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THE PRESENT STATUS OF LUNG RESECTION FOR PULMONARY TUBERCULOSIS

BY

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In few conditions is there such a difference in the point of view of physicians and surgeons as in the treatment of pulmonary tuberculosis. For the part played by the surgeon is that of the character who comes into the play fairly late, monopolizes the most dramatic scene, and then takes little further active part in the play ; whereas the physician is on the stage from the rise till the fall of the curtain.

As nearly all papers written on lung resection have emanated from surgeons, a physician's view may be useful. The material used consists of 26 cases of my own, and a further 52 made available to me by my colleagues at the Brompton Hospital : a total of 78. It includes practically every case in which resections were performed on *unhealed* tuberculous cases in 1949 and 1950 at Brompton Hospital, on the advice of physicians who had had resections performed on five or more cases ; 80% of the cases have been followed up for a minimum of two years, and none for less than eighteen months. These years were selected as being those in which streptomycin was first freely available.

From the psychological point of view, resection of the diseased area of lung has a tremendous appeal to the patient and his doctor, as the immediate results are often dramatically good ; hence there will be a great temptation to overdo the operation, and this will have to be guarded against till there is a more accurate assessment of its ultimate value than is at present possible. The patient tends to feel that, as the diseased tissue has been removed, he is no longer suffering from the disease or is infectious and will rapidly be able to resume a more or less normal life.

But this feeling of satisfaction and safety carries with it grave disadvantages. Examination of post-mortem material, and of the less diseased or apparently undiseased areas of lung which have had to be removed for technical reasons, and above all the appearance years later of areas of calcification in parts of lungs which have been previously radiologically normal, is illuminating. It proves that, in most cases, other parts of the lungs are usually the seat of much tuberculous disease. This implies that careful aftercare, with restriction on physical and general activity, must be carried out for a long time. It is difficult to persuade patients of the necessity for this, after a relatively short period of treatment culminating in what they are inclined to

regard as a radical cure. Failure is particularly apt to occur when collaboration between physician and surgeon is not close. Surgical follow-up is a poor substitute for thorough aftercare.

It seems to me that the fundamental principle that the patient's fate depends on his resistance may be lost sight of. I feel that the suggestion—I acknowledge it is not more—put forward by the Liverpool School that pulmonary tuberculosis often is clinically a localized disease is full of danger.

Because we have removed the part of the lung which is an immediate bronchogenic menace and a source of toxæmia, it does not mean that other foci of disease, manifest or occult, will not progress in the near or distant future. For why did the patient get the diseased area which has been removed ? Often it was not by bronchogenic spread from a manifest cavity or, in many cases to say the least of it, from an exogenous super-infection. On the other hand, resection has won for itself such a definite place in treatment that its use must be envisaged from the start and every effort made to avoid the production of streptomycin-resistant organisms. Evidence is accumulating that the risks of resection in streptomycin-resistant cases are many times greater than in sensitive cases.

Role of the Bronchus

It has been realized in the past few years that narrowing of the bronchi leading to cavities is one of the main reasons for the failure of collapse therapy to produce cavity closure ; and, even if closure is obtained, residual tuberculous bronchiectasis may follow.

Speaking generally, resection is a better method of dealing with a lung in which bronchial stenosis is a prominent feature than is collapse therapy. Unfortunately, bronchoscopy is a very fallacious guide. The information derived from the average bronchoscopy is limited to a view of the condition of the openings of the main bronchi, and very often the obstruction is beyond. Some figures (Table I) which I obtained from Brompton Hospital cases illustrate this point.

