

removed by that route. This was one of my earlier cases, and I have not had any trouble with the development of blood clot since I began half-hourly irrigation of the catheter and the base of the bladder with 3 per cent. sodium citrate for the first twenty-four hours after the operation. The apparatus designed by Cuthbert Dukes,<sup>7</sup> and in use at St. Mark's Hospital, has been found valuable in this connexion.

Regarding the mortality, several features must be considered. In the first place, many of these cases were recruited from the worst group of operative risks. Another feature is that the actual obstruction is frequently of a gradual onset over a period of years, with the result that the renal efficiency has been imperceptibly depreciated. Thus, these patients are worse risks than men with large adenomatous prostates which become suddenly congested and develop acute retention without any previous history of urinary trouble. Again, many of the milder cases (and therefore those in better condition) were not operated upon, since they reacted satisfactorily to conservative measures.

Cystoscopy, both before discharge from hospital and some months later, revealed in the main a wide shelving sulcus at the posterior lip of the bladder neck. The question which now arises is whether this will be permanent, or whether the sulcus will be obliterated by subsequent fibrosis and contraction. Time alone can solve this problem, but provided resection can be made a safe procedure, a second treatment, perhaps four or five years later, presents no insuperable difficulty, even should such be necessary.

With regard to the instrumentarium, after carrying out many of the earlier resections with those instruments in common use in this country, I have recently been using the von Lichtenberg-Heywalt resectoscope. I have found this instrument generally satisfactory, especially with regard to the better visual field provided.

### Conclusions

1. The importance of the classification of prostatic obstruction with a view to treatment is emphasized. Without a preliminary cystoscopy such a classification is impossible.
2. Non-operative measures are described in detail and the type of case suitable is indicated.
3. The pre-operative treatment is dealt with, including the technique to be employed in order to avoid liability to the various complications arising when using an indwelling catheter.
4. The indications for suprapubic prostatectomy and for transurethral and suprapubic prostatic resection are dealt with.
5. A personal series of thirty-five cases of transurethral prostatic resection is analysed.

### ADDENDUM

#### Cases of Prostatic Obstruction (1934-5-6)

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Transurethral resection ... ..	35
Suprapubic resection ... ..	4
Death before operation ... ..	6
Conservative measures ... ..	16
Refused operation ... ..	2
Prostatic enlargement associated with some more serious condition ... ..	7

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## TUBERCULOSIS OF THE LOWER LOBE

BY

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That it is extremely uncommon for the adult form of tuberculosis to start in the lower lobe is an unfortunate generalization which has gained currency even from the time of Laennec. He held that excavations hardly ever develop first in the middle or base of the lungs. Throughout the last century this opinion enjoyed the sanctity of an unquestioned axiom. Fowler, who is quoted in Osler's book on *The Principles and Practice of Medicine*, states that the apex is the first site of parenchymal lesion. Fagge considers that tuberculosis never spreads upwards from the base. Garron, Lyall, and Monta claim that rales of long standing below the middle of the chest are almost as diagnostic of a non-tuberculous lesion as rales in the upper half of the chest in the diagnosis of tuberculosis.

Some of the modern workers also are inclined to believe in the extreme rarity of basal lesions, particularly in the reinfection type of tuberculosis. Landis asserts: "My opinion concerning basal tuberculosis is still unchanged; children may have it at the base, but adults practically never." While the primary lesion may occur in any part of the lung, the reinfection, according to Loeschke, is almost always localized in the territory of the apical bronchus. Fishberg, after emphasizing the extreme rarity of basal lesions, enunciates the diagnostic principle that a lesion at the base while the apex is free should be considered non-tuberculous unless the sputum is positive for tubercle bacilli, or the radiograph shows that the lesion is tuberculous in character. Paterson, Pottenger, and Young hardly make any mention of tuberculosis of the lower lobes.

