

## SURGERY OF THE LUNG.

W. H. C. ROMANIS, M.C. Cantab., F.R.C.S. Eng.

*Surgeon to St. Thomas's Hospital; Surgeon to the City of London Hospital for Diseases of the Heart and Lungs.*

The surgery of the lung has probably advanced in the last ten years as much and as definitely as any part of medicine or surgery. It can be said now to have passed beyond that experimental stage which is naturally the initial step in any such progress, and to have established itself definitely and permanently on a sound scientific basis. Its progress is still somewhat hampered by the fact that the particular type of case suitable for some of these operative procedures is uncommon. Such patients are very rare indeed at a General Hospital, and not too many of them are seen at special Chest Hospitals, while it must also be remembered that these cases in the first instance come before the physician, with whom the selection of those suitable for operation naturally lies very largely, and on whose activeness and progressive-mindedness the supply of material will to some extent depend.

A large part of modern chest surgery has resulted from the main fact that it is now possible to explore the chest by an operation known as an exploratory thoracotomy, with as much ease, and by doing as little damage, as it is possible to explore the abdomen; indeed probably, with less in the way of after effects, for either operation may produce adhesions within the cavity concerned, and intra-pleural adhesions are certainly less troublesome than abdominal adhesions may be. This operation of exploratory thoracotomy which is so easily done, is performed nowadays by first collapsing the lung by means of artificial pneumothorax, and then opening the chest without taking out a rib at all, by a long incision between two ribs, which are then forced apart by powerful retraction. It may sometimes be rendered easier either by cutting across one or other of the ribs involved at the dorsal end of the incision, or by taking out a small piece of them. This, however, is in no sense essential. The standard method of thoracotomy is really in every way comparable to the standard methods of laparotomy.

There are four main diseases with which the surgery of the lung deals: abscess of lung, phthisis, bronchiectasis and growths of the lung, and in all of these many different lines of treatment are available.

### Abscess of Lung.

Abscesses of lung are surprisingly common in chest Hospitals, and though some of them follow pneumonia, influenza, or even unknown causes, it is found that the majority of them are due to inhalation of foreign bodies, most of which unfortunately get into the lung during such operations as tonsillectomy, dental extractions and other operations about the mouth and nose. It is really only the so-called chronic lung abscesses which are likely to come within the surgeon's scope; these are usually treated first by purely medical measures, though without very great success.

The next line of treatment to be adopted is then generally that of bronchoscopy, by means of which the bronchus and abscess cavity are examined, pus is mopped out, granulation tissue removed and, if necessary, antiseptics introduced. Drainage is thereby improved, and in many cases the patients are undoubtedly made fitter and more comfortable. The temperature frequently drops; the expectoration becomes less in quantity and in offensiveness. Bronchoscopy has to be repeated many times at fairly short intervals; it is

usually done under a local anæsthetic and, apparently, without very much discomfort to the patient but in spite of the temporary improvement it is exceedingly doubtful whether it can ever be said to produce a real cure. Many cases of chronic lung abscess therefore ultimately come to the surgeon, and what he will do must depend very largely upon the nature, size, situation and depth of the abscess. Two main principles of treatment are at his disposal, either that of collapsing the abscess cavity or draining it externally. Collapse of an abscess cavity may sometimes be achieved (if its walls are not too thick) by a phrenic avulsion, but this is only likely to help if the abscess is near the diaphragm. In other instances a partial or localized thoracoplasty, consisting of the removal of a few ribs immediately over the cavity, will be of great benefit, but as a rule only if the abscess is near the surface, and in quite a number of cases, recourse will have to be had to some drainage procedure either instead of, or in addition to, the above collapse proceedings. Before attempting to drain a pulmonary abscess, very careful localisation must be achieved; this may be done partly by clinical physical signs, but still more accurately by skilled X-ray photography. The insertion of a needle is of course the final localising test but it is better that this should not be done until the patient is on the operating table ready to be operated upon. The requisite number of ribs, one, two or three, are then removed over the abscess cavity and the pleura exposed. No attempt must then be made to open the lung and drain the abscess unless the two layers of pleura are adherent at this spot, for otherwise an empyema is certain to follow. If they are already adherent, this adherence should be reinforced by a ring of sutures stitching the two layers of pleura together. If they are not adherent, steps must be taken to make them so either by stitching the two layers of pleura together again, or else by pressing the parietal pleura in, into contact with the visceral pleura, by a plug soaked in iodine. This plug is left there for four or five days, and the wound closed over it. The iodine preserves asepsis and irritates the pleura so that after five days the pleural layers are adherent and the wound can be reopened, and the abscess drained. It is impossible to lay down rules as to what sort of tube should be used, and how long it should be left in; it is well to err on the side of leaving the tube in a longish time and gradually reducing it in length. Sinuses following these abscesses of lung are less common than following empyemata, as the empty cavity can almost invariably be got to close, but it should be remembered that there is some risk of neighbouring parts of the lung being or becoming bronchiectatic.

