The Shrunken Right Middle Lobe*
With Reference to the So-called "Middle Lobe Syndrome"

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Attention has been directed recently to the diagnostic difficulties frequently associated with the finding of a shrunken right middle lobe, a condition referred to by some as the "middle lobe syndrome." The following study of 16 cases of shrunken middle lobes deals with the probable cause of the condition, its diagnosis and treatment. The material does not include instances of middle lobe neoplasm, pneumonia, foreign body aspiration or tuberculosis in which the middle lobe involvement is incidental to a more widespread process.

Anatomic and Roentgenologic Considerations

The right middle lobe is separated from the right upper lobe by the horizontal fissure and from the lower lobe by the oblique fissure. Laterally, the middle lobe is in contact with the lower anterior aspect of the chest; medially, with the right side of the heart and posteriorly, with the lower lobe. The costal portion of the lobe is triangular; the cardiac portion, quadrilateral. In more than 50 per cent of instances the horizontal fissure is incomplete or absent with the result that in these the middle lobe is either partially or completely fused with the upper lobe.

Because of the obliquity of the main fissure and the fact that the middle lobe lies anteriorly to the lower lobe, roentgenologic study requires lateral as well as postero-anterior (P-A) positioning of the patient. A P-A projection does not suffice for the additional reason that if the middle lobe is shrunken, it retracts to the hilum and its place is filled with overdistended lung. On the other hand, although the lateral projection is more revealing, the contracted lobe may be obscured by densities cast by the heart and hilar structures.

If the middle lobe is diseased, as in acute bacterial pneumonia, without much loss of volume, the P-A projection reveals a prominent horizontal fissure which is slightly depressed and a diffuse density extending below and medially, the costophrenic sinus remaining clear. Should the middle lobe be considerably reduced

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In size, helpful information may be obtained by noting a shift of the heart to the right or a downward displacement of the horizontal fissure. The frequency with which calcified lymph nodes are demonstrable in the roentgenograms is quite impressive.

In the lateral projection, it is occasionally possible to discern a triangular density within a large quadrilateral mass; more often the atelectatic lobe is roughly triangular. If the middle lobe is shrunken as a result of bronchial obstruction, and its volume greatly reduced, the lobe may be represented by a narrow opacity not much wider than that of a rib. The configuration of a shrunken middle lobe is greatly modified by the shape of the thorax, the presence of pleural adhesions and the condition of adjoining lobes.

Either the lateral or medial segments of the middle lobe may be involved. Obstruction of the lateral (costal) division of the middle lobe bronchus is characterized in the P-A projection by a diffuse cloudiness extending into the lower lung field; a clear zone separates the density from the right border of the heart. In the lateral projection, the density appears triangular and is situated low and posteriorly. Obstruction of the medial (cardiac) division of the middle lobe bronchus produces in the P-A projection an irregular density immediately adjacent to the right border of the heart. In the lateral projection, the density appears quadrilateral lying immediately behind the sternum and beneath the horizontal fissures.

In addition to postero-anterior and lateral projections, supplementary procedures are often necessary, the most important being the following:

1) Lordotic View (the abdomen is brought forward, the upper back kept against the partition of the fluoroscope). In this projection, the greater mass of the middle lobe and interlobar septa are brought parallel to the plane of the central ray and a triangular shadow is brought to view. Usually the lower margin of the lobe is sharply visualized; at times, the upper as well as lower margins are seen. Roentgenograms are then taken at the desired angle for more detailed study.

2) Tomography (sectional roentgenography). Study of the lung at various depths in the right lateral position (patient lies on the right side) is apt to be most instructive. A triangular density in the lateral sections stands out in sharp contrast to a quadrilateral density in the medial sections. Tomography is therefore helpful if one suspects either the lateral or medial segments of the lobe to be involved. Each tomogram should be studied for the presence of calcified bronchopulmonary and hilar lymph nodes as well as for evidence of narrowing, distortion or displacement.
of the lumina of the lobar and lobular bronchi. The interlobar fissures are particularly well visualized.

