two pathogens from the sputum during treatment, though they often reappeared before the patient left hospital.

However, this alteration in the flora of the bronchi appears to have conferred little additional benefit on patients already receiving routine ward treatment. This routine, with breathing exercises, postural drainage, bronchodilator sprays, and early ambulation, was applied with as much enthusiasm and frequency as was humanly possible. There was an atmosphere of active treatment for an often neglected illness which must have contributed psychologically and allowed the earlier discharge of patients.

Our results indicate that ampicillin reduces the frequency of early relapses even if it does not affect the ultimate prognosis of the acute illness. The frequency of relapses seemed to be reduced only in those patients with *H. influenzae* in their sputum on admission. Unfortunately this test takes time, and is especially unreliable when the patient has received antibiotics before admission. If treatment is to be started straightaway a different method of selecting which patients need antibiotic treatment is needed.

Antibiotic therapy is not without its hazards, both to the patient and to other patients around him in the hospital environment. Broad-spectrum antibiotics are particularly apt to encourage cross-colonization by "hospital" antibiotic-resistant bacteria.

New methods are needed so that the patient who will really benefit from antibiotic therapy can be identified as soon as he reaches the ward. The rest of the bronchitic patients should not receive antibiotics while in hospital.

Summary

The value of ampicillin in the hospital treatment of exacerbations of chronic bronchitis has been assessed in a double-blind trial.

Twenty-eight pairs of patients were included in a sequential trial in which all patients were treated intensively with bronchodilator drugs and physiotherapy. One member of each pair received bacteriologically effective doses of ampicillin for seven days, while the other member of the pair received placebo.

Sequential analysis of the results showed no conclusive evidence that the ampicillin was beneficial.

Ampicillin did not shorten the length of the patients' stay in hospital. In those patients whose sputum cultured *Haemophilus influenzae* on admission there was a reduction in the frequency of relapses while the patient was still in hospital.

There was no evidence that any such improvement caused by the ampicillin persisted after the patient was discharged from hospital.

We are grateful to Dr. J. A. Fisher, who acted as the independent observer. We are indebted to the Northern Ireland Hospitals Authority for making the beds available which made this trial possible, and for funds granted through their Medical Education and Research Committee. The trial could not have been run without the active co-operation of the staff of the Belfast City Hospital, and in particular Ward Sisters Harrison and McCully, Miss Kelso, of the Physiotherapy Department, and Mr. Coulter, chief pharmacist. Statistical advice was obtained from Dr. J. D. Merrett, of the Department of Medical Statistics. Dr. O. P. W. Robinson kindly arranged for the supply of all the ampicillin and placebo capsules by Beecham Pharmaceuticals Ltd. free of charge.

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Surgical Treatment of Bronchiectasis: Ten-year Survey

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Brit. med. J., 1965, **2**, 908–912

In the decade 1952–62 125 patients were operated on for bronchiectasis in the Southern Metropolitan Thoracic Surgical Unit, Dunedin. In 91 of these the resection was unilateral and in 34 bilateral. Two patients with unilateral disease required a second operation for removal of a lung segment that had become bronchiectatic after the first operation. Four of those with bilateral disease required a subsequent segmental resection. In the period analysed, therefore, 165 operations for bronchiectasis were performed on 125 patients, as follows:

Unilateral bronchiectasis ...	91 resections 2 subsequent resections
Bilateral bronchiectasis ...	68 resections 4 subsequent resections

All these patients were referred from the Chest Clinic, Dunedin Hospital, or Regional Chest Clinics, Otago and Southland, because of failure of medical treatment.

There were 75 females and 50 males, a proportion of 1.5 to 1. This supports the experience of Ginsberg *et al.* (1955). Other reported series have shown a different sex distribution (Lindskog and Hubbell, 1955). The unilateral group comprised 53 females and 38 males, and the bilateral group 22 females and 12 males. The two groups are analysed separately.

