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BRONCHIECTASIS .
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Sion F. Sherrill

BRONCHIECTASIS.

Bronchiectasis is a condition characterized by dilatation of one or more branches of the bronchial tree, and which sooner or later becomes complicated by infection. It may be congenital or acquired. It is characterized pathologically by the bronchial dilatation and clinically by a chronic cough with purulent sputum.

The condition is generally symptomless unless complicated by infection hence some authors, principally Hedbloom,¹ hold that the condition is a disease, and the diagnosis can not be made unless infection producing symptoms are present. ^{some} Other authors ^{2,3} hold that the term implies simply the anatomical change found in the bronchi.

The condition of bronchial dilatation may be either congenital or acquired. Sauerburch has emphasized the importance of the congenital type, but most American authors consider this type rare.

The condition was formerly thought to be quite rare; the incidence was given as about 1 to 1000 hospital admittances. However, in later years the diagnosis is being made more and more frequently. The disease may have become more frequent but probably this increased incidence is due to an increased recognition, which has been made possible by the aid of the bronchoscopy and bronchography.⁴ Hedbloom¹ states that it is next in frequency to pulmonary tuberculosis among the chronic pulmonary diseases, and that it is found in from 2 to 4% of the necropsies in general hospitals. Ochsner⁶ states that he believes the condition to be even more frequent than pulmonary tuberculosis, and first among the chronic pulmonary affections. He considers that the condition is frequently mistaken for tuberculosis, and that 25 to 50% of the inhabitants of tuberculosis sanitarium are non-tuberculous. The reason for this error in diagnosis is easily understood in view of the fact that the predominant symptom

is chronic persistent cough resisting therapy and frequently accompanied by a low grade temperature. It is also frequently diagnosed chronic bronchitis, asthma, or lung abscess.

As stated before the condition may be either congenital or acquired. In the acquired type the dilatation is secondary to some bronchial, pulmonary or plural disease.

A climate subject to sudden fluctuations of temperature and humidity may act as a predisposing factor by increasing the incidence of infection of the respiratory tract and paranasal sinuses which may be in turn exciting causes of bronchiectasis. By animal experimentation it has been found that sudden cooling of the body when infection is present is especially provocative of bronchiectasis.

The age at first observation is most commonly between twenty and thirty years. Only 17.4% are under sixteen years. However, the first observation is generally 3 to 5 or more years after the actual onset of the condition.

In adults there is a preponderance of cases in males probably because of occupational factors and increased incidence of respiratory infections as a result of exposure. Hedbloom states that in children this condition is reversed and there is a slight preponderance of cases among the females. In the acquired type there may be an inherited inferior structural quality of the bronchial wall leading to a predisposition to the condition. The congenital type is frequently associated with other congenital defects such as hare-lip, web fingers, club feet and mental abnormalities.

The condition is seen more frequently among those in poor economic circumstances. Which is probably due to overcrowding and poor hygiene leading to an increased incidence of respiratory infection.

A pneumoconiosis may lead to a chronic bronchitis with fibrosis and secondarily develop into a bronchiectasis.

Bronchial obstruction is a well recognized cause; this obstruction may be due to a foreign body, a stenosis, or pressure from without by tumors, hypertrophied glands, etc..

Undoubtedly the most important cause is infection. This may be measles, whooping cough, influenza⁵, broncho-pneumonia, chronic catarrh, lobar pneumonia⁶, pulmonary abscess, fibroid phthisis, or syphilitic fibrosis of the lung. Secondary to these there is frequently a bronchial inflammation extending over a longer or shorter time. As a result the bronchial walls tend to lose their elasticity and the dilatation probably follows as a result of scar tissue contraction and the mechanical stress incident to respiration. Chronic bronchitis may play a very important part in etiology. In a series of university students with chronic bronchitis Oschner⁵ found bronchial dilatations in 90% upon bronchographic examination.

In over 50% of the cases there is an associated infection of the paranasal sinuses⁷. The sinusitis is frequently symptomless, and there is no established relationship between the degree of sinusitis and bronchiectasis. By experiment it has been found that large amounts of iodized oil dripped into the posterior nasal fossa is easily aspirated into the lungs during sleep. The concomitance of sinusitis and bronchiectasis may be explained by the assumption of a similar aspiration of a purulent post nasal discharge.

