Tracheotomy

in

Diphtheria

Ernest T. Roberts.
Tracheotomy

in

Ophthalmia

Being a Thesis, illustrated by records of twenty-nine cases, and composed by

Ernest Theophilus Roberts
Senior Resident Medical Officer
Children's Hospital, Birmingham
formerly
Resident Physician,
University Clinical Wards,
Edinburgh Royal Infirmary
Tracheotomy in Diphtheria.

The exceptional advantages for the study of Diphtheria in relation to Tracheotomy which are afforded by the Birmingham Hospital for Sick Children has led me to choose this as a subject for a thesis especially as the usefulness of this operation in diphtheritic laryngitis has been strongly questioned by many, a few indeed stating that it should never be performed in this disease.

Twenty-nine cases of Diphtheria in which it has been necessary to perform Tracheotomy have been admitted into this Hospital during the two years ending March 1st, 1889. The notes of these cases are appended to this manuscript, together with a synopsis of the cases arranged in tabular form which is intended to show the leading features of each, and to illustrate the various points of which this thesis treats.
Officers at this Hospital commenced in March 1888, and I am therefore indebted to my predecessor for the records of the cases admitted during the preceding year, March 1st 1887 to March 1st 1888.

The fact that I performed the operation of tracheotomy myself in cases 21, 28, 25, 26, 27, 28, and 29 has given additional interest to the subject.

The trachea has in all these cases been opened above the isthmus of the thyroid gland; and the manner in which the operation has been performed is similar to that described by Mr. Whitehead in the Lancet of April 30th, 1887, and recorded on page 190 of the Year Book of Treatment for 1888. The operation is performed as follows:—The head of the patient being bent well back over a wooden block, an incision is made extending from the cricoid cartilage downwards for about an inch, the incision extending through the skin and fascia, as deep
as the interval between the sternothyroid muscles; the scalpel is now laid aside, and a strong scissors—somewhat sharp-pointed—is used, not only to separate the sternothyroid muscles, but to split the strong fascia which runs down from the hyoid bone to enclose the isthmus of the thyroid gland. This fascia is split to a distance extending from the upper limit of the incision down to the isthmus below. The isthmus is then pushed down, and the trachea exposed to the necessary extent. The front of the trachea can in this way be cleared perfectly, and since the method is bloodless, the rings of the tube are seen glistening white at the bottom of the wound. A sharp hook is now fixed in the trachea immediately below the cricoid cartilage, and an incision made into that tube of the desired length. The bivalve cannula is then easily introduced, its blades being pressed together during its insertion.
The wound is held open from the moment the knife is laid down until the trachea is incised, with retractors of the size and shape of an aneurism needle. The operation is almost bloodless is easily performed, few instruments are required, and removes many of the dangers attending the operation which are mentioned in the text books. The account given above is taken with several modifications from the account referred to in the Year Book of Treatment for 1888 (p. 120) which I saw a short time ago.

Occasionally it has been found necessary to open the trachea more quickly and then the skin having been divided the knife is plunged into the trachea; in these cases where the patient is nearly moubound from asphyxia, chloroform is of course not given; but in all others, where there is sufficient time to perform the operation in the manner described above, chloroform has been given.
Anaesthesia is usually produced quickly, and the operation is completed without the necessity for any further administration. The depressing effects of chloroform are not appreciable in those cases where the operation is performed at a comparatively early stage in the progress of the laryngeal obstruction.

From the experience gained in the study of these twenty-nine cases, it seems clear that the early use of

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As soon as the hard, brawny cough, stridorous breathing, and recession of the soft parts of the chest wall (epiglottal notch, epigastric region, and lower intercostal spaces — and in young children the lower ribs also — are observed, which indicates that not only has the disease attacked the larynx, but that it is causing obstruction to the entrance and exit of air, tracheotomy should at once be performed.
If the operation be delayed until the restlessness of the child, the dyspnoea, cyanosis, and pupil recession of the chest wall (e.g. Case XXVII) show that death from asphyxia is imminent, the child will have more exhausted, and the membrane will probably have spread further along the respiratory passages. If the operation be then performed (and it is certainly still the best means of affording relief and a possibility of recovery) the child will in all probability die from asphyxia within the next forty-eight hours, or it will die from asphyxia in two to six days after the operation.

The administration of an emetic, which some make use of to endeavour to expel the membrane from the larynx would appear to be a dangerous proceeding seeing that the usually causes depression of the nervous system and the heart, and a useless method of treatment as the membrane
is as a rule quickly reformed during
the early period of the disease (this
being markedly the case on the tonsils),
and is moreover firmly attached to
the mucous membrane of the larynx
at least as low as the vocal cords.
Below this level it is said to be
more loosely attached.

If the operation is performed at
an early date it is in itself attended
with little danger to the patient,
provided that the after-treatment
of the case be carefully attended
to, and one has a nurse who
understands this.

Furthermore the operation has a
beneficial effect in giving the larynx
rest from the disturbing influences
of respiration, expectation, and so
speeding its return to a normal
condition.

In the after-treatment, indeed
in the whole course of the disease,
Alcohol is of great service in
diminishing the depression produced
by the disease, in stimulating the appetite, aiding digestion and
increasing the amount of tissue metabolism. It is perhaps best given in the form
of whisky, as this is said to be the purest spirit and large doses are taken well.

Carbonate of Ammonia is also of use as a stimulant and is also
of value as a means of increasing the expectorating power of the bronchi and
tubes.

In cases (XXVI and XXVIII) where there was much viscid mucus, difficult
to expectorate, causing frequent coughing and more or less obstruction in the
tracheotomy tubes and air passages, I have found the Carbonate of Ammonia
medicines doses of Vimin pneumaticus to diminish the congestion of the mucous
membrane of the air passages, render the mucus more watery, thus aiding
in its expulsion. This effect is deemed to have in the two cases in which
it was tried; and workable was
the effect that the nurse in charge of the case stated that in about an hour after each dose relief was obtained, and the mucus more easily expelled and with little pieces of membrane.

In many cases a hand-spray used near to the tracheotomy tube has been employed to aid in liquefying the sputum in and immediately below the tube, and to facilitate expectoration.

An oiled feather to clear the tube and treble immediately below it, and also excite coughing, is also often of use.

