POST-OPERATIVE CHEST CONDITIONS.

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It is by no means uncommon for the physician to be asked to see a patient who has recently undergone operation, and to find that there has been some complication in the chest. The possible complications are fairly numerous and their treatment differs considerably. It is also a fact that many of the more serious complications can be prevented, or the duration of incapacity can be considerably shortened if early diagnosis leads to prompt and energetic treatment.

The foregoing applies not only to operations which have been carried out under general anæsthesia, but also to certain operations which have been performed with spinal anæsthetics and even with some basal anæsthetics, such as avertin.

The commonest conditions with which the physician is called upon to deal are as follow:—

i. Acute Bronchitis. This is most commonly present in patients who have been subjected to a general anæsthetic. It may result from inhalation of irritant vapours, and is therefore most common when ether has been employed, but it is frequently found that in such cases the patient has been exposed to sudden changes of temperature in the transit from the operating theatre to the ward. In patients who have previously suffered from chronic chest disease, such as chronic bronchitis and emphysema, acute bronchitis is more apt to occur and it is correspondingly more serious in these sufferers. The symptoms are usually fairly characteristic. Within twenty-four hours of operation, the temperature rises, although not to any great height, and cough develops. There may be a raw sensation under the sternum, but there is no localized pain. Sputum is at first scanty and tenacious, but later becomes looser and more copious, yellowish in colour, but never bloodstained. The illness runs a course of about a week's duration and treatment must be directed towards making the patient more comfortable.

The *treatment* selected must, of course, depend to some extent on the nature of the operation which has been performed. In most cases it is safe to push fluids and to give glucose. The relief of respiratory discomfort may be obtained by the frequent use of an inhalation such as the following:—

R

Ol. pini.	...	...	...	...	℥v
Mag. carb. levis		...	...	...	Gri v
Aquam ad.	...	...	...	...	ʒi

Sig. ʒi in one pint of water at 150°F.

In addition medicinal treatment may be of great value. In the early stages the patient should be given:

R				
Tr. ipecac.	...	...	...	℥x
Tr. camph. co.	...	...	...	℥xxx
Syr. tolu.	...	...	...	℥xxx
Aquam chlorof. ad.	...	...	...	℥ss
t.d.s.				

In the later stages, when the phlegm is more abundant, this medicine can usefully be abandoned and the following mixture given:

R				
Ammon. carb.	...	...	...	Gri v
Tr. scillæ	...	...	...	℥x
Inf. senegæ	...	...	...	℥ss
Aquam ad.	...	...	...	℥i
t.d.s.				

For the irritating and useless cough, Gee's linctus is usually sufficient. The local application of heat to the front of the chest is frequently comforting to the patient and therefore a linseed poultice or antiphlogistin may be employed.

2. Pneumonia. Pneumonia is a less common sequel of operation, and when present usually occurs in a diffuse form and broncho-pneumonic in type. The condition may follow either general anæsthesia or spinal anæsthetics and this point should always be borne in mind when selecting the type of anæsthetic to be given. In other words, a spinal anæsthetic does not ensure immunity of the patient from pneumonia.

Again, the symptoms usually come on within twenty-four hours after operation, but the patient is more ill, the cough is more troublesome, the sputum may be blood-stained and there is frequently pain in the chest. The lower lobes are more commonly affected than the upper, and therefore pain is situated towards the base of the lung. On physical examination there are definite signs of consolidation, the percussion note is impaired and there are crepitations or râles in the affected region. The breath sounds may be bronchial but it is important to note that the heart is not displaced.

The *treatment* should be on the same lines as that for acute bronchitis but antiphlogistin should be applied repeatedly in the affected area in cases where there is pain as the result of pleurisy. It may be necessary to administer oxygen. A possible complication of this condition is heart failure and therefore digitalis, camphor, and strychnine should be kept in reserve. In these cases, the illness may last for a considerably longer time and the patient may need to be kept in bed for several extra weeks.