3) Bronchography. This procedure is often indicated because bronchiectasis is a frequent accompaniment of middle lobe disease. The roentgen examinations following instillation of iodized oil are made in the positions mentioned previously.

The indications for bronchoscopy will be discussed under Differential Diagnosis.

Report of Cases

Case 1: M.M., 44 years old, male; right middle lobe shrunken and bronchiectatic. Disease accidentally discovered during a routine x-ray inspection of the chest. Roentgenography (P-A, right lateral, lordotic): collapse of right middle lobe; tomography showed lateral as well as medial segments involved. Bronchoscopy showed small amount of thick pus, no endobronchial disease. Bronchography showed dilatation of proximal portions of both divisions of the middle lobe bronchus (Fig. 1). Course: No significant symptom referable to chest over a period of five years. During this time, appendix and gall bladder removed on separate occasions. Working.

Case 2: D.E., 51 years old, male; right middle lobe shrunken and bronchiectatic. Moderate cough and expectoration for a number of years. Roentgenogram one year previously revealed findings practically identical with those on present occasion. Roentgenography (P-A, right lateral, lordotic): collapse of right middle lobe. Bronchoscopy negative. Bronchography revealed dilatation of both divisions of right middle lobe bronchus. Course: Continues to have moderate cough and expectoration. Working.

Case 3: A.C., 50 years old, female; right middle lobe shrunken and bronchiectatic. After a seizure of pleurisy 25 years previously, developed recurring seizures of cough and expectoration. Lately, repeated hemoptyses and increase in bronchitic symptoms. Roentgenography (P-A, right lateral): collapse of right middle lobe; also fibrocalcific foci in both upper lobes and scattered foci in other lobes. Bronchoscopy negative. Bronchography showed cylindric bronchiectasis of right middle lobe. Bronchogram of left lobe negative. Course: Because of recurring hemoptyses, lobectomy of right middle lobe. The specimen revealed cylindric bronchiectasis in a partially shrunken and fibrotic lobe. Fully recovered.

Case 4: M.W., 29 years old, male; right middle lobe shrunken and bronchiectatic; lingula bronchiectatic. Moderate cough and expectoration for 10 years. Past four years, recurring seizures of severe cough, wheezing and occasional fever. Roentgenography (P-A, right and left lateral, lordotic): collapse of right middle lobe, also lingula (Fig. 2); tomography confirmed findings. Bronchoscopy negative. Bronchography: Bronchiectasis involving right middle lobe and lingula of left upper lobe. Course: Status unchanged during past five years. Cough and expectoration more annoying during winter months. Working.

Case 5: J.O., 59 years old, female; right middle lobe shrunken and bronchiectatic. Pleurisy 30 years previously; pneumonia one year ago. Chronic cough and moderate pain in chest for many years. Roentgeno-
Shrunken, bronchietatic middle lobe accidentally discovered in a man of 44 years: (A) Postero-anterior projection: irregular density in region of right middle lobe. (B) Lateral projection: density now triangular in shape with a well demarcated lower margin. (C) Lateral projection: irregular triangular density in region of right middle lobe.
Shrunken, bronchiectatic middle lobe accidentally discovered in a man of 44 years: (D) Right lateral tomogram: middle lobe appears as a sharply triangular density in the lateral section, becoming more quadrilateral in (E) the medial section.

Shrunken, bronchiectatic middle lobe accidentally discovered in a man of 44 years: (F) Bronchogram reveals dilated bronchi in middle lobe. In the lateral bronchogram (G) the proximal divisions of the middle lobe bronchus are filled with iodized oil, the distal bronchi are free of oil.