The use of the steam kettle and tent should be strongly recommended, if the weather be cold — especially if the brand come from the west or north — and also during the night time in warm weather. Its use has been abandoned by some, but I am of opinion that this is a mistake, and believe that if it had been used from the first in case 25 the boy would not have had bronchopneumonia, but would have recovered.
The steam retort used is the same as that devised by W. H. D. Parker, Surgeon to the East London Hospital for Children; and it possesses this advantage that fresh air is driven with the steam through the tube running horizontally across the boiler, as described by Mr. Parker. The tent used here is of the same shape as the child's bed but about six inches larger all round and reach the canopy reaching to the ground, if it is kept open for about two feet at the sides where the steam is entering a sufficient supply of fresh air is obtained.

Serebene may be added to the water in the boiler, especially if the air be offensive; about 2/3 of Serebene, made up with carbonate of magnesia and a little water, is added to the hot water each time the boiler is charged, which is usually done every four hours.

On admission the patient is usually given carbonate of potash in small doses, which some writers say
is of great use in this disease, together with Ferri Renibland, in doses of \( \frac{m v}{m v} \) or \( \frac{m v}{m v} \) every four hours. This mixture is usually continued until the fauces and tonsils are free from membrane, unless vomiting contra-indicates it.

The tonsils and fauces are painted every four hours unless it annoy the patient so as to interfere with his recovery; the application used being the following:

\[
\text{Glycerrini } \frac{3}{10}
\]

\[
\text{Sols. Hydrarg. Phenolor. (1-1000)} \text{ at } \frac{3}{10}
\]

With reference to the tubes used, silver are undoubtedly best, and the larger form for the outer tube is the one usually employed here, its introduction at the time of the operation being easy. The minor tubes should at first have no opening on its upper surface, so that the tongue may be shut off from the air passages below the tube, and thus the spread of membrane downwards
be prevented in cases where it has not already done so, and the lungs may obtain complete rest no air being allowed to pass through it. Later it is of advantage to have an opening on the upper aspect of the inner tube (and of the outer also) so that the inner may become accustomed to the passage of air through it, and so the tendency to laryngeal spasm be diminished.

The tube was first temporarily removed on the 8th or 9th day (average) in the first seven of the cases in which it was possible to remove it finally, and permanently removed on the 11th day (average). In the last three cases it was first removed on the thirteenth day (average), and finally on the twenty-seventh average. Whilst the tube was out, the wound was covered with lint, protective, and a bandage, so that
The air must pass through the larynx. Each case must, of course, be decided separately; but I believe that to delay the first removal of the tube for a few days, and to bring about the final removal more gradually, as was done in cases 24, 26 and 28, enables the larynx to recover more completely and lessens the risk of the occurrence of such sequela as psueudomembranous laryngitis, festula (e.g. case 6); I think the case 23 is one in which the tube was removed too quickly.

During convalescence Fodide of iron and cod-liver oil are of great value. Multine was given in some cases where cod-liver oil could not be taken; later multine with cod-liver oil being administered. When the children were well enough to leave the hospital, they were usually sent to the convalescent home in the country.

The performance of the operation...
as a rational and scientific method of treating the disease, is I think justified by the comparatively large number of cases which have recovered, the percentage being as follows:

1st year (March 1887 - Mar. 1888)

- Recovered: 31.0%
- Died: 69.0%

2nd year (March 1888 - Mar. 1889)

- Recovered: 46.0%
- Died: 54.0%

Total: Recovered: 38.0%

Died: 62.0%

These results are much better than those recorded by most books which give statistics relating to靁lectrolyte in diphtheritic laryngitis, and I think that the suspicion which is afforded indicates that the diagnosis of diphtheria was correct in each case.

It is interesting to notice that in nearly all the cases albumin was present in the urine, its presence would appear to be strong in favour of the diagnosis that the disease was
Diphtheria. The fact that the albuminuria of diphtheria is
unaccompanied by oedema was also
demonstrated, anasarca being absent
in each case, although in some of
the cases the urine contained a large
quantity of albumen.

The temperature too is worthy of
attention, being in the majority of the
cases (especially in those which
recovered) lower and the pyrexia
of shorter duration than is usually
the case in acute non-diphtheritic
affections of the tonsils and larynx;
this also is in favour of the diagnosis
of diphtheria.

Spasm of the larynx causing
attacks of near dyspnoea, with
recession of the soft parts of the
chest wall already mentioned, is said
to be of more frequent occurrence in
non-diphtheritic cases than it is in
diphtheritic laryngitis, and observation
of these cases has shown that such
is the case.
Although the conclusion be arrived at that there is probably membrane in the trachea, the operation is still justifiable, for in many of the cases which recovered here there was membrane in the trachea, as will be seen from column 2 of the Synopsis of cases annexed.

In several of the cases death has resulted from asphyxia, the disease being of a malignant type in some of these, and I have seen one or two cases in which the symptoms indicated tracheotomy, but the asphyxia was so great that I postponed the operation and gave stimulants freely. The patient dying next day of asphyxia before the tracheal obstruction became so great as to endanger life from asphyxia. Case 29 was, I believe, another example of this class, where the operation should have been deferred for a few hours at least, and stimulants administered frequently in full doses.
Death resulted in the majority of cases from asphyxia chiefly, the membrane extending downwards from the trachea into the bronchi, and in some cases it appeared to have reached even the finer ramifications, in others miliary was present in the bronchiola.

Endocarditis, which is said by some to be of frequent occurrence in diphtheria, was not discovered in any of the post-mortem examinations made, except in case IV where its existence as shown by a mitral systolic murmur was diagnosed on the admission of the child for chorea.

