TWO CASES OF BRONCHIECTASIS

TREATED BY

PARACENTESIS,

WITH REMARKS ON THE MODE OF OPERATION.

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CASE 1.—Mr. C—, æt. 67, a gentleman of literary pursuits and of spare wiry frame, consulted Dr. Theodore Williams February 3rd, 1885. He had contracted bronchitis at the close of 1882, which persisted through the winter and was accompanied by emphysema, and in April, 1883, he had dry pleurisy of the left lung. After this attack the expectoration, hitherto moderate in amount, became profuse, reddish, and purulent, and continued so up to the time of the operation. Patient states that on one occasion he felt something give way in his lung and that he expectorated yellowish fluid for several hours. He spent two months at Malvern and Bournemouth without improvement, the cough increasing, and returned to London in November, and was pronounced by his medical advisers

no better. During the following winter a great variety of medicines and inhalations were tried, but with no permanent benefit, and during the summer and autumn of 1884 the patient seems to have lost faith in remedies and to have discontinued them altogether. He had lost flesh and strength and declared that life was not worth having under the circumstances.

At present his cough is exceedingly troublesome, especially at night, when the paroxysms last for an hour and necessitate getting up and pacing the room. He has an anxious, worn look, and his breath is short on the slightest exertion, the expectoration exceeds one pint a day in amount and consists of frothy pus somewhat sanguinolent and nummular in character. It contains no tubercle bacilli or lung-tissue, but putrefactive bacteria in abundance. Inspection of the chest shows lowering of the left shoulder, with flattening of the anterior left wall, and some deficiency of movement is visible on that side. The heart's impulse is felt in the fourth interspace. The right chest is hyper-resonant and harsh breathing is audible throughout. The left side shows anteriorly considerable flattening, with resonance over the whole surface. Over the lower third of this resonant area vocal vibration is absent and little or no respiration is audible. Over the upper two thirds respiration sounds are harsh.

Posteriorly, dulness commences immediately below the level of the seventh rib behind the mid-axillary line, and following the direction of that rib back to the spine extends then downwards to the base of the lung. The dulness does not vary with change of position, is nowhere strongly marked, and gives the impression of being due to an adherent pleura, and some retraction of the spaces is visible. Vocal vibration is absent over this area, and this absence extends as high as the top of the scapula. Crepitation is occasionally to be heard over the dull area and in one spot (c) about the size of a half crown, situated in the eighth interspace about three inches from the spine, immediately below the scapular angle, some distant tubular

sound can be detected. Harsh breathing is heard over the rest of the lung. Tape measurements at the level of the nipple give the left chest a smaller circumference than the right, by two and a quarter inches.

Two days later Dr. Williams saw the patient in consultation with Dr. Orton, of 30, Lower Phillimore Place, who had had the care of him previously, and a second examination not only confirmed the result of the former one, but also discovered another area of tubular sound, about the same size as the first, situated in the eighth interspace about three inches to the outside of the first (see Fig. 1).

FIG. 1.

A. Area of slight dulness, scattered crepitation and retracted intercostal spaces. B. Area of hyper-resonance and harsh breathing. C and D areas of cavernous sound. + puncture spot.

The diagnosis arrived at was emphysema of both lungs from chronic bronchitis; partial adhesions of the

left pleura, from dry pleurisy, causing contraction of the side, and displacement of the heart's apex ; and extensive dilatation of the bronchi in the lower lobe of the left lung.

The adhesion of the pleura over the lower third of the left lung being well ascertained, the next question was as to the number of bronchiectases and their distance from the surface of the lung. From the few and limited areas of tubular sound, and the distant character of that sound, it was concluded that they were limited to the lower lobe of the lung, and were situated at some depth from the surface.

Considering the miserable condition of the patient and the possibility of reaching the bronchiectasis by puncture, the question of an operation in all its bearings was laid before the patient and his wife, and their consent being obtained, Mr. Godlee was requested to perform the operation.