### Phthisis.

Surgery has now very definite indications in pulmonary tuberculosis. Its aims and objects are with very few exceptions to produce collapse and rest of the diseased portion of the lung. To collapse a phthisical lung, an artificial pneumothorax is the best method, and the first method to be tried, as it is only when this has failed to produce a complete collapse that further surgery is indicated. Artificial pneumothorax fails to produce collapse because of pleural adhesions, which may be of two kinds; (a) either a series of thick strong isolated bands, in which case a partial pneumothorax may be achieved and the bands can then be seen in an X-ray photograph, holding the lung out, or (b) the two layers of pleura may be inextricably fused, in which case no air can be introduced at all.

(a) In this case, if thought necessary, the pleural bands may be cauterised and cut with a cautery by means of the thoracoscope, or indeed the ordinary defulgurising cystoscope may be used. In this connection it should

however be remembered that long thin bands which are easy to cut do not usually require cutting because they can be stretched by the pressure of a pneumothorax, whereas thick tough bands which do require cutting are often very difficult or impossible to cut because of their multiplicity and situation. Into these bands are drawn out little areas of infected lung tissue, and should one of these areas be cut into, disastrous pleural infection may follow. It is all-important therefore not actually to cut the band across so much but, as it were, to dig it out of the parietal pleura with the cautery. These bands have often been, and can quite easily be sectioned by open operation between the ribs, but such cases do not do well as pleural infection frequently follows, and hence this open operation is seldom performed nowadays.

(b) When the two layers are inextricably fused, some further more elaborate procedure will have to be adopted in order to produce the collapse. A very large number of cases of phthisis are nowadays submitted to phrenic avulsion with, on the whole, a surprising amount of benefit.

Section of the phrenic nerve was practised many years ago with poor results, because in many cases the diaphragm was not found to be immobilised as a result. This is now known to be due to the fact that in many instances the nerve is joined by an accessory branch lower down within the chest, so that it is only by pulling the nerve up that this branch can be destroyed, and the nerve completely put out of action.

Naturally the greatest collapse produced by this operation is at the base of the lung, where phthisis is not so often seen, but all the same quite definite improvement and partial collapse is achieved also in the apex. Though occasionally employed alone, the operation is still more extensively employed as an adjunct to a thoracoplasty, partial or complete. It may be done either before or after this major operation, in which case it ensures complete collapse of the base of the lung and may even render it unnecessary to remove one or two of the lower ribs. The operation is one of very slight magnitude, is performed under a local anæsthetic, and only necessitates keeping the patient in bed for two or three days. Though certain complications and even dangers have been reported, we have only seen one complication that led to a fatal result in 250 personal cases.

As the disease is most common at the apex of the lung and this portion is the most difficult part in which to produce collapse and immobilization, recently the operation of scalenotomy has been introduced with a view to sectioning the scalene muscles and allowing the first ribs to drop. It is rather more difficult than phrenic avulsion, though the line of approach is very similar, but it has, however, hardly been practised enough at present for one to be able to say that it is definitely of benefit. Theoretically it does not seem likely to be of great value.

### **Thoracoplasty.**

Many cases, however, where artificial pneumothorax has failed, require a much more complete collapse, and then an attempt has to be made to collapse the whole lung by one of the various forms of thoracoplasty. It must not be thought, however, that every case where artificial pneumothorax has failed is suitable for thoracoplasty, for it is a big and serious undertaking. Moreover, whereas it may be justifiable to perform an artificial pneumothorax when there is disease in both lungs, (for the artificial pneumothorax can always be given up and the lung re-expanded) this is not so in the case of a thoracoplasty, from which there is no going back, and where collapse is final. The cases must therefore be very carefully selected; they should be of the chronic fibrosing type

and with the disease confined to one side. It is found in practice that a very large proportion of the cases suitable for thoracoplasty are left-sided.

In most instances a complete thoracoplasty is performed, removing large portions of the upper ten ribs, usually 40—45 in. of rib in all, while it is essential to remove as much as possible of the first rib. This is generally done in two stages, with a ten or fourteen day interval between, through a J-shaped incision in the back, on the lines advocated by Saugman.

In some cases where the disease is rigidly confined to the apex, a more limited procedure may be possible, either a localised thoracoplasty, confined to perhaps the upper five ribs or so, or in other cases the operation of apicolysis may be performed. In this operation, without taking out a rib, by an intercostal incision in front or behind, the outer parietal layer of pleura is easily stripped off the ribs over the apex and round the front, sides and back, and the upper part of the lung collapsed and compressed. This extra-pleural cavity has then to be filled with some substance to keep the lung collapsed. The pectoralis major, fat or sterile paraffin wax may be used, though the latter has the disadvantage that it usually in a year or two comes out through a sinus. The amount of improvement in carefully selected patients by the various operations of thoracoplasty has to be seen to be believed. Many of them are back at work, though one has to remember that the word "cure" is a difficult one to apply to any case of phthisis or to any method of treatment.

Other surgical procedures are at times applied to these patients. Ligature of one or other main branch of the pulmonary artery is occasionally done for those who have continual small recurrent hæmoptysis; this usually stops the hæmorrhage, and the lung does not go gangrenous, but fibroses. Occasionally in very special instances it is justifiable to drain a phthisical cavity externally; this is usually only in desperately bad cases with a large cavity, whose last few months are rendered absolutely miserable by continuous cough and expectoration. Occasionally also if the cavity is near the surface, though there is no hope of cure, the patient's condition may be rendered more comfortable, and the cough stopped by draining the discharge on to the surface.

