Remarks

ON THE

PRINCIPLES OF TREATMENT IN PULMONARY
TUBERCULOSIS

BY

L. S. T. BURRELL, M.D.CAMB., F.R.C.P.LOND.

SENIOR PHYSICIAN, ROYAL FREE HOSPITAL, AND PHYSICIAN TO THE
BROMPTON HOSPITAL FOR CONSUMPTION AND DISEASES OF
THE CHEST

It has been seriously suggested that tuberculosis should be regarded as a classic in the teaching of medicine. So many are its manifestations that anyone with a sound general knowledge of tuberculosis would certainly have a solid foundation on which to base his study of other diseases. In the lung it may appear as an acute bronchopneumonia which rapidly proves fatal; as a subacute infection progressing to a fatal issue by stages of remission and relapse; as a chronic disease allowing the patient many years of life and even full activity, but exposing him to the risks of periods of ill-health due to such complications as haemoptysis or pleurisy. Tuberculosis may produce scar tissue in the lungs, which is obvious on post-mortem examination, but which gave rise to no symptoms during life, so that the patient may have died of old age after an active life, during which he was quite unaware of ever having been ill. In this last type of case there is surely no need for treatment, even if by modern methods of examination the lesion in the lung is detected during life. Many people have their lives impaired by prolonged treatment which is quite unnecessary, and vast sums of money are spent owing to the failure to distinguish between infection which requires no treatment and that which if untreated will lead to actual disease. In civilized countries the great majority of people react to tuberculin, but this evidence of infection cannot be taken as an indication for treatment, since comparatively few develop the disease.

"PRETUBERCULOUS STAGE"

Some authorities speak of a "pretuberculous stage," by which they mean a state of health or environment tending to produce tuberculosis. I have recently seen a family in which two children died of acute tuberculous bronchopneumonia and one of tuberculous meningitis; two are alive and apparently well. In the same poor quarters lives their grandfather, who has had a cough for years and whose sputum contains tubercle bacilli. I agree that these two children are pretuberculous and require, not treatment, but change of environment. In the same sense I agree with a friend of mine who thinks of a child climbing a ladder as in the "pre-fracture stage." I do not, however, agree with the word "pretuberculous" when used to imply that a delicate child or adult is liable to become consumptive. When the lives of these delicate children are followed it is found that the incidence of tuberculosis is not appreciably greater among them than among their robust brothers or sisters. If we approach the problem from the other angle and inquire into the past history of the adult consumptive, it is exceptional to find one who was specially delicate as a child. Not uncommonly the robust member of a family is attacked. The athlete is just as likely as the bookworm to become consumptive.

An abundance of good food and fresh air, a regular life, and absence of strain make up the road to longevity. The stronger the constitution of the individual the less the danger of ignoring some or all of these rules of health, but the more delicate he is, especially if he has some

definite disability such as tuberculosis, the greater the risk of living unwisely. I agree, therefore, that all children should be taught how to lead a healthy life and be given the chance of leading it, but I do not agree that this is a problem of tuberculosis or that large sums of money, allocated for the prevention and treatment of tuberculosis, should be spent in keeping delicate children or adults for long periods in public institutions.

The "pretuberculous stage," however, is one of prevention, and does not come within the scope of this paper, so I shall pass on to consider the various stages of the actual disease. It is important to remember that it does not progress uniformly from stage to stage, and one cannot always speak of an early or late case according to the actual state of the disease. Healing takes place by fibrosis, and acuteness or chronicity depends upon the balance between infection on the one hand and fibrous tissue formation on the other. In a very acute case there is practically no fibrosis, but a rapid breaking down of lung tissue; in a very chronic case there is a steady formation of fibrous tissue and little if any toxæmia from the tuberculous infection. The principles of treatment vary with the different stages, which I will discuss under the following headings.

NON-CLINICAL PULMONARY TUBERCULOSIS: THE ALARM

In this stage a definite diagnosis is made, but there is no direct evidence of present or past activity in the lung. Pleural effusion or haemoptysis of unexplained origin may be mentioned as examples.