Dr. Williams marked the two areas before described, and directed Mr. Godlee to try the first one, viz. that situated below the angle of the scapula, in the eighth interspace ; and to pass a good-sized trocar and cannula to the depth of four or five inches from the skin, directing it forwards and slightly inwards. The patient was anæsthetised by Dr. Orton, and at the innermost of the two spots, viz. in the eighth interspace just below the angle of the scapula, a puncture was made with an exploring trocar about two inches in length, but nothing definite was ascertained. A large aspirator cannula was then inserted to a greater depth, and on making a vacuum, mucus and pus were drawn through it into the bottle. The spray was then turned on, and a T-shaped incision was made through the soft parts, while the cannula was left *in situ*, so that the exact position in the intercostal space which it had occupied might be followed. When this was definitely ascertained the cannula was withdrawn and a scalpel was passed through the intercostal space at the spot. It entered a cavity at a short distance from the ribs, though the exact distance was not

clear; it was certainly not more than, if so much, as an inch. The opening was dilated with dressing forceps, and an attempt was made to introduce the finger, but the ribs were too close together to allow of this being done. A tube was accordingly introduced about four inches long with the usual flange, and through this a considerable quantity (an ounce perhaps), of membranous shreds¹ and pus was forcibly ejected. The tube passed almost directly forwards. Before the patient awoke from the chloroform he began to cough up blood with the expectoration. There was no fœtor about the contents of the cavity; the ordinary gauze dressings were accordingly applied. One grain of opium was administered at night.

February 12th.—Patient has slept well and has scarcely any cough. The expectoration is free from blood, and consists of two or three greyish pellets of mucus. The discharge from the wound has been profuse, soaking through the gauze dressings and reaching the bed. It appears to be thinner and contains a large number of the membranous shreds.

14th.—Yesterday the tube slipped out through the movements of the patient, and, although it has been replaced, the discharge is very slight. The expectoration is of a brick-red colour, somewhat pneumonic in character, with a few streaks of bright hue. Pulse 72, temp. 98·2° F., resp. 20. Crepitation is audible over the lower fourth of the left front chest. A longer tube was then introduced through which the discharge was tolerably free.

25th.—The wound is dressed once in four days, and the dressings found to be quite sweet, though soaked through with thin watery fluid, which scarcely stains them. The tube is extruded by fresh granulations, and has to be shortened half an inch. The sinus has a depth of three and a half inches.

March 2nd—The patient is up most of the day, and has scarcely any cough or expectoration. The dressings

¹ These were examined microscopically by Dr. Percy Kidd and found to contain no cellular elements, but to consist of amorphous material.

are changed once in five days, and always found to be sweet; the discharge being still watery and soaking through the gauze. The tube has been again shortened. Pulse 72, temp. 98° F.

17th.—The sinus had contracted so much that a shorter tube of smaller diameter had to be inserted, and to-day the increase of granulations has pushed this outside the ribs. Discharge very slight. The tube was removed altogether and the wound dressed antiseptically.

31st.—The patient has gained flesh and looks well. Cough and expectoration absent except on rising in the morning, when two or three pellets of greyish mucus are raised. The wound has healed up.

Physical signs.—The left shoulder is markedly lower than the right, and the movement of the whole side is very deficient. There is curvature of the spine towards the right. Anteriorly the left chest is resonant throughout, and vocal vibration is felt to the very base. Breath-sounds are weak. Posteriorly there is marked flattening, specially from the eighth rib downwards. Here also vocal vibration, formerly absent, is felt to the base, but is not so marked as at the apex or even over the opposite lung. The dulness has disappeared except at the extreme base, and is replaced by marked resonance. Fine dry crackle, chiefly accompanying inspiration, and quite characteristic of emphysema, is heard over the whole posterior surface, but is most marked in the mid-axillary line. No tubular sounds audible anywhere. The right chest remains the same.

May 2nd.—The patient has no fresh symptoms. He has returned to his ordinary habits and drives out on fine days, and also takes walks. He has grown stouter and looks in excellent health. Cough and expectoration *nil*. Measurement of the chest at the mammary level shows the left side to be two and three quarter inches smaller than the right, showing a shrinking of the left side, since the operation, of half an inch. There is more resonance and crackling sound at the left posterior base, showing further development of emphysema.

July, 1886.—Patient remains in excellent health, and walks four miles at a stretch. He has passed through the late inclement winter without fresh symptoms.

