BRONCHOTOMY.

By...

[Signature]

[Handwritten name]
Splenectomy and its applications is a department of surgery with which the surgeon should have a thorough knowledge. I would urge this necessity as an apology for my choosing it as the subject of my thesis. The necessity of something more than a mere empirical knowledge in this operation must be apparent, when we consider how sudden in many cases are the calls for its performance, how fatal the slightest delay may prove, and yet how dangerous an ignorant task is.

Surgical aid is required in the case of a patient seized with suffocation. The surgeon makes on the examination. Unless his knowledge is accurate, his diagnosis may be wrong, and consequently his treatment ineffective.

It is thus evident that a complete knowledge of the various causes which require this operation is of great importance. No time is lost to which a medical man or friend can be entrusted, and if the patient dies the surgeon standing with
performer is rigid, and with justice.

On the other hand, with a complete knowledge of the subject, the surgeon proceeds with that confidence in his abilities, which is always the result of a perfect knowledge. He becomes the cause of the arrangement, if the operation is required, he performs it with facility, truth, care, the patient's life and obtaining the credit due to a successful operation.

Another branch of this subject is the various stages of disease in which it is advisable that the operation should be performed. That complete success may be obtained, the surgeon must also make this a matter of study, as it is of much importance in this, as in every other operation. That the proper time be selected for its performance. Thus in cases in which the patient's condition whether the operation is performed or not, either when the part of the system is so much affected by disease, that the only effect-
of the operation will be a temporary effect from
death. Of these and all other cases relating to this
operation, the surgeon, if he wishes to acquire a
standing in his profession, must have at least
a complete theoretical knowledge.

For this purpose, believing in its importance,
I have chosen it, so that while fulfilling the
requirements of the University in writing a med-
cal thesis, I may at the same time gain a
more rapid command of medical knowledge
upon this subject.

I do not in submitting this to your notice lay
any claim to originality; the subject has been
largely treated by experienced medical men
both in this and other countries, to account of
a type in the surgical art, adding to the stock of
accumulated knowledge. All I can hope to
do, is to present you with an account of the
various opinions as to the causes and stages of
disease in which this operation is called for, and
The methods of its performance according to the best authorities. Among those which I have consulted may be mentioned, Cooper, Silver, Byrne, Bailey, Ferguson, Frater, Wrig, Wast, and Peter.

Bronchotomy is derived from the Greek terms, bronkos, the windpipe, and TEPHE, I cut.

Of the true care of its performance or of the operator finely, there is no certain record. It is commonly thought in the authority of Galen to have been Hippocrates. The obvious nature of the operation as a remedy in most of those cases in which it is performed, must have suggested it as a very early period in the history of medicine. It was practiced in the Greek school, and the Arabic and other eastern races still practiced it, as handed down to them from antiquity. It has in modern times been practiced with great success in France, and in our own country.

Under the term Bronchotomy is included the two distinct operations of Tracheotomy.
and Laryngotomy. Tracheotomy (from ῾ΠΑ῾ῼ, the neck, and ῾ΡΑ ῾ΥΡΟΥ to cut) and Laryngotomy (from ῾ΠΑ῾ῼ, the larynx, and ῾ΡΑ ῾ΥΡΟΥ to cut) are performed in cases in which the access of air to the lungs is prevented by some obstruction arising either from disease of, or accident to, the air passages.

Many surgeons have hesitated in performing this operation from the apparent danger attending it, and as to doing have endangered or altogether annihilated the patient's chance of recovery. Such hesitation is however quite uncalled for, as the principal danger is that arising from hemorrhage, and may easily be avoided if the operation is performed skilfully and carefully. And this objection but of course was exploded, i.e., that wounds of cartilage are indissoluble to heat. Cases illustrating the fallacy of this idea came recently under my notice, while attending
The lecture on clinical surgery by Mr. Lyman last summer. In this case the nasal cartilage was very much hypertrophied. Mr. Lyman excised a piece of the cartilage of a double convex shape. The operation was entirely successful; the wound healing satisfactorily, and the natural colour of the nose being in a great measure restored.