The patient should be told to observe the ordinary rules of health, but apart from this no treatment may be required. He should, however, be kept under careful observation, including regular x-ray examination for at least three years. As a rule it is unwise to advise a change of occupation, and one should avoid the mistake of regarding a sedentary life as unsuitable. A tuberculous patient is more likely to break down while carting hay on a farm than while working in a city office. If, after haemoptysis, the patient feels perfectly well and there are no x-ray or other signs or symptoms he may be allowed to keep on with his occupation under medical supervision. Haemoptysis does not always indicate activity; indeed, it is especially common in the fibrotic type of tuberculosis and in bronchiectasis or other non-tuberculous forms of fibrosis. After pleural effusion the case is a little different, because the effusion is evidence of activity in the lung. Time, therefore, should be given to allow the healing of the lesion to consolidate, and a course of sanatorium routine is most beneficial. This type of case is especially suitable for Switzerland. A study of after-histories shows that a considerable proportion of patients who have had haemoptysis or pleural effusion develop active pulmonary tuberculosis, whereas those who have had surgical tuberculosis or were delicate and called "pretuberculous" in childhood have no greater tendency to become consumptive than has the normal individual.

EARLY PROGRESSIVE STAGE: THE ATTACK

This stage is by far the most important as regards treatment, because it almost always proceeds to a fatal issue if neglected, but responds well to proper management. Inman's classification—(a) resting febrile; (b) resting afebrile, ambulant febrile; (c) ambulant afebrile—may well be applied to this stage, but as treatment is not entirely dependent on the temperature one should regard these three groups as indicating disease which is: (a) acute—that is, rapid invasion of the lung tissue with little if any formation of fibrous tissue; (b) subacute—

fibrosis and breaking down of lung tissue taking place side by side; (c) chronic—fibrosis the predominant factor with little if any breaking down of lung tissue.

I have called this stage "the attack" because the patients are curable if the disease is properly attacked. The patient has the upper hand. More mistakes in treatment are made in this than in any other stage, and mistakes are much more serious for the patient than at any other period in the disease. The patient often feels fairly well, and does not understand the necessity for strict treatment. The doctor rightly feels that an optimistic outlook is part of the cure and does not wish to alarm the patient, and hence there is a danger of consent being given to some such suggestion as a sea voyage, a few months in the country, or sanatorium treatment at home. The prognosis is well known to be good in patients whose first symptom is haemoptysis, and I am sure that this is because such patients are frightened and willing to undergo any treatment to prevent a recurrence of the haemorrhage. Many patients will say, "You tell me that I have the disease so slightly that it can hardly be detected, and yet you propose to treat me like an advanced consumptive." In reality, of course, the treatment is intended to prevent him from becoming an "advanced consumptive."

A patient suffers a great shock when he first realizes that he has tuberculosis, and he should be treated gently and every consideration given to his wishes. Fortunately the initial treatment in this important stage is rest, and it is usually safe to send him to bed at home or wherever he likes to go for the first few weeks. After that time most patients are much more amenable to reason, and will consent to sanatorium or other treatment. Details of treatment depend on the degree of activity of the disease.

1. In the resting febrile or acute phase absolute rest in bed is indicated. If the disease is unilateral and sufficiently advanced for crepitations to be heard artificial pneumothorax should be induced at once. In some cases this should be done on *x*-ray evidence before crepitations or other definite signs appear. It is a mistake to wait for evidence of a cavity before inducing pneumothorax. If both lungs are affected bilateral pneumothorax or pneumothorax of the most acutely affected lung and sanocrysin for the other may be advised, but sanocrysin must be given very cautiously in acute cases. If the temperature does not settle and the physical signs increase, small doses of sanocrysin, tuberculin, or other substances to produce shock may be tried. Rest in bed should be continued for at least three months, and longer if the temperature is unstable. When the patient begins to get up sanatorium treatment is essential.

2. In the subacute phase the temperature is normal only when the patient is resting in bed, and he should not be allowed up. As in the acute phase treatment consists of rest in bed, and possibly artificial pneumothorax or sanocrysin. Shock treatment may be tried in certain cases, but the possibility of doing harm must be borne in mind.

3. The chronic or ambulant afebrile phase may follow the previous ones, but very often the patient has never been through the acute or subacute stage. When first seen he has slight cough and sputum containing tubercle bacilli. There may or may not be a history of recent loss of energy or weight, but there is no pyrexia and often no history of any febrile attack. In this case sanatorium routine is indicated, and, if the patient refuses, a few weeks' rest in bed at home should be advised. Most patients will agree to this, especially if it is called a period of observation; afterwards, as I have already said, they are often more ready to agree to sanatorium treatment.