Remarks.—The history of this case rendered the existence of bronchiectasis extremely probable, for it may be noted that the expectoration, at first moderate in amount, after the attack of dry adhesive pleurisy became profuse and altered in character, and it is likely that in the lower lobe of the left lung, the wall of the bronchus having been infiltrated during the prolonged bronchitis, had lost its elasticity, and yielding to the inspiratory efforts, and still more to the traction outwards of the adherent pleura, as Hamilton¹ has most ably demonstrated, had become dilated and had lost the power of easily expelling its contents. This explains the limited character of the lesion, and the cessation of the expectoration after the successful tapping of the cavity—the dilatation of the bronchi being limited to the portion of the lung underlying the recent pleurisy. The physical signs indicated bronchiectasis, rather than localised empyema, for the dulness at the left posterior base was nowhere so marked as in effusion, in fact was very slight, and did not vary with change of posture. Moreover, the breath-sounds were not entirely absent anywhere and crepitation of a purely intra-pulmonary character could be heard over the dull area. The intercostal spaces were distinctly retracted. On the other hand vocal vibration was absent, but this was the case not only over the dull spot, but also over nearly two thirds of the posterior surface of the left chest reaching nearly to the top of the scapula, where no dulness existed. The expectoration also had not the character of that of an empyema bursting into the bronchus, which is generally very purulent and rather liquid, whereas this was partly froth and partly nummular pus, streaked with blood, and, for some days after the operation, was distinctly pneumonic. The diagnosis of bronchiectasis was confirmed by the appearance, after the operation, in the discharge from the cavity, of

¹ 'Pathology of Bronchitis,' p. 86.

membranous shreds, which are quite characteristic of bronchial dilatation. In addition to other points of difference, the absence of tubercle bacilli precluded phthisis. The operation appears to have set up some local pneumonia of the neighbouring lobules: as evidenced by the sputum, but had no effect on the patient's temperature, which never rose above 99° F. The entire disappearance of the tubular sounds from the second area after the operation indicated that they originated in the tapped cavity and were conducted through a patch of consolidation to the surface, thus giving rise to sounds similar to those heard over the first area, and as the expectoration practically ceased, we may conclude that only one important bronchiectatic cavity existed and that this was effectually drained. This is no doubt the explanation of the complete success in this case, and although the patient was advanced in years, he had an excellent constitution and was of the lean and wiry kind, which withstands operations well.

CASE 2.—Mary E—, æt. 21, single, domestic servant, was sent to the Brompton Hospital for admission under Dr. Theodore Williams by Mr. Hugh Smith, of Farningham, April 1st, 1885.

Her family history was good, with the exception of the death of a paternal aunt from phthisis.

The patient's illness began with typhoid fever eight years ago, followed by cough and expectoration which had persisted ever since; during the last six years the cough had gradually become worse, and the expectoration increased in quantity and fœtor. Seven years ago she had hæmoptysis two or three times, amounting, on one occasion, to a pint, but none since.

The patient had been prevented from taking a situation for some years by the fœtor of her breath.

On admission by Dr. Percy Kidd, in Dr. Williams's absence, she appeared a fairly-nourished but unhealthy-looking young woman. Cough very troublesome. Expec-

toration abundant, 13 to 16 oz., partly frothy and partly muco-purulent and exceedingly foetid. On examination it contained no tubercle bacilli or lung-tissue. Temperature was 103° F. Pulse 100.

Dr. Kidd's examination of the chest showed on the right side hyper-resonance with some bubbling râles at the base, and on the left side less resonance and bubbling râles throughout. The fœtor was so great that she had to be placed in a private ward.

She improved under treatment, the cough becoming less troublesome, the expectoration diminishing to 4 or 5 oz., and being slightly less foetid, the temperature falling to 99° F., and the patient gaining in weight ; but about the middle of June, in spite of vigorous antiseptic treatment, the expectoration increased and grew more foetid, and the cough more troublesome and convulsive.

Dr. Williams made several examinations of the chest and noted as follows :—The chest is flattened in the upper left front. The right side is hyper-resonant, with fair breathing except at the posterior base, where a few râles are to be heard. On the left side there is a remarkable absence of vocal vibration ; slight dulness and diminished movement extend downwards from the lower border of the third rib in front and from the seventh rib behind the demarcation line, crossing the sixth rib in the axilla, as seen in Diagram 2. The dulness is nowhere strongly marked as in effusions. Above this line there is resonance, and in the axilla, hyper-resonance. The bubbling râles have disappeared from the upper portion of the lung, but coarse crepitation is heard in front from the fourth rib downwards, and behind over about the same area as the dulness. In the sixth and seventh interspaces are two spots (Fig. 3, *d* and *e*), each about the size of a half-crown, situated in the axilla, and a third one (*f*) in the eighth space immediately below the scapular angle. Over these the crepitation is very coarse indeed, especially after coughing. The heart is not displaced. Tape measurements of the two sides give :

	Right.	Left.
At the level of the third rib . . .	14½ in.	14 in.
At the ensiform level	13½ in.	13½ in.

