

demanding for working out the extermination of infectious diseases. I cannot forbear calling attention to the collateral means. There must be efficient local boards of health, co-operating with State boards, all of which are controlled by a central national organization under the United States government. The highest intelligence of expert sanitarians would thus penetrate all communities and concentrate action on a common foe.

TRACHEOTOMY AND INTUBATION AT THE BOSTON CITY HOSPITAL.¹

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PREVIOUS to July 1, 1892, tracheotomy for croup had been done 514 times at the Boston City Hospital. One hundred and sixteen patients recovered (22 per cent.). Intubation has been done 502 times between December 31, 1886, and the above date. There were 91 recoveries (19 per cent.). In 58 instances both operations were performed, and only 7 recovered (12 per cent.).

A clearer statement of the facts would be as follows: primary tracheotomies 456, recoveries 110 (24 per cent.); intubations without tracheotomy 442, successful 90 (20 per cent.). This shows a difference of four per cent. in favor of the older operation.

Before the introduction of intubation 327 tracheotomies had been done and 95 recovered (29 per cent.). Since the new method came into vogue in this hospital in December, 1886, 129 primary tracheotomies have been done, with 15 recoveries (11 per cent.). During the latter period the ratio of recoveries under the various modes of treatment is as follows: intubations 20 per cent., primary tracheotomies 11 per cent., secondary tracheotomies 12 per cent.²

In estimating the relative value of tracheotomy and intubation it is well to have a clear understanding as to the purposes for which these operations are done; as to the definite results to be reasonably expected from them. In the great majority of cases of croup the result largely depends upon three conditions, to wit: laryngeal obstruction, bronchial croup and septicæmia. Now it is more than doubtful if either of these operations has any direct influence whatever upon the extension of the membrane, or upon the septic infection. They are done to overcome any obstruction to free and easy respiration located in the larynx, and no other direct result can reasonably be expected of either procedure. The type of the disease, more than all things else, determines the result of the treatment.

The great importance of giving relief to the laryngeal difficulty is indicated by the nature of the affection itself and also by the fact, that life is prolonged, and more time is thereby obtained in which to combat the various complications. In very many instances the operations are successful and satisfactory, although the result of the disease is fatal. The patient succumbs to sepsis in some of its various forms or to some other complication, but has no more trouble from the dyspnoea. The operative or surgical part of the treatment was successful, in that it accomplished all that could

have been expected of it, by overcoming the difficulty in breathing through the larynx.

Hence, I submit, that a more rational criterion by which to estimate the comparative merits of tracheotomy and intubation would be the amount of relief to the laryngeal dyspnoea resulting from each operation. Judged by this standard, rather than by the result of the disease, which operation gives the most satisfactory relief to the difficult and labored respiration of acute laryngeal stenosis in children?

Every one who has had much to do with tracheotomy, is familiar with the favorable change, which follows the introduction of the tube into the trachea, providing the obstruction is not too low in the air-passage. Unfortunately the respite after both operations is all too brief, but for some hours it is so striking that one needs to be on his guard as to the ultimate prognosis.

In 110 cases of the later intubations at the Boston City Hospital, a record of the immediate effect of the operation upon the dyspnoea was made, with the following results: In 75 instances the relief was immediate and complete: 22 patients were so much benefited that no further operative treatment was required. In 13 cases no relief was obtained by the laryngeal tube. In one instance membrane was pushed down in placing the tube. Immediate tracheotomy was done and the child recovered. In another favorable case it is doubtful if the tube entered the larynx at all. In several of the cases little or no relief was obtained by opening the trachea after intubation, which is not an uncommon result, except in those instances of displaced membrane.

Any method of overcoming the dyspnoea of croup, which gives sufficient relief for all practical purposes in nine cases out of ten, as indicated above, is worthy of our respect and consideration.

Does tracheal section relieve dyspnoea in those cases in which intubation fails? That is the key to our subject and a correct answer will decide the question at issue. Should membrane be pushed down by the laryngeal tube and the patient be unable to expel it, then tracheotomy may be depended upon for relief. These cases, however, are not very common and there are not many exceptions to the rule, that if intubation does not relieve the dyspnoea, little benefit need be expected from tracheotomy. It is obvious that neither operation will do much good, if the obstruction is situated below the point reached by the tracheotomy tube which does not extend enough lower than the laryngeal tube to make any difference in the result. Cases of rapid or difficult respiration due to extension of the morbid processes or to sepsis, are not benefited by any method of treatment with which I am familiar.

Secondary tracheotomy has been performed 58 times in this hospital previous to July of this year. Seven recovered (12 per cent.). It will be noticed that the results of primary and secondary tracheotomies in late years are about the same, and are due to the fact, that only the worst cases are subjected to this mode of treatment. Intubation, even if not successful, does not seem to lessen the patient's chances for relief, except in the gravest cases, when any disturbance may result in collapse. Except in those cases in which the laryngeal tube becomes occluded in its introduction, very little benefit resulted in many instances from opening the trachea, after a fair trial of intubation. It is best just to say, that the lack of skill and experience must be held responsible for some of the failures of the new

¹ Read before the Surgical Section of the New York Academy of Medicine, October 20, 1892.