### **Bronchiectasis.**

The problems involved in the surgical treatment of bronchiectasis are in some ways similar to those of phthisis and pulmonary abscess, as we have to consider the question of compressing or draining a diseased and cavitated lung. In this disease, however, the lung has multiple cavities, which are thick-walled, tough and not easily collapsed. Thus such methods as artificial pneumothorax, phrenic avulsion and even thoracoplasty, though often beneficial, are certainly not so satisfactory as they are in the case of phthisis, because the collapse of the rigid walled cavities is by no means so easy to achieve. Unfortunately in a majority of cases the disease is not confined to one lobe or portion of the lung, but is diffused throughout the greater part of one or even both organs, which again renders surgical treatment more difficult. It has long been thought that some method of radical removal of the diseased portion of the lung would be the most satisfactory cure in cases where the disease is confined to one lobe. Several methods have been tried and given up, such as that of exposing the bronchiectatic part of the lung at the bottom of a wound, rendering it adherent, and on several subsequent occasions burning it away with a large cautery; or marsupialising it and allowing it to slough away externally. But the most recent method, and one which is now being practised extensively, and has given very satisfactory results, is the operation of lobectomy, or complete removal of

the diseased lobe, which is luckily usually a lower lobe. An artificial pneumothorax is performed first if possible, and the ordinary method of thoracotomy employed. The lobe is gently separated from adhesions all round until its hilum is reached. The difficulties of dealing with the large vessels and bronchus have been largely overcome by the use of one or two so-called snares, though they are really rather tourniquets than snares, by means of which the hilum region of the lobe is tightly constricted and held while it is cut across between the snares. The vessels are then ligatured or stitched and the bronchus is stitched over and rendered air-tight, and buried in the lung or pleura more or less at leisure. A certain amount of pleural infection is almost certain to follow, and therefore it is well to put in a small tube either at the time or a few days later. The results of this proceeding in a well-localized case are very good: the mortality is not unduly high, being about 15 per cent., while the remaining portion of the lung rapidly expands to fill up the thoracic cavity.

### Growths of the Lung.

*Carcinoma* of the lung is by no means an uncommon condition, and it is thought by some authorities that it is actually becoming commoner. There is no great difficulty in removing these growths provided they are encountered early while they are still confined to one lobe of the lung. Unfortunately this is rarely the case, and the large majority of pulmonary growths are only diagnosed in the first instance when they are already inoperable. At present the only hope of early diagnosis seems to lie in taking early radiograms of all doubtful chest conditions, and possibly in greater use being made of the procedure of exploratory thoracotomy, which can be done with a minimum of disturbance by the method indicated above. If an operable growth is discovered, a lobectomy is performed in precisely similar manner to that described above. In the more common case, however, which is inoperable, the best that can be done at present is to insert radon seeds through an intercostal approach. The results of this procedure, however, have not been very satisfactory.

There remain two conditions, both of which are rare in this country, which when seen can be completely cured by surgery, viz. *dermoid cysts* of the mediastinum, and *hydatid cysts* of the lung. The dermoid cyst is usually diagnosed by its X-ray appearance, and its origin usually lies above the heart amidst the great vessels. They may be very large. An artificial pneumothorax is done on whichever side the cyst appears to be nearer to the surface; the usual intercostal exploration is made, the pleura is opened and with careful dissection the cyst can be removed entire. It will probably help to aspirate it or empty it first.

Common as they are in other parts of the world, hydatid cysts of the lung are somewhat of a rarity in this country. It must be remembered that when they occur in the lung no true ectocyst is formed, so that the lung is capable of easy expansion after the removal of the cyst. If not already so, the two layers of pleura must be rendered adherent before the cyst is removed, just as in the case of a pulmonary abscess, as otherwise should the cyst be ruptured—and it probably will be—hooklets will escape into the pleural cavity and the pleura become infected. Having made the two layers of pleura adherent at the first operation, a few days later the lung is incised and the endocyst completely removed, when the lung tissue will rapidly expand and obliterate the cavity. It is perhaps as well to reiterate the old warning that hydatids in the lung should not be aspirated with a needle, for if this is done the cyst wall is so thin that sooner or later one will rupture and discharge all its contents up the bronchus, with the result that the patient will be drowned by his own hydatid fluid.



## Surgery of the Lung

W. H. C. Romanis

*Postgrad Med J* 1934 10: 58-62  
doi: 10.1136/pgmj.10.100.58

---

Updated information and services can be found at:  
<http://pmj.bmj.com/content/10/100/58.citation>

---

### Email alerting service

*These include:*

Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

---

### Notes

---

To request permissions go to:  
<http://group.bmj.com/group/rights-licensing/permissions>

To order reprints go to:  
<http://journals.bmj.com/cgi/reprintform>

To subscribe to BMJ go to:  
<http://group.bmj.com/subscribe/>