

BRONCHIECTASIS

DIAGNOSIS AND PROGNOSIS IN RELATION TO TREATMENT

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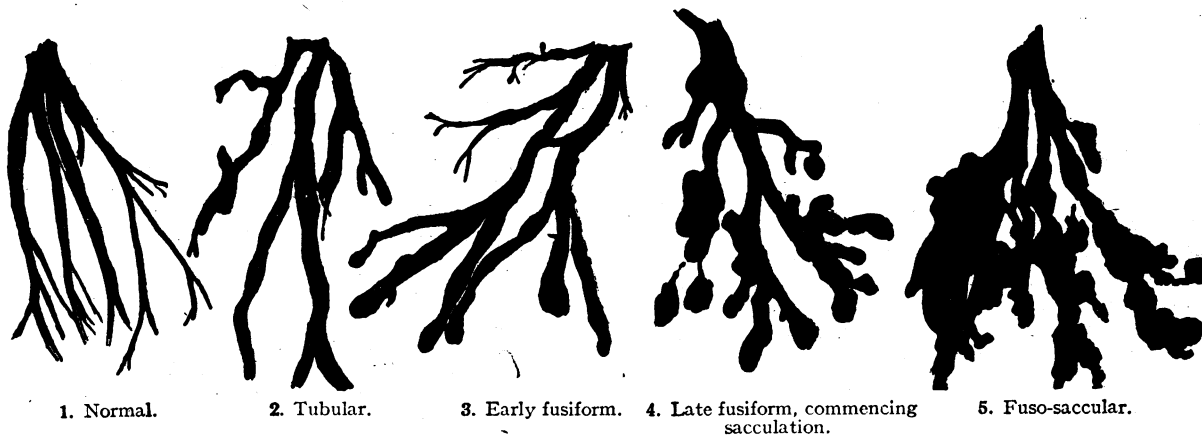
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The picture of bronchiectasis that is carried away from his textbooks by the student, to judge from his answers to written and oral questions, is that of a condition of almost hopeless prognosis in which the patient has foul sputum, clubbed fingers, and signs of basal pulmonary cavitation. Having recently consulted a number of textbooks in common use, we find it rarely conceded that there is the possibility of an earlier stage in which the

When confronted with a case of bronchiectasis with little present disability, it is difficult to persuade oneself that a severe operation should be advised. Those clinicians who have seen the elderly adult live many years with a fusiform bronchiectasis and little incapacity will remain convinced that lobectomy is not indicated for all unilobar cases. The object of this paper is, first, to attempt to shed light on the prognosis of established cases of bronchiectasis of all types which have been subjected to the commoner varieties of treatment in order that some definite statement of the alternatives may be available when giving a prognosis or advising radical treatment to a patient. Secondly, it is intended briefly to re-state the main indications and contra-indications for particular operative procedures; and, thirdly, we hope to assist in the earlier diagnosis of unilobar bronchiectasis while the patient is still in a fit state for a radical cure.

Figs. 2-5 appear to be consecutive developments of the same process.



diagnosis can be made and in which curative treatment is practicable.

The widespread use of lipiodol in the elucidation of obscure cases of pulmonary disease, chiefly of haemoptysis of unknown origin, has led to the publication of accounts of symptomless or "dry" cases, which indicate that their diagnosis is becoming increasingly common. Wall and Hoyle¹ have given a complete account of the cases in the literature, as well as of their own twenty examples of dry bronchiectasis, and the correspondence which followed showed that other observers, notably Leonard Findlay² and Pinchin and Morlock,³ have had extensive experience of a similar condition. The problem of treatment of these non-septic (in this paper called "simple" rather than "dry") cases is an urgent one. There has been a unanimous opinion that the average treatment—artificial pneumothorax and phrenic evulsion—has on the whole proved ineffective. Thoracoplasty is, by its nature, a purely palliative procedure, which should only be performed when the whole of a lung is already destroyed by the septic process. It has of recent years been done less and less at the Brompton Hospital for this condition, whereas in pulmonary tuberculosis it is becoming an increasingly valuable form of treatment. Lobectomy in the right hands has recently been shown to have an extremely low mortality, as witness the fact that only two operative deaths have been recorded in the last thirty-four cases during the past two years at the Brompton Hospital. It is obviously the only radical cure of a localized condition, and numerous examples now testify to its striking success in the relief of symptoms.



6. Saccular: ? congenital type.

TYPE OF CASE INVESTIGATED

In order to fulfil these objects 106 cases of the condition proven by lipiodol examination have been followed at the Brompton Hospital for a period of from three to six years. These cases were entirely unselected, except in so far as they have been known to the hospital or have been traceable by a questionnaire over that length of time. Patients at the Brompton are generally admitted for observation and elucidation of the cause of some such symptom as pyrexia, cough, or haemoptysis; or, when diagnosed already, in order to discuss possible surgical intervention. There are thus a large number of patients with advanced disease attending the out-patient department who have never been admitted to the wards and who do not come into the scope of this inquiry. The former group has been studied more extensively and will be described in another paper dealing with the causes of non-tuberculous haemoptysis. The cases under consideration here are in the second group—examples of the already established condition, many of them of the textbook variety. As many as possible have been examined, x-rayed, and given lipiodol again within the last few months. Naturally those patients who are fit and at work, many of whom have had lipiodol injections several times previously, have been difficult to persuade to come to hospital again. Enough, however, came forward to shed some light on the question of spread of the initial lesion. This series does not include any individuals described by Wall and Hoyle.