Case 6: A.L., 49 years old, male; right middle lobe shrunken and bronchiectatic. Recurring hemoptyses of 10 years’ duration, punctuated by seizures of excessive cough, expectoration and occasionally severe pain in chest. Roentgenography (P-A, right lateral, lordotic): collapse of right middle lobe, also fibrocalcific foci in both apical regions. Bronchoscopy revealed hyperemia and swelling of the right main bronchus, especially marked around the orifice of the right middle lobe bronchus from which exudate was noted. Bronchography revealed saccular and cylindric bronchiectasis of right middle lobe bronchi. Course: Symptomatic improvement with aerosol and intramuscular penicillin. Developed right empyema which required thoracotomy and drainage. One year later, recurrence of hemoptysis necessitated right pneumonectomy.

Case 7: W.W., 64 years old, male; right middle lobe shrunken and bronchiectatic. Admitted to hospital in congestive heart failure; embolization and gangrene of right foot. Roentgenography (bedside): calcified focus above right leaf of diaphragm and several calcified foci at right hilum. Diffuse pulmonary congestion. Died 10 days later. Autopsy revealed shrunken bronchiectatic right middle lobe caused by strangu-
lation of bronchus by a collar of calcified lymph nodes. A calcified tuberculous focus was found at periphery of right middle lobe (Fig. 3). Calcified tubercles in spleen. Coronary thrombosis and myocardial infarction.

Case 8: B.M., 51 years old, male; right middle lobe shrunken. Several seizures of pneumonia and pleurisy; recurring hemoptyses and pain in chest. On one occasion, spat-up gritty material which he was told were "stones" from broken down lymph nodes. Repeated examinations of sputum failed to reveal acid-fast organisms. Roentgenography (P-A, right lateral, lordotic): collapse of right middle lobe. Tomography confirmed findings. Bronchoscopy performed two years previously reported negative. Bronchography in another institution findings unknown. 

Course: Presently at the Morrisania City Hospital where examinations of the sputum reveal acid-fast organisms.

Case 9: S.R., 21 years old, female; right middle lobe shrunken. Condition accidentally discovered in course of routine roentgenologic examination of chest. Had five months treatment at Seton Hospital at the age of seven years for primary tuberculosis. Roentgenography (P-A, right lateral): triangular density in region of right middle lobe. Course: Now in seventh month of pregnancy complicated by sickle cell anemia.

Case 10: J.H., 73 years old, female; right middle lobe shrunken; tuberculous bronchitis. Eight months of cough, expectoration, pain in the chest, hemoptysis and vomiting. Roentgenography (P-A, right lateral): collapse of right middle lobe. Bronchoscopy revealed mucosal swelling

FIGURE 3: Shrunken, bronchiectatic middle lobe in a man of 64, accidentally discovered at autopsy. Arrow points to a constricting collar of calcified lymph nodes at origin of right middle lobe bronchus. The bronchi are dilated and distally the middle lobe is collapsed and darker than the surrounding lung. At the periphery of the middle lobe there is a calcified focus (broken arrow), the remains of a healed primary tuberculous infection.
Shrunken middle lobe; tuberculous bronchitis in a man of 56 years. Acid-fast organisms in sputum. (A) Postero-anterior projection: the middle lobe is markedly reduced in size. (B) Lateral projection: the middle lobe appears as an elongated quadrate density.
and infiltration of middle lobe bronchus, swelling and redness extending into the right main bronchus. Sputum contained acid-fast organisms.

Case 11: G.T., 56 years old, male; right middle lobe shrunken; tuberculous bronchitis. Examined as a possible source of contact, a son of 30 having recently died of tuberculosis. Moderate cough and expectoration. Examination of sputum one year previously failed to reveal acid-fast organisms but they are now found in sputum. Roentgenography (P-A, right lateral, lordotic): collapse of right middle lobe. Bronchoscopy revealed occlusion of middle lobe bronchus with ulceration of central area of stenosis. Bronchography revealed failure of filling of the right middle lobe bronchus (Fig. 4). Course: Admitted to Morrisania City Hospital where, after streptomycin treatment, middle lobe lobectomy was done. Specimen revealed shrunken middle lobe with fibrocaseous foci; bronchus occluded. Uneventful recovery, sputum negative; attending Morrisania City Hospital Chest Clinic.