Some will refuse to go into an English sanatorium but are willing to go abroad. Switzerland is considered the Mecca by many. It is usually best to start treatment in an English sanatorium, but the patient may be allowed to go abroad provided a good sanatorium is chosen. The cold dry air of the Alps is exhilarating, especially in the winter, and it undoubtedly helps many patients. Some, however, find Switzerland depressing, and are homesick and prefer to remain in England. Whether he goes abroad or stays at home the patient should have confidence in the treatment. If he firmly believes that Switzerland will effect a cure he should be encouraged in the belief, and sent to a good sanatorium there unless there are definite contraindications. If, on the other hand, he objects to going to Switzerland or cannot afford to go, it is a mistake to urge him to do so or to give him the impression that he is unwise to stay in England. The psychological element is of the utmost importance in pulmonary tuberculosis, and unfortunately it is a much neglected part of the treatment. In this phase of the disease treatment is essential, but where it is given is immaterial, apart from the psychological aspect. The objections to Switzerland in this phase of the disease are: (1) The patient is apt to think that the fact of his being there is in itself treatment, and consequently to live less carefully than he would at home. (2) Discipline in most Swiss sanatoriums is bad. In some, of course, it is good, so that this objection does not apply if the sanatorium is carefully selected from personal knowledge; and one must remember that what suits one patient will not suit another. (3) Patients are apt to acquire the Swiss habit; that is to say, they go year after year until they are really unable to get through a winter without spending several months in the Alps. (4) Post-tuberculous neurasthenia is more common in Swiss-treated than in English-treated cases. (5) Recovery is no quicker in Switzerland than in England, and expenses are greater.

The advantages are: (1) The dry cold air and bright skies have an exhilarating effect on the patient, and make him feel better. (2) Many patients insist on leaving an English sanatorium after a few months because they say they can get just the same treatment at home. The fact that the majority of relapses occur in the first few months after leaving sanatorium shows that this is not so, but the patient (and sometimes his doctor also) may not appreciate this. It is much easier to persuade a patient to carry treatment to the stage of cure in Switzerland. (3) The psychological effect on those who believe that there is a charm for the cure of tuberculosis in the Swiss air.

Whether the patient should be sent to a foreign or an English sanatorium depends largely on his temperament; the important thing is to send him to a good sanatorium, and not allow him to go alone into the country or for a sea voyage, or to drift into the incurable stage of the disease. Sanatorium treatment consists in the judicious combination of rest, gentle exercise, and routine, so that life is perfectly regular. The progress of the disease is watched by physical and *x*-ray examination, and by methods such as the sedimentation and vital capacity tests. Improvement usually indicates the need for increased exercise, whereas failure to improve or a relapse necessitates more rest, artificial pneumothorax, sanocrysin, phrenic evulsion, or some other form of treatment. Sanatorium routine should be continued until the disease is arrested or has passed into the later stage. After arrest, a few months in Switzerland are often most beneficial in order to consolidate the cure, or at this period the patient may be allowed a sea voyage or quiet country holiday before resuming work. He should be kept under observation for at least two years, and regarded as in what I have called the "non-clinical" stage.

LATE PROGRESSIVE STAGE: THE DEFENCE

By this is meant the chronic consumptive stage, and it is as a rule the outcome of the previous stage. The disease now has the upper hand and the patient is on the defensive. He may live for several years, but apart from a few exceptional cases eventually dies of tuberculosis. It is to prevent the patient from passing into this stage that thorough treatment is so urgently needed in the previous one. No hard-and-fast line can be drawn between these two stages. Some patients obviously belong to one or the other, but there is a large intermediate group. Patients who recover usually respond early and readily to treatment. If they do not respond at first they do so after a few months. There are exceptions, of course, but if one placed in this late progressive stage all patients who still have active disease after two years' thorough treatment one would not make many mistakes. I trust I shall not be misunderstood in this matter. There is no doubt that many patients in this stage of the disease improve sufficiently to have several years of active or useful life; some actually recover, and much can be done for them by modern treatment. From my own experience, however, and from the extensive literature describing the late results of patients who have reached this stage, it is not open to doubt that a large proportion of them do die of the disease, and a great many within a few years. To remain blind to this fact is a common mistake; I feel that the happiness of the patient is too often disregarded, and he is subjected to confinement in a sanatorium or to some drastic treatment which renders his last years irksome and does not offer any real hope of benefit.