The practicality of this operation is now beyond a doubt. To perform it successfully, a minute knowledge of anatomy and a dexterity of manipulation is required, both of which can only be obtained by long and frequent direction of the two operations: Laryngotomy and Tracheotomy. The former according to Mr. Denuit is unquestionably and easily performed, and is to be preferred in sudden emergencies, but the latter most readily admits of the removal of foreign bodies and is generally chosen in cases of suffocation from disease. Mr. Lyman prefers the latter operation, but restricts its performance to that part of
The trachea which is immediately below the cricoid cartilage: for the following reason. That in Tracheotomy the space occupied by the operation, although comparatively superficial is objectionable, because of the difficulty in obtaining a large enough aperture for the introduction of the tube without incising the laryngeal cartilage; and also in most cases in consequence of its proximity to the site of the disease. That performance of Tracheotomy near the sternum is objectionable from the depth of the trachea, and the probability of injuring the Thyroidal blood which are situated in the line of incision, and also the occasional presence of a branch from the Carotid named the Internal Thyroidal Aorta; and also the small space which is often left by the transverse portion of the Thyroid gland. That the great arteries at the root of the neck may be situated higher than usual, and be susceptible
to be injured, hence the necessity of piercing the
fingers to the bottom of the wound to protect the
joints in this situation, and also the precautions
of introducing the knife with the blade downward.
Mr. Miller is of opinion that
excepting the case of artificial aspiration on
account of asphyxia unconnected with
laryngeal disease, or the case of a foreign body
impacted in the aëria glottidis, tracheotomy
is preferable to laryngotomy. He urges for
this the performance of the operation in any
case where the danger depends on disease of
the general system, rather than on a particu-
lar affection of the larynx or trachea.
The air passages being obstructed and an
operation for the relief of the patient having
been determined upon; laryngotomy or
tracheotomy according to circumstances is
performed in the following manner. The
patient of an adult is placed in a convenient...
position with his head extended, in order that increased prominence may be given to the trachea and that these will may be obtained for the operation. If the patient be a child it should be placed upon the knees of a nurse or of an assistant, that any tendency may be curtailed towards muscular excitement. If Laryngotomy is to be performed an incision is to be made over the larynx about an inch below the prominence adami in a longitudinal direction and central position. By dissection the crico-thyroid membrane is exposed, and an opening is then made into the larynx, as large as the cartilaginous space will allow. Unless the crico-thyroid cartilage is of an enlarged bise, it is seldom extensive hemorrhage. Cases however have been known in which the patient has died of death from a wound of this bise. In performing Laryngotomy the patient is
placed in the same portion as directed for the former operation. One incision is made to be made in the crural line, commencing at a little above the curved cartilage, and extending downwards about two inches. The fascia are thus divided, and the sternohyoid muscles brought into view; the space between which is recognised by its white appearance. On these muscles being separated and held aside, the trachea is observed. The point of the knife with the back downwards is thus to be inserted between the third and fourth rings of the trachea and then carried upwards, till an opening is made of sufficient size for the introduction of the tube without force. During the operation care must be taken not to injure the tracheal portion of the thyroidea gland; this may be prevented by exerting an upward pressure upon it.

A curved silver tube of a flattened conical shape
is now to be introduced and retained by strings passing through rings in the sides of the tube, and tied together at the posterior part of the patient's neck. The size of the tube should vary with the age of the patient; it should be nearly equal to the size of the trachea. It should not be introduced until the bleeding has stopped, which is assisted, or made easier by ligature of various ligatures. The introduction of the tube causes irritation of the trachea, the result of which is a violent fit of coughing, during which a quantity of mucus and any blood that may have entered will be expelled.

The operation, so far as is concerned the surgeon being now completed; the patient is to be placed in his bed in such a position as to allow the escape of any further mucus or blood. Particular attention must be directed to the tube that it may not become obstructed. To prevent this it should be occasionally cleaned by passing
Through it a probe covered with lint, or felt, better, the use of a double cannula, so that while cleaning the one part the other may be retained in the wound. A piece of gauge or muslin should now be placed over the mouth of the tube, to prevent the entrance of insects or any other injurious substances; of course allowing free liberty for the entrance of air. The tube must be retained until breathing can be performed in the usual manner. But if the disease is of such a nature that this become impossible the tube must be retained through life. Little inconvenience can be experienced by its removal. Breathing is performed in the case, and the voxx may be some degree be restored.