Unilateral Bronchiectasis

Age Distribution.—The age distribution at the time of onset of symptoms and at operation is given in Table I. These figures show that in two-thirds of the patients the onset of symptoms occurred in the first decade of life. The age distribution at operation, however, showed a different pattern. Thus over a third of the patients were operated upon in the second decade of life. It was felt that convalescence, in the

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main, was easier if the operation could be deferred beyond the first decade so as to get maximal co-operation from these young patients. However, if symptoms were severe, operation was carried out in the first decade. An appreciable number who had tolerated their symptoms through their earlier years sought relief in the third and fourth decades. Occasionally, too, there was need for surgical treatment in the fifth and sixth decades, usually for haemoptysis associated with localized bronchiectasis, especially in the middle lobe.

TABLE I.—*Age of 91 Patients at Time of Onset of Symptoms and at Operation*

Time	Age in Years						
	0–9	10–19	20–29	30–39	40–49	50–59	60–
Onset of symptoms ..	59	11	7	8	2	2	2
Operation	11	34	12	17	9	4	4

Aetiology.—This followed the standard pattern, with bronchopneumonia, measles, or pertussis in early childhood as the initiating disease, leading to unrelieved lobar or segmental collapse and bronchiectasis. In contrast, in this unit during the same period of review another 150 patients were referred early because of post-pneumonic collapsed lobes. After prompt aspiration bronchoscopy their collapsed lobes again fully aerated and have remained normal. To some extent, therefore, bronchiectasis is a preventable disease.

Disability.—In 77 there were recurrent colds, 15 had considerable loss of schooling, and 9 had appreciable fatigue.

Symptoms.—These were usually multiple. In order of frequency they were: cough 84, sputum 81, haemoptysis 24, shortness of breath 9, pain 9, feverish bouts 7, and wheeze 2. The incidence of haemoptysis was significant, being present in a quarter of the patients. In this unit all patients with haemoptysis are investigated by chest films, bronchoscopy, and bronchography, an approach that has revealed bronchiectasis not obvious on plain chest films alone.

Complications.—As in other series, most patients had some complication of their bronchiectasis. Those noted were: nasal sinusitis in 63, pneumonia in 25, infected tonsils and adenoids in 15, otitis media in 6, pleural effusion in 6, empyema in 3, and peripheral neuritis in 2. The association of peripheral neuritis with bronchiectasis has been described elsewhere (Caughey, Wilson, and Borrie, 1958).

In our unilateral group 63 of the 91 patients had nasal sinusitis, and in the bilateral group 28 of the 34 patients were similarly affected. Our incidence is thus considerably higher than that of Lindskog and Hubbell (1955), who demonstrated nasal sinusitis in 74 out of 215 patients.

General Management

After clinical assessment all patients had sputum culture, routine chest and nasal sinus radiographs, ear, nose, and throat examination, followed by physiotherapy, postural drainage to reduce sputum below 30 ml. a day, lung-function studies, bronchoscopy, and bronchography. Antibiotics were given, and in the period 1952–5 were supplemented by daily endobronchial penicillin.

Sputum Culture.—In all patients a wide range of bacterial flora was cultured, but no constant organism detected.

Bronchography Technique.—In children up to the age of 12 years this was done under general anaesthesia. In adults it was performed under local anaesthesia by the "over-tongue technique." From 1952 to 1957 Lipiodol was used to outline the bronchial tree, and thereafter oily Dionosil. Now all bronchograms are done under general anaesthesia and combined with bronchoscopy.

Distribution of Unilateral Bronchiectasis

The distribution of the disease in the 91 patients is set out in Table II.

