of a particular case may indicate prolongation of the treatment beyond it. It is, however, the duration for which an average case should be kept up.

Actual Manner of Termination

It is the practice of some workers, when it has been decided to terminate the treatment, gradually to increase the intervals between the refills, and to diminish the amount of air introduced each time. There does not appear to be any particular point in this procedure. It is my custom, once it has been decided that the treatment should be stopped, to effect this abruptly. If this is done the lung in most cases will take three or four months to expand completely. During this time the patient should be kept under careful observation. A record of the weight should be kept, the temperature taken morning and evening, the sputum (if any) examined weekly, and an *x*-ray taken as often as circumstances permit. If, during the re-expansion of the lung, the result of any of the above observations indicates that the disease is still active, the lung should be recollapsed for a further period.

DANGERS AND COMPLICATIONS OF ARTIFICIAL PNEUMOTHORAX THERAPY

Pleural shock and air embolism have always been regarded as the two chief dangers of the induction of a pneumothorax. With due attention to technique they can, as a rule, both be avoided, and their occurrence is becoming less and less frequent.

Clear Pleural Effusions.—If frequent *x*-ray examinations of the chest are made during the treatment a small amount of fluid will be seen in the pleural cavity at some time in practically all cases. Less often large collections accumulate. Provided that they remain clear they have in themselves no deleterious effect on the patient, nor do they affect the prognosis adversely. The question that arises is the correct method of dealing with them. If such effusions cause any embarrassment to the patient they should, of course, be removed. It is my custom generally to remove large effusions, even in the absence of distress, and to replace the fluid with air. Frequently, for some unexplained reason, the fluid will not reaccumulate after two or three tapplings. Moreover, the patient, though not actually embarrassed by the effusion, will often feel more comfortable with air in the pleural cavity rather than fluid.

Pyopneumothorax.—Pyopneumothorax is the one really serious danger associated with collapse therapy. Since the adoption of low-tension pneumothoraces it is much less common than it was when attempts were made to produce collapse of the lung by the production of high intrapleural pressures. It results from the rupture of an adhesion at its insertion into the lung. A hole in the lung is thus produced, and the pleural cavity becomes infected by organisms passing into it from the bronchi—that is, a bronchial fistula is established. This is most likely to occur when a few fine adhesions are present, and, as already mentioned, these are most commonly seen extending from the region of the apex outwards to the chest wall in the axillary region. In the presence of such adhesions special care must be taken to collapse the lung gradually and to keep the intrapleural pressure low. The supervision of a pyopneumothorax, though not of necessity uniformly fatal, constitutes a serious danger to the patient, and renders the prognosis very grave.

It is a complication that may result after the division of adhesions. The probable explanation of its occurrence at that time is that, in addition to the main adhesions, there are present finer ones, which break off at their insertion into the lung after the division of the former. With due care and forethought the occurrence of pyo-

pneumothorax can be reduced to a minimum, but even then it will happen on occasion.

Haemothorax.—The collection of blood in the pleural cavity is very rare. I have only met with one case. In that the fluid was pure blood. The blood was removed and the patient made a good recovery.

CONCLUSIONS

The chief points that have been stressed in this article are:

1. That in artificial pneumothorax we have a valuable form of treatment for something under 5 per cent. of all cases of pulmonary tuberculosis.
2. That the remaining 95 per cent. of cases have still to be treated by the old methods of diet, hygiene, and climate.
3. That great care must be taken in the selection of suitable cases along the lines laid down.
4. That the patient must remain under careful medical supervision during the course of the treatment, especially as regards *x*-ray control.
5. That the operator should aim at producing as good a collapse as possible, with the minimum amount of mediastinal displacement, and as low an intrapleural pressure as possible.
6. That the treatment should not be continued for too long, three years being the correct time for an average case.
7. That the great danger that has to be guarded against is the supervention of a pyopneumothorax.

THE EFFECT OF FLUID COMPLICATING ARTIFICIAL PNEUMOTHORAX

BY

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Of eighty cases, T.B. positive, in which I induced artificial pneumothorax at Midhurst between 1924 and 1930, and all of which have since ceased refills for various causes—from completion of treatment to obliteration by adhesion—fluid appeared at some time during the treatment in forty. No case is considered unless fluid was demonstrable by physical signs and/or *x*-ray examination. These forty patients have been followed up by a special form to find out their condition in November, 1933, and therefore at intervals of three to nine years from the date of induction, in an attempt to assess the influence of the complication.

Summary of Results

	Alive		Dead	Totals
	T.B. +	T.B. - or no Sputum		
Completed treatment ...	—	14	—	14
Continued treatment: fresh disease appeared	4	1	1	6
Obliterated { With spread ...	—	—	3	3
{ Without spread	1	10	1	12
T.B. Pyopneumothorax ...	1	—	4	5
Totals ...	6	25	9	40

The above table shows that fourteen patients carried on refills until it was considered safe in the individual case to allow re-expansion; this was, on an average, three years from the date of induction. Two only required gas replacements, and only one has had accessory

treatment, phrenic evulsion being necessary to avoid too much traction of the heart and mediastinum to the affected side. The only evident effect in these cases was an apparently good one in the lengthening of the intervals between refills. All the patients are free from symptoms, have no sputum, and are fit for work.