Showing a slight contraction of the upper left chest.

The diagnosis was chronic bronchitis and emphysema of both lungs, followed by pleurisy and fibrosis of the lower lobe of the left lung and consequent dilatation of

FIG. 2.

A. Space of dulness, diminished movement, and coarse crepitation.
B. Hyper-resonance.

the bronchi of that side. Dr. Williams was of opinion that several bronchiectases existed, but that three large ones were situated beneath the three areas above described at a considerable distance from the chest surface. He was also of opinion that the dulness was caused by (1) pleuritic adhesion and (2) by fibrosis of the lung. It was

thought that a deep puncture might lay open one of the dilatations and that the other large ones which appeared to lie at no great distance might be connected afterwards and all drained by one tube, although there would be obviously great difficulties in reaching these cavities. The nature and prospects of the operation were duly explained to the patient, who readily consented.

FIG. 3.

A. Shaded space to indicate area of dullness and crepitation. B. Area of marked resonance and harsh breathing. C. Crepitation. D, E, F. Areas of very coarse crepitation. G. Hyper-resonance.

June 29th, 5.30 p.m.—The patient was placed under an anæsthetic, and Mr. Godlee first passed a small exploratory trocar, one inch in length, into the marked spot of the sixth interspace about two and a half inches to the left of the left nipple, and obtaining no result, repeated

the process on the marked spots in the seventh and eighth interspaces with like effect, this operation showing that the pleura contained no fluid. He then inserted a large-sized trocar and cannula of considerable length into the seat of the first puncture (sixth interspace), directing it inwards to the depth of four inches. The trocar was then withdrawn and the cannula connected with an aspirator. Nothing followed at first, but on withdrawing the cannula to a depth of about two inches and exhausting again, some membranous shreds similar to those described in the first case appeared in the receiver. Mr. Godlee now proceeded to open this cavity, but during a paroxysm of the patient's cough the clinical assistant let slip the guiding cannula and the track to the seat of those shreds was lost, and all efforts to regain it failed. Mr. Godlee then with antiseptic precautions made an incision of an inch in length and two inches in depth and passed his finger into the lung, but was unable to discover the cavity. Some free hæmorrhage followed. The wound was washed out with chloride of zinc, and plugged with boracic acid lint soaked in carbolic acid lotion. The antiseptic gauze and pad were then applied.

July 9th.—The discharge not continuing, the tube was withdrawn, and under antiseptic dressing the wound was nearly healed. The expectoration still continues fœtid and cough troublesome. The patient appears to have quite recovered from the operation, eats and sleeps well, and is up and about. Pulse 90, temp. 98·8° F.

Physical signs.—The dulness-area has increased: bronchial breathing is heard over a small spot in the eighth interspace about three inches from the spine, at the same level as the former incision. This spot was carefully marked.

July 16th.—The wound has healed and the patient appears generally fairly well, but the expectoration is unchanged. On examination, the physical signs were confirmed and the area of bronchial breathing again marked. It was decided to make another attempt to reach one or

more bronchiectases, and accordingly the patient was given an anæsthetic, and Mr. Godlee passed a fine curved trocar and cannula into the marked spot to the depth of at first three inches and then of five inches, the curve being directed towards the median line, so as, if possible, to intercept some dilatation of the bronchial tree. Nothing followed but blood. The same trocar and cannula were passed into the old wound and directed first upwards and then inwards, but with no result. Mr. Godlee then, under carbolic spray, made an incision and laid bare the eighth rib, and excised about an inch of it in order to approach nearer to the bronchi before again attempting to puncture. The pleura was carefully examined and found adherent. The trocar and cannula were passed to the depth of five inches. On withdrawing the trocar, a few drops of pus oozed from the cannula. Mr. Godlee then cut down along the cannula and introduced a drainage-tube. No more pus followed at the time, but a good deal of blood. The patient, who had been expectorating the usual foetid pus, suddenly began to spit clots of blood, evidently coming from the wound. The tube was fixed in and the wound dressed antiseptically.

July 18th.—The wound has been dressed under carbolic spray ; the discharge from the tube is distinctly purulent, and has soaked through several layers of the gauze.

July 20th.—The patient is doing fairly. Before the dressings were removed to-day the characteristic odour of the expectoration was noticed to come from them, and was still more marked when they were undone. Discharge profuse and foetid ; wound granulating and healthy.