TABLE I.—Incidence of Bronchial Stenosis

Total no. of resections		78
No. available for review		76
No stenosis found pathologically		26
Stenosis found pathologically		50
Stenosis found on bronchoscopy		31

I have taken the reports of the bronchoscopies done immediately before resection operations, and the reports on the resected material. A caveat must be entered here. Unless the possibility is remembered, the bronchial obstruction in the resected lung may appear to be greater than it is in life. The proportion of cases with stenosis (66%) is very high, and in all probability even this figure is lower than the actual rate, because in some cases particular attention was not paid to this question, or at any rate its complete absence was not noted in the pathological report. The proportion of cases in which bronchoscopic evidence of stenosis is found is much smaller (40%). If, as I believe, the real place of resection is in the treatment of cases with bronchial stenosis, it is important that the pre-operative diagnosis of this should be made in as high a proportion as possible of the cases in which it occurs.

Is there any method by which the probability of stenosis can be suspected in the absence of bronchoscopic proof? A trial pneumothorax will often give a clue. After the first few insufflations with air it may be noted that an area corresponding to a lobe or major segment will be much more dense or contracted than the remainder of the lung. This may be taken to indicate that bronchial obstruction is probably present. If this occurs in the middle, lingula, or lower lobes the case should immediately be considered as a candidate for lung resection and the pneumothorax only kept up if it is thought that the patient can be got into better shape for resection, or if the surgeon prefers to carry out the resection with the pneumothorax in being.

In many bronchoscopic reports in which the absence of visible bronchial stenosis is alleged there appears the remark, "Secretion is seen coming from . . ."; and here follows the lobe bronchus, which subsequently is proved to be stenosed. Are we paying too little attention to minor bronchoscopic findings, which really indicate the high probability of occult bronchial stenosis?

The employment of lipiodol would be of great value, but among many workers there is still a feeling that the claim that aspiration spreads do not occur after its use is not quite true, and certainly residual lipiodol may be a nuisance. The use of the thick sulphathiazole-lipiodol mixture may prove to be the answer. Since using this I have had no evidence of any spread of disease and little residual lipiodol.

Artificial Pneumothoraces and Lung Resections

Of recent years most of those workers who have had extensive experience with artificial pneumothorax have felt that bronchial stenosis, obvious to bronchoscopy, is a contraindication to maintaining a pneumothorax, and even to its induction unless lung resection in the immediate future can be contemplated with equanimity. The figures which I have quoted indicate that occult bronchial stenosis is common, hence the possibility of its existence should be envisaged before inducing an artificial pneumothorax (A.P.). It has of late become the practice of many physicians to use streptomycin as a preparatory method of treatment before the induction of pneumothorax in acute and toxic cases. The use of P.A.S. in conjunction with it has reduced the likelihood of producing streptomycin-resistant organisms. Where, however, there is a chronic cavity, either in the lung under consideration or on the other side, the likelihood of producing such organisms is by no means negligible if large amounts of streptomycin are given over long periods. Careful consideration must be given to this possibility, and the risk of performing a resection at an unduly early stage must be weighed against the risk of producing resistant bacilli.

A relatively high proportion (22%) of my resections have been performed to deal with disastrous A.P.s, often associated with bronchial stenosis.

TABLE II.—*Pneumothorax Disasters*

Total no. of resections	78
Resections of A.P. disasters	17
With only pathological evidence of stenosis	11
With bronchoscopic evidence of stenosis	6

In my opinion, for cases with definite bronchoscopic evidence of stenosis, except in the upper lobe, pulmonary resection should normally be preferred to initiating an A.P. Where it is not possible to prove stenosis bronchoscopically, any evidence that stenosis is probably in the middle lingula and lower lobes indicates that the A.P. should only be tried to provide evidence on the question; it should be continued only if no support is given to the suspicion; resection should be preferred if the suspicion is confirmed.