The location and extent of the bronchial dilatation varies with the etiology and duration. The lesions are usually confined more or less completely to one lung and especially to one lobe. The bases of the lung are more frequently involved than the apices, and it is more common in the left lung than in the right. However, it does occur in the apices es-

pecially when secondary to a tuberculous process, but it may appear there primarily. If the condition is due to an obstruction such as a foreign body or stenosis, the involvement is first localized to the affected bronchus and later spreads to the neighboring bronchi. Secondary infection of adjacent bronchi and of the other lung from the entrance of purulent secretion into these determines the rate of spread from the original focus. A diffuse involvement of one or more lobes from the beginning occurs in those cases which are congenital or secondary to an extensive fibrosis or massive atelectasis of the lung.

The acquired type is seen in a rare acute form and in the characteristic chronic form. The acute form is generally a complication of a severe rapidly progressing whooping cough. In this type the patient may recover and the bronchial dilations not be recognized until symptoms of the chronic form develop years later. In the chronic form the shape, size, and distribution of the lesions may vary greatly in the same and different cases. The dilations may be cylindrical, saccular, fusiform, or moniliform, of which a combination of the cylindrical and saccular is the most common type. The dilations are more commonly in the proximal larger bronchi when due to a bronchitis or obstruction, and more commonly in the smaller bronchi when secondary to measles, whooping cough and influenza. The alveoli between the cavities may become collapsed and atrophied so that large cavities may lie in direct contact. In the walls of the bronchi and in the peribronchial tissues there are chronic inflammatory changes. The epithelial lining undergoes variable changes; there may be hypertrophic and atrophic changes in the same cavity. At times the epithelium may be lost with the formation of an ulcerated area. This may then proceed to an erosion into a blood vessel with resulting hemorrhage and hemoptysis.

It has been held that the increased pressure in the lungs and

plural cavities during expiration and coughing probably acted to expand the bronchial walls weakened by a disease process. However, when it is in the bronchi, it is realized that this probably is not the case. Probably the dilatation occurs during inspiration when the pressure is greater within the bronchi than in the plural cavities. This difference in pressure is increased during the gasping respiration following a cough and also in such conditions as atelectasis, *fibrosis, etc.*

The bacteriology of the condition is in dispute. Cultures taken from material obtained thro the bronchoscope always show a mixed infection. However, David T. Smith ¹⁰ points out the frequency with which spirochaetes and fusiform bacilli are found in the sputum taken from the trachea and bronchi as well as in the tissues surrounding the bronchi. He also points out the resemblance of this disease of the bronchi to that of syphilitic endarteritis.

Among the most typical of the earlier symptoms is a chronic or recurring cough. This is more significant if its onset follows grippe, whooping-cough, broncho-pneumonia, measles, or influenza. If the patient is very young the cough may be present only upon being inverted. The symptoms may at times be so slight that the possibility of bronchiectasis should be considered in any case of broncho-pneumonia or bronchitis of unusual duration.

In a case of fully developed bronchiectasis the cough is typically intermittent, paroxysmal and more or less induced by a change of position. In about three-fourths of these cases the sputum is purulent. The most severe paroxysms of coughing generally occur on rising or soon after. The cough does not generally disturb sleep, but the patient usually lies on the affected side thus allowing the bronchial secretions to be

retained in the bronchiectatic cavities instead of entering healthy bronchi where their irritation would induce coughing.

The amount of sputum varies from day to day and in different cases. In some cases it may be from 30 to 60cc or less in twenty-four hours in others it may be 1000cc or more. The physical characteristics of the sputum are likewise very variable; however, its color is frequently a grayish-green, this may be altered by the presence of blood in variable amounts. In a welladvanced case with classical symptoms the sputum may divide into layers in which case the upper layer is frothy and brownish, the middle is thin and turbid, and the lower is grayish opaque.

Hemoptysis is a common symptom, and at times may be the only symptom.⁷

Fever in the early stages is rare in adults but common in children, In later stages there is commonly a low grade fever.

A pleuritic pain is present in about one-fourth of the cases.

The physical findings tend to approximate the normal. The general health may be good for a long time; many, however, are under-nourished, anemic, listless semi-invalids. The lung findings are very variable and depend upon the extent of the lesions, the amount of fluid present at the time of examination, and the amount of secondary changes. At times the only finding may be a decreased thoracic expansion over over the involved area. There may be a few creaky rales at the base posteriorly, these when accompanied by a suggestive history are significant. In a more advanced case there may be coarse bubbling rales especially if the bronchiectatic cavities have not been recently emptied by a coughing paroxysm. The finding of loud moist rales with a normal percussion note is very suggestive!