Case 12: R.S., 70 years old, female; right middle lobe shrunken; tuberculous bronchitis. Two years' cough, expectoration, pain in the chest, fever and wheezing. Roentgenography (P-A, right lateral, lordotic): collapse of right middle lobe; tomography revealed circumscribed area of highlight in superior segment of the right lower lobe adjacent to the collapsed middle lobe. Bronchoscopy showed endobronchial tuberculosis with stenosis of middle lobe bronchus. Sputum contained acid-fast organisms. Course: Symptomatic improvement with streptomycin. Sputum still shows acid-fast organisms. Recent spread of disease in right lower lobe.
**FIGURE 5A**  
Shrunken middle lobe, later becoming the seat of an abscess. (A) Postero-anterior projection: irregular rounded density at right hilum. (B) Lateral projection: middle lobe is somewhat reduced in size (arrows point to horizontal and longitudinal fissures seen clearly in the 14 x 17 inch film): note calcified lymph nodes in hilar region. (C and D) Ten weeks later, abscess occupying middle lobe showing fluid level. (See Figure D in following illustration.)
Case 13: T.H., 40 years old, female; *right middle lobe shrunken; tuberculous bronchitis; interlobar tuberculous effusion*. Left pleural effusion two years previously followed by tuberculosis of left lung treated with pneumothorax and later thoracoplasty. Recent development of collapse of right middle lobe with encapsulated interlobar effusion. Roentgenography (P-A, right lateral, lordotic): marked collapse of right middle lobe with concave lower margin. Bronchoscopy showed granulation tissue in right middle lobe bronchus extending into the main bronchus. Chest aspiration revealed fluid containing acid-fast organisms. *Course*: Patient now in Montefiore Hospital Country Sanatorium.

Case 14: B.B., 71 years old, female; *right middle lobe shrunken; interlobar tuberculous effusion; anthracotic lymph node penetrating right middle lobe bronchus*. Seven year history of cough, expectoration, recurring fever and pain in chest. Sputum contained acid-fast organisms. Roentgenography (P-A, right lateral, lordotic): middle lobe bronchus occluded by swollen mucosa with anthracotic material penetrating into lumen. Bronchography revealed filling defect at point of origin of right middle lobe bronchus. Chest aspiration revealed fluid which contained acid-fast organisms. *Course*: Condition good, attending Montefiore Hospital Chest Clinic.

Case 15: A.G., 23 years old, male; *right middle lobe shrunken and tuberculous*. History of repeated hemoptyses. Diabetes. Acid-fast organisms in the sputum. Pneumothorax for four months, abandoned because technically ineffective. Roentgenography (P-A, right lateral): collapse of right middle lobe; several translucent areas within the shrunken lobe; tomography confirmed the above. Bronchoscopy showed the mucosa of

![Figure 5D](image1) ![Figure 5E](image2)

*FIGURE 5D*  
Shrunken middle lobe, later becoming the seat of an abscess. (D) Ten weeks later, abscess occupying middle lobe showing fluid level.  
*FIGURE 5E*  
Following middle lobe lobectomy: evidence of resection of posterior segment of sixth rib and pleural reaction at base; reexpansion of remaining lobes.
the entire tracheobronchial tree reddened with slight discharge; all orifices patent; no ulceration, granuloma or edema. **Course:** Right middle lobe lobectomy and decortication under streptomycin coverage. Specimen revealed scarred lobe with tuberculous cavitation and encapsulated caseous foci; tuberculous bronchitis. Uneventful recovery.

**Case 16:** H.Y., 50 years old, male; shrunken right middle lobe; abscess of right middle lobe. Onset with symptoms of atypical pneumonia, not responsive to treatment. Later, hemoptysis and shortly thereafter, fever, chills, cough, fetid expectoration and pain in the chest. Roentgenography (P-A, right lateral): Initial films showed accentuated horizontal and longitudinal fissures with reduction in size of right middle lobe; many prominent calcified nodes at hilum. Later films revealed suppurration with abscess formation of right middle lobe. Bronchoscopy revealed mucosal redness. **Course:** After two weeks intensive penicillin treatment symptoms abated and abscess receded in size. Lobectomy and excision of a chronic organized mass. Uneventful recovery. Returned to work (Fig. 5).