3. Lung Abscess. This complication may follow operations either on the upper respiratory tract or on the abdomen. In the latter case it is nearly always found that the operation has taken place in a septic field. It is probable that inhalation

and septic embolism both play a part in the causation of lung abscess in different cases; it certainly seems that aspiration of septic material is not the only cause. It follows that, while every precaution must be taken to avoid aspiration in patients who are under the influence of a general anæsthetic, this precaution cannot be expected entirely to prevent the occurrence of pulmonary suppuration.

In lung abscess the symptoms are not so characteristic as in the two previous conditions. Very often there are no symptoms until towards the end of the first week. There is then pyrexia, cough, sputum which is frequently blood-stained, and there may be pain in the chest. The physical signs are frequently indefinite, and when the lesion is deeply seated no signs of any sort may be expected. On the other hand, when the lesion is superficial, there may be an area of pleurisy or even signs of consolidation, in which case the condition may be clinically indistinguishable from bronchopneumonia. After a few days, however, the patient usually begins to cough up pus in considerable quantities and it is this fact which suggests a clinical diagnosis of lung abscess. The final diagnosis is made from X-ray examination of the chest. Lung abscesses are most commonly found towards the base of the lung, they present a circular shadow with a somewhat indefinite margin and, in many cases, a fluid level when the patient is in the erect position when the film is taken. The presence of this fluid level is almost pathognomonic of lung abscess. From the patient's point of view, it is important to make a diagnosis of lung abscess as early as possible, for the prompt institution of energetic measures of treatment may result in speedy improvement.

It is usually desirable to pass a bronchoscope in order to exclude the presence of a foreign body and to aspirate any pus which may be lying in a bronchus. More than one bronchoscopy is not, as a rule, necessary since the patient should be then placed on postural treatment, assuming that the condition of the operation wound permits this. The position assumed will depend upon the exact site of the abscess but, as has already been stated, most of these lesions are basal, and therefore a proper posture bed may need to be employed. There are few methods of medical treatment which are likely to be of great benefit, but a stimulating expectorant mixture should be given, and the local application of heat to the chest either by the methods already indicated, or by actual diathermy, are thought to be helpful.

In many of these cases it would appear that the abscess has formed because for some reason the pulmonary ventilation is insufficient, and it may be possible to reduce the inadequacy of pulmonary ventilation by giving inhalations of carbon dioxide to post-operative cases in which there is evidence of insufficient chest expansion.

4. Massive collapse of the Lung. This is a complication which is fairly frequent and which is often misdiagnosed. It is now agreed that it results from the blocking of a large bronchus by sticky secretion. The result is that the air in the lobe supplied by the affected bronchus is absorbed and the lobe is then in a state of collapse. This complication occurs, as a rule, within one or two days of operation. There is frequently fever as the result of retained secretion, but the patient is not so ill as he would be if the condition were a pneumonia. Cough is not invariable, but when present is usually irritative and unproductive. The physical signs consist in deficient movement of the affected part of the lung, impairment of percussion note and *absent breath sounds*. *The heart is nearly always moved towards the affected side*, and this is the most important single sign of all. Proof that collapse is due to bronchial obstruction is furnished by bronchoscopy,

demonstrating a plug of mucus in the bronchus leading to the affected lobe, and by the removal of the plug of mucus by suction resulting in prompt expansion of the lobe. *Treatment*, therefore, must be by bronchoscopy, and the results of this treatment are excellent. If the condition is allowed to persist, lung abscess is a common sequel.

It should be possible to prevent post-operative pulmonary collapse in a certain proportion of cases by the administration of carbon dioxide.

5. Œdema of the Lungs. This complication may come on at any time within the first seven days after operation and it is one of the most serious events which can occur. It results from the failure of the left ventricle, either temporarily, or permanently, and therefore the prognosis is that of heart failure. The onset is sudden and the patient is urgently ill, with cyanosis, intense dyspnoea, incessant cough and the production of large quantities of watery sputum which may be bloodstained. The clinical appearance is quite characteristic, and physical examination reveals numerous râles throughout both lungs, a rapid pulse and a dilated heart.