For synopsis of cases see next page.
Lynne's
Cases
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<th>Traceable Abscess</th>
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Case I
A. F. S. 6 yrs. male
Admitted March 14th 1887.
History: Previous illnesses: measles.
Present illness: 14 days, cough, 2 days difficulty in breathing, nose bled on coughing.
Condition on admission: child well, normal.
Fauces tonsils swollen red; no membrane.
Lymphs in left submaxillary region enlarged.
Yellowish nasal discharge.
Breathing stridulous; rheumonia present; recession in left temporal region, 2 of lower ribs, voice
suppressed; cough coryza (headache)
Treatment: Steam baths, atropine, calomel 1/2
every hour. Mr. Meade as急需.
Belfast milk pints.
Progress: 12th no improvement, violent attack of
coryza during night. Albuminuric.
Neches from 10.30 AM. Much mucus
expectorated through tube; respiration difficult.
Steam medicines discontinued.
Hot moist sponge tube kept over10.30 tube.
Fine water spray when breathing is difficult.
4.30 PM. Sacramento through tube some thick mucus.
16th. Several pieces of membrane expectorated through tube.
18th. Mucosa improving; still breathing partly.
Nasal discharge much less.
20th. Tube left out for 60 minutes; tracheal opening temporarily closed; child frightened, breathed with some difficulty.
21st. Tube permanently removed; wound closed with plaster; child breathes comfortably but noisily through larger.
Case II
3 yrs. Male

History. Present Illness: None.
Recent Illness: 4 days, difficulty in breathing.

Condition on Admission: 1 day complained of sore throat.

Treatment: P. of Chloroform, 12 grains (0.24 g) applied.

21st. Sore throat. P. +. Ag. 33, 20.5 hours.

22nd. Breathing difficult all day. Whole patient under chloroform the whole time. Death occurred at 11 p.m. Pulse was 80. Patient under chloroform during operation. No reaction seen to chloroform. Chloroform applied also to pharynx and nose. Whole child still under chloroform.


25th. Very sleepy, colour of face not good. Heart sounds not, weaker than on 24th.

Membrane on tonsils. Pulse stronger.

Convulsed at 3 p.m.; left bricks 22 ordered with free breathing so relief, 1 a quantity of urine passed.

26th. Pulse rather stronger; coffee 3 oz. Jutice, Chart by name.
27th 12 noon : Chloroform given ; tube removed ;
membrane sun in trachea + round wound ;
fig. 37 \( \frac{3}{4} \) - Alkaline 3-7 applied to surface
affected, then salicyl. powder 1-500 applied.

Pulse same. After, Membrane large piece
extricated through tube.

28th restless night, sick after coffee; and
pulse weaker today. Congested up nuclear
piece of membrane. Hot bottle ordered.

3 P.M. tube again removed; respiration
forceps introduced into trachea, + a quantity
of membrane taken away; surface washed
with alkaline solution. Internal wound
bedded with zinc chloride, poln. 40 p.s. - 35.

Quantity of blood in trachea. Tube replaced.
legs raised. Wine suppositories.

Coffee Quinn not retained.

Gradually became weaker, died at 5:15 P.M.

Autopsy: Membrane of trachea per color over

tracheal rings, blocking lower trachea, also
covering tracheal walls in part (which was much
congested), extending into bronchi. Bronchitis.
Numerous haemorrhages in lungs.

Body well-nourished; skin has Rickets.
Kidneys pale. Venous congestion on liver.
Case III

W.C. 6 years Male
Admitted May 8th 1847. Passed Death
History - Difficulty of breathing, sore throat, complained of after awaking on the morning of the 7th. Became worse.

Condition on admission:
Retching of membrane on both sides, fluids in membrane.
Recession marked.


10th. Slept well. Breathing quietly. Corpse inanition. Wound oozing from retching. Increased swelling around wound (Brandy 3rd).


Autopsy. Not held.
Case IV

W. T. 10 years Male
Admitted May 31st 1859, Remnel Beach
History, Previous Illnesses—Measles, Pock ors, Malaria Fever.

Present Illness—Chorea, following fright at school for 2 weeks, commencing on the left side.

Clinical Involvement:
Condition on Admission: Chorea well marked with dysarthria.
Past: Dysarthria with 3rd pain until the 6th when sore throat complained of, fare was seen to be red, membrane on right tonsil, glands in submaxillary region enlarged, somewhat tender and rather supple, apply 3% daily.

8th—Breathing labored. Reception of check well present.aped in steam bed, Colonel Pi every hour. Pain in back.

9th—Throat dry, strong pressure increased. Antipyretic present. Tracheotomy performed: considerable venous haemorrhage, collapse and respiration ceased on introducing tube: stimulant and artificial respiration applied. Pulse improved, relieved movements returned. Pulse 112 for mini.

7th—Restless occasionally. Today, mumps 104.3°, suppurative pains in both antsy oric and then Antisferon prescribed.
10½ slept fairly well. Pulse weaker. No
murmur heard. Thoracic movements less
marked.

Headache, apply ice cloth.


12½. Very restless during last night. Slept
very little.

No membrane on tonsils. Pulse weaker.

Tonsil removed this morning; replaced at
9½. As great dysphoria, flexidity occurred
on awaking. Much mucus.

Brandy 3 1/2 every hour. Soaks nourishment well.

Fine water spray needs

12½. Frequent attacks of dyspnea with

Autopsy. Extension of membrane
over bronchii and bronchioli, from trachea;
congestion present in tubes, vessels, walls.

Right heart dilated. Vegetations on mitral
valve.
Case 7

B. T. 2 yrs. Female
admitted June 16th 1887. Result: Death.

History: 1 day before admission drowsy vomiting which continued until the 15th, when there was difficulty in swallowing, neck noticed to be swollen, patches seen on nails.

In the morning before admission breathing became difficult, voice suppressed.

Condition on admission:

Milds covered with patches of membrane, glands enlarged in submaxillary region, voice suppressed. Byssosca excavation marked.

Haematoma performed.

17th Byssosca commenced again. Relief following operation being only temporary.

19th Died today. for 24 hrs. before death dyspnoea extreme, recession, pyrexia, coldness of extremities.

On 18th was ordered replenished with 3% with Brandy 3º, as an enema every three hours.
Case VI

P.C.G. 23 yrs. male
Admitted July 19th 1889 / Recovery
History: One child in the family died of diptheria after 14 days illness; another recovered from this disease.

Recent illness: Fine throat, 2 days.

Condition on admission:

Membrane on tonsils; submaxillary glands enlarged. Breathing laboured; cough (coughs of hard sputum).

20% 3/4 2 am. Breathing became worse; recession marked; tracheotomy performed.

Ant. chlorate, 8 grm. 8 1/2 horis.

Epistaxis. Art. subphrenici, Jachaque, plaster to

Tonsils painted

21% less membrane on tonsils. Cough troublesome occasionally. Membrane seen in trachea this morning or removing tube temporarily.