The hands are often cold and clammy, and there may be a slight cyanosis. Clubbing of the fingers and toes is a common finding in a case of some duration.

Bacteriological examination of the sputum always shows a mixed infection without specific organisms. The value of a bacteriological examination lies in the elimination of such specific infections as tuberculosis, actinomycosis, etc. ceteras.

The blood frequently shows a periodic leukocytosis of 10,000 to 25,000 in fully developed cases. A leukocyte count of over 12,000 with a suggestive history is significant of bronchiectasis rather than tuberculosis according to Brauer. A secondary anemia is frequently present.

An ordinary Roentgenogram may show normal findings, which in the presence of suggestive symptoms may be considered as significant of bronchiectasis. Findings when present are due to changes in the bronchial walls, a varying content of air and secretion, and associated pathology in the parenchyma and plura. The findings may consist of increased linear markings, areas of increased density as due to associated atelectasis, fibrosis, or pneumonic consolidation, or a thickened pleura may mask the lung findings. There is a great divergence of opinion as to the significance of most of the findings.

For definite diagnosis contrast media bronchography is almost necessary. The introduction of lipiodal contrast media in bronchography marks a great advance in the differential diagnosis of bronchiectasis. Not only does it render a positive diagnosis possible, but it is possible early, even in the incipency of the condition, and at which time the condition is most amenable to treatment. Many attempts to outline the bronchi with different opaque media were made with varying success in the period from 1906 to 1923. In 1923 Sicard and Forrester first published their results with lipiodal, which has now assumed a field in bronchography comparable to the contrast

media used in other fields of roentgenography. Lipiodal consists of a mixture of 40% iodine in poppy seed oil. The oil may be injected by the passive or supraglottic method, the transglottic method, subglottic method, or the bronchoscopic method. 20 to 30cc. of oil is injected and is directed into the bronchi by changing the position of the patient. The supraglottic or passive method has been recommended by some as the easiest and most satisfactory method especially when repeated introductions are done. ¹⁰⁻⁸⁻¹¹ By this method when the swallowing reflex has been abolished by anaesthetizing the pharynx the lipiodal passes down the trachea instead of the esophagus when the patient attempts to swallow it. By the transglottic method lipiodal is run into the larynx thru a catheter which has been passed down between the vocal cords. In the subglottic method the lipiodal is injected into the larynx by a needle passed thru the crico-thyroid membrane. The bronchoscopic introduction affords the most accurate placement of the lipiodal, but the procedure is a rather more formidable one than is necessary. Fluoroscopic studies should be made while the oil is being introduced and Roentgenographic plates immediately afterward. Since the introduction of the procedure, a rather formidable array of dangers have been pointed out; these dangers, however, have not been borne out by experience as very few if any injurious effects have been noted. It is not, however, recommended that the lipiodal insufflation be done in acute active tuberculosis, in acute infections such as in the early stages of colds or influenza, in very extensive advanced general pulmonary suppuration, or when the patient is very weak or presents various circulatory disturbances.

The diagnosis in an advanced case with classical symptoms then may be suspected when there is a history of long continued recurring

catarrhal bronchitis limited to certain pulmonary regions, periodic attacks of coughing especially upon change of posture or when in a certain posture, accompanied by a more or less profuse expectoration and without tuberculous bacilli. Physical examination presents an indefinite variable lung picture, and may also give evidence of the presence of chronic infection accompanied by more or less decrease in aeration. The diagnosis may be confirmed by bronchographic examination. However, in early cases when treatment is most successful there may be few or none of the classical symptoms. It may be said that bronchiectasis should be considered in cases of chronic pulmonary affections with cough, slight or severe, with more or less expectoration although this may be slight, with a history of chronic or recurring attacks of bronchitis, or an unduly prolonged convalescence from broncho-pneumonia.¹⁺⁹

Finally it should be remembered that the condition may be latent in type and only revealed by acute exacerbations.¹²

In the differential diagnosis we must consider;

Chronic bronchitis, which is often a forerunner of bronchiectasis and may simulate it so closely that bronchography is necessary to make a diagnosis.

A chronic unresolved pneumonia may keep up symptoms for a prolonged period of time and is a recognized cause of bronchiectasis. An ordinary Roentgenogram would demonstrate the consolidation, but bronchography would be necessary to establish the presence or absence of bronchial dilations.