The use of pneumothorax is more debatable in cases of upper lobes with cavitation and occult bronchial obstruction. In some of these, cavity closures can be obtained with the production of a completely airless lobe, with a freely expanding lower lobe. Should these cases be submitted to lobectomy? Contrary to some workers, I believe that these are comparatively safe if two essentials are fulfilled. (1) The presence of a residual cavity must be excluded by every possible means; if it exists there is a likelihood of two disasters: (a) a pin-point broncho-pleural fistula with production of fluid; and (b) spread into other parts of the lung. (2) The atelectasis must be complete. If the atelectasis is of one segment only, there is a likelihood that periodic reinflation of the incompletely collapsed area may occur and thus, by altering the dynamics of the lung, lead to spreads to the other side. If the atelectasis of the upper lobe is complete, resection is unnecessary, at any rate at this stage, for reinflation should not occur. When re-expansion is allowed, the collapsed lobe will occupy a narrow wedge against the mediastinum at the apex, and this will result in a symptomless bronchiectasis. In the event of trouble the shrunken lobe can be removed subsequently. There are two objections to primary resection in these cases: (1) the middle and lower lobes are nearly always the seat of some disease, even though it is occult and the A.P. is very valuable in assisting to heal this; and (2) the availability of skilled surgeons for whom resection is a safe procedure is limited.

A very important point arises in connexion with cases in which a pneumothorax has been maintained for six months and upwards in the presence of an unclosed cavity. Before the advent of resection the physician was in rather a quandary. If he allowed re-expansion there was a great chance of spread of disease into other areas during the re-expansion of a lung which had been collapsed without cavity closure for some months; on the other hand, few surgeons liked the idea of performing a thoracoplasty without re-expansion owing to the danger of tearing the pleura. Resection obviates this difficulty.

The Residual Pulmonary Function

The estimation of the residual pulmonary function which will follow pneumonectomy is of course of primary importance: a patient who has severe dyspnoea on any exertion is a poor result. Some years ago Dr. Cheale and I investigated the capabilities of patients who had had lungs removed for bronchiectasis and carcinoma, taking ability to climb the stairs from the ground to the first floor without distress as our basis. We found that in young people who had had pneumonectomy for bronchiectasis, and in patients under late middle age who had had the operation performed for carcinoma, the function was usually remarkably good. The bad group was the middle-aged bronchiectatic. These included those who had damage from bronchitis and emphysema on the other side.

If the serial x-ray films in a case of pulmonary tuberculosis of long standing are studied the current film may appear comparatively normal, whereas the previous films

will show that a considerable amount of disease has been present and has radiologically disappeared. Post-mortem examinations, when available, indicate that the radiological clearing is not proof that quite extensive damage does not persist in the form of foci of chronic tuberculous pneumonia and fibrosis with emphysema and chronic bronchitis, which is often intermittently silent. Hence, before a lung resection of choice is embarked upon it is essential that all possible previous x-ray films or, if not available, reports, should be studied. This is often of more value than function tests, which I find rather disappointing in assessing the doubtful case.

In this series two patients died and two are respiratory cripples as the result of miscalculation of respiratory reserve, but only one was an operation of choice.

Reasons for Resection

I have divided the reasons for resection into three classes, but not by the pre-operative indications for it. I have taken the specimens removed and post-operative x-ray films—that is, I have, as they say on the Stock Exchange, “jobbed backwards” and considered the cases with the possible alternative methods of treatment thus revealed. (1) Where the alternative to resection was chronic invalidism with the prospect of early death (58 cases). (2) Where the alternative was some other form of major surgery (15 cases). (3) Where non-surgical treatment was possible (5 cases).

1. Resection or Chronic Invalidism

Under this heading we may include the following conditions: destroyed lungs or lobes, with cavitation; bronchial stenosis of the main bronchus or of the middle- or lower-lobe bronchi; cavitated and bronchiectatic lesions of the middle and lower lobes which have proved unamenable to other treatment; and cavitated lesions with empyemata or fistulae, especially after disastrous A.P.s.

In this group the problem is to assess the value of the patient's life to him, under the conditions prevailing at the time of the proposed operation and the prospects of rapid deterioration. Some of these cases may have years of useful though restricted life before them even if nothing is done. In assessing the risks of operation, careful review of the patient's previous immunological response to the tubercle bacillus is almost as important as the x-ray film; in addition, the fortitude which a patient has shown under previous misfortune will often allow his physician to encourage the surgeon to take a risk which on the face of it is too great.