26% Right haemorrhage from tracheal wound.

29% Repudiation of fluids from nostrils.

August 1st. tube can be left out constantly.

4% Discharged cured; tracheal wound closed.

Readmitted August 7th. Tracheal wound
having recieved fluids returning fluid
edges of wound red & dried. membrane covered with peri os membrane.

Mousy; amorous; tongue joined; general depression. Rigaemia: Aphthiea; wound
Bony ulcer ulcers were affected frequently.

18th Sept. Mr. W. (I-500) The fourth
wound 1 1/2 hours.

11th membrane clearing off wound. With
returns through wound & appears intact yet
soft catheter made thru nose for feeding
purposes caused too much irritation (wounding)

in allows of its use.

with 3 1/2, Brandy 3/4, as an enema 9th hour.

13th no membrane on wound.

14th Fistula closing; voice returning.

23rd Hem. St. Splenium. 1st, 1/2 hour.

28th fluid not returning thru wound.

September 1st, Fistula closed.

Wound cured.
CASE XIV

F. W., 5½ years Female
Admitted July 31st 1887 Reinnt Recovery

History: Previous illnesses: Tuberculous Meningitis.
Recent illness: On 26th with "sudden fit of illness," condition unchanged (11 AM).
Redness, swelling of face; membranous seen; hands (subcutaneous) enlapsed.
Dry cough, considerable. Stridulous inspiration. Slight expectorated secretion.
2nd membrane seen on left posterior phleas.
3rd face; general depression. Applied imp. Teri.
4th face; Brandy ad libitum.
5th Well; occasional attacks of dry cough expectorated secretion; paralysis of both by thick mucus.
6th Face of wound red and inflamed, covered with membrane. No membrane observed; redness Swelling.
9th Tube left out permanently.
14th Discharged cured.
Case VIII

2. Mr. 4 years male
Admitted August 31st 1881 Breslau Death: History—Child ailing for a few days; in and night. Hoarseness; difficult breathing;
Condition on admission (8 a.m.): membrane on fauces; encrea trachea; superficial suppuration; cyanosis.
Neck wound at 9 a.m. Brandy to soaked.
11th. Thirsty night. Albuminuria.
Membrane exfoliated through tube during the night.
38. Died at 9.30 a.m.

Kidneys—especially the suprarenal bodies—intensely congested.
Case IX
Mr. B. 2 years male.
Admitted August 24, 1887. Remarked death.
History: Pain in chest, sneezing, shortness of breath.
(p) 2-4 days, became gradually worse.
Condition on admission: Nausea, dyspnea,
with marked recession, especially in the chest.
Inference of superficial veins in
nuchal region.
Small umbilicated pustules on posterior pillars
of fauces. Hands enlarged in submaxillary region.
Heavily bearded.
(11) W. F. (or W. M. Johnson)
(12) Nephrectomy. 86 cases discharged
uneventful from tube, but no membrane.
(13) Small patch of membrane on right
mandible, reduces swelling of fauces less.
Nellie May
(13) Several attacks during night of severe
dyspnea with recession relieved by coughing
up much muco, membrane.
(14) Larger tube inserted.
(15) Less restless last night, breathing quicker.
(16) Breathing labored. Tube removed, renewed
no change, but little relief followed.
Autopsy: Moderately well-developed, well-nourished child.

Membrane had completely disappeared from trachea & fauces, but had extended from hygus phrenic to bronchi & bronchoides, completely filling many of the smaller bronchoides. The wound (tracheotomy) was red, suppurated, covered with whitish, tough, purulent membrane. Lungs, deeply congested posteriorly, with well-washed lobules of collapse; anteriorly, emphysema present along the marquis.'

Kidneys normal.
Case X

J. T. 1½ yr. Male
Admitted August 4th 1887 Result Death
Condition on admission:
Fauces deeply congested; membrane on tonsils
Nasal. Hoarse cry.
5th Film nasal discharge, albuminuria.
White, urgent dyspnoea with marked
respiration; symptoms increasing in urgency;
Haemoptysis; relief; respiration quiet.
(His brother was admitted on August 2nd 1
and died on 5th week. See Case VIII. Another brother
was admitted on 5th week with diphtheria,
much membrane in throat; prostration; 2
albuminurias; he recovered too was discharged
on 25th August.)

6th Death
Autopsy:—Body well nourished.
Toes, upon 1st day phlegm, flares, closely
invested with diphtheritic membrane. Haeam
mucosa inflamed, commencing patches of membrane
so far down as subdivision of Bronchii, but not
well marked. Bronchii filled with mucous
fluid. lungs: congested posteriorly; anteriorly collozer
emphysema, m. patches. Kidneys deeply congested.
Case XI

J. B. 3 years male
Admitted September 24th 1887. Russell Berth
History: 5 days before admission was rich
sweaty; yesterday had been to be swollen
condition on admission: boils much
swollen covered with membrane, slight
redness of mala palate. Stands enlarged.
Bacteriology to be applied to stools.

3½ Restless night, hard cough; with
mysternal recession; also of lower ribs.

Urine: strong - some voided; no albumen;
recession marked; no curd; inspiration
stridulous. Aluminae 3/10 aq. 1/2 pinn.
Free vomiting relented with some relief;
emetic repeated after 4 hours. But no vomiting
occurred.

14th Symptoms increased. Respiration:
A few minutes after tube inserted, respiration
ceased; pulse quite perceptible; colour of
lips good; tube clear. Heath introduced
with speed - excited respirating effects; then
mepind miraculously, inema containing
brandy given.

Aluminae
5th Restless - drowsy: breathing laboured;
secretion rivid - changing pita temperature.
6th buffalo race much recession; face pink; extremities cold blue. Died at 2 P.M.