² For the later statistics in this paper I am indebted to Dr. W. H. Prescott, formerly house-surgeon.

method in the above cases, rather than the character of the operation itself. The failures of intubation were generally due to pushing down membrane, faulty introduction of tube, or to the obstruction being situated so low that no operation could give relief. In the great majority of cases the right tube, properly placed in the larynx, will afford adequate relief to the acute symptoms of laryngeal obstruction.

The fact that 502 intubations have been done at the Boston City Hospital during the past five and a half years, and only 129 primary tracheotomies, shows pretty conclusively, that the new operation has supplanted the old one to a very considerable extent in that institution. Intubation, as a rule, is the primary operation, and only in case of failure, is the trachea opened. Considering the large number of surgeons who have charge of our diphtheria wards at different times, it is remarkable to what an extent this operation is performed. There is necessarily a personal equation in these matters, and unless a particular mode of treatment has much in its favor, it is hardly to be expected that a dozen different surgeons would resort to it year after year in preference to its old and well-established rival. Such are the facts, and the lesson is unmistakable.

Intubation is by no means a perfect method of relieving laryngeal obstruction. That is yet to be invented. But it has sufficient advantages to give it a permanent place in the treatment of this affection. It will never entirely supplant tracheotomy, as the latter possesses some desirable features which cannot be claimed for the former. The most important of these is the facility of swallowing. The dysphagia is the most serious objection to intubation. In a small number of cases it is difficult to get the patient to take sufficient food and stimulants by reason of the choking at every attempt to swallow. A good nurse possessing tact and perseverance can overcome this difficulty to a great degree, but unfortunately such a person is not always attainable. In a hospital this objection does not have that importance which appears in private practice. In a large proportion of cases, however, the difficulty is not great enough to lead one to abandon the plan of treatment.

Among other objections to the laryngeal method are the facts, that occasionally the tube is coughed up repeatedly; that it becomes occluded; that there is no expectoration; that for some reason, not always apparent, it does not relieve the dyspnoea; and, finally, that the tube can not always be introduced into the larynx. While it is true that all of these complications are met with, yet they are not sufficiently common, nor so difficult to overcome, as to lead any one, who has had a fair amount of experience, to give up the method. Tracheotomy is by no means free from complications, such as hæmorrhage, sudden blocking up of tube, shock, etc.

That any one with reasonable dexterity, who has done both operations a good many times, should consider the new one the more difficult to perform, is beyond my comprehension. One requires from five to ten minutes including the time necessary for preparation; the other from half an hour to an hour. In the new operation no anæsthetic is required; the light is of secondary importance; there is no hæmorrhage, and except in the worst cases little danger is to be apprehended from shock.

Unless one's early experience with intubation has

been peculiarly favorable, he is prone to condemn the method upon insufficient evidence. Croup is not an easy disease to manage by any method known to the profession, and the new one is no exception to the rule. A fair amount of skill, perseverance and experience are requisite for a satisfactory management of these cases. From thirty to fifty examples of each operation are necessary to enable one to form an intelligent opinion of the advantages and disadvantages, the accidents and complications incident to each. Personal peculiarities will always be a factor in choosing the method of treatment. But the strongest advocates of intubation will be found among those who have had the largest experience, which is the best and safest of all teachers.

In conclusion, allow me to say, that in a majority of cases I think intubation is preferable to tracheotomy for the relief of acute laryngeal obstruction in children under seven years of age for the following reasons: It relieves dyspnoea; it is more quickly and easily done; consent of parents or guardians is more readily obtained; it will be resorted to earlier in the disease; it requires no more skill and care in the after-treatment than does tracheotomy; the tube takes care of itself; it is less likely to "gum," or to become obstructed; no anæsthetic is required; as there is no cutting, there is no hæmorrhage; it is not regarded as a surgical operation by the parents and friends; and finally, the records of the Boston City Hospital indicate, that the results are nearly as favorable, as after the other method of treatment.

Such are the reasons for the opinion expressed in this paper, and they are based upon the experience of my colleagues, and of myself, in upwards of a thousand operations. The type of the disease will vary at different times, thereby affecting the results. Accidents and complications will occur not infrequently in both plans of treatment. But after making due allowance for these facts, as well as for individual preferences and peculiarities, I venture the statement, that Dr. O'Dwyer's operation will remain in the opinion of a large number of surgeons for a long time to come, what it is at present, a reasonably safe, efficient and satisfactory method of relieving acute laryngeal stenosis in children.

TRACHEOTOMIES AND INTUBATIONS AT THE BOSTON CITY HOSPITAL TO JULY 1, 1892.
(Fractions omitted.)

	No.	Recov.	Per cent.
Tracheotomies,* total	514	117	22
Intubations, total	502	97	19
Tracheotomies, primary	456	110	24
Intubations, without tracheotomy	442	90	20
<i>December 31, 1886, to July 1, 1892.</i>			
Intubations, total	502	97	19
Tracheotomies, total	187	22	11
Intubations, without tracheotomy	442	90	20
Tracheotomy,† primary	129	15	11
Tracheotomy, secondary	58	7	12
Tracheotomy,‡ to December 31, 1886	327	95	29

* Dr. W. H. Prescott.

† Prescott and Goldthwait: Boston Medical and Surgical Journal, December 31, 1891.

‡ Lovett and Munro: American Journal of Medical Sciences, July, 1887.

It is stated in a German paper that more than twice as many people died in London last winter from influenza as died in the same city, during the year 1843, from cholera.