2. Resection or Some Other Form of Major Surgery

Among my cases there were seven pneumonectomies in which a complete thoracoplasty would have been a possible alternative: these were cases in which cavitated fibro-caceous disease involved the whole lung without stenosis of the lower- and middle-lobe bronchus, or basal cavitation.

From the point of view of local condition there is no doubt that the pneumonectomy will give a better result. If the effect of distension of the other lung is feared a subsequent paravertebral thoracoplasty can be done with a minimum of risk, or, as in this type, if a pneumoperitoneum and a phrenic interruption can be done without disadvantage, this may suffice. I believe, however, that a thoracic surgeon of limited experience or with limited facilities may perform a staged thoracoplasty with less risk. We should not encourage the relatively inexperienced surgeon to abandon a well-established and comparatively safe operation for a method of treatment which is on trial. Apart from this, I think that a planned complete thoracoplasty is seldom called for.

In the other eight cases an upper-stage thoracoplasty would have been possible, and one of the most controversial questions is the respective advantages of the upper-stage thoracoplasty and resection in disease of the upper half of the lung.

From the point of view of function, all other things being the same, the functional result of an upper-lobe resection must be better than a seven-rib thoracoplasty, but if a pneumoperitoneum and a phrenic interruption are done to help to fill the space the advantage is negligible. The advocates of resection often advise inducing this quite casually; but the figures of Michael and others show that recovery of phrenic nerve function fails to occur in about 20% of cases in which a pneumoperitoneum is used to supplement the phrenic interruption, and partial lack of recovery is found in 30–50%. Where the thoracoplasty is confined to five ribs the difference must be much less, and an apical thoracoplasty has comparatively little effect on function.

I do not propose to go into the results of the complications of resection and thoracoplasty except to point out that a thoracoplasty avoids two difficulties that may occur in resection.

1. A lobectomy may be contemplated, but for technical reasons it may be found at operation that a pneumonectomy is essential. As experience is gained the possibility of this may be negligible, but at present there are cases in which it does occur. If the other lung is not sound the loss of a lobe which was relied on to make up a deficiency may be a serious thing. The functional result of a pneumonectomy will be inferior to that of a seven-rib thoracoplasty. The latter will preserve functioning lung, which will be of great value, especially if there is reactivation of disease in the other lung.

2. In dealing with cavities in the middle zone their exact location in cases in which much distortion has occurred is by no means easy, even when every facility is available. If the surgeon discovers at operation that an error in location has occurred a pneumonectomy may be necessary, with a corresponding diminution of available functioning lung.

In my series a pneumonectomy was performed in six cases in which the pathological specimen showed that the lower lobe was sacrificed when its condition was such that it would probably have healed. In three a pneumonectomy was performed deliberately, as it was thought that the condition of the lower lobe was worse than it was; in three a lobectomy would have been done if it had proved practicable. In all these a seven-rib thoracoplasty would probably have been successful and one death avoided.

This also raises a further point: some surgeons say that if they find that the condition of the lobes, other than the one which they propose to remove, is worse than the x-ray film suggests, they extend the resection. This seems to me quite wrong unless the film has been misinterpreted and a given shadow is not in the lobe in which it was envisaged.

If no lesion shows in the film there is no more reason why a similar amount of disease in the supposedly good lung would not be found if it were examined. The pathological condition is difficult to interpret at the operation till the lung is cut; and the patient's resistance may completely alter the picture.

The risks to life after an upper-stage thoracoplasty will of course vary enormously with the material which is operated, but unless desperate cases are tackled it is very low. Similar results in resection have been published by some workers, but my figures hardly bear this out; the onus lies on the advocates of resection to show that in a similar type of case such a low mortality can be obtained by the average thoracic surgeon. Until that is proved to be the case I think that it would be a grave error to assume that the very low figure published by some very brilliant surgeons, and the Liverpool School headed by Mr. Ronald Edwards in particular, will be produced by all other workers. I suspect that the difference lies in the type of material.