TABLE II.—*Distribution of Unilateral Bronchiectasis*

RIGHT SIDE	
Right Upper Lobe Alone	
R.U.L.	2
R.U.L.—anterior segment ..	1
Right Middle Lobe and Variants	
R.U.L. + R.M.L.	1
R.U.L. (anterior segment) + R.M.L.	2
R.M.L. medial segment ..	1
R.M.L.	12
R.M.L. + R. basals	1
R.M.L. + posterior R.L.L. ..	2
R.M.L. + R.L.L.	2
Anterior R.U.L. + R.M.L. + R. basals	1
R.M.L. (lateral segment) + R. (medial basal)	1
Right Lower Lobe Alone	
R.L.L.	2
	28

LEFT SIDE	
Left lung	1
Left Lower Lobe and Variants	
L.L.L.	25
L.L.L. + L.	27
L.L.L. + L. + anterior segment L.U.L.	4
L.B.L. + lingula	3
Left Upper Lobe	
Lingula	2
Lingula + anterior segment L.U.L.	1
	63

Total unilateral resections 91
Later operation { Apical segment R.L.L. 1
Later operation { Anterior segment L.U.L. 1
93 operations

Comment.—On the right side by far the commonest lobe affected was the middle lobe. Sometimes it was in combination with disease in the upper lobe and sometimes with disease of the lower lobe. Of the 28 patients with right-sided disease alone 23 showed involvement of the middle lobe. Of those with left-sided disease, only one patient had total destruction of the left lung requiring pneumonectomy. In the remainder the left lower lobe was most commonly affected (59 of the 63 "left-sided" cases). Careful appraisal of the bronchograms showed that other minimal disease (not requiring surgical treatment) was present in 23 of the 91 cases. An additional 14 had bronchitis shown by bronchography as fine mucosal sacculations along the bronchial tree. Thus 37 of the 91 patients had some additional reason for less than a perfect result, and this was known before surgical treatment was undertaken. Despite this, however, in most patients the results of treatment proved to be good.

Operative Note.—Most patients had an aspiration bronchoscopy just after induction of anaesthesia, and if secretions were excessive a Thompson endobronchial blocker was inserted. All had dissection lobectomy as originally described by Churchill and Belsey (1939). The children were all positioned in the face-down Parry-Brown position. The adults were positioned for posterolateral thoracotomy. At the conclusion of the operation all had a further aspiration bronchoscopy.

Operative Mortality.—In these 93 unilateral operations there was no operative or post-operative hospital mortality.

Post-operative Morbidity

Half of these patients, however, had a complicated convalescence, and several had more than one complication. The nature of post-operative morbidity in the 93 resections is shown in Table III.

TABLE III

1.	Temporary lobar collapse		39
	Relieved by physiotherapy	13	
	„ „ bronchoscopy	19	
	„ „ tracheostomy	7	
2.	Persisting lobar collapse		2
3.	Pneumothorax—blocked drainage-tube		3
4.	Fistula { Parenchymal		1
	Fistula { Bronchial		1
5.	Infection { Wound		2
	Infection { Empyema		6
	Staphylococcal pneumonia		3
	Suppurative pericarditis		1
6.	Haemothorax		4

Temporary lobar collapse from sputum retention was the commonest complication. This at times responded to physiotherapy. If not, bronchoscopy was promptly performed. If

a second or third bronchoscopy was required it was wiser to perform tracheostomy.

In two patients an unrelieved post-operative segmental collapse caused bronchiectasis within two months. This occurred once in a conserved apical segment of the right lower lobe, and once in the anterior segment of a left upper lobe. The former had persisting cough and sputum, the latter repeated haemoptysis. Both were relieved by subsequent resection of the involved segments. These were the only examples in this unilateral series of "spread" following operation; and here the cause was "sputum retention and associated infection."

Infection caused the second largest group of complications. Six patients had an empyema, two had wound infection, and one had an acute suppurative pericarditis, all staphylococcal in type. The pericarditis responded to pericardiostomy. Three of the 91 patients developed transient post-operative staphylococcal pneumonia.

Haemothorax arising from extensive pleural stripping complicated the convalescence of four patients.

Follow-up

All patients were seen a month after operation, six months later, and thereafter annually. The effect of surgical treatment on their subsequent life and health was carefully recorded. The entire series was rechecked in 1962, and have been followed annually since then.

Patients assessed as "excellent" results were symptomless, and had full physical capacity. Those assessed as "good" had full physical capacity but occasional cough or clear sputum; those assessed as "fair" had, in addition to cough or clear sputum, occasional haemoptysis, susceptibility to respiratory infection, or mild dyspnoea on exertion; and those assessed as "poor" had residual symptoms, dyspnoea on exertion, and repeated episodes of pulmonary infection.