Autopsy. Body well nourished. Heart; lungs; stomach completely lined with membrane, which on being detached shows a complete coat of air. Passages lined, leaves a concentric appearance. Bronchi contain mucus. Lungs show marked venous congestion. Kidneys show marked venous congestion, also liver spleen.
CASE II

C.T. 5 yrs. Male
Admitted Sept. 30th 1882 Reason: Death from typhoid fever. 3 days before admission, felt sick; vomited; next day showed some much swollen restlessness frequent at night.
Condition on admission: Face dusky red color, patches of membrane covering tonsils, gums & submaxillary glands swollen; voice throaty.
Sulphur magnesium ordered for throat, & calomel & castor oil internally.
Oct. 1 Voice more throaty; albuminuria.
2nd Restless night. Tongue large, flat (hard tongue). Fine membrane on tonsils.
Washed away at P.M.
Brand 3/4 for dinner. Bear's strength. Only did not sleep well last night, restless. 8 P.M. Better this evening sultry, very sultry. 5th. Mouth very red & patches of membrane on them. Fever this evening, eschani: Ice given.
6th Febrile good night, but woke late today & 20. All retention cold, blue & restless, thumps, pleasant ears.

The patient's condition gradually became worse. Breathing became labored, and the breath sounds were distant. The temperature was normal. The patient's pulse was irregular and weak.

The breathing was shallow, and the patient's skin was cold. The patient died at 5:40 AM.

Autopsy revealed no membrane in the chest. The lungs were congested. The tongue appeared not to be examined. Kidneys pale.
Case 411

W. D. 2 years, male
Admitted Oct. 7th 1897. History: Recovery
Condition on admission:

Very full cheeks, with jaundiced temperament,
breath deep and swollen, membrane on
both tonsils; submaxillary glands enlarged.

Considerable dyspnoea present.


8th post-treatment easy; no membrane.

9th Breathing tranquil. Tube taken out for
1/3 hr. Head placed more upright, could
breath this longer, but respiration laboured
and laboured.

11th Progress satisfactory. Blanche in much less
12th tube removed for an hour, but able to
dry mouth replaced.

13th 10th hr. tube removed for 8 hr. passed
no trouble occurring. No membrane on tonsils.

14th tube out 5 hrs.

16th tube removed. Scrotum passed upwards
this longer, breathing thus longer difficult.

Tube replaced after 2 hrs.

17th tube out for 1 1/2 hrs., breathing difficult.
18th. Tube left only for this, breath of tube closed with tissue at night, breathed well this morning, trachea being occasionally removed to allow mucus to be coughed this tube.

20th. India rubber tube tried today, but expectoration more difficult through it.


29th. Extreme dyspnoea with recession & ridiculous breathing when tube removed second closed. Beauty fi fi fi fi fi.

March 30th. Developed leucocytosis, removed to Brongli Fever Hospital. Tube still in_na_m_.

Readmitted June 18th. 20th to Children's Hospital.


Autopsy: lungs acutely congested, patches of collapse, liver, spleen, kidneys also congested, lumens membrane of lungs milked saturated casein.
Case XV

R. R., age 54, female
admitted Nov. 24th, 1887, with Heart Disease.

History: In 11 days has complained of difficulty in swallowing more than a little at night. Anorexia; some constipation. Yesterday morning breathing rapidly; more restless condition on admission.

Mails of fauces congested; membrane on palate gums; bronchitis; slight hoarseness.

Throat is throat frequently.

24th. Recession of pyorrhea increasing. No drainage performed. Relief followed.


Coffee ordered also from strychnine.

All right.

26th. NW taking food well. Hands much swollen, also submaxillary glands; breath very bad. Nutrient emetics. Pharynx.

Throat with sputum fluid diluted.

Had several attacks of delirium tremens.

27th. Breathing.

Autopsy. Membrane lining upper half of larynx; patches on trachea & bronchi.

Lungs congested with patches of collapse.
Case XIV

M. F. 43 yrs. Female
Admitted October 26, 1887. Remittent Repeated
Diagnosis: 14 days of sore-throat, which lasted a few days; 3 days ago throat sore again.
Yesterday breathing difficult; petechial spots on neck in early. The head Measles, Petechia.
Condition on admission—fever, stridulous breathing; much recession in superficial redness on lower part of chest wall.
Nails swollen, congested. Petechial of membrane on cheeks; suboccipital glands swollen.
Measles treated immediately with complete relief of symptoms. All recovered.
W. improving slowly. Breathing much, scrofula; beauty.
Dr. Eastman ordered radium, thoria, and arnica.
1st. Hydro. Pellet 1500._apply to throat. Spearmint cough.

1st. Cough little induration. Success Continued
111. Fever. 4:00, C1 skin returned. Neuritic, 14th.
14th. Slept better last night.
15th. Pulse 94, regular. moved with "wind machineto.
16th. Is still better, and during day time the membrane

Case XVI

F. W. 5 yrs. Male

Admitted December 10th 1867. Result Death.
Condition on admission: malignant case of trichinosis with severe laryngeal symptoms (of obstruction).
Cæcetomy performed at once, but child died on the operating table.

Antigen: Not held.

Case XVII

Annie #. + 8.
Case XVII

8½ yrs. Male
Admitted March 14th 1888 Result Death
Condition on admission:
Marked case of dipliaemia with large pleural obstruction requiring treatment immediately. Empyema on left.

Necroscopy:
2nd Pulse 160. R. 60. All normal signs
Membrane on tubes; large pleural obstruction markedly present. Emphyema considerable.
Necroscopy 3rds. Albuminuria.
2nd Membrane reflected through tube. May be freely with saturated solution of soda bisulph.
½ Death from asphyxia.

Case XVIII

9½ yrs. Male
Admitted March 24th 1888 Result Death
Condition on admission:
Membrane on tubes; large pleural obstruction markedly present. Phthisis considerable.
Necroscopy 3rds. Albuminuria.
2nd Membrane reflected through tube. May be freely with saturated solution of soda bisulph.
½ Death from asphyxia.
Case XIX

N. T. 2 yrs. Female

Admitted April 17th 1887 Renell Beach

History: Has had Bronchitis twice but made good recoveries on each occasion; last attack 7mths ago.

Yesterday morning became restless and unable to run about the house, seat well, last night very restless, breathing laboured.

Condition on admission (30th):—

Tonsils enlarged covered with membrane, respiration stridulous, cough laugheat; muscle recession of ribs (scoliosis of right side); face slits dusky; pulse quick; small. Waist. 39s. 4oz.

In less than 2hr. breathing easily, cheeks and lips had regained their natural colour, swallows easily, several pieces of membrane expelled through tube.