Pulmonary tuberculosis is usually located near the apices and bronchiectasis at the bases, however, the conditions may be reversed. The finding of acid fast bacilli in the sputum is presumptive of tuberculosis and it may be proven by animal inoculation. Finally it should be remembered that bronchiectasis may develop secondary to a tuberculous

involvement so that the two may be concomitant.

In empyema with bronchial fistula there is a history of sudden onset with the evacuation of large amounts of purulent sputum, often more than in bronchiectasis. Definite evidence of the presence or absence of empyema may be secured by aspiration. These two conditions may also coexist.

When a subphrenic abscess penetrates the diaphragm and into a bronchus the history and a high diaphragm shadow will usually determine the diagnosis.

Malignant disease of the lung will produce a localized shadow on the Roentgenogram unless obscured by consolidation. A relatively short duration and rapid downward course are also characteristic of malignancy.

The complications which may be met in a case of bronchiectasis are:

An ulceration of the bronchial wall and into a large blood vessel may result in a fatal hemorrhage.

Lymphatic extension of the infection may result in a chronic interstitial pneumonia.

An acute pneumonia may develop from the aspiration of pus into uninvolved portions of the lung.

Multiple pulmonary abscesses are frequent in late cases with extensive pulmonary infection.

A putrid bronchitis with abscess and gangrene may develop.

About 10% of the cases of bronchiectasis are accompanied by pulmonary malignancy.

Empyema may develop as a result of extension or perforation of a bronchiectatic cavity or an associated pulmonary abscess into the plural cavity.

An associated cardiac hypertrophy especially of the right side and an endocarditis is common. There is myocardial damage in all cases of long standing.

Associated renal disease is quite frequent.

There may be an associated painful arthritis.

Metastatic abscesses especially to the brain are quite common.

About 13% of the cases with pulmonary suppuration develop brain abscesses or meningitis.

The chief causes of death are marasmus, pneumonia, gangrene, empyema, cardiac decompensation, hemorrhage, or cerebral abscesses.

The prophylactic measures consist of combating recurring colds by hygienic and local measures, the local treatment of infection of the paranasal sinuses, the treatment of such etiological factors as bronchitis et ceteras, and the early recognition and treatment of an early case while it is still quite amenable to treatment.

The treatment is divided into medical and surgical phases. No plan of therapy has proved to be very satisfactory when the condition has progressed to the stage at which it is generally diagnosed.

The medical treatment is largely symptomatic and general. Absolute rest is important.⁷ The diet should provide for an adequate number of calories and all the essential food constituents. Any sinus infection should be attended to immediately. It may at times be advisable to send the patient to a sunny, warm and moderately dry climate. Inhalations are sometimes used to control the fetor of the sputum and to prevent intrabronchial infection. Autogenous vaccines are sometimes of value.⁴

Postural drainage is one of the most valuable procedures and should be instituted at once,¹ for by its means a periodic evacuation of the bronchiectatic cavities may be accomplished. Rather elaborate apparatus have been devised to accomplish postural drainage; however, the procedure may be satisfactorily instituted by having the patient lie face downward across his bed with his face and trunk over the side and hands on the floor.

Some of the continental clinics use the so called "thirst cure".

This consists of reducing the intake of fluids, which results in a definite diminution in the amount of sputum. Some authors have reported beneficial results obtained by the thirst cure.

Ochsner has recently published several articles in which he purports to have obtained some very encouraging results by means of repeated introductions of lipiodal. ⁵⁺¹¹ The procedure was first suggested by the symptomatic relief which followed lipiodal introductions used as a diagnostic measure. He reports that in 1500 lipiodal introductions which he has done he has observed no untoward reactions and only six cases of iodism which varied from a slight rhinitis to a rather severe erythematous rash. In a series of 112 cases in which he used repeated introductions of lipiodal he reports 32% with symptomatic cures, of which 12% showed radiographic evidence of cure, 36% symptomatic relief, and 32% were improved and still under treatment when the report was made. He reports an early reduction in the bacterial count in the sputum soon after the institution of the procedure. Those cases showing radiographic evidence of cure probably had suffered no organic change in the wall of the bronchi but merely a functional dilatation of the bronchi, which disappeared following the control of the infection. Ochsner does not hold out iodized oil as a panacea for all cases of bronchiectasis, but he considers that its use is indicated in those cases in which there is relatively little pathology or a bilateral process as well as in cases in which surgery is not indicated.