Late Deaths.—Seven of the 91 patients with unilateral disease died some years after operation (Table IV). One had coronary occlusion at the age of 52, one died from cor pulmonale aged 52, and one committed suicide at the age of 65. Four died from pneumonia.

TABLE IV

Sex	Age at Operation	Time of Death	Cause
1. Female	42	10 years after pneumonectomy	Emphysema and cor pulmonale
2. Male	55	7 years after lobectomy	Pneumonia
3. Male	60	5 „ „ „	Suicide
4. Male	40	4 „ „ „	Pneumonia
5. Male	48	4 „ „ „	Coronary occlusion
6. Female	7	3 „ „ „	Pneumonia
7. Female	30	1 „ „ „	„

Survivals.—Eighty-four patients were alive up to 10 years after operation, and 52 (62%) were fit, well, and symptomless, leading normal lives. Residual symptoms were present in 32 (33%) of the patients. Effort tolerance was excellent in 46 (55%) cases, good in 35 (42%), fair in 2 (2%), and poor in 1 (1%). In 22 (64%) of the 35 with good but not excellent results the cause was known, and was due to (1) sinusitis, or (2) bronchitis, or (3) other minimal disease. None the less, these patients were leading normal lives and were gainfully employed.

Our general finding is that young patients who have had a sump-like bronchiectasis confined to one lobe and with no bronchitis will remain symptomless after operation; they have good effort tolerance and an excellent prognosis.

Bilateral Bronchiectasis

Thirty-four patients had 68 operations for bilateral bronchiectasis.

Age Distribution.—The age distribution at the time of onset of symptoms and at operation is given in Table V. Analysis showed considerable differences when these cases were compared with the unilateral ones. None of the unilateral cases arose in the first year of life. Fourteen arose in the second year, 28 at ages 2 to 4, and 17 at 5 to 9 years. Of the bilateral cases nearly a third occurred in the first year of life, nearly a third in the second year, and almost all the remainder before the age of 10 years. In 28 of the 34 patients with bilateral bronchiectasis the onset occurred before 5 years of age. This early onset of bronchiectasis is similar to the experience of Clark (1963). It again emphasizes how vulnerable is the infant bronchus and how important are all measures aimed at early recognition of lobar collapse and its prompt correction. The operation was usually undertaken about 10 years after the onset of symptoms, and most commonly in the second decade (Table V). The aetiology, disability, symptoms, and complications of these bilateral cases were similar to those with unilateral disease.

TABLE V.—*Age of 34 Patients at Time of Onset of Symptoms and at Operation*

Time	Age in Years								
	0–	1–	2–4	5–9	10–19	20–29	30–39	40–49	50–
Onset of symptoms	10	8	10	3	2	1			
Operation ..			4		17	4	5	3	1

Physical Signs.—These were commoner than in the unilateral group, and were detected in the lungs of 32 of the 34 patients; seven had finger-clubbing. Eight of these "bilateral" patients had poor physique. Two adult male patients, however, were of outstanding physique, which belied the state of their lungs.

Distribution of Disease.—On the right side the middle lobe was affected in 29 of the 34 patients, and the left lower lobe in one combination or another in all but 4 of the 34 patients (Table VI). There was, however, a greater incidence of "other minimal disease" and "bronchitis."

TABLE VI.—*Distribution of Disease*

Right Lung		Left Lung	
R.U.L.	–	L.L.L.	7
R.M.L.	15	L.L.L. and L.	18
R.M.L., R.L.L.	8	Lingula alone	4
R.M.L. and R. medial basal ..	1	L. basals and L.	4
R.M.L. and R. post. basal ..	1	L. basals alone	1
R.M.L. and R. upper ant. ..	1		
R.M.L. and R. basal segment	3		
R.L.L.	4		
R. basal segments	1		
	34		34

Time Between Operations.—Each patient with bilateral disease had at least three months between the two resections.