The great relief which the patient experiences after the operation is apt to cause the surgeon to relax his treatment of the disease. This is a great mistake, as Taxectomy is not a
paradine but only a palliative operation. The attempt to subdue the disease should still be continued with unremitting energy.

Some surgeons prefer performing this operation by means of a simple trocar and cannula, others by the same instruments but in a complicated form. As examples of the latter class of instruments may be mentioned the chien trocar of Mr. John Wood. Also an instrument invented by Dr. Marshall Ward, which is described by Dr. J. Gray as follows. It consists of a cannula with a cutting edge, through which passes a trocar cylinder, terminating not in a cutting point but in a small hook. The two are connected by a small screw, by which the cannula revolves upon the trocar within it. The hook points projects a quarter of an inch beyond the cutting edge of the cannula. The instrument is applied by seizing the portion of the tissue to be removed with the hook, the
Canula is then screwed down with its cutting edge on the axis of the trackea and the central portion drawn out; the canula may be retained or not. 

Mr. Mylly has used the first-mentioned instrument on one occasion, but he objects to its use on account of the difficulty he experienced in introducing it into the trackea. He speaks very highly of the latter, and goes so far as to prefer it even to the use of the knife.

With all due respect to Mr. Mylly's opinion, I must differ from him regarding the advantages attending the use of this instrument as I think that it tends to make the operation more tedious, and consequently causes more suffering to the patient. Because before the operation can be performed by this instrument, an incision must be made over the spot where it is intended to be used. Would it not be better to make a second incision into the trackea with the knife at once, and
Thus quick the operation; Thus lose time by a public exchange of instruments?

The cases which require this operation may be divided into constitutional and accidental. Those which come under the first head, are:

Insufficiency, Laryngitis, Indwelling of the Globe, Contraction of the Eardrums. Those which are accidental are:

Glossitis, Impaction of Foreign Bodies in the Larynx or Trachea, Cold Thrup, Suspended Anæmia.

As regarding the time when the operation should be performed, we should not be

guided merely by the nature of the disease. We should, to the necessity for its perfor-

mance, and the probability of an after-scar, operating being capable of relieving the patient.

If there are symptoms of impending suffocation accompanied by hoarseness of the voice;

The operation should be performed without loss of time. It would be impossible for
one is to treat fully of all the above cases. It shall therefore only of the greatest importance, and justly deserved. The object of ligature the operation of tracheotomy, must be of very slow nature. The tonsil must be of such a size as almost to be approximated, and the soft palate pushed up by these to a great measure or entirely to stop the access of air through the nasal fossa. Some surgeons recommend incision of the tonsil, for the purpose of relieving the congested state of the blood vessels, and forming an opening for the exit of matter if present. But in some cases of tonsilitis, it is impossible to reach the glands for this purpose, since the mouth is completely shut, and therefore prevent the passing of instruments. In these cases, it should be considered threatened, the only drainage is tracheotomy.

Laryngitis. In the first stage of this disease...
there is an absolute call for the performance of this operation. But if the disease, instead of being arrested by the usual medical measures, advances in severity, so as to endanger death by suffocation, tracheotomy should be performed. If the inflammation is limited to the larynx, a more favorable result may be expected than if the trachea is involved.

Meduca Glutaei, is an effusion of serum in the
acinar tissue of the mucous membrane of the
larynx. In consequence of this effusion, the
mucous membrane from the sides of the larynx
is speedily approximated, and thereby causes
the most distressing dyspnoea and various other
symptoms which naturally arise from such a
condition. The swelling of the mucous membrane
can be felt of the finger, he introduced into
the mouth inside the glottis. As soon as
it has become apparent that medical treat-
ment is of no avail, and if determini to any other
cerebral symptom should arise, then tracheotomy
must be performed. In this case it is the only
operation which would be advantageous, as
laryngotomy if performed, would be upon
the site of the disease and above the obstruction,
and so would be useless. Here as well as in all
other inflammations it is of the greatest ad-

cantage to give rest to the part affected. This
advantage can only be obtained by tracheotomy.

Before performing this operation however, the
surgeon should consider whether benefit
may not be derived from a scarification of
the glottis by means of a curved knife.

Dr. Laywell proposes to scarify the glottis
by means of a small lancet attached to the
extremity of the index finger, so as to incise
the glottis in the introduction of the finger.
This is however but seldom attempted.