The classification of cases in this paper, being related only to prognosis and treatment and not to pathology, is kept as "straight" as possible. The anatomical distinction used is based on that of Moll,⁴ which divides his list into tubular, fusiform, saccular, and moniliform, with intermediate types. We have taken "tubular" to represent the condition where the terminal bronchi do not taper in the normal way; and "fusiform" to represent clubbed extremities—the "glove-finger" type of radiologists—whereas in pure saccular forms cavities alone are present.

TABLE I.—Showing Relation of X-Ray Type to Sputum

X-Ray Type	Dry	"Simple"	Septic	Fetid	
Tubular	2	—	1	—	3
Tubulo-fusiform ...	1	—	1	1	3
Fusiform	3	2	3	5	13
Fuso-saccular	3	4	11	7	25
Saccular	13	4	23	22	62
Total	22	10	39	35	106

-41 cylindrical
62 saccular

A comparison of Tables II and III shows that for our present purposes a more directly valuable approach is to be obtained from a division of cases into infected and non-infected. In the term "dry" Wall and Hoyle have included, as Findlay points out, a few cases which, although mainly dry, still had sputum, which in one or two was infected. Ten of our cases fall into this division, which we have called "simple." Our feeling that once a case has had septic sputum it is evidently infected and is liable again to break down has been borne out by the results in our series. Since the "simple" group has exactly the same prognosis as the septic type, we feel that there is nothing to be gained by separating them. A strict division into dry and septic is a first essential, and it is of assistance to divide from the latter as a further group those cases with persistently foul and copious sputum—called here "fetid."

TABLE II.—Showing Prognosis of X-Ray Type in Relation to Treatment
(A) 44 "Cylindrical" Cases

	Medical	Surgical					
		A.P.	Phrenic	A.P. + Phrenic	Thoraco-plasty	Lob-ectomy	
Well (Dry)	2	—	1	—	1	2	6
Well (With sputum)	2	—	—	2	1	—	5
Partial incapacity...	3	1	1	—	1	—	6
Total incapacity ...	2	3	—	—	3	—	8
Died	11	2	2	—	2	2	19
Total	20	6	4	2	8	4	44

* A term commonly used to describe in a group those we have called tubular, tubulo-fusiform, fusiform, and fuso-saccular.

(B) 62 "Saccular" Cases

	Medical	Surgical					
		A.P.	Phrenic	A.P. + Phrenic	Thoraco-plasty	Lob-ectomy	
Well (Dry)	2	3	3	—	3	1	12
Well (With sputum)	3	1	2	1	1	—	8
Partial incapacity...	5	—	1	—	—	—	6
Total incapacity ...	7	2	1	—	5	—	15
Died	12	1	2	3	3	—	21
Total	29	7	9	4	12	1	62

TABLE III.—Showing the Relation between the Original Character of the Sputum and the Present Condition

Present Condition	Original Condition						Totals			
	Dry		Septic		Fetid		Medical	Surgical		
	M	S	M	S	M	S				
Well { Dry	4	3	—	6	—	5	4	14	18	27
{ Septic	—	—	2	4	1	2	3	7	6	
Partial incapacity or "I.S.Q." Fetid	5	—	1	3	—	—	6	3	9	74
Total incapacity: Fetid	2	1	7	8	1	6	10	15	25	
Died	3	3	7	7	12	8	22	18	40	
Total	14	7	17	28	14	21	45	56	101	

Five cases whose present condition is unknown are not included in the above table. Since compiling the table these other five cases have been examined, but are not included.

We are not especially concerned in this account with the more uncommon types, such as the moniliform, atelectatic, and congenital cystic, although all are represented among our cases. One liberty has been taken. We hold, with J. E. H. Roberts and others, that cases of marked sacculation localized to one main bronchus (usually the left lower) in young people without any severe antecedent disease are most probably congenital in origin. Admittedly this is not susceptible of proof at the present time, but the observation is partly confirmed by the appearance of lobectomized lobes. We have tentatively used this description in ten cases, and it has been noticed that they often remain without spread for long periods of time. It is of interest to find, since the writing of this paper, confirmation in a series of articles by Graham and his co-workers in St. Louis. Their "grape" type corresponds closely with that shown in Fig. 6, and it is stressed by them that the complete absence of normal branches of a main bronchus suggests a congenital aetiology.