Extent of Resection.—The most extensive resections were in three patients aged 5, 24, and 54 years. Each had a totally destroyed right middle and lower lobe and left lower lobe and lingula. They made excellent recoveries, and have good physical and pulmonary function nine, eight, and six years after operation. They remain in excellent health, leading apparently normal lives. Seven of the cases had "minimal disease" not requiring surgical resection. Twelve of the 34 had "bronchitis," which is a greater proportion than those with unilateral disease. Thus in 19 of the 34 patients there were known reasons for other than excellent results.

Post-operative Morbidity.—Fourteen patients (28 operations) had an uncomplicated convalescence. In 20 patients (40 operations) the complications shown in Table VII were noted. Sputum retention, pneumothorax, and infection were again the commonest complications. One patient had a haematemesis, presumably from an acute gastric ulcer. He has since been symptomless.

Operative Mortality.—There was one post-operative death in the total of 68 surgical procedures on the 34 bilateral patients. The patient was a woman aged 43. She had a left lower

lobectomy on 5 March 1956, followed by resection of the right middle and lower lobes on 5 July 1964. During the operation the anaesthetist had difficulty in maintaining adequate aeration because of sputum spill during a difficult dissection. Three hours after operation she died from respiratory failure. It was felt that the sputum spillage from the right side to the left had contributed to her death.

TABLE VII

1.	Temporary lobar collapse from sputum retention		16
	Requiring physiotherapy alone	8	
	„ bronchoscopy	7	
	„ tracheostomy	1	
2.	Persisting lobar collapse		4
3.	Blocked drainage-tube—pneumothorax		2
4.	Fistula { Parenchymal		3
	{ Bronchial		1
5.	Infection		2
	Wound		1
	Empyema (two related to post-operative haemothorax, one to persisting lobar collapse, and one to wound infection)		4
6.	Haematemesis		1

Multiple Operations.—Four had a third-stage operative procedure because of persisting lobar collapse. Two of these required resection of the apical segment of the right lower lobe for persisting post-operative atelectasis. One required a right middle lobectomy for a lobe that had not re-expanded after a more severely diseased right lower lobe had been resected. Another required a further stage to remove the right medial basal segment for persisting symptoms. All four patients tolerated these additional procedures well.

Follow-up.—Of the 32 patients seen 10 were symptomless.

Residual Symptoms.—These were present in 22 of the 32 patients. They were: cough and sputum-bronchitis in 15, cough only in 6, cough and minimal haemoptysis in 4, low effort tolerance in 3, and cough and nasal sinusitis in 1.

Late Deaths.—Two patients subsequently died. One, a boy aged 14, died 15 months after operation when accidentally drowned in a river. The other, a boy aged 11, died 18 months after operation from pulmonary artery thrombosis complicating nephritis.

Results.—The general results in respect of physical well-being and activity were more pleasing than the above residual symptoms might suggest. They were excellent in 10 (31%) cases, good in 17 (53%), fair in 4 (13%), and poor in 1 (3%). Of those with good results, six had minimal residual symptoms only, the other 11 being more pronounced. Neither those showing fair nor those showing poor results were respiratory cripples, they were still leading active lives and were gainfully employed.

Discussion

Our results do not support the guarded views of the *Lancet* (1955, 1958a, 1958b) which suggested that the number of cases of bronchiectasis suitable for resection was small, and that the results of surgery were often disappointing. The high percentage of those cured or greatly relieved of all symptoms refutes this attitude, as do the subsequent "life histories" of those so treated.

In our unilateral series 55% of results were classed as excellent and 42% as good, making a total of 97% of patients who had greatly benefited from surgical treatment. In 3% the results were fair or poor. In the bilateral series 31% were excellent and entirely symptomless, and a further 53% good, with minimal symptoms, making a total of 84% who had benefited greatly by operation. In 13% the results were classed as fair and in one patient as poor. But, even so, those with fair and poor results in the unilateral and bilateral series were not respiratory cripples, and when adult could earn their living. No patient was made a respiratory cripple as a result of a unilateral or bilateral resection.