July 23rd.—Discharge less foetid to-day. At 5.45 p.m. patient had hæmoptysis, ten ounces, and appeared rather excited. Pulse fairly good. Temp. 98° F.

The hæmoptysis continued for three days, the patient bringing up nine and eight ounces of blood on the second and third days respectively. The blood was bright coloured and had no foetor. The temperature rose to 103° F., but has fallen to-day to 100° F. The sputum is now blood

stained and eight ounces in amount. Pulse 92, fair. The discharge is scanty and not foetid, wound healthy.

August 5th.—The hæmoptysis recurred to the amount of three ounces on July 29th, and to a less amount on the 31st, and lastly, there was a small quantity on August 4th. On the last two occasions the amount was small, but on one it was accompanied by slight lividity of the face, cold and moist extremities, a rapid and compressible pulse, and some mental excitement. These symptoms, however, all subsided.

27th.—The patient has improved greatly in appearance, and has gained four pounds in weight, though she lost several during the hæmoptysis. The wound has healed up. Cough is much less troublesome. The expectoration varied from four to six ounces for some days, but has now fallen to two ounces, and is sometimes foetid and sometimes quite free from odour. The temperature is 98.2° F. Pulse 74, good. The patient sleeps soundly and has an excellent appetite, and declares she feels quite well.

The following chest measurements were taken :

	Right.	Left.
At the level of the third rib . . .	$14\frac{1}{2}$ in.	$14\frac{3}{4}$ in.
At the ensiform level	$13\frac{1}{2}$ in.	13 in.

These show some increase at the upper level, but a diminution at the lower one, in the region of the operations. There is marked flattening and contraction in the neighbourhood of the cicatrices on the left side, and more dulness at the base posteriorly. Fine crepitation is audible in parts, but no bronchial sound anywhere in the dull area. Some tubular sound is heard in the interscapular region, over a space the size of a half crown. Over the anterior surface there is fair resonance, the breathing is much freer, and the moist sounds have entirely disappeared.

Remarks.—In this case we had to deal with disease of apparently long standing, and of constitutional origin, for the symptoms of bronchiectasis followed closely after typhoid fever, eight years previously, and the patient

showed signs of marked cachexia. The probability of bronchiectases in the left lung was easily recognised from the foetor of the expectoration, and the amount of chronic pneumonia present at the base. The slight dulness and flattening enabled us to trace the line of adherent pleura. But to determine the number of dilatations and their exact position was most difficult, partly from the amount of congestion at the base of the lung, and partly from the presence of emphysema, which existed in the upper parts of the lung. In both operations Mr. Godlee had to puncture in several directions, and in the second, to incise the lung freely before the bronchiectasis was reached.

Though this patient was sent up to the hospital with the view of operative interference, by Mr. Hugh Smith, who had seen one of Dr. Williams's former cases, she was kept in the hospital for two months, and treated with antiseptics, and it was only when these remedies entirely failed and her symptoms became worse, that operation was resorted to. The extensive hæmorrhage which followed the second operation appeared to be due to some ulcerative process set up by the presence of the tube, and not to the operation itself. This led to an increased infiltration at the base of the left lung. The diminution in the amount of sputum and the fact of its being only intermittently foetid, combined with the general improvement of the patient, are the results claimed for the operation, but the presence of bronchiectases in other parts of that lung, and possibly in the right lung also, precluded complete success.

However, where both cough and expectoration are reduced and the patient's life is rendered fairly tolerable, we may claim a moderate success.

Remarks by Dr. WILLIAMS.—The subject of paracentesis of cavities has been of late years brought before this Society by Dr. Douglas Powell and Mr. Lyell (vol. lxiii), and by Dr. Cecil Biss (vol. lxvii), and also by Dr. Cayley and Mr. Pearce Gould, in the latter volume. As Dr.

Powell's and Dr. Biss's papers contain an account of the principal literature on the subject, I need not enter upon it, but will refer the Fellows of the Society to their papers, confining myself to a short account of my own experience.

Dr. Cayley's case in vol. lxvii, and his case in vol. xii of the 'Clinical Transactions,' were instances of gangrene of the lung treated by paracentesis with relief, and on one occasion with recovery.

Dr. Powell's and Dr. Biss's cases, as well as those two just related, are examples of bronchiectasis, and it is in reference to operative interference in this class of patients that I would direct attention, as, having had in all six cases of bronchiectasis treated by paracentesis, the subject is one of considerable interest to me.