A fairly large volume of opinion, however, has gathered during recent years in favour of a less dogmatic attitude towards localization of early lesions in tuberculosis reinfections. Contributions to the study of tuberculosis of the lower lobe have been made by Sweany, Jacob, Colton, Dunham and Norton, Middleton, Rosenblatt, Reisner, and Hamilton and Fredd. The last two writers consider that one should not be too ready to dismiss a diagnosis of pulmonary tuberculosis because of location of the lesion in the lower lobe. Reisner questions the validity of such a statement as "involvement of the lower lobe is irrelevant and as a rule of late occurrence in the course of progressive cranio-caudate phthisis." He concedes, however, that early involvement limited to the base of the lung is an extremely rare and unusual occurrence in the reinfection forms of adult tuberculosis. But he is definitely of opinion that initial manifestations of tuberculosis are not uncommon in the cranial portion of the lower lobe. He has also tried to prove that the majority of lesions presenting the x-ray appearance of the so-called hilus forms are really lesions involving the apical and subapical portions of the lower lobe.

The contradictory nature of the data available and of the opinions held on tuberculous infections of the lower lobe impelled me to make the following study, which is based on the material of the department of tuberculosis of the King George Hospital, Vizagapatam, over a period of four and a quarter years.

### Incidence in Present Series

In 4,494 cases of pulmonary tuberculosis Reisner found thirty-four with primary involvement of the lower lobe. Hamilton and Fredd give an incidence of 3 per cent.

Rosenblatt found three cases in 1,000. Ross discovered eleven cases in sixty tuberculous nurses, which evidently transgresses the limits of variation in incidence fixed by Kidd—namely, from 1 in 80 to 1 in 500.

In the present series there were forty-one cases in which the lower lobe was primarily involved out of a total of 638 of pulmonary tuberculosis, giving an incidence of 6.4 per cent. Though the percentage of incidence is greater in women than in men, being 10 and 5.6 respectively, it is not so high as that found by Reisner, who gives a proportion of eighteen women to one man. The ages of the patients ranged between 17 and 42, with an average of 26, which more or less conforms to the age incidence in corresponding forms of pulmonary tuberculosis in general. The age distribution of the present series definitely disproves the statement of some writers like Jacob, and Dunham and Norton, who believe that tuberculosis has a peculiar predilection for juveniles.

### Pathogenesis

It has been definitely shown, both by the review of the available literature and by the study of the incidence in the present series, that tuberculous reinfection primarily affects the lower lobe in a fairly large number of patients, though the percentage is comparatively small. The problem of tuberculosis of the lower lobe can no longer be brushed aside by considering such locations as occasional atypical occurrences and as mere exceptions which prove the general rule.

Panchost, in discussing Dunham and Norton's paper, expressed the belief that lower lobe tuberculosis is an atypical manifestation of miliary tuberculosis, and is due to blood stream infection. Colton thinks that the most plausible explanation of basal lesions would be rupture of a tracheo-bronchial or hilar lymph node into a large bronchus, and lodgement of a massive infection in the terminal bronchioles and alveoli producing a bronchopneumonic involvement. Though it may in a way explain the location of the lesion at the base of the lower lobe in a few cases, it cannot adequately account for the predilection for the apical and subapical portions of the lower lobe in the majority of the cases under discussion.

Reisner has attempted a physiological explanation based on the distinctly greater incidence of tuberculosis of the lower lobe in women. He says:

"In view of the more limited diaphragmatic excursions in women, it is only logical to assume that the superior boundary of the pulmonary area ventilated by the diaphragm is on an average at a lower level in women than in men. It is therefore reasonable to expect that the zone of predisposition comprises a larger area in the former, and that it extends further down, including a portion of the lower lobe, chiefly its apical region."

It is generally agreed that tuberculous infection primarily occurs in those areas of the lung where ventilation is deficient and blood circulation and lymph flow are retarded. Ordinarily, expansion is relatively less in the cranial portion of the lung. This accounts for its greater vulnerability to tuberculous reinfections. If, either by some change in the configuration of the thoracic cage or by some variation in the diaphragmatic movements, any other portion of the lung is made to expand relatively less, then the susceptibility of that portion to infection becomes naturally greater. Certain new factors evidently operate on the patients with lower lobe tuberculosis, causing deficient expansion of that lobe. What are these factors? Ventilation of the caudal portions of the lung is mainly caused by movements of the diaphragm. Hence it will be diminished in those individuals in whom the costal type of breathing is the predominant factor. The vulnerability of the lower lobe is conse-

quently increased in them. In all probability this accounts for the greater incidence of lower lobe tuberculosis in women, as their type of breathing is predominantly thoracic.