Operative mortality has become acceptably low. Even in 1937 Churchill reported two personal series where, with improved techniques, it had fallen from 6.1% of 49 patients to 2.6% of 38 patients. Chesterman (1952) reported two deaths in 114 resections. Our series of 165 resections with a single operative death follows this trend.

Post-operative morbidity, however, though usually temporary and without lasting ill-effects, was as high as in other series. But the very nature of the surgical procedure undertaken for bronchiectasis involves a possibility of some complication arising; and, as in other thoracic surgical units, these are quickly detected by daily post-operative chest films and promptly corrected. By far the commonest was "sputum retention" leading to temporary lobar collapse, accounting for 85% of the complications in the unilateral cases and 80% of the complications in the bilateral cases. In all but two patients it responded to treatment.

This analysis confirms that where bronchiectasis is unilateral and confined to one segment or lobe, resection can confidently be advised, and a good or excellent result expected in 97% of cases. It also supports the view that good or excellent results are obtained when the disease is bilateral, acceptable results being obtained in 84% of cases. Incomplete but worth-while relief of symptoms can also be obtained even in the presence of "known bronchitis" and "minimal bronchiectasis" in the remaining lung tissue.

Regarding the extent of resection, it is possible to resect up to 13 destroyed segments, provided the remaining lung tissue is bronchographically normal. In the three examples of extensive resection in our series the affected segments were the right middle and lower lobes, and the left lower lobe and lingula. As these lobes were totally destroyed by the bronchiectatic process, and were therefore not functioning, the patients merely lost their sump of infection. However, to attempt any wider resection would be to invite permanent dyspnoea from lack of lung tissue. Further, if the disease is more extensively scattered through all lobes surgery has nothing to offer.

The main criticisms of surgical treatment have resulted from poor selection of patients or from acceptance of incomplete bronchograms in those undergoing operative treatment. Incomplete bronchograms appear to be the commonest cause of "surgical failure." There is only one rule and safeguard recognized by all thoracic surgeons—namely, that every lung segment be carefully and accurately outlined by bronchography before surgical treatment is undertaken.

Apart from technical difficulties, the prime cause of lack of complete filling by contrast media is bronchial obstruction by endobronchial secretions. This phenomenon in itself indicates the presence of disease. If the significance of this lack of filling is overlooked resection will be limited to those areas of lung that have been shown by bronchography to be abnormal; and bronchiectatic segments may be left behind. Thus many instances of reputed "spread of bronchiectasis" following operation are due to inadequate initial bronchography. Therefore it may be asked if in fact this "inadequate filling" rather than "new bronchiectasis" was behind the unfavourable results reported by others (Ginsberg *et al.*, 1955).

In general we subscribe to the view of Churchill and Belsey (1939) that "bronchiectasis usually has reached its full extent and distribution at the time the diagnosis is made." Minimal bronchiectasis in a segment may become grossly bronchiectatic when adjacent lung segments are resected, but this does not occur in previously normal segments. This fact makes it even more vital to secure complete bronchograms before considering any operation. Further, it has been demonstrated time and again that palpation of the bronchi at operation is no substitute for complete pre-operative bronchography.

Careful post-operative care is a *sine qua non* to success; for post-operative lobar collapse, imperfectly treated, will produce a completely fresh set of circumstances leading to a new era of bronchiectasis in as short a time as six weeks. A conserved apical segment of the lower lobe is the most vulnerable. Twice

it became bronchiectatic. One patient had the initial basal lobectomy elsewhere, and one was handled entirely in the unit. Both became symptomless after resection of the bronchiectatic collapsed apical segment.

This vulnerability caused Kergin (1950) to abandon preserving the apical segment when resecting disease confined to the basal segments of a lower lobe. Yet the principle of saving all normal lung tissue still holds, especially when resecting bilateral disease ; and, with strictest post-operative management, there is no reason why normal apical segments should not be successfully preserved. Hoffman (1955), reporting on 51 patients in whom the apical segment was conserved, found that though there was a high incidence of atelectasis of the residual apical segment, this was readily reversible, and the late follow-up—checked bronchographically—showed end-results as good as those for other segmental resections for bronchiectasis. Crutcher and Pellegrino (1960) reported on 80 patients with bilateral bronchiectasis that the apical segment of the lower lobe was preserved after basal resection in 11 patients. Late complications occurred in three and were significant in only one.