Two of these cases have just been related, and three of the other four have been published elsewhere.¹

In all these three the cough was convulsive and harassing, and the expectoration so foetid as to necessitate the isolation of the patient. Various kinds of antiseptic treatment, both general and local, were persistently tried, and failed, before the operation was had recourse to.

The sixth case, hitherto unpublished, was that of a boy, aged thirteen, who had a history of chronic cough and of foetid expectoration of three years' standing, accompanied on one occasion by hæmoptysis. A good deal of emphysema was present, and signs of bronchiectasis were detected in the left side, especially in the first and second interspaces in front, and posteriorly over the eighth and ninth spaces below the scapula. After the patient had been in the hospital several months, without improving under various kinds of treatment, at my request Dr. Hicks made a vertical incision two and a half inches in length, involving the eighth and ninth intercostal spaces below the scapula, where the gurgling sounds were loudest, and punctured

¹ 'Clinical Transactions,' vol. xii, p. 47; 'Lectures on Bronchiectasis,' 'Brit. Med. Journ.,' vol. i, 1881, p. 837; 'Proceedings of Medical Society,' vol. vi, p. 323; and 'Lancet,' vol. ii, 1882.

first the eighth space and then the ninth. The second puncture was successful in reaching the excavation, and a discharge was established through a tube. This continued for some time but did not reduce either the fœtor or the amount of the expectoration, and after a while the discharge ceased. Another attempt was then made to reach the principal cavity from the same wound by deepening the puncture. At the depth of four and a half inches the bronchiectasis was reached and a drainage-tube introduced. Scarcely any matter flowed at the time, but the following day the dressings of the wound were soaked through and through with it ; air could be heard whistling in and out, and on coughing some very tenacious fœtid muco-pus escaped from the tube. The discharge continued for about three weeks to the amount of two or three ounces a day, but the expectoration did not greatly diminish in quantity though it was less fœtid. At the end of this time profuse hæmorrhage occurred from the wound, apparently due to ulceration from the pressure of the right tube. This was stopped, but it recurred on the introduction of a flexible tube, which it was found necessary to remove altogether, and the wound was allowed to heal up. Later on the patient was attacked with pyæmic periostitis of the left forearm, which was incised, and a good recovery followed. Under these circumstances no attempt was made to reach the other bronchiectases whose position had been detected. Considerable contraction of the punctured side followed the operations and the patient left the hospital, his cough less troublesome and the expectoration less fœtid. He was ascertained to be alive two years afterwards.

In three out of these six cases the diagnosis of bronchiectasis was confirmed by post-mortem examinations, and there is every probability that it was correct in the other three ; the general aspect of the patients and the symptoms of the disease amply confirming the physical signs.

The post-mortem examinations in the three fatal cases indicate clearly the mode of death in bronchiectasis. It

seems to be from some form of septicæmia. In two of my cases, and in Dr. Powell's, it was from septic pneumonia of the healthy lung through inhalation of fœtid secretion. As a proof of this, in each of my cases I was able to trace the membranous shreds from the dilated bronchi into the smaller bronchi of the pneumonic lung. Sometimes the septic material enters the stomach and intestines and gives rise to diarrhœa, and sometimes it passes into the circulation, causing pyæmic abscesses. Abscess of the brain was the cause of death in one of my cases and in Dr. Biss's. Another of my patients suffered from pyæmic periostitis. The danger of septic pneumonia from reinhalation is greater than is generally supposed, though undoubtedly many cases of bronchiectasis go on for years without its occurrence; yet I have rarely witnessed this immunity where the expectoration is very fœtid. This point ought to be borne in mind in regulating the posture, and especially the decubitus, of these patients. The mode of death is certainly one strong argument in favour of the operation. Another, which has been advanced by Dr. Powell, is that much of the secretion and the efforts made to expel it from the bronchi are due to the great irritation which the passage of the fœtid matter causes to the bronchial membrane, and this was well shown in Mr. C—'s case, where the whole expectoration diminished from a pint a day to a few pellets immediately on the establishment of the external discharge.

A third argument in favour of this operation is the comparative invulnerability of the lung-tissue, for it has been repeatedly demonstrated that the lung may be punctured to a considerable depth without giving rise to any serious symptoms or marked physical signs. At one of the autopsies we endeavoured to trace a puncture made in the eighth interspace below the scapula to a considerable depth, a few days before death, and entirely failed, the lung having apparently completely recovered. Such recuperative power does the lung display when irritated.