In this country there is an additional important factor which greatly modifies the type of breathing both in women and in men. The majority of the people here tie their clothes—the women their saris and the men their loin-cloths—tightly round the upper abdomen, evidently causing definite impairment of movement of the diaphragm. This has been verified by observing on the radiographic screen the diaphragmatic excursions of a large number of individuals who are accustomed to tight lacing round their waists. Most of the patients, particularly men suffering from tuberculosis of the lower lobe, who came under my direct observation showed costal type of respiration, and were in the habit of wearing their loin-cloths tightly round their waists.

Another probable contributing factor, at least in some cases, is an antecedent diaphragmatic pleurisy, which no doubt causes impairment of movement of the diaphragm and consequent diminution in the expansion of the lower lobe. In Fishberg's words, "the diaphragm remains elevated and more or less immobilized." In such individuals the lower lobe is more liable to infection. Two cases in the present series gave definite previous history of basal pleurisy on the same side as the subsequent basal pulmonary involvement.

### Clinical Features

Symptomatology in lower lobe lesions is more or less the same as in apical affections. The majority of the cases gave a history of short duration. Only nine patients traced back their symptoms to over a year. In three cases the onset was more or less sudden, in two of which the presenting symptom was haemoptysis, while the third case exhibited symptoms of an acute attack of influenza. Cough and fever were complained of by all. Scanty expectoration was a noticeable feature in about 65 per cent. In one case expectoration completely stopped after a week's hospitalization, even though tubercle bacilli were present in a fair amount in the sputum at the outset, and there was definite clinical and radiographical evidence of lower lobe infiltration. In seven cases there was a history of haemoptysis during the course of the illness. In six there was pain over the affected side; two of these patients had antecedent chronic pleurisy, the rest having intercurrent pleural involvement. The lower lobe on the right side was affected in thirty-four cases, showing thereby a definite preponderance of vulnerability of the right side.

Apical and subapical areas of the lower lobe were involved in thirteen cases. Areas of bronchopneumonic consolidation in the middle of the lobe were found in three. In seven the extreme base was the starting-point of the tuberculous process. The rest showed such diffused infiltration of the lower lobe that it was difficult to judge in which part of the lobe the infection started originally.

Physical signs were more or less definite in almost all the cases, except in those with intercurrent pleurisy, which masked the signs corresponding to the condition of the underlying lung. Coarse rales were extremely rare in most of the cases.

Diagnosis, as a rule, is not difficult provided the possibility of lower lobe tuberculosis is kept in view whenever a case with basal signs is encountered. The incidence of tuberculous reinfection of the lower lobe is sufficiently large as to discredit the time-honoured dictum that basal signs are invariably non-tuberculous in origin. Difficulty in diagnosis arises only when tubercle bacilli are not found in the sputum. In the present series bacilli were absent

from the sputum in only three cases. But the clinical course and the radiological appearances gave sufficient evidence to warrant the diagnosis of tuberculosis in all of them.

### Case Reports

The following are reports of three interesting and illustrative cases.

*Case 1.*—A male Mohammedan, aged 20, was admitted on March 23rd, 1936, for cough and fever of three months' duration. Family and previous histories were negative. The present illness started with fever in the evenings, with sensations of chill, lasting throughout the night and leaving him in the morning. Pain over the lower part of the right side of the chest and cough started two weeks later. Expectoration was scanty. He never spat blood. Physical examination revealed an unusually narrow waist, costal type of breathing, impaired resonance below the inferior angle of the right scapula, distant bronchial breathing, and a few fine crepitations. The radiograph showed infiltration of the extreme right base, with slight thickening of the pleura. Bacilli were present in the sputum. Artificial pneumothorax was successfully induced. The temperature has remained normal since the first refill, and the patient's general condition has considerably improved.