The problem is further complicated by the remarkably good immediate results obtained by some surgeons by the use of plastic ball plumbage. Even though it is suitable for only a proportion of cases to which the other procedures are applicable, it yet does provide an alternative to resection in some cases—for example, those in which the

possibility that a contemplated upper lobectomy may be a pneumonectomy, with the likelihood of disaster—while avoiding some of the disadvantages of a thoracoplasty.

It will be noted that so far I have not referred to the bearing of bronchial stenosis on upper-lobe disease. Bronchial stenosis, unless absolutely complete, which is comparatively uncommon, will almost certainly produce some bronchial dilatation. Is this important? If it is, all upper lobes in which narrowing of the bronchus can be diagnosed are cases for resection unless there is a definite contraindication. All one can say is that many cases in which upper-lobe bronchial dilatation, either under a thoracoplasty or produced by spontaneous healing, remains do very well for many years; the drainage is so good that a slight cough in the morning and sputum free from tubercle bacilli are the only symptoms of its presence. The dilatation can be demonstrated easily by bronchography, but the clinical effect is small. I feel that the few patients who do develop recurrent pyrexial attacks and in whom a lobectomy is subsequently necessary do not as yet tip the balance against a small thoracoplasty.

With the nervous and unstable patient there are great advantages in resection. It is one thing to screw up one's courage for a big operation; it is another to face two operations, as must be done when a thoracoplasty is contemplated. To a woman, especially a young unmarried woman, it is often the deformity produced by the falling in of the ribs and by the spinal curvature, even if these be minimal, which is the main horror of a thoracoplasty. The following case illustrates this point.

A woman aged 22, after a partially successful pneumothorax and a phrenic interruption, was left with a shrunken upper lobe with an infrequently bacilliferous cavity. A thoracoplasty was advised by a surgeon, who practically guaranteed a permanent arrest of the disease. Knowing the patient, the physician advised against it. The thoracoplasty was done with complete local success and closure of the cavity. She returned to her physician some time later as she had influenza, and she was doubtful about her condition. There was no recurrence of disease, but she looked ill. She was an alcoholic addict and had tried to commit suicide: she had become an alcoholic because she was so ashamed of her deformity (which was hardly noticeable) and she had cut herself off from all her friends and refused to go out. She attempted suicide when she heard that if she had waited she could have had a lobectomy without deformity of the chest wall. Her physician knew that a quiet life with a cavity and an intact thorax would have been a much better result than a closed cavity with a ruined life; he realized that her appearance was the breath of life to her.

3. Cases in Which Non-surgical Treatment was Possible

These were inspissated cavity (one), tuberculomata (two), and localized areas of fibrotic disease (two). In none had tubercle bacilli been demonstrated at the time of operation; in three no growth, and in two very scanty growth only, was obtained from the pathological specimens. Judging from the pathological specimens, conservative treatment would have been adequate in four and less disastrous in the other.

I am extremely doubtful whether resection is indicated in the absence of tubercle bacilli and symptoms of activity—that is, a static x-ray shadow, even if known to be tuberculous in origin, is not in itself an indication for resection.

Timing

The success of thoracoplasty has been largely attributable to the insistence that a good resistance is a *sine qua non*. This insistence must be applied to resection or the results will be poor in the long term. However, our estimation of resistance is fallible and largely dependent on the observation of the individual's reaction to the disease. This takes time. In the 78 cases under review 34 were known to have had tuberculosis for more than four years, 24 for two to four years, 13 for more than one year, and 7 for less than one year, but all may have had the disease for much longer. Three of the latter seven had localized disease, which indi-

cated a good resistance; a fourth, from the type of disease, was of considerable standing. The remaining three were probably acute low-resistance types; they were kept in bed for a minimum of three months and taken on very slowly afterwards, but one has already relapsed.