**Analysis of Cases**

The majority of individuals with middle lobe disease, of the type described, give a history of moderate cough and expectoration dating back many years. At times the symptoms are more severe, the cough croupy and spasmodic, associated with wheezing and increased expectoration. Seldom, however, is the amount of sputum eliminated as profuse or malodorous as that commonly met in the usual forms of bronchiectasis unless there is secondary infection. A history of pain in the chest or pleurisy with effusion at an early age is often obtained. Recurring hemoptysis is a striking feature of the disease and may be the presenting symptom. Right middle lobe shrinkage may be discovered accidentally in the course of a routine roentgen inspection of the chest or during an intercurrent respiratory infection. This partly explains the fact that nine of the 16 cases presented here were seen in office practice.

As for the nature of the disease, the following are pertinent to our discussion. In six instances the lobe was shrunken and demonstrably bronchiectatic; in one (Case 7), the bronchiectasis was discovered at autopsy. In several the presence of bronchiectasis was suspected but not verified by bronchography. Iodized oil was not instilled in the bronchi of patients with active tuberculosis; in these the presence or absence of bronchiectasis was not ascertained. In five, bronchoscopy revealed a shrunken lobe associated with tuberculous bronchitis. One young man, a diabetic of 23 years (Case 15), with a shrunken middle lobe was treated with lobectomy; the excised lobe revealed tuberculous bronchitis. Another man of 56 (Case 11) had a right middle lobe lobectomy for a shrunken tuberculous lobe associated with tuberculous bronchitis.
In two of the patients with tuberculous bronchitis mentioned above (Cases 13 and 14), encapsulated serous fluid was present between the middle and lower lobes which on aspiration revealed acid-fast organisms. One patient (Case 8), expectorated what he thought was a broken tooth; his physician who had been observing the patient closely, advised him that it was a piece of broken lymph node. Two years later, acid-fast organisms were found in the sputum. One patient (Case 9), received sanatorium treatment at the age of seven years for primary tuberculous infection. Another patient (Case 11) spat up a broncholith while being prepared for a middle lobe lobectomy.

From a careful analysis of the histories, roentgen findings and course of events of these 16 patients, the evidence is strong that in each instance a preexisting tuberculous focus, probably in regional lymph nodes, led to the involvement of the middle lobe. Undoubtedly middle lobe shrinkage with or without bronchiectasis occurs as a result of pressure exerted on bronchi by cicatrizing nontuberculous lymph nodes as well as other causes. There is reason to believe that in the majority, if not all, of the patients in our study, the cause existed in pressure on and invasion of bronchi by casealcalcareaous tuberculous lymph nodes and accompanying cicatization.

Differential Diagnosis

The differential diagnosis of middle lobe shrinkage and associated changes in bronchi and pleura involves exact localization as well as determination of the nature of the disease. The history and physical findings are helpful in diagnosis but they assume much more significance after inspection of the roentgenogram.

Although roentgenography in the P-A and right lateral projections suffice in most instances to localize the disease, one often meets with difficulties. A shrunken anterior segment of the right upper lobe may be depressed by overdistended lung in the remainder of the lobe causing the affected segment to occupy the space normally taken up by the right middle lobe. It is important in such instances to examine the films, especially the lateral tomograms, for evidence of interlobar fissures. The lordotic projection which brings to view one or both borders of the middle lobe is particularly revealing. By this means it is usually possible to exclude simple enlargement of the hilar lymph nodes, pleuropericardial adhesions or an interlobar collection of fluid, the conditions with which right middle lobe disease is most often mistaken.