Within an average period of ten weeks from the date of the appearance of fluid six cases showed evidence of a spread of disease; in five this was in the opposite lung, in the sixth it was in the larynx. Two of the five with lung disease had pneumothorax induced in the other lung, and while one of these is still sputum-positive, the other is sputum-free and fit for work; two more are alive, but sputum-positive and in poor condition; and one is dead. The patient who developed laryngeal tubercle was healed of this complication by galvano-cautery, but never became tubercle-free; phrenic evulsion was performed, but the patient refused thoracoplasty. Two of these six cases had gas replacements.

Fifteen cases obliterated—that is, at varying periods from the date of the onset of fluid it was no longer possible to continue refills as the pneumothorax cavity closed by spreading adhesion of the pleural surfaces. In three of these the obliteration was rapid, within at most three months from the appearance of fluid. All three showed rapid extension of disease on the opposite side, and all three are dead; two, however, were already bilateral at the time of induction, and had laryngeal tuberculosis, so that the treatment was instituted more as a palliative than as a curative agent.

Twelve cases obliterated without evidence of spread of disease to the other side. Eight of these patients have remained soundly healed without further treatment, and are fit for work, while a ninth is also in this condition after phrenic evulsion, which was performed as there were signs of activity when the lung re-expanded. The remaining three again became sputum-positive. One of these refused further treatment; her general condition has been good for six years. The other two became acutely ill, and were advised to have thoracoplasty, and while one died following the first stage of the operation, the other has remained sputum-free and in good condition for two years. Six of these fifteen cases required gas replacements.

Tuberculous pyopneumothorax developed in five cases. Four of these patients are dead; the immediate cause in three was tuberculous meningitis, and in the fourth it was frontal lobe abscess. The fifth developed the complication following a superimposed spontaneous pneumothorax at a period when he required several gas replacements; in 1932 he had a three-stage thoracoplasty, and while he is still sputum-positive his general condition is fair.

CONCLUSIONS

Thirty-one of forty patients are alive at intervals of three to nine years from the date of appearance of fluid, and twenty-five of these are sputum-free or sputum-negative. Nine patients are dead—three from acute spread following obliteration (two were already bilateral at the time of induction), one from acute disease in the opposite side soon after the appearance of the fluid, one from re-exacerbation in the same lung, and four from tuberculous pyopneumothorax.

Gas replacement would seem to have no definite bearing on the after-history for good or bad results. Tuberculous pyopneumothorax is a serious complication, but where this does not develop fluid has seldom a bad effect on the ultimate result of artificial pneumothorax.

[It is hoped that a paper to show comparative results in those cases that did not develop fluid and in "control" cases where pneumothorax failed for various reasons will be ready for publication in the next few weeks.—R. R. T.]

CHRONIC APPENDICITIS*

BY

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In the great majority of cases acute inflammatory lesions of the appendix give a fairly clear group of signs and symptoms, not all of them being present in each case, which enables a diagnosis to be made—stomach-ache starting all over the abdomen, or in the epigastrium, or umbilical area, which, after a varying length of time, radiates to the right iliac fossa; nausea or vomiting; probably some rise in temperature and pulse rate; tenderness in the right iliac fossa or near neighbourhood; and perhaps rigidity and alteration of the cutaneous sensation and abdominal reflexes.

Chronic appendicitis does not, as a rule, give rise to signs and symptoms so definite that they can be considered characteristic of this condition, and of this condition only, and it is frequently only by a process of exclusion that a diagnosis of chronic appendicitis can be entertained as the most probable cause of the signs and symptoms. These, I think, may be classified into four groups, but it must be remembered that the mental reaction of patients to an inflammatory lesion differs very greatly, so that the same apparent degree and intensity of inflammation in two patients may evoke descriptions of pain and symptoms which are quite different, and will also affect their conduct during the process of their illness—one may feel compelled to go to bed and call in his doctor, the other may carry on his work and not take much notice of the upset. The result, then, is that the term "chronic appendicitis" must be of rather an arbitrary nature, depending on the duration of the patient's symptoms, his description of and reaction to them, as well as on the appearance of the suspected area at the time of operation, along with the macroscopic and microscopical changes seen in the appendix.

The chronic inflammation may follow an attack of acute appendicitis, or the condition may be chronic throughout. An acute attack may supervene on the chronic and simplify diagnosis.

The four groups I should suggest are:

1. With signs and symptoms of a very mild nature, resembling those already described for acute appendicitis.
2. Appendicular dyspepsia.
3. Lower abdominal pain.
4. Without symptoms or signs.

Group 1.—It is in patients of this group that the diagnosis of chronic appendicitis is rather arbitrary. The signs and symptoms are of a very mild nature, but are fairly characteristic—pain starting all over the abdomen and radiating to the right iliac fossa, where there is tenderness and perhaps rigidity. These attacks (of varying duration) may have recurred over a prolonged period, without having interfered with the patient's employment, and without having had any obvious effect on his general health. Between attacks the patient may enjoy normal health, and operation may show no macroscopic abnormality in the appendix or its area, or there may be adhesions; but microscopically the appendix shows changes of a fibrotic nature in the submucous coat, with round-cell infiltration of all coats, or its lumen may be occluded and replaced by fibrous tissue.

Group 2.—Indigestion of appendicular origin may simulate very closely that due to peptic ulceration of the stomach or duodenum, or that of cholecystitis. It may follow on an attack of acute appendicitis which has subsided, or the inflammatory lesion of the appendix may be chronic from the start. The similarity of the symptoms of these conditions may be very close, both in periodicity and in type—indigestion occurring in bouts lasting from twenty-four hours to two weeks or longer, with periods of almost complete freedom up

* Read to the Willesden Division of the British Medical Association, November, 1933.