Whether from its difficulty, danger, or
incidence, I know not.
lobulus, is an affection of the throat peculiar to children, although some cases have been known in which the patient had arrived at the age of maturity. Dr. Oates describes a case in which a girl of twelve years of age died of it, while under his treatment. It consists principally of an inflammation of some part of the larynx or larynx, extending in all directions into the alternate air cells of the lungs. A membranous crust is formed over the affected parts by the effusion of lymph, which, combined with spasmodic closure of the glottis, prevents the elevation of the blood by preventing the entrance of air, and thus causes death.

Throatotomy in this disease was first advocate in theoretical grounds by Dr. Home. But many years elapsed after his proposition before any attempt was made to reduce it to practice, and unfortunately for Dr. Home's theory.
its practice was for a long time uniformly unsuccessful. Just as only one instance could be recorded in which the patient's life was saved. The operator in that case was Dr. Lister of London, who performed it in 1792. In France the operation had been much more successful than in this country. I endeavoured to explain this by saying, that in France the expectoration of the nasopharyngeal symptoms are induced in the majority of cases by the exteriority of the layers of false membrane originally deposited in the faucets and soft palate. While the trachea and tracheitis, which in this country, often accompany or even usher in the laryngeal affection, are then secondary in point of time, and subordinate in importance. Some may however be attributed to the earlier stage of the disease in which the operation is resorted to abroad than in England, so that while in this country a successful tracheotomy prevents a child matched from inevitable death, in
not a few of the instances of its performance in France other means might have been tried and probably have controlled the disease. Among the surgeons of this country it is still a question as to the propriety of this operation in cases. No one entirely deny its efficacy, others partially admit it, while others are strenuously in favour of it. Its efficacy depends greatly on the state of the disease, whether it is confined to the lungs alone, or extending downwards into the bronchi, and also whether it is accompanied with any pulmonary disease. In the latter case it is plain that the operation wherein performed, can only result in a prolongation of the patient's life for a short time, by furnishing an exit for flakes of false membrane which could not pass the larynx glottides, and thus opening a passage for the temporary admission of air to the lungs. But in the former case, if our
diagnosis leads us to believe that the disease is confined to the larynx alone, and that no abnormal thoracic or pulmonary symptoms are present. Thus I think a successful operation may be hoped for. Everyone is in no way favourably impressed with the efficacy of this operation itself. A case, however, in which this operation was entirely successful just came under Dr. Lyon's notice in 1860, which is of so much importance as illustrating the value of tracheotomy in cases, that a detailed account may not be out of place. The patient was seven months and a half old, and was brought to the Infirmary on September 3, 1860. Respiration was very difficult, each inspiration was attended with a croaking noise. The extremities were cold, and the face pale and slightly bluish. The pulse weak. The child could not take the breast nor sleep.
Friday. The child had been complaining of a cold in the breathing since the proceeding Tuesday (August 26th). The glands in the right side of the neck were considerably enlarged, but no suppuration could be detected. The mother stated that the child became feverish and complained of feverishness was accompanied by a cough and sore throat. At the commencement it had been given four grains of blue powder, and every night of the preceding week a teaspoonful of castor oil. Poultice had been applied to the enlarged glands.

Soon after its admission it was put for a short time into a warm bath, and a mustard poultice was applied to the cheeks. By these means warmth was induced, and it seemed much easier.

Sept 4th. Same. Symptoms is still very great. Has not slept since yesterday, and is evidently
becoming very weak. When seen by Dr. Jones
Tracheotomy as a last resource was believed
to be performed. The breathing did not
improve in an hour or two. When visited
by S. Bell M. D., the afternoon the breathing
had not improved, and the weakness
had increased. Tracheotomy was per-
normed and immediate relief followed.
Very little spasm followed the introduction
of the tube.
When the trachea was opened there were
distinctly seen ragged portions of false lere
brane adherent &- and oozing from the
walls of the trachea. After the operation
some milk was given to the child, which
it swallowed with avidly, and shortly
after fell into a quiet sleep. When seen
in the evening it was much better. The
natural heat and colour had returned.
Can take the breast and breathe with
perfect freedom. A considerable quantity of dirty
mucus had collected in the tube, and required
to be removed with a feath-
Sept. 6th. Rell was called early this mon-
ning to see it. The ground of looking very cily &
The tube choked by a quantity of watery mucus,
the removal of which the child was considerably
aliev. Sound breathing in the chest,
Sept. 8th. Has gone on well. Powell feels opened
this afternoon. Sleeps, eats, and takes good
well. Pulse strong and full
Sept. 12th. Progressing favourably. Tube
changed. Sleeps well. Nov. 13th. Going
well. The tube is changed every second day
Nov. 27th. Tube is taken out and the aperture
closed by plaster. When the tube was taken
out there was a good deal of irritation and
coughing, but this soon passed off
Dec. 7th. Child was seen quite well. The
aperture is nearly healed. As to stone remarked
that this was the youngest child, in second, after whose tracheotomy had been successfully performed.