In most of these cases the lung-tissue had undergone fibrosis, and puncturing this tissue seems to promote its growth and subsequent contraction.

One accident that these operations are liable to is inoculation of the pleura with septic material, leading to pleuritic effusion or empyema. This happened in one of my cases, on the withdrawal of the aspirator needle (though a fine one) from the bronchiectasis. Unfortunately the pleura which was adherent over the greater part of the lung was not adherent over the region of the cavity, and hence the accident. As a rule, however, this can be ascertained by observing the state of the intercostal spaces on deep breath, and of course no operation should be attempted if there is any doubt about adhesion.

One accident of these operations is hæmorrhage, which occurred in two of my cases, and was rather troublesome in Case 2 (Mary E—). I allude not only to the hæmorrhage accompanying the operation, but that which followed. It is quite possible that the pressure of the tube against the fresh granulations during the various movements of the patient gave rise to ulceration. In such cases the indication is at once to withdraw the tube.

It will be noted that in all six cases the diagnosis of the cavity was sufficiently accurate to enable us to reach it, and the difficulty consisted less in localising its situation than in ascertaining its distance from the chest wall. In more than one case it was found necessary to deepen the puncture considerably, before it was successful.

The two principal difficulties in the diagnosis of a bronchiectasis cavity, are (1) The presence of emphysema, which invariably accompanies the globular form of bronchial dilatation and often entirely masks the physical signs of a cavity, even when the patient's sensations and the amount and character of the expectoration point to the presence of a bronchiectasis in a certain portion of the lung.

(2) The character of the cavernous sound heard over bronchial dilatations. This is so jarring in tone that it is

audible over a far larger area of chest wall than that immediately overlying the cavity ; and it is not rare on this account that the size of the bronchiectasis is thought to be larger than it eventually proves. This jarring note is more common in bronchiectasis associated with interstitial pneumonia and fibrosis and assuming the cylindrical form, than in the globular bronchiectasis accompanied with chronic bronchitis and emphysema.

The success of the operation seems mainly to depend upon whether the bronchiectasis is single, or at any rate confined to one lobe of a lung the pleura of which is adherent, or whether it is multiple, and affects the bronchi of both lungs. In the former case operation gives the greatest possible relief, and may, as in Case 1, effect a cure. In the latter case, and especially where there are indications that the whole bronchial tree is more or less dilated, no advantage can be looked for and the operation cannot be advised.

To sum up, paracentesis in bronchiectasis seems to me to be indicated under the following circumstances :

1. In cases where antiseptic treatment of all kinds, having failed to correct the foetor of expectoration and to allay the harassing nature of the cough, death by septic pneumonia seems imminent.

2. Where all evidence goes to prove that the bronchiectases are confined to one lung, are situated in the lower lobe, and have overlying them an adherent pleura.

It is not indicated where multiple bronchiectases exist in both lungs, where they are surrounded by emphysema, and where the pleura is non-adherent.

Remarks by Mr. GODLEE.—The surgical aspect of the first case presented no difficulty whatever from beginning to end ; the cavity being single and the position accurately localised by Dr. Williams, and verified unmistakeably by the preliminary puncture with the aspirator needle ; there was a clear indication for cutting down with this as a guide and making a free opening. The pleura was ad-

herent, and the cavity at a short distance from the surface of the lung, so that here again all was straightforward, and in the further progress of the case the sudden diminution in the amount of expectoration and the rapid closure of the cavity, as shown by the decrease of the discharge in the dressing, left no doubt as to the advisability of shortening and ultimately withdrawing the tube.

The second case, however, illustrates most of the difficulties that the surgeon is likely to meet with in dealing with cases of bronchiectasis.

First, the lung containing possibly the ramifications of one or more branched or labyrinthine cavities and the intervening pulmonary tissue being consolidated, the physician is not always able with certainty to define the exact limits of the cavity which it is desired to open, though he may indicate its position generally. The preliminary punctures are thus frequently most unsatisfactory, for it must be remembered that while the individual branches of the cavity may be comparatively small, the bronchi themselves contain a material of a precisely similar nature to that in the bronchiectasis; confusion may therefore easily arise either from just missing an elongated cavity which gives very obvious physical signs, or puncturing and subsequently cutting down upon a bronchus, because some pus has been drawn out of it into the aspirator.

