

a handful of ashes. Is the answer to be that death was due to "heart failure," or to "carelessness," or "to an eclipse of the moon"?

### TRACHEOTOMY FOR DIPHThERIA IN CHILDREN.

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THERE is considerable difference of opinion as to whether a low or high tracheotomy should be performed for the relief of urgent dyspnoea in children suffering from diphtheria. There are objections against either form. But so far as I am aware, there appear to be more objections against the performance of a low tracheotomy than against that of a high one.

In high tracheotomy, especially in children, laryngeal stenosis sometimes occurs, due to œdematous granulations at the seat of operation, which is very close to the larynx. Thus, in a series of 53 cases where high tracheotomy had been performed, in 5 laryngeal stenosis was observed with the result that the little patients could not do without their tracheotomy tubes. On removal of the tube, urgent dyspnoea with cyanosis supervened. In one case for the relief of this symptom the tracheotomy tube was taken out and intubation was attempted without success, owing undoubtedly to the stenosis that had taken place. In every one of these cases low tracheotomy had again to be performed, which made the healing of the high tracheotomy wound possible and led to the disappearance of the œdematous granulations. After 4 or 5 days, the low tracheotomy tube was removed without any trouble. In the 77 cases of low tracheotomy performed by me, there was not a single instance where dyspnoea persisted after removal of the tracheotomy tube in the usual course in 2 to 3 days.

The objections against a low tracheotomy are, (1) that the trachea in the lower part of the neck lies deeply, (2) that there is a danger of injuring the large vessels, which pass into the neck from the thorax, (3) that owing to the depth, which separates the trachea from the skin wound, a large tracheotomy tube is required as otherwise it is coughed up, (4) that there is a danger of producing mediastinal cellulitis, and (5) that there is a likelihood of driving the diphtheria infection into the trachea. Thus, the arguments against a low tracheotomy appear to be quite formidable, but fortunately do not stand examination. When a low tracheotomy is performed in what I consider the proper way, there is no danger of wounding any large vessel, such an accident never having occurred in any of my cases. As for the other objections they appear to me to be purely theoretical, as I have never seen mediastinal cellulitis or extension of the diphtheritic membrane into the trachea when it had not already been there. In children, the depth at which the trachea lies is not great, and does not make the

operation in any way difficult. It is also quite easy to fit a proper sized tracheotomy tube into the trachea.

It will thus be seen that when correctly performed a low tracheotomy, as it does not produce laryngeal stenosis and is also definitely indicated in those cases where the diphtheritic membrane has extended from the larynx to the upper part of the trachea, is the operation of choice.

In all these cases apart from septic bronchopneumonia, which is almost always present, the heart is enfeebled, as is well-known, by the diphtheritic toxin. It is therefore not advisable to use either ether or chloroform as a general anæsthesia in these cases, nor is such anæsthesia necessary, the only pain in the operation being a momentary one caused by the skin incision.

Descriptions of tracheotomy operations in textbooks are frightening, as is the situation where the operation is performed. Thus, a simple operation, which may be performed in 2 or 3 minutes, is regarded with fear by the general practitioner in this country and is not attempted, this resulting in death to many little children.

I will now take the liberty of describing the operation as I perform it. To me it seems that it would be better for beginners to forget the existence of all the vital structures which lie in the neck round about the trachea, because they are far away from the field of operation. The only caution necessary is that one should stick strictly to the middle line. In performing the operation, the structures that will come in the surgeon's way are the two anterior jugular veins, Burns' space, the thymus, the trachea, the inner edge of the sterno-thyroid muscles, and the thin line of deep fascia between them.

After having cleaned and sterilized the neck in the usual way, extend the neck by raising the shoulders on a sand bag and holding down the head at a lower plane. The little patient is rolled up in a sheet to make movement of the limbs impossible. One assistant holds the patient down by the lower limbs and another holds the head with great care, keeping it in the middle line. The surgeon stands to the right side of the patient.

Putting the tip of the index finger of the left hand at the sternal notch, a longitudinal incision about 2 inches long should be made exactly in the middle line down to the investing layer of the deep cervical fascia. This brings into view the thin line of deep cervical fascia between the sterno-thyroids in the middle line, and also resting on the muscles on either side the two anterior jugular veins. There is little or no hæmorrhage at this stage of the operation, and there is no pain felt subsequent to this. With the sharp edge of a small scalpel directed towards the chin pierce the deep cervical fascia at the level of the lowest points reached by the anterior jugular veins before they disappear into Burns' space to communicate with each other, and continue dividing the two layers of the deep cervical fascia which

form the walls of Burns' space. The large vessels, which pass from the thorax into the neck, are situated well below this level behind the pre-tracheal fascia. This incision should be carried upwards, that is towards the chin, for a distance of an inch and a half. The knife should penetrate to a depth of about half an inch and keep strictly to the middle line. There may be a little bleeding due to the division of a few very small veins which are congested. None of these vessels requires any attention. If the soft tissues thus incised are now separated, the thymus comes into view and the outline of the trachea behind the pre-tracheal fascia can be perceived.