The surgical treatment of bronchiectasis aims at drainage and pulmonary compression to counteract the mechanical tension and decrease the retention of secretion. The surgical treatment is limited to those cases in which the pathology is entirely or predominately localized to one side. However, since this is true in the majority of cases, surgery offers some valuable methods of therapy.

There are a number of outstanding procedures offered by surgery in the treatment of this condition. It is generally recommended that these procedures be carried out in progression as this appears to produce the greatest number of improvements or cures, as each step makes way for the following more serious step and reduces the operative mortality, and finally because each step may produce a sufficiently satisfactory result that the following and more serious step in the progression becomes unnecessary. No method has been discovered to determine just how extensive a surgical procedure may be necessary in each case.

Artificial pneumothorax is the simplest operative procedure for bronchiectasis and is the first step in the progressive operative treatment. In a report of 97 cases treated by this method 15 were reported symptomatically cured, 8 died during treatment of which 3 were following operation, in 12 cases adhesions rendered pneumothorax impossible although in several others a satisfactory collapse was obtained in spite of adhesions, one case was complicated by a valvular pneumothorax. In nearly all of the cases cured the disease was of recent onset. When improvement was noted, the treatment was continued 5 or 6 months to 6 years. The objections to this method of treatment is that adhesions may prevent collapse, an infected plural effusion may occur, and refills are necessary for a prolonged period of time. Its advantages are its simplicity and the fact that collapse is not necessarily permanent.

Phrenic exersis is a worthwhile procedure in early cases, in lower lobe bronchiectasis, in children whose tissues are elastic, when adhesions prevent collapse by pneumothorax and as a preliminary to thoracoplasty. This produces a paralysis of that leaf of the diaphragm and the subsequent elevation tends to collapse the lung and results in the evacuation of the sputum and lessens the amount coughed up each day. In 22 cases reported by Hedbloom there were 2 symptomatic cures, in 5 the sputum was decreased 50 to 80% ultimately

becoming reduced to less than one ounce in twenty-four hours, 4 were appreciably improved, in 4 the sputum was decreased by measurement but not appreciably to the patient, in 1 phrenic exeresis failed to paralyse the diaphragm, and in 6 cases no improvement was noted. Objections to phrenic exeresis have been raised on the grounds that the nerve may rupture at a point above that at which the main stem is joined by the accessory; the pericardiophrenic artery, which accompanies the nerve in its intrathoracic course, may bleed; and adhesions and connective tissue bands resulting from the disease process, which may have embedded the nerve, ~~may~~^{may} be torn by the traction with the resultant exposure of the mediostinum to pus. Experience has shown, however, that these dangers are more hypothetical than real. In four cases, however, the vagus nerve has been mistaken for the phrenic; this mistake was fatal in each case.

The form of collapse therapy which is most frequently employed at the present time is that of extrapleural thoracoplasty. Hedbloom emphasizes that thoroplasty should be reserved for those cases of undoubted bronchiectasis, for in cases attended by multiple or multilocular abscesses the procedure is attended with a high mortality.⁵ The use of any collapse has been questioned on the ground that the bronchiectatic cavities are not readily collapsible, Sauerbrush stating that they may not be collapsed^{at times} by pressures of 80 to 100 pounds. However, Hedbloom has shown by bronchography that the saccular and fusiform dilations may at times be collapsed to marked degree by thoracoplasty. Moreover, the operation as now done in a graded stage and under a local anaesthetic is not attended by a high mortality. The principles involved in collapse therapy are much the same as in tuberculosis; The diseased lung is put to rest, the lymph circulation and therefore toxic absorption is slowed, it brings about further fibrosis, and there is a

partial obliteration of the bronchiectatic cavities with a decrease in the amount of purulent secretion and a tendency to prevent dissemination of the disease. The operation is done in several stages, usually five, the extent of each operation being gaged by the patient's condition. When the involvement is limited to the lower lobe an extensive resection of the lower ribs is preferable to a paravertebral thoracoplasty such as used in tuberculosis when a collapse of the entire lung is desired. Hedbloom says that the results obtained have been encouraging and believes that with a more careful selection of cases as is made possible by bronchography the procedure will prove to be a valuable adjunct to our mode of attack in these cases.