Again, some timidity is naturally felt in introducing a large aspirator needle to a great depth into the lung. It must not be forgotten that the nearer the root of the lung is approached the larger the pulmonary vessels become, and that a puncture through a branch of the pulmonary artery of some size into a bronchus might conceivably lead to very serious symptoms.

Secondly, in this case the pleura was closed by adhesions, but they were so soft that they easily broke down with the finger, so that the lung could be pushed away to some extent from the ribs. If the two layers of the pleura be not adherent two difficulties present themselves (and it must be remembered that however great the *pro-*

bability may be that adhesion has taken place we can never be absolutely *certain* of it until the incision has been made through the chest wall); in the first place, it is impossible to puncture the lung with any amount of accuracy or definiteness, because it recedes before even the sharp point of the needle; and in the second place, if we do succeed in laying open the suspected cavity we run the risk of setting up a septic pleurisy. It is not likely that the lung will be in a condition to collapse very much, for it is probably in a more or less solid state, and it is not likely that the pleura will be found quite free from adhesions, so that a general pleurisy need not be anticipated; still, if the condition mentioned be found, it is safer to stitch the surface of the lung to the opening in the parietal pleura. This is not, however, a very satisfactory proceeding. I have done it on one occasion where the suspected adhesions were not found, but though I succeeded in bringing the lung out to the chest wall, the two surfaces of the pleura did not unite very well, and after a few days it was possible to pass a probe freely into what remained of the pleural cavity, some of the stitches having no doubt cut out through the friable lung-tissue.

Thirdly, there may arise difficulties in connection with the hæmorrhage. The incision of the lung-substance, solidified as it is in these cases, does not in my experience often lead to much bleeding; but it is impossible to avoid the risk of opening a large vessel, at a depth from the surface which would render the application of a ligature out of the question, and it seems to me highly probable that a case will some day arise in which very serious hæmorrhage will occur. In Case 2 the bleeding was very free, but there was no difficulty in controlling it by plugging the wound. This is clearly the only line of treatment to be adopted, and as far as I have yet seen it always (as in the free hæmorrhage which follows incision of the parenchyma of the liver) proves to be successful. But hæmorrhage may also take place into a bronchus and then

cause considerable hæmoptysis. I have now seen this occur three times from the puncture of an aspirator needle, which has no doubt passed either completely through a bronchus into a neighbouring vessel, or through a vessel into a bronchus. This accident it seems impossible to guard against, but it suggests the inadvisability of producing profound insensibility with the anæsthetic, so that the patient may by coughing be able to get rid of the blood from the air passages. In all these cases the hæmorrhage quickly stopped, but in estimating the risks of the operation it must be remembered that M. E— had severe hæmoptysis on several occasions, at a subsequent period in the case; though we must not forget the history of large hæmoptysis before admission.

Another very real danger of which I have seen a striking example is that during the coughing which occurs whilst the anæsthetic is being administered, the bronchi may become dangerously obstructed by the pus which previously filled the cavities. This not only renders the diagnosis of the position of the cavity for which search is being made extremely difficult, but produces more or less asphyxia, which, when added to the narcotic effect of the anæsthetic, may sensibly imperil the safety of the patient.

The indication is to give the anæsthetic slowly so that coughing may be avoided, and in order to prevent the pus from finding its way from the affected to the sound lung, to keep the patient as much on the back as possible.

It is perhaps presumptuous to attempt any general conclusions on the advisability of surgical interference without more extended experience, but the following opinions may be hazarded provisionally.

First, when the physical signs point clearly to the existence of a cavity on one side only and to its being moderately localised, the indication is to operate. But it is wise to make quite sure by preliminary puncture of its exact position before an incision through the chest wall is made, even if this involve exploration on more than one

occasion. Secondly, if the physical signs indicate very extensive mischief on one side only, though the prospect is much less promising, some good may result from operation. If in such a case the preliminary puncture has apparently revealed the presence of a cavity which the further exploration fails to open, the patient will probably suffer no serious consequences from the operation. It is even possible that the incision into the lung and the interference with the natural rigidity of the chest wall may aid in the contraction of the cavity in the neighbourhood of the puncture; while it is just possible that the cavity may have been only just missed, and that by a process of ulceration it may at a later period discharge itself into the actual opening. Thirdly, if the physical signs point with anything approaching to probability to the presence of bronchiectases in both lungs it is wisest to abandon all thought of surgical interference.

(For report of the discussion on this paper see 'Proceedings of the Royal Medical and Chirurgical Society,' New Series, vol. ii, p. 85).