Dec. 24. The aperture has been healed three weeks. The child was discharged today. Great care is required in tracheotomy, as it is a condition of life. It may be induced by accidental causes, such as bites of insects, and also from constitutional causes. A. T. Bell says, "Should a case present itself too advanced to admit of waiting for the effects of liniment, life must be saved at all hazards by tracheotomy."

Mr. Benjamin Bell saved a patient's life by tracheotomy, in a case of glottis produced by mercury.

Pus and foreign bodies in the larynx Hechens. Tracheotomy is more immediately required to be performed in a case of this nature than in any other.

It often happens that a person during a meal shows symptoms of suffocation from a portion of food.
Having stopped the respiratory passage, so that a child while aconstricting itself with some small substance may suddenly become inensible from it having passed into the larynx. In such cases the presence of a foreign body may be diagnosed by the history of the case, and if the substance has not become in-pacted, and if light, it may in some cases be felt moving during inspiration; causing an intense violent fit of coughing, during which it may be expelled. If the substance however be as large as a bean, it is impossible for it to be thus expelled as the local ends during inspiration are approximated so that the space left between them is not sufficiently large for the passage of the foreign body.

Before performing any operation, an attempt may be made to get of the substance by inverting the body, when the foreign body may fall out by its own weight. The surgeon should also at making his diagnosis as to the necessity of an operation, make himself certain, that the symptoms
are caused by the presence of a foreign body in the
trachea, and not in the oesophagus, by passing a
probe or of necessity down the latter, as cases have
been known, in which, the impaction of a foreign body
in the oesophagus has been the cause of the patient's
death, after the operation of tracheotomy had been
performed. If the substance has become impacted
in the larynx, some surgeons recommend that laryn-
gotomy should be performed as beingearer
the position of the substance to be extracted, by other
that tracheotomy should be performed, and
the foreign body pushed into the pharynx.
Mr. Ferguson is of opinion, that enquiring the
impunity of a foreign body being impacted between
the vocal cords, he knows of no other evidence to-
delete laryngotomy to tracheotomy. If the foreign
body is not expelled after the incision into the
trachea, it should be searched for by means
of curved forceps and extracted. After its extraction
it is necessary to keep the wound open; it should
be brought together and treated for adhesion.

Besides the foregoing cases, bronchotomy has also been performed with various success, especially in cases of ulceration, and in phlegmatic leucotaxis from, sperm of the glottis; ulceration of the cartilages and mucous membrane of the larynx; polypi of the larynx, and in the treatment of catarrhal.

From the perusal of the foregoing observations, I think that the following conclusions may be arrived at:

That tracheotomy is in nearly every case preferable to laryngotomy. That in this as in every other operation, there is no advantage to be derived from complicated methods in performing it.

That if performed skilfully and at the proper time, great danger is not to be apprehended.

That it should not be performed when the case is of sufficient to establish or general disease of the system, rather than in a particular affection of the larynx or trachea. That it is of service in glossectomy of tonsillitis of a chronic nature, when aphthae is threatened, either
where the usual remedies have failed or where the
climate is so sudden that no time is allowed for their
administration. That as laryngitis and oedema of
the glottis, it is to be considered only as a palliative, and
not a curative operation. This remark applies to
all other diseases for which it is demanded. The
success in success is very variable, depending on the
extent of the glottic membrane, and also upon the
preliminary complications which usually accompany
it.

Any observations must now come to a close. After
that I have derived considerable benefit from
the labour devoted to this dissertation. Although
fully aware that I have treated of this sub-
ject in its widest comprehension, I hope however
that this paper will deem it worthy of its
said approval.

[Signature: A. B. C. Harris]