To perform the next stage of the operation, the thymus is pulled down with a hook by an assistant. With the tip of the left index finger the trachea is palpated immediately above the thymus, and a half inch longitudinal incision is made into it through the pre-tracheal fascia with a tenotomy knife with its sharp edge directed towards the chin. The edges of the tracheal incision are now separated by the tracheal dilator and a well-fitting silver tracheotomy tube fitted into it.

The retraction of the soft tissues is only necessary for beginners, and for this purpose the self-retaining retractor devised by me will be found useful. It assures not only wide separation of the tissues, but also secures equal separation on either side of the middle line, preventing lateralization of the trachea. It can be steadied by the tip of the left index finger while the knife incises the trachea between its two blades. The old fashioned hook retractors do not bring about equal retraction on either side, whether the retraction is done by an assistant or by the surgeon himself. The result often is that the trachea is pulled more to one side than the other, thus confusing the beginner. An illustration of the

retractor is given below. The operation is now finished by carefully bringing the skin edges together above and below the tracheotomy tube. There is no danger to any vital structure if the operation is performed as described above, and it takes only about 2 minutes to do it.

One helpful suggestion may here be made for the beginner, and that is that before incising the skin the line of incision exactly in the middle line may be traced on the skin with the point of a needle, the knife later following this line. Hooking the trachea to fix it is unnecessary. Retraction of the soft structures by hooks is confusing. Chloroform or ether as a general anæsthesia is positively dangerous.

THE INTENSIVE TREATMENT OF KALA-AZAR BY NEO-STIBOSAN.

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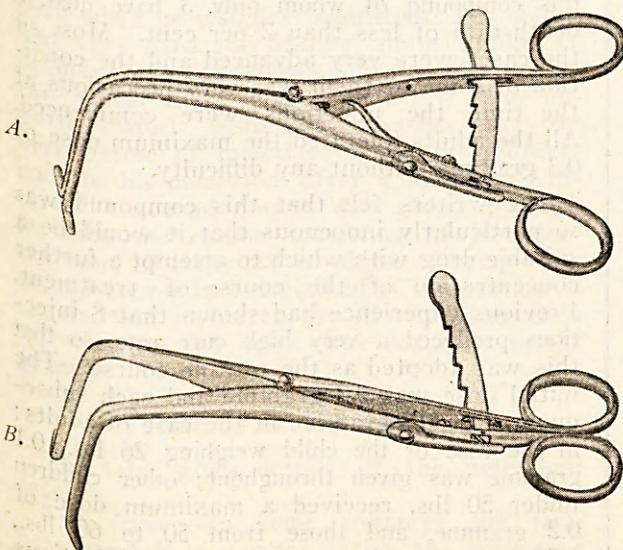
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THE treatment of kala-azar has now reached a comparatively satisfactory stage; thirteen years ago the death-rate in kala-azar was said to be 95 per cent. (though in our opinion it is doubtful if it was ever as high as this), whereas now, at whatever stage of the disease the patient first comes under treatment, the recovery rate should be at least 95 per cent. Many pentavalent compounds have been used; a number of these have proved satisfactory, but there is still scope for further work on this group of compounds and it is very probable that others, even more satisfactory than those at present in use, will be found. It also seems possible that some advance may be made in the methods of administering these compounds.

It is not known how the antimony acts, but it is almost certain that the action is not directly on the parasite. The largest single dose of any of the antimony compounds that is given does not amount to a 100,000th part of the body-weight of the patient, the antimony is fairly evenly distributed amongst the various organs and tissues of the body, and the concentration in any one organ, except possibly the kidneys, is unlikely to be greater than 1 in 10,000 at any time. As the antimony is very rapidly excreted, especially when given in the pentavalent form, the cumulative effect is probably not very great. On the other hand, we know that solutions of antimony compounds of 1 in 100 have no effect on the flagellate form of the parasite *in vitro*. It has been suggested that, as is the case with arsenic in the salvarsan group of compounds, the parasitotropic action of



Tracheotomy Retractor devised by the author. A, closed; B, opened.