It is difficult to prove that cases treated with long periods of rest prior to resection do better than those who receive early operation; my present opinion is that resection should usually be postponed until the maximum benefit has been achieved by conservative measures. It may be argued that this policy will lead to bronchogenic spreads; but Mitchell has shown that in cavitated cases treated by phrenic interruption and rest in bed this seldom occurs.

The Contralateral Lung

Passing to the effect of lung resection on the other lung, there are three points which I should like to consider. (1) What is the effect of removal of a mass of tuberculous tissue on the other lung from the point of view of immunity? (2) What is the effect of overdistension on the tuberculous foci, which must be assumed to be present even if not radiologically evident, in the contralateral lung, or in the remainder of the lung in the resected side, when a subtotal resection is performed? (3) Is deterioration in the contralateral lung likely after the patient has recovered from the immediate effects of the operation?

1. It is obvious that the removal of a source of bronchogenic spread must reduce the chance of such a spread; but it is not so clear whether the presence of tubercle bacilli in the right number in the body may not keep up the acquired immunity, although I think that there must be adequate numbers elsewhere to deal with this. In some cases, however, the basic cause of the disease is haematogenous in spite of the fact that the main lesion in the lungs is a bronchogenic lesion which is superimposed. It has been found that in extrapulmonary tuberculosis the removal of the principal focus may be followed by recrudescence of disease elsewhere, and that if a pulmonary case is mainly haematogenous it is possible that this may occur in the lungs. However, it may be said that so far there is no real evidence that pulmonary resection will have an adverse effect on the patient's immunity.

2. On the basis that relaxation is the method by which healing in the lungs can be promoted, overdistension should produce an adverse effect. However, comparison with a pneumothorax affords a possible explanation why this should not be so adverse in its effect as might be expected. When a lung free of adhesions is fully collapsed and then allowed to re-expand partially, the undiseased part re-expands more readily than the diseased area owing to its unimpaired elasticity: this is the mechanism by which selective collapse is produced. By analogy it may be that the overdistension falls mainly on the undiseased part of the lung with little effect on the diseased area.

3. A review of these cases shows that 7 out of the 70 survivors (10%) showed some evidence of deterioration in the two years following the operation. Two factors seemed to be of importance. (i) Deterioration took place five times as frequently in those cases in which there had been adverse changes in the contralateral lung during the previous 12 months as in those in which there was no previous or only static disease. (ii) Deterioration was more frequent in patients who were over 50 at the time of operation. The details of this investigation will appear in *Thorax*.

Results

The mortality from lung resection will vary very much with the type of case which the physician and surgeon agree is a possible risk. Where the alternative is chronic invalidism or the likelihood of early death, it is justifiable to tackle cases with a high mortality risk; and a high mortality in this class of case throws no reflection on the surgeon and little on the physician.

The results are shown in Table III ("satisfactory" indicates that the disease is apparently arrested and no tubercle bacilli are found in the sputum). In the group where

TABLE III.—Results

	Satis- factory	Unsatis- factory	Died	Total
No alternative treatment:				
Pneumectomy	25 } 37	8 } 12	7 } 9	40 } 58
Lobectomy	12	4	2	18
Surgical alternative possible:				
Pneumectomy	4 } 12	1 } 2	1 } 1	5 } 15
Lobectomy	8	1	1	10
Conservative treatment possible:				
Pneumectomy		1		1
Lobectomy	4			4
Totals	53	15	10	78

resection was the only possible method of treatment 64% can be classified as satisfactory, 15% were dead, and 21% unsatisfactory. Where alternative surgical treatment was possible 80% were satisfactory, 7% dead, and 13% unsatisfactory.

Causes of Death.—Table IV shows the causes of death. In four cases the surgeon did not have a chance—in two the respiratory reserve was too low, but in both the possibility was recognized before operation; in the other two the operation was satisfactory, but the patients' resistance was not sufficient to deal with the remaining disease.

TABLE IV.—Causes of Death

Operative deaths	6
Lack of respiratory reserve	2
Directly following operation	2
Blood-transfusion disaster	1
Oedema of larynx	1
Post-operative deaths (failure of treatment)	..