Minimal Residual Disease and Bronchitis

In discussing treatment with patients it is important to indicate than an " imperfect " but " worth-while " result may be likely because of other minimal disease or pre-existing bronchitis.

A review of our bronchograms confirmed that " bronchitis " usually appeared in the late teens, as evidenced by sacculations, especially in the segmental bronchi of the left upper lobe. This points to the advisability of operating earlier rather than later. The well-known observation, re-emphasized by Field (1961) in her long-term follow-up of 225 cases, that there is frequently an apparent lessening of symptoms at puberty, may lead one to delay surgical treatment too long. The temporary improvement is probably due to the increased size of the bronchi, with less frequent obstruction by retained secretions, and does not mean the start of a permanent cure. In fact, since established " bronchitis " in non-bronchiectatic lung tissue can be demonstrated after this period of apparent improvement, any delay may be detrimental to the final outcome and mar an otherwise excellent result. Patients presenting in childhood with symptoms due to bronchiectasis that warrant surgery do not seem to " grow out " of these symptoms. Nor is this surprising when one considers the underlying pathology.

The necessity for treating the commonly associated sinusitis needs no emphasizing.

With the wide range of antibiotics available, the serious complications of untreated bronchiectasis—such as brain abscess—are now so rare that surgery should be reserved for the relief of symptoms that trouble the patient rather than for extirpation of the disease wherever and whenever demonstrated. Many patients, however, have never known life otherwise, and do not realize how good life can be when relieved of the symptoms of cough and sputum.

The striking finding after operation is the relief of long-standing symptoms and the new sense of well-being that allows most of these patients to lead normal lives.

Bronchiectasis is based on bronchial obstruction and infection. It can be prevented, and its incidence in this area of New Zealand is fast waning. In the future, with the further steady decline of respiratory illness in childhood, and with prompt detection and referral for bronchoscopic aspiration of children with collapsed lobes, thus usually securing complete lobar re-expansion, bronchiectasis as a surgical problem will largely disappear.

Summary

In the decade 1952–62 125 patients had surgical treatment for bronchiectasis. They fell into two groups: 91 with unilateral (91 operations) and 34 with bilateral resections (68 operations). Six patients required a further resection for persisting segmental or lobar collapse. In the total of 165 operations a single operative death occurred in a " bilateral " case ; there were no " hospital " post-operative deaths.

Each group is analysed regarding aetiology, age and sex distribution, disability, clinical features, anatomical distribution as shown by bronchography, extent of resection, and post-operative morbidity.

Eighty-four of the 91 " unilateral " patients and 32 of the 34 " bilateral " patients were alive and well up to 10 years after operation.

A follow-up examination with clinical assessment showed that in the unilateral patients 55% of results were classed as excellent and 42% as good, making a total of 97% of patients who had greatly benefited from surgical treatment. Of the bilateral patients, 31% had excellent results and were entirely symptomless, and a further 53% had good results with minimal symptoms, making a total of 84% who had greatly benefited from operation. Even those who had only fair or poor results with residual symptoms were earning their living if adult.

Incomplete but worth-while relief of symptoms can be obtained even in the presence of known bronchitis and minimal bronchiectasis in the remaining lung tissue. The need for complete bronchograms, outlining all lung segments before undertaking surgical treatment, is again stressed.

The striking findings after operation are the relief of long-standing symptoms and the new sense of well-being that allows most of these patients to lead normal lives.

We wish to thank our consultant chest physicians, Dr. Roland F. Wilson, Dr. Arthur Kidd, Dr. H. R. Paterson, and Dr. Alistair Taylor, for their co-operation in referring their patients and assisting in their management. We are also grateful to Miss L. Thompson for secretarial assistance.

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