Encapsulation of fluid between the middle and lower lobes, or between the middle and upper lobes, seldom occurs unless there is coexisting parenchymal disease. A diagnosis of interlobar pleu-
risy is made more often than is warranted. This applies also to pleuropericardial adhesions. Free fluid in an interlobar fissure is apt to show a concave lower margin, but this does not necessarily hold if the middle lobe is markedly contacted and the fluid hugs closely the collapsed lobe. The roentgenographic appearance of a shrunken middle lobe may also be simulated by a triangular density formed by the superimposed lower cardiac border and an elevated right leaf of the diaphragm. By using the several diagnostic modalities mentioned previously, the disease can be usually localized with a high degree of accuracy.

Bronchoscopy is indicated in the differential diagnosis of a shrunken right middle lobe for the reason that many individuals, the majority in our series, are of the cancer age and bronchiogenic carcinoma has to be excluded. In the case of relatively young individuals, a history of recurring hemoptyses associated with spasmodic seizures of cough and wheezing suggests the possible presence of bronchial adenoma. An additional indication for bronchoscopy is a history of repeated pneumonia or pleurisy. In these, one has to rule out bronchial obstruction caused either by a foreign body or by extrabronchial compression of one form or another. Bronchoscopy was done in 13 of the 16 cases. At the time of bronchoscopy, material is obtained for bacteriologic examination and for study of cellular elements. A biopsy is also taken for histologic study. The bronchoscopist should be prepared to encounter irregular calcified masses penetrating the mucosa or lying freely (broncholiths) within the bronchial lumen. These "lung stones" are due to calcified lymph nodes ulcerating and eroding into a contiguous bronchus.

The frequency with which tuberculous bronchitis is encountered in patients with middle lobe disease is remarkable. The bronchial involvement may take the form of ulceration or diffuse mucosal swelling and redness. It often affects the right main bronchus and is most pronounced at the orifice of the right middle lobe bronchus. In none of the cases studied was a broncholith found on bronchoscopy. In one instance (Case 14), bronchoscopy revealed an anthracotic lymph node penetrating the bronchus but no free "stones" within the lumen. However, on other occasions we have encountered in one instance a broncholith within the right upper lobe bronchus; in another, within the right lower lobe bronchus and in a third, within the bronchus supplying the lingula.

Bronchography serves the purpose of demonstrating the presence or absence of bronchiectasis or of bronchial obstruction beyond bronchoscopic view. As occurred in several of our patients, stenosis of the middle lobe bronchus was not seen endoscopically,
yet iodized oil revealed distal obstruction. Four of our patients showed variable degrees of cylindrical or saccular bronchiectasis and in one there was involvement of the lingula as well as of the right middle lobe bronchus. In two patients with tuberculous bronchitis, the iodized oil failed to enter the shrunken lobe.

**Treatment**

Middle lobe disease of the type described is best treated by resection unless the age or condition of the patient are contraindications. The presence of active tuberculosis requires thorough preparation with streptomycin and adjuvant measures before surgery is undertaken. Surgical treatment is more urgent in patients who have frequent episodes of pneumonia or recurring hemoptyses or superimposed suppuration or empyema. In these, preoperative treatment with antibiotics, both locally and systemically, as well as supportive measure are of great importance.

One of the patients treated surgically (Case 16), developed a nontuberculous abscess in the partially collapsed middle lobe after several months of cough, wheezing, hemoptysis, fever and recurrent seizures of chest pain. After two weeks of penicillin treatment the symptoms abated and the abscess reduced in size. The patient was treated by right middle lobe lobectomy and made an uneventful recovery. Another patient (Case 6), had recurring hemoptyses for a period of 10 years. He developed an empyema which was drained surgically. However, recurrence of copious hemoptyses a year later, necessitated a right pneumonectomy because technical difficulties prevented resecting the middle lobe alone. The third patient, a woman of 50 (Case 3), had a right middle lobe lobectomy for recurring hemoptyses. The patient made an uneventful recovery.