Unsatisfactory Results.—In 15 cases classified as unsatisfactory the patients were still alive at the end of the period of observation. Three cases are in serious danger, and one is well except for a small sinus. Of the others the deterioration on the other side is slight in four cases, and there is a reasonable prospect that it will settle down.

TABLE V.—Unsatisfactory Results

Pneumectomy (obligatory)	8	Pneumectomy (choice)	1
Persistent sinus	1	Deterioration other lung	1
Deterioration other lung	4		
T.B. + ; ? cause	1		
Respiratory cripples	2		
Lobectomy (obligatory)	4	Lobectomy (choice)	1
Deterioration other lung	1	T.B. + same lung	1
T.B. + ; cause ?	1		
Spread other lung	2		
For Localized Disease: Pneumectomy	1		
Deterioration other lung	..		

Conclusions

Any investigator into the results of and indications for any particular mechanical form of treatment for pulmonary tuberculosis is confronted with the difficulty that if he allows a long enough time to elapse to enable him to reach a definite conclusion the method of treatment may have improved so much that the immediate mortality figures are out of date. In all probability the mortality figures obtained here would be reduced if the operations were performed to-day; but if advanced cases are tackled the mortality will be appreciable. Most cases dealt with have been followed for a minimum of two years.

It can be claimed, however, that this paper does confirm the opinion that in resection we have a method by which many cases unsuitable for any other form of surgical treatment can be rendered quiescent; a high proportion (64% of 58 cases) who would be dead or hopeless invalids have been rendered quiescent with a

good prospect of ultimate arrest of the disease. Resection has not yet proved itself superior to surgical collapse therapy in upper-zone disease.

The cases dealt with are mainly those which have shown a fair degree of resistance, and the findings are not applicable to cases in which the disease is recent in onset. The basic indication for resection in advanced cases is bronchial stenosis or its results.

As the cases were selected for operation by a number of physicians and include cases operated on by at least five surgeons the results may be regarded as representative of average high-class clinical work. The cases are not confined to one particular type.

It appears that if deterioration is going to occur in the opposite lung it will probably do so within a year of the start of convalescence. The likelihood of deterioration is high where the disease has shown signs of instability within the previous year or in patients over 50 years of age.

I acknowledge with gratitude the kindness of my colleagues at Brompton Hospital, who have allowed me to use their case notes and radiographs. The accuracy and success of the follow-up are entirely due to my registrar, Dr. M. R. Geake, to whom I tender my warm thanks.

SKIN LESIONS IN ORGANIC BRAIN DISEASE

BY

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During recent years many papers have been published on the psychological aspects of skin disease, yet comparatively little has been written on the subject of skin lesions found in association with organic brain disease. This discrepancy has not passed unnoticed by dermatologists, and MacKenna (1947) has commented on it in his introduction to Wittkower's article on the psychological aspects of seborrhoeic dermatitis. Posing the question, "To what degree does the mind influence the behaviour of the skin and its appendages?" he points out that the answer must concern itself with the cerebral control of the epidermis, and goes on to state that "a search of the literature indicates that from the dermatological standpoint there have not been any great advances since D. Krestin published his famous paper on 'The Seborrhoeic Facies as a Manifestation of Post-encephalitic Parkinsonism and Allied Disorders.'" Krestin's paper was published in 1927, and on the basis of 73 cases studied in the wards of the London Hospital he made the suggestion that the secretory disturbances described might "depend upon lesions in the neighbourhood of the third ventricle involving vegetative nerve centres."

More recent evidence that cerebral lesions can be followed by skin changes has emerged from the study of patients subjected to prefrontal leucotomy. Ziegler and Osgood (1945), in a careful study of the post-operative findings in 17 patients submitted to leucotomy, found that three suffered for a variable period post-operatively from a bullous eruption of the heels. These bullae healed slowly and were stated "to resemble