Treatment of this condition must always be instituted at once. Perhaps the most useful single measure is the injection of m of adrenalin, 1 in 1,000, at frequent intervals; digitalis, coramine, and strychnine are often useful, and another favourite remedy is a combination of morphia and atropine. Venesection may be urgently necessary, and oxygen should be administered at once.

6. Pulmonary Embolism. In cases where a large pulmonary embolus occurs, the result is nearly always fatal. The event is commonest about the tenth day after operation. The patient is suddenly seized with violent pain in the chest and dyspnoea, there is cyanosis, rapid heart failure and death is rarely long delayed. We as yet have no certain means of preventing occurrence of this complication and when it does happen there is no available method of treatment. In some extremely rare instances, it is possible by immediate operation to remove the embolus from the pulmonary artery, but this is of theoretical rather than practical interest.

When smaller emboli occur, then the outlook is entirely different. A minor area of the lung is infarcted and the patient complains of a sudden onset of pain with a rapid development of cough and usually hæmoptysis. On physical investigation there may be few signs except perhaps pleural friction. In such cases the prognosis is quite good so long as a major embolus does not occur. Rest in bed and heat applied to the affected part are all that should be necessary. Sometimes the infarcted area breaks down and forms an abscess, in which case the treatment already described for lung abscess may be adopted.

7. Pleural Conditions. Apart from acute pleurisy, which is almost invariably associated with an inflammation of the underlying lung, as in pneumonia or lung abscess, the only pleural condition of importance is effusion. The fluid which forms in the pleura may be clear or it may be purulent from the start. Clear effusion may occur in the course of any of the inflammatory lung complications, but it is important to remember that it may also result from an inflammation below the diaphragm. This clear effusion in the pleural cavity is by no means uncommon in cases in which there is sub-phrenic or perinephric abscess. The

signs in these cases depend to some extent upon the size of the effusion. There is always restricted movement upon the affected side and the vocal vibrations are diminished, or even absent, at a quite early stage. This is, perhaps, the most significant single sign. The percussion note is usually stony dull and, with small effusions, bronchial breathing may be heard. With larger collections of fluid the breath sounds usually vanish completely and in such cases the heart is almost always displaced towards the opposite side.

It is important to distinguish clinically between clear fluid and pus. When there is a swinging temperature and marked leucocytosis, an empyema is likely to be present. In all cases it is essential that a needle should be inserted as soon as the presence of liquid is recognized, and the resultant fluid should always be cultured. In cases of clear effusion, even where organisms can be grown on culture, it is well to procrastinate, for many of these cases make a good recovery with absorption of the fluid. When pus is present, the condition must be treated as an empyema in the ordinary way, either by closed intercostal drainage, or by rib resection. In cases where the pus is thin and streptococcal, the former method is preferable. With thick pus and considerable fibrinous deposit, then open drainage is by far the best.

The foregoing are the chief complications from the common operations which result in a healthy individual, but it must also be remembered that such operations, especially those performed under general anaesthesia, may light up disease previously quiescent in the lungs. The most important underlying disease is pulmonary tuberculosis. It goes without saying that the chest should always be carefully examined before a general anaesthetic is given, but in some cases it is not possible to detect a small focus of latent trouble. It follows from this that in every case in which an acute respiratory complication occurs after any operation, the possibility of there being underlying tuberculosis should always be considered. The only certain method of establishing a diagnosis is to demonstrate the presence of tubercle bacilli in the sputum, and therefore every patient who is producing sputum should have it examined at least once. Treatment of these cases usually resolves itself into the treatment of pulmonary tuberculosis and this must be carried on in exactly the same way as it would be if the tuberculous lesion had been detected before operation.