In the previous stage the patient's temporary unhappiness or inconvenience is not so important, because one can offer a very real hope of recovery. As a practical physician I continually find the greatest difficulty in persuading a patient in the early stage to submit to a strict course of treatment, and he is often supported by his doctor, who takes the view that he is not bad enough for this or that treatment. They do not realize the extreme gravity of the condition when it has passed the early stage. When once the patient has reached what I call the late progressive stage he will submit to any treatment, and I want to make it quite clear that even then much can be done. The point I wish to emphasize is the enormous importance of strict treatment in the early phase.

The principles of treatment in this late progressive stage depend on the ratio between the breaking down of lung tissue on one hand and the formation of fibrous tissue on the other. The more the fibrosis the greater the expectation of life. In exudative cases with but little ability to form fibrous tissue artificial pneumothorax is indicated, but it becomes of less value the more the fibrosis, until in most chronic fibroid cases of tuberculosis life is actually shortened by it. The reverse is true for phrenic evulsion and more especially for thoracoplasty, which are often of great value in cases where fibrosis is the predominant feature, but are actually harmful in the more acute phases of the disease. Tuberculin or shock therapy may help in certain cases in this stage. If, for example, the disease is only slowly progressive and the patient appears to be holding his own, but tends to get pyrexia on the slightest exertion, tuberculin may render the temperature stable and aid the formation of fibrous tissue. In most cases in this stage treatment is mainly symptomatic, and one of the most common symptoms is the mental state of the patient. He is often unsettled, self-centred, and neurasthenic, especially if he has had prolonged sanatorium treatment. For these cases work is the best solution. Life is more often prolonged than shortened by suitable occupation in this stage of the disease.

CHRONIC FIBROID STAGE: THE AFTERMATH

This may be the outcome of one of the previous stages, and here again no hard-and-fast line can be drawn. In the previous stages, however, the patient has his good and bad times, but is never really free from symptoms. In the chronic fibroid phase, however, the patient often has years of nearly if not completely good health. I have one patient of 76 who has a large cavity at one apex and fibrosis around it, and according to her notes at Brompton Hospital has had much the same physical signs for over fifty years. In some cases fibrosis is found in a patient who has never had any acute or subacute manifestation of tuberculosis. Such a patient seeks advice owing to sudden haemoptysis, dyspnoea, or loss of energy, and an extensive fibrosis is found. There is a popular belief that such an insidious onset is common in tuberculosis, whereas it is rare, and in the majority of cases the patient can date the onset of his disease, at any rate to within a few weeks. In this stage the patient should be allowed to lead a normal life, but must be warned that he is more likely than a normal individual to suffer from any break of the ordinary rules of health.

Treatment becomes necessary: (1) if the fibrosis is steadily increasing; (2) for repeated haemoptysis, which is not uncommon in this type of case; and (3) for recurrent attacks of pyrexia. Phrenic evulsion and thoracoplasty are usually indicated when special treatment is needed in this stage of the disease. Artificial pneumothorax is suitable only in exceptional cases. One must remember that prognosis is good in the average chronic fibroid case, and may be made worse by treatment. One common mistake is to try and collapse a portion of the lung by pneumothorax or operation simply because there are physical signs or x-ray evidence of a cavity. The safest rule is to keep the chronic fibroid case under careful supervision, but to leave well alone and not initiate any special treatment unless there are any special symptoms which must be controlled.

Complications and symptoms may arise and need treatment at any stage of the disease, but the following table indicates the principles of treatment which usually apply to different stages.

1. Non-clinical Pulmonary Tuberculosis ...	(Medical supervision Sanatorium Switzerland)
2. Early Progressive Stage:	
(a) Acute	(Absolute rest Artificial pneumothorax Shock therapy)
(b) Subacute	(Rest Artificial pneumothorax Sanocrysin Shock therapy)
(c) Chronic	(Sanatorium Switzerland Artificial pneumothorax Sanocrysin Phrenic evulsion)
3. Late Progressive Stage	(Controlled rest and exercise Occupation Phrenic evulsion Thoracoplasty Shock therapy)
4. Chronic Fibroid Stage	(Supervision Occupation Phrenic evulsion Thoracoplasty)

The chief point I wish to emphasize in this paper is the urgent necessity for strict treatment in the early progressive stage. In the later phases much can be done for the patient, but his chance of recovery is only a fraction of his chance in the earlier stage. Everything possible should be done, therefore, to prevent him from passing into the late stage.