11th. Vom. belli. green stool well formed 12 (midnight). Restless, feverish, breathing laboured, suffocant rhonchi, heat over chest and abdomen, regular attacks of dyspnoea, a struggle from blocking of tube; hurry of saturated solution of Bodi Breibis' aided

...
Expectoration apparently. Urine passed in bed.
Recession slight. Pulse regular, 160;
Resp. 56.
Bladder phlegm with expectorations over
chief, especially posteriorly.
Death: due to asphyxia; ellipt at home.
Case XX

S.F. 6 years female
Admitted April 5th 1907

Recurrent Death

Condition on admission:


At 12 p.m. in status qua.

On 8th day, increase considerable recession. Face cyanosed. Lacrimation. 9th death.

Autopsy:

Haemorrhage extended throughout the whole of its mucous membrane, covered by a thick yellow adherent membrane, which is continuous with the membrane lining the larynx, false cords being especially affected.

Lungs congested, especially the lower lobes. Anterior marquis empysematous. Kidneys markedly congested.
Case XXI

J. S. 3 years male
Condition on admission—
Tonsils severely enucleated. Pain with the mouth.
Cough prolonged. Voice "croaky." Brand 3 per cent.
2nd breathing stridulous. Voice suffused.
Recovery considerable. Albuminuria.

Neclectomy:
29th Membrane resected through tube.
4th Hours ordered at 10 P.M.
29th Membrane resected through tube
regularly thence. Tube left in place.
50th Whisky substituted for Brandy.
Thick. 20 Min. galliex ordered. Resolution
considerable.
May 4th Tube left out 2 hours.
3rd Tube left out permanently.
4th Voice good. Improving rapidly. Stop.
Whisky + Am. Carbs.
5th Wound healed.
14th Discharged cured.
Case XXII

W.T. 4 years male
Admitted May 10th 1888. Fever recovery
condition on admission 1st 4.30 P.M.
Small pustules of membrane on tonsils.
Breathing slightly stridulous. Moderate
recession ; voice suppressed. Whisky 1 fluid.
6th 12th P.M. Symptoms getting worse. Intestines
11th Coupling up membrane through tube.
Excision done (none).  
12th Less membrane on tonsils. Whisky 2 fluid.
12½ Suspended large pieces of membrane
During the night; membrane is generally
expected after the minor tube well
Suited- has been reintroduced (after removal
for cleaning it), or after the introduction
of an oiled feather.
14½ Less membrane expected.
16½ Tube removed, had placed over
wounds. Breathing became more even.
Suited was angry, therefore quiet.
Tube not again inserted.
20th Whisky 3 fluid drain.
20½ Discharged cured. Soon had an
attack of Pertussis, but recovered complete.
Case XXIII

J.V., aged 5½ yrs. Male

Admitted May 15th 1888 Recovered

History: On 13th worse, 14th feverish in evening, breathing somewhat laboured, 15th very ill, worse—much difficulty in breathing. Has had measles. Condition on admission (5.30)!—Fauces toneless, clear, no membrane, symptoms very urgent.—Breathing stridulous, voice suppressed, cough thick troubled, recession great. Haemoptysis, whilst for 10th, expectorated 4½ hours, after operation, thump rieus continued. 18th condition favourable, but unless last night cough worsens less watery. No membrane expectorated since noon yesterday. Whir large piece of membrane expectorated together with some bright coloured blood. 20th coughing up membrane blood tinged mucus at same time. Wound covered with membrane. Hept well last night, 22nd no membrane expectorated since 20th.

24th false left nostr. Wound these years
Case XXIII

17. V. Aged 54 yrs. Male
Admitted May 18th 1886. Best Recovery.

History: 10th of April (14th crescent), 13th of April, feverish in evening, breathing somewhat coloured. 14th of April, worse; much difficulty in breathing. Has had Measles, condition on admission (5 phi).

Fumes e. tonsils clear, no membrane, symptoms very urgent; breathing stridulous, voice suppressed, throat dry, tongue large, recession great. Nasal congestion, Whisky for indigestion.

Membrane expectorated few times soon after operation. Mucus, mucus confirmed. 18th condition favourable but unless last night 19th mucus less watery. No membrane expectorated since noon yesterday.

This large piece of membrane expectorated together with some bright colored blood. 20th evening of membrane, blood tinged mucus at same time. Wound covered with membrane. Left well last night, 21st no membrane expectorated since 20th.

22nd False left out this. Wound nice.
26th: tube left out all day.
26th: respiration most during night; no
"croaking" heard morning (nurse says),
tube being out still. Top ammonia.
Carb.
27th: breathing became very difficult
during last night. Several recurrences
present, tube inserted again, wound
not being closed (cheeked).
27th: Had a good night without tube,
which was therefore not reinserted today.
27th: Considerable dyspnoea during night.
27th: Respiration normal during the
daytime. Last night breathing very
laboured, inspiration crowing, expiration
very weak. Wound re-opened, with a
seepage; tube again inserted.
27th: Tube removed permanently.
27th: No urinesal symptoms have recurred.
27th: Fustilir burn, cit. given.
27th: So for up.
28th: Last night had several attacks
of the following character, lasting for a
few mins. In 20s: Inspiration crowing --- accompanied by chestnutal
August 1st, lateral (or lower intercostal nerves) recession, no incontinence of urine, when awaked symptoms become quickly much less and gradually disappear entirely. 26% of similar attacks.

27% of attacks better next day.

July 15th, attacks as described above still occur at night sometimes, but not distinctly relieved by laxatives. Brought on by other inhalation of angin nitrite, it seemed to give a relief on 2 separate occasions, but at other times it had no effect. Nor had 1% nitroglycerin 170, 1/4 to 1/2 i. 14th steam bottle tent ordered, as attacks occurring during daytimes as well as at night.

30th no attacks half night, so steam stopped. 31st tent removed.

August 8th recurrence of anginal chest symptoms. (Before July 14th 10% nitroglycerin was given with no marked benefit; addition of 1% nitroglycerin in 1/4 to 1/2 i. had no effect; resins produced no distinct result; presence of numerous inorganic nitrates at times distinctly audible from
October 13th frequent attacks similar to those already described have occurred frequently since August 31st; in damp weather they were less severe. The Bellad, mail with all fuss dodged. Mrs. Smith, aged 45 years, appeared to give relief for several days, but symptoms soon returned.