*Case 2.*—A male Hindu, aged 32, a cobbler by profession, came on January 25th, 1936, with a history of severe haemoptysis of a day's duration. His father died of tuberculosis ten years previously. He was apparently in perfect health before the onset of the present complaint of spitting blood. He was a well-built muscular individual with a narrow waistline, due to the constant wearing of the dhoty tightly. His breathing was predominantly thoracic in type. Medium-sized rales could be heard at the left base both in front and behind, and in the lower interscapular region. A radiograph showed mottled appearance of the left lower lobe, particularly at the base. Two injections of Congo-red solution controlled the bleeding for a time, but as the haemoptysis started again after three days artificial pneumothorax was induced on the left side. The bleeding stopped almost immediately. The patient has had more than a dozen refills up to the time of writing, and has shown remarkable improvement. He was discharged on March 7th, 1936, and has since attended the hospital as an out-patient, for refills.

*Case 3.*—A male Hindu student, aged 21, sought admission on June 29th, 1935, for pain on the right side of the chest, fever, cough, and spitting of blood of a month's duration. He was having high fever in the evenings, up to 102° and 103° F., associated with slight chill. Physical examination revealed a circumscribed area of dullness near the lower angle of the right scapula, with bronchial breathing and a few fine rales. Radiograph showed a patch of uniform opacity in the middle of the right lower lobe. A provisional diagnosis of abscess of the lung was made, as no tubercle bacilli were found in the sputum at the first examination. As his sputum was scanty he was put on potassium iodide. Subsequent examination of the sputum by the concentration method showed tubercle bacilli. Artificial pneumothorax was not resorted to, as it was decided to observe the progress of the disease under general constitutional and symptomatic treatment. An x-ray picture two months after admission showed a well-walled-in cavity in the same area. The area of infiltration had definitely narrowed. The general condition of the patient had improved. His temperature was normal and he had scarcely any cough. Phrenic evulsion was done on December 9th, 1935. He was discharged "arrested" two months later. A radiograph taken when he reported himself on April 18th, 1936, showed disappearance of the cavity. There was only a mottled appearance over the affected area, possibly due to calcification. He is now in good health.

### Prognosis

In the present series one patient died, three were discharged "otherwise," seventeen as "arrested," and seventeen as "relieved." The remaining three are still in hospital progressing favourably. Ten cases had

collapse therapy, and all of them are in the "arrested" series. The remainder had general constitutional and symptomatic treatment only. Judging from the above results, prognosis in lower lobe tuberculosis is in no way worse than in those cases of upper lobe involvement in which collapse therapy is resorted to. I have noticed more marked and rapid improvement in the constitutional symptoms following collapse therapy in lower lobe than in upper lobe affections. Response to treatment of any form is definitely better in the former than in the latter. The study of the present series of cases entirely disproves the statement of Dunham and Norton that basal lesions are virulent. Hamilton and Fredd, on the other hand, give a favourable prognosis in lower lobe involvement, though their observations were limited to a small series of ten cases. Reiser observes that the course and ultimate fate in cases of lesions of the lower lobe are probably not different from those in cases in which the lesion originated in the upper lobe, provided that the nature and extent of the involvement are of a corresponding type. The conflicting nature of the opinions on prognosis in lower lobe lesions can probably be accounted for by the small number of the cases studied in the different groups, by the difference in the type of lesions in each group, by racial peculiarities, by the difference in duration of the disease in each group, and by the form of treatment adopted. All things considered, one is justified in concluding that prognosis in lower lobe lesions is probably the same as the prognosis in involvement of the upper lobe.

### Summary

1. The literature on the subject is reviewed.
2. The incidence and clinical course in a series of forty-one cases of lower lobe tuberculosis are discussed.
3. The different views on pathogenesis are stated. It is suggested that the costal type of breathing increases the vulnerability of the lower lobe by diminishing its expansion. Two additional factors favouring costal type of breathing are described—namely, tight lacing round the upper abdomen and diaphragmatic pleurisy.
4. Three illustrative cases are reported.
5. Prognosis is discussed. It is concluded that the prognosis in lower lobe involvement is in no way worse than in upper lobe lesions.

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