A shrunken middle lobe which is the seat of active tuberculosis, especially if associated with tuberculous bronchitis, presents many difficulties in treatment. Sooner or later evidence of tuberculosis is found in other parts of the lungs, if not already in existence, so that one is dealing with a multilobar disease of serious nature. One utilizes sanatorium treatment, streptomycin and whenever feasible, some form of surgical treatment. If conditions are favorable resection of the diseased middle lobe may be successfully employed as was done in the following instances. This patient (Case 15), a diabetic man of 23, had a shrunken tuberculous middle lobe for which pneumothorax proved ineffective. Under streptomycin coverage, it was possible to resect the middle lobe and at the same time decorticate the remainder of the lung which was bound down by a fibrous membrane. The patient made an uneventful recovery. Another patient of 56 (Case 11) had a suc-
cessful excision of the middle lobe which was the seat of fibrocaseous tuberculosis and tuberculous bronchitis.

**Discussion**

Nelson, Brock and others have shown that the bronchus to the right middle lobe, more so than any other, is subject to compression by enlarged or cicatrizing lymph nodes. As a result, the right middle lobe is particularly vulnerable to collapse. In explanation, these authors drew attention to the fact that the right middle lobe bronchus, as it leaves the main channel, forms an acute angle. At the point of bifurcation the bronchus is surrounded by a chain of lymph nodes which drain the lymphatics not only of the middle lobe but also of the lower lobe. When these bronchopulmonary lymph nodes become involved, they are apt to exert pressure on the middle lobe bronchus. Should the bronchial channel become obstructed, the lobe collapses leading in many instances to bronchiectasis. Bronchiectasis has been observed repeatedly in children who have gone through the primary infection with the tubercle bacillus, especially in those who have had signs of bronchial compression. It is noteworthy that the middle lobe is most often involved in such instances.

Case 7 is particularly instructive. The patient, a man of 64 years, died of coronary thrombosis and myocardial infarction. At autopsy, the right middle lobe was found shrunken and bronchiectatic caused by strangulation of the middle lobe bronchus by a cicatrizing collar of calcified lymph nodes. A calcified primary focus was present at the periphery of the right middle lobe (Fig. 3A). The presence of calcified tubercles in the spleen was additional evidence that the condition in this particular instance was the end result of a healed primary tuberculosis.

It should be emphasized that enlargement of lymph nodes in primary tuberculosis occurs irrespective of the lobe involved. The resulting collapse may affect the right upper lobe, the left upper or lower lobes or a combination of lobes, even the entire right lung or the entire left lung. The predilection of the entire left lung to collapse is ascribed to the fact that the left tracheobronchial glands are in a position to obstruct easily the left main bronchus. One lymph node lying between the bronchus supplying the lingula and that of the lower lobe is in a particularly strategic position. The predilection of lingular involvement when bronchiectasis involves the left lower lobe may find an explanation in this circumstance.

There is no need to designate the condition of right middle lobe collapse a syndrome because an anatomical peculiarity renders this lobe especially vulnerable to bronchial obstruction, no more
than the term "epituberculosis" should be used when the right upper lobe is involved. The mechanism is identical in all forms of pulmonary collapse due to bronchial obstruction by lymph nodes.

Collapse of one or more lobes or an entire lung and accompanying sequelae, caused by compression of bronchi by calcified tuberculous lymph nodes, is only one facet of the disease the ramifications of which are much more profound. What is not sufficiently realized is the fact that the sequelae of lymph node enlargement may not only appear at a time or shortly after the first infection with the tubercle bacillus but at any time during the life-time of the individual. Of the 16 patients analyzed in this study, 13 were 40 years of age or over. In this respect our experience is unique since most of the reported instances of "lobar collapse," "absorption collapse" or "atelectatic bronchiectasis," followed primary tuberculosis in children.