On this day—October 13th—chloroform was administered at the advice of one of the physicians to ascertain if its anti-parasitic effect would be of benefit; the boy struggled during the commencement of its administration, and while struggling suddenly the screen breathing; the chest walls were rigid; no air would enter; the artificial respiration was at once attempted; the child died before resuscitation could be performed.

Antemortem:—Heart; auricles contained dark fume blood; lungs showed numerous congestion; means membrane of lung and—especially of false cords—deeply congested. The hypothalamus

Epiglottis in similar condition. Larynx in lacerated has caused marked narrowing of lumen at this point.
Case XXIV

Mr. A., 5 years male

Admitted August 16th, 1880. Recovered. Recovery
Duration of Laryngeal symptoms 2 days;
none thought not complained of.

Condition on Admission:

Membrane on tonsils; faint throe daily
with -

24th August

Softh. (Up. Tonsil Tissue) (Hemorrhage)
11.00 a.m. 80. Lough Laryngeal breathing
laboured, inspiration crowing, recession
present. Gelatine Perleed. Absinthe. 4.5g. 4.5g.

17.10 Symptoms increased. Haemorrhage.

Very large piece of membrane
excretated i. e. afterwards. Whiskey 3 fl.

4.30 th Mr. A. in coma. Muri added to

20th Throat quite clear of Membrane.

Wound red. Swollen.

Tube out 2 hrs. Wound improving.

Sept 1st Tube out 5 hrs. Replaced quickly
because mucous blocking wound.

2nd Weaker. Whiskey 8 fl.

3rd - 9th Tube out daily 5-8 hrs.

9th Shee returns thin tube considerably after

Insertion (Hair wound of tube out) Epliotes
Not doing well; this has continued since the 5th inst.

We have left out permanently since dawn yesterday. Stop Whiskey.

Stop Chlorate of Potash. From Thyroidea's advice

We have little milk returns this morning.

Wound closed.

October 1st: Discharged, cured.

February: Occurrence of symptoms similar to those recorded in Case XXIV, but to a less extent & only lasting for 2 weeks, the laryngeal symptoms then disappearing (the secretion was less troubled & the brown mixture less so).
Case XXV

2½. 7 years male
Admitted August 20th 1888. Seen, death.
Condition on admission: (9 P.M.):
Membrane on right tonsil. Oedema;
Inspiration crowing; perception not peak.

12th (midnight). Recession via buccal:
region + over lower ribs laterally; reached,
but not peak. Oedema increased.

24th: 11:15 A.M. Recession + oedema increased,
but not very peak. No pyrexia. Albuminuria.

Naphtholone at 1:30 A.M. slept afterwards.

Membrane on both tonsils, especially right:

3½, 9½, 16th Drag. Perchlor. (1-1000) at 9½
PM until 7 A.M.

Sept 25 Left tonsil covered with membrane,
right clearing over reflex. Kidney, glands
on retroperitoneum region enlarged, especially
on the right side. slept well after 2 days,
takes milk well. Rise of membrane
in posternate (9½ A.M).

26th Left tonsil clearing slightly at upper
portion; right covered again by membrane.
Restless — refusal to eat, & expectoration
more difficult. faeces — oily — increased milk
feed.
said

is necessary, each attempt of expectoration.


Rash, redder, drowsy, enuresis, phlegm
a little, 2-½ 2-½ hours. Carb. p. 2 every hour.

11. 20 am. Improved. Nausea, looseness; stronger,
less restless; slept at intervals during night.
Membrane expectorated. Whisky ½ Tumbler.
Raspoli over elbow. Peyote over back of chest.

Redde 6½. Fever 103. 4 am am. 1. 0, am

4th Lucas yesterday 3½ pm ord. by p. PM
in pallets frequently. Slight pulse well.
Rise full, re-compressible. Urine with a
arrow at no. Concepted. May contain still
necessary expectoration. Whisky and wine,

aq. equal. pallets.

5th. Restless last night. D Deals clearing
at a proportion but spreading downwards.
Several cyanosis distinct; face dusky;
finger prefer.; lips no show venous condition
of blood.

6th. Rife meals during the day; lossy,
Raspoli; membrane expectorated. Kind sale;
fever is very necessary still.
The patient is not acting well, allowing me to return plus title in small quantities. Cyparissus somewhat less. Mummy still. Superficial. Cotton wool packed
not applied instead.

Very offensive odour from tube.

Steam bottle with ferrous added to water.

Throat: Tendinitis clear; recession of left condition of wound has become gradually worse. Last evening was dark in colour at margins. This evening it is almost black.

Tissues swelling evidently.

Death at 1:45 a.m., exactly 8 days after haemostomy performed.

Autopsy: Body wasted considerably.

Wound gangrenous.

Lungs: Localised pneumonia in small patches throughout both lungs.

Haemorrhage rough congested; ulceration.

Present overribs of haemorrhage where haemostomy has been pressing. Haemorrhage much congested.

No membrane seen. Necrosis of membrane with the Pleurisy sets much expectation from haemorrhage during life.

Kidneys congested. Right heart filled with dark blood clots.
Case XXvI

K. T. 6 years female
Admitted 27th September 1888. 

History indefinite; said to have been ill about 10 days.

Condition on admission: 8 p.m.,
membrane on nose, face, and body,
temperal region. No dyspnoea or fever,
skin and weak.

Oct 1st: Kept fairly well last night; restless at times, had a few attacks of frequent repeated complaining causing cyanosis of face.
5 a.m. Some recession, and 4.30 a.m.
respiration slowing; lips blue, face dusky.
10 a.m. Symptoms becoming more severe;
Nasal curet at 10:45 a.m., venous of nasal much constricted; membranous seat of nasal in
long expectorated nasal tubes as soon as it was
inserted. Tonsils removed covered with
membrane; large bleeds were removed from
left tonsil, leaving a bleeding surface.
11 a.m. P. 156 R. 80: ratio of inspiration to
espiration normal. Mentally: feeling better.

Tent: Chlorid of Potash + 20 p.c. Peridochol, 1/4
10 gr. 3 p.m. 1/40 gr. Peridochol, 1:002.

14.11.21

Membranes reformed on tongue.

