unattached. The cystic duct had three complete twists in a clockwise direction. The gall-bladder fissure of the liver was closed. Cholecystectomy was performed, and the patient made an uninterrupted recovery.

COMMENTARY

Upon consulting the literature relevant to the condition I find that Rendle Short and Paul (*Brit. J. Surg.*, 1934, **22** 301) give a very complete account of it, with a survey of all the recorded cases, fifty-three in number, of which only twelve were recorded by British surgeons. Since then seven fresh cases have been reported.

I have not been able to examine the accounts of all the fresh cases, but in those which I have studied the similarity of the histories is striking and seems to indicate that, in spite of its comparative rarity, pre-operative diagnosis should be possible. The cardinal points seem to be the local symptoms and signs of acute cholecystitis, but with no rise of temperature or pulse for some days, no evidence of jaundice, and the sudden, rapid development of a palpable tumour in the gall-bladder region.

In all cases the gall-bladder is not situated in the fissure, but is attached to the liver by a short mesentery; this may possibly be explained by the fact that the con-