In those cases of bronchiectasis in which the process is limited to one lobe and in which the symptoms are severe enough to justify the performance of a lobectomy, the greatest amount of relief is obtained by this procedure as it permits a complete removal of the diseased process.⁵ However, because the process is frequently bilateral and because of the high mortality attending this procedure (10 to 50%), it is applicable in only a relatively few cases. Brunn¹⁶ recommends a one stage lobectomy for those advanced cases without prospect for cure but who are not hopelessly septic. He gives his patients a preliminary treatment of several months consisting of rest in bed, exposure to sunlight, postural drainage, care to the accessory sinuses, the use of vaccines at times, a course of neoarsphenamin if a spirochaetal infection is present, 500cc of dextrose solution intravenously the night before the operation, and 1500 to 2000cc of Ringer's solution subcutaneously during the operation. He uses a local anaesthetic together with scopolamine and morphine and preceded by barbital. He emphasizes the importance of careful hemostasis and the prevention of the development of a pneumothorax or a hydrothorax for the first five days post-operative.

Most other authors,^{10/12} however, seem to prefer a multiple stage lobectomy, by which technique the patient is purposely prepared for the exeresis of the diseased lung by the systematic use, in the order named, of pneumothorax, phrenicotomy, graded thorocoplasty, and in some cases, ligature of the corresponding branch of the pulmonary artery. A ligature of the corresponding branch of the pulmonary artery¹² has been recommended as an excellent preliminary measure as it is a technically easy procedure in the inferior lobes and it eliminates the danger of hemorrhage and air or septic embolism. It is even possible at times that ligature of the pulmonary artery in cases of uncomplicated unilateral bronchiectasis may prove to be a curative measure when combined with thoracoplasty.

A pneumolysis is sometimes used to compress a localized bronchiectasis. Thoracotomy with rib resection is done. Then the lung is sutured to the chest wall and the space between the lung and diaphragm filled with gauze. The gauze is later removed and the space is allowed to fill in by granulation. However, the collapse at best is only temporary. The procedure may be used together with ligature of the pulmonary artery as a preliminary to lobectomy or cautery extirpation of the diseased lobe as recommended by Graham.¹

Death during or shortly after lobectomy¹² can generally be ascribed to shock, cardiac failure (mechanical or reflex); hemorrhage during or after operation; increased intraplural pressure during the first days after operation, by pneumothorax, or intraplural fluid; septic pleurisy, and septic mediastinitis. The graded operation eliminates or decreases the possibility of most of these.

Incision into and drainage of one or more of the bronchiectatic cavities has been used; but it has a very limited field of usefulness and has proved ineffective and dangerous and so has fallen into disrepute.

In general we may say that the surgical treatment of bronchiectasis is reserved for those cases entirely or predominately unilateral. However, a secondary involvement of the other lung will at times clear up when the original site of disease has been cared for. In all cases the medical treatment should be tried before surgery because first it builds the patient up making him a better operative risk, and secondly the patient may clear up under this therapy so that surgery will prove unnecessary. Generally, however it is not wise to wait too long before surgery is resorted to and especially in those cases failing to respond to medical therapy as it should be remembered that the disease is definitely progressive and becomes more and more refractive to treatment as it progresses.

The prognosis depends upon the extent and duration of the pathology. Earlier and more accurate diagnosis has reduced the mortality rate by bringing the patient to treatment sooner and by aiding in the choice of treatment to be used. Spontaneous healing of a mild early case may occur, but spontaneous healing of a more advanced case is not to be expected. Restoration of the damaged bronchi is impossible and those dilations which are later returned to normal are considered functional but without yet losing the elastic and muscular fibers in the wall. Those cases which become symptomatically cured but retain permanent bronchial dilations may later sustain a reinfection with a reoccurrence of symptoms. Finally the association of 10% of the cases with malignancy of the lung and 12% with brain abscesses makes a 22% mortality inevitable.

CONCLUSIONS

1. Bronchiectasis is more common than is generally recognized and has a high incidence among the chronic pulmonary affections.

2. The condition is frequently mistaken for pulmonary tuberculosis, chronic bronchitis, asthma, and lung abscess.

3. Upper respiratory infections and especially sinusitis and chronic bronchitis probably play a large part in etiology.

4. An early case will not present the classical symptoms, and may have no other complaint than a slight cough.

5. Lipiodal bronchography offers a safe simple method of diagnosis.

6. The condition is amenable to treatment in its early stages, but later it becomes highly refractive.

7. The medical treatment aims largely at building up the patient's general health and postural drainage.

8. The surgical treatment aims at drainage and pulmonary compression.

9. A progressive plan of treatment appears to offer the best method of therapeutic attack.

10. When an organic dilatation of the bronchi has occurred, a cure probably can not be hoped for, but with the control of infection a symptomatic cure may be accomplished.

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