Gt. Pulse stronger. Mucous more viscid; excretion more difficult, febrile necessary this morning. No membranes expect.

Pt mi speech w/m. Throat (towards) better.

Am. Cells, pp. (Putting distance, so difficult.

Mrs. Bright, pt 92 hours.

Pts. Incomes wax rapidly, excretion easier.

Nurse says, first of 2 pieces over medicine piece, coughs easily, expectorates freely; coughs again in an hour. Throat dry and expectoration difficult. Prescribed every 2 hours.

5th Medicine still beneficial. Baseline. Hydrogen applied around frequent, it being red and irritated.


7th hay fever & membrane exfoliated.

Wounds healing. Pulse strong.

9th have mixture 6 & 6.
26th. From deck. Inbed out 4 hours.

17th. Inbed out 11 hrs. 20th. Inbed out 13 hrs.
21st. Inbed removed permanently.

Steam stopped. Lungs normal.

26th. Wound closing slowly.


For 3 days has been able to say words distinctly, soundly by an effort, frequently with difficulty.

Nov 5th. Impending. Flat dry cough.


January 12th. 89. Discharged. Good health.

February-March: in good health. Had occasional attacks of lungfoul which occurred during the cold weather.
Case XXVII

W. D. 14 years Female
Admitted October 27th 1887. Cause Death.

History: - 4 days sore throat; gradually getting worse, breathing became difficult yesterday. Proceeded quicker.

Condition on admission: - 12 noon. Involuntary coughing, with great recession which has increased much since.


Tonsils: soft palate, also pillars of fauces, simply covered with yellowish greenish film. Membrane: breath very offensive.

Whiskey 1/2 every hour ordered. 1/3 pencil in addition. Steam tent.

Necleactomy performed at 12:50 A.M. During 1/3 A.M. several pieces of membrane expelled. Some nausea; nothing vomited. Afterwards, coughed after intimation of febrile, but nothing expelled. No blocking of tube apparent.

Suni followed. B.M. heavy. With Spirit of chloroform given every two hrs. About 8 hr. from passed. Blood albumen present.
6 Pm mounted, for a water fever.
8 Pm mounted from after medicine taken, so was stopped. Arr Italy, since admission, cut skin, felt cold since 9 Pm.
Gradually became weaker, died at 10:30 Pm. from asthma.

Post Mortem:

Body well nourished.

Lungs congested markedly, especially left lower lobe.

Larynx, trachea, bronchi lined completely with a dirty white membrane, which is thick, closely attached to the subjacent nerves and membrane which on removing the diplosis, several membranes is seen more deeply congested.

Heart muscle fatty.

Kidneys congested.
Case XXVIII

N. F., 3 1/2 yrs. Female
Admitted December 8th 1888. Recent Recovery
History: 3 or 4 days feeling sick; always
fever noticed; difficulty in breathing.
Condition on admission:—Lily.

Facies congested; small patches of
membrane in right nostril. Submucillary
lymph glands enlarged.

Tracheal obstruction very marked
Recession considerable, rough trachea.
Pyrexia of fairly m맹ling. Protasis.
Whiskey 3/o p. i. i. /i. Albucrem in.

Haeleecomy at 3:30 P. M. Child very
fat; cheeks pink. Gumma numerous
congestion; little haemorrhages
Shepit 1 dr. off. After operation.

Membrane expectorated. Gumma pearly,
Expectoration difficult (midnight).

Ski 32, 
Comm. Pern., 3 dr.

Moss Bianchi, 31.

Gumma had the same beneficial
effect in facilitating expectoration as
is needed in connection with the last
case.
Qth & 10th Process favourable. Locamce
refracted each day.
11th & 12th Refraction difficult, foetors
with necessary. General attacks of
dyspnea & running.
13th Improvement noticed. Refraction
14th Tube out thus. Slight rig of pain
Chees towns sleep side of medical
Smurf. Dose form tablets.
15th Tube out thus.
16th & 17th P.M. Kezel Co. 6 12 Blou,
Pleas kump. Can speak in a whisper.
18th Though returns tube 10 a slight
extent of drinking, tube out the.
19th Tube out thus.
20th P.M. In a day. - 1:30 P.M. &
2.30 - 4.30 P.M. Wound more healthy.
21st Tube out for "plugs. breathing now,
language not as easy, inspiration coming refuse.
Wound normal, standing to close when
Tube out. 14th Can speak clearly by effort.
24th & 27th Tube out under each day.
25th Wound still returns tube 10 a
slight extent.
Port line 3½ in touch.

Symp: Mrs. Todd. M.T. of Needley.

Mass. Tined. P.C.

Acid. Citric 9.4 in the die.

Jan. 3rd. Money Co. thrice during night.

As it appears to facilitate excretion, not needed during the day.

Bec. 2½ - Jan. 10th. Intent daily.

For about this time whilst bile was very

occurred sometimes, numerous expectation

pipes this wound into limit covering

in part this large, iso trachea nearly

1st bile removed permanently.

Having become gradually less in quantity

(limit. March Co. stopped in jawth.)

Water is in need.

Admonis going on its suppuration

occurred in submaxillary region during

this period.


14th. 9½ get up.

Feb. 1st. Wound o' blood, 2½ in die

trench 7th. Brain charged. cured.

Kept in metal longer than necessary

because weather cold & child's home not food.

Seen several times since, no bad symptoms,
Case XXIX

Mr. F. Tym. Female
Admitted February 13th 1889 Result Death

History: 2 brothers from same house treated
for Diphtheria at this time at the
Children's Hospital, recovered.

Condition on admission: - 1 P.M.
Laryngeal cough. Dyspnoea considerable.
Recession marked. Whisky 2 flr. given.
Laryngeal obstruction, but not sufficient
to account for the cyanosis. Child was
clearly moribund. Acting on the
advice of another medical man I
performed Tracheotomy; the operation
only occupied 15 mins., but just
before it was completed respiration
ceased; I immediately opened the
trachea; we held it open with small
retractors removed some membrane
which appeared to be blocking the
trachea. I performed artificial respiration
but no success. The heart having ceased
to beat very little chloroform was given,
when she was revived with it.

(To be continued on next page.)
Author:-

Larynx especially the false cords, covered with thick yellowish pur membrane; several phlebes in faellea. Amo in Bruceli.

Lumps congested.