Certain fundamental aspects of the problem, which can only be touched upon here, concern the frequency with which dormant caseo-calcareous foci in bronchopulmonary and tracheobronchial lymph nodes give rise to exacerbation of tuberculosis, by one or another avenue of dissemination, during the life-time of an individual. Physicians of the "endogenous" school give considerable weight to this form of onset of tuberculosis in the adult. Unexplained pleurisy with effusion in later years, even empyema without obvious cause, tuberculous pericarditis or tuberculous bronchitis with minimal pulmonary involvement probably represent regional spreads of the disease from tuberculous lymph nodes. Fistulization may take place between pleura, bronchi, esophagus and chest wall; at times, adhesive mediastinitis with obstructive or traction phenomena on adjacent organs. Some forms of bronchiectasis are occasionally due to bronchial obstruction by bronchopulmonary lymph nodes. A dramatic event, and one not at all uncommon, is the expectoration of broncholiths or "lung stones" which is often preceded by a bout of severe cough and hemoptysis. Although there are times when the diagnosis of the above mentioned presents difficulties, the probable course of events is easily reconstructed once tuberculosis is suspected.

SUMMARY

Of all the lobes, the right middle is most subject to collapse. This is due to the fact that the middle lobe bronchus is especially vulnerable to compression and invasion by bronchopulmonary lymph nodes, the latter draining the lower as well as the middle lobe. An analysis of 16 cases of shrunken middle lobes reveals the cause to lie in cicatrizting tuberculous lymph nodes constricting the middle lobe bronchus. In some, the shrunken lobe is the seat
of bronchiectasis; in others, there is tuberculous involvement of the bronchus and lobe. The significance of the existence of dormant caseocalcareous bronchopulmonary lymph nodes in the pathogenesis of several tuberculous and nontuberculous conditions is discussed.

The symptoms referable to shrunken middle lobes are of a bronchitic nature punctuated by acute seizures due to intercurrent pulmonary infections or hemoptysis. The relatively mild course of the disease, in most instances, accounts for the fact that the condition is often encountered in office practice. It is usually overlooked or erroneously ascribed to pleuropericardial adhesions or interlobar pleurisy. The diagnosis can be made by roentgenography in the postero-anterior, right lateral and lordotic projections. The shrunken lobe appears as a triangular or roughly quadrilateral density at the root of the lung. Tomography is helpful. Bronchoscopy is essential in determining whether or not one is dealing with bronchiogenic neoplasm. Bronchography is necessary to establish the presence of bronchiectasis. Definitive treatment consists of excision of the involved lobe unless the age and condition of the patient contraindicate surgery.

RESUMEN

El lóbulo medio derecho es el más sujeto de todos al colapso lo que es debido al hecho de que es especialmente susceptible de sufrir compresión e invasión, por los ganglios linfáticos que canalizan tanto el lóbulo inferior como el medio.

Un estudio de 16 casos de lóbulo medio retraído revela que la causa radica en los ganglios linfáticos en proceso de cicatrización que comprimen el bronquio del lóbulo medio derecho.

En algunos casos hay bronquiectasía en ese lóbulo; en otros hay invasión tuberculosa del bronquio y del lóbulo. La significación de la existencia de ganglios calcareo-caseosos en la patogenia de algunos padecimientos tuberculosos o no tuberculosos, se discute en este artículo.

Los síntomas atribuibles a lóbulo medio retraído son de naturaleza bronquítica con acentuación durante episodios agudos debidos a infecciones pulmonaers o hemoptisis. El curso relativamente benigno en la mayoría de los casos, explica que estos casos se ven a menudo en la práctica de consultorio. Habitualmente es pasado por alto o erroneamente se atribuye a adherencias pleuropericárdicas o a pleuresía interlobar. El diagnóstico puede hacerse por radiografía en posteroanterior, lateral derecha o en lordosis.

El lóbulo retraído aparece como una sombra triangular o toscamente cuadrangular en el pedículo del pulmón. La tomografía es muy útil.
La broncoscopia es esencial para determinar si se trata o no de una neoplasma. La broncografía es necesaria para establecer la presencia de bronquiectasis. El tratamiento definitivo consiste en la extirpación del lóbulo comprometido a menos que la edad u otras condiciones contraindique la cirugía.

REFERENCES