PROGNOSIS OF 106 CASES

Table II sets out the original lesion, the treatment, and the present condition of groups of cases diagnosed first by lipiodol in or before 1928, in 1929, and in 1930 respectively. It will be seen that although the period of observation is not a long one it has served to reveal the severity of this condition (a total mortality of 38 per cent.) and to give clear indications as to which cases have been successfully treated and which have done badly. Out of fourteen fetid cases treated medically only two patients survived, and of these one is totally incapacitated. Out of seventeen septic cases seven patients are dead and seven now totally incapacitated, with persistent fetid sputum. The "medical" death rate is very interesting when divided into the morphological groups. For instance, of the cylindrical cases eleven patients out of twenty (55 per cent.) and of the saccular cases twelve out of twenty-nine (44 per cent.) have died. Added to this, of the cylindrical cases a further 15 per cent. are partially incapacitated and 10 per cent. totally incapacitated; of the saccular cases 17 per cent. are partially incapacitated and 24 per cent. totally incapacitated. Contrasted with a total "medical" mortality of 51 per cent. our figures show a "surgical" death rate of only 30 per cent. Table II again illustrates how the latter is distributed among the x-ray types of cylindrical and saccular—namely, that surgical treatment does not appear to be as successful in the cylindrical types as it is in the saccular: 25 per cent. of cylindrical cases are well from surgery as opposed to 33 per cent. of saccular cases.

Another striking fact in the prognosis of the cases under discussion is that of the nineteen patients with

septic bronchiectasis who are now quite well eighteen were treated by the various surgical procedures. The measures adopted were artificial pneumothorax in three, artificial pneumothorax plus phrenic evulsion in four, phrenic evulsion alone in four, phrenic evulsion plus thoracoplasty in five, and lobectomy in two.

TYPE OF SPREAD

Thirty-six cases have been given lipiodol injections again during the last few months in order to determine the liability to extension of the lung lesion and the direction of spread. In all, sixteen had been treated surgically, and in only one of these could contralateral spread be demonstrated, this being of the basal tubular type on the right side following a left thoracoplasty. In three patients who had been treated by artificial pneumothorax there was extension of the disease on the same side, and in a case treated by a left artificial pneumothorax and phrenic evulsion a change from tubular to fusiform type in the left descending bronchus was revealed. Of twenty medical cases only eight remained unchanged. Of the twelve whose disease was originally confined to the left side there was a spread bilaterally in two, on the opposite side in three, and on the same side in three. Of the four remaining unaltered one is of the congenital saccular type in the left lower lobe and the rest are fusiform. Roughly the same proportion was exhibited by the five right-sided cases. In four surviving patients in whom the disease was originally bilateral there was considerable extension on both sides.

It would appear from our series that in saccular disease of the acquired type there is almost certain to be spread with medical treatment (often to a large extent) in a very few years; and that, provided the general condition of the patient (particularly with regard to septic foci) is good, fusiform basal disease rarely may not progress, but it is much more likely to become saccular and to extend bilaterally. Tubular disease always appears to become fusiform in the course of the time interval under consideration. In cases treated surgically, apart from lobectomy, the tendency is for a gradual extension of sacculation to other zones on the treated side; but there appears to have been marked diminution in successful cases in the risk of contralateral spread. In artificial pneumothorax cases there is invariable progression from tubular through fusiform to saccular type. Further observations are being made along these lines, and endeavours are still being made to get the remaining cases to submit to further lipiodol examinations.

TREATMENT

Having established the severity of the condition, particularly of the septic types, an analysis of the results of operative procedures is next to be undertaken. It must be remembered that even in the short space of three years thoracic surgery has made such rapid strides that the present relative status of these operations is by no means represented in our tables.

Artificial Pneumothorax

If fibrosis and damage of the lung have not become so prominent as to form a rigid wall of tissue which no amount of air pressure will collapse, bronchiectasis is benefited by artificial pneumothorax. If the contrary obtains it is perhaps definitely harmful, because it adds to the damming back of secretions, and hence to the general toxæmia. It has been shown in a series investigated by lipiodol at the Brompton Hospital that with the most complete collapse the cavities are still invariably present, so that it is probably never possible to allow the lung to re-expand without the return of symptoms. This was well seen in a boy who, following unilateral bronchiectasis, had an artificial pneumothorax induced, and his

sputum, which had stood at 20 oz., became reduced to 1 oz. a day when the pneumothorax was found to be complete. On attempting to allow the lung to re-expand on several occasions his temperature was found to rise and his sputum to return to its original 20 oz. The treatment of bronchiectasis by artificial pneumothorax has now been almost completely abandoned at the Brompton Hospital, except as a preliminary to lobectomy. In our series there were thirteen cases treated by artificial pneumothorax, and at the present time only three of these patients are well and able to carry on a normal life. Of the remaining ten three are alive and totally incapacitated and the rest are dead. The three successful cases quoted may be therefore taken as being exceptional. Some 300 individuals attend the out-patient department of the hospital for refills, and of these we have only been able to trace half a dozen examples of bronchiectasis in which the collapse has been maintained for over two years.

Artificial pneumothorax has been combined with phrenic evulsion in eight cases in our series. Of these, four patients are now "dry" and well. Thus the combination of the two methods appears to be slightly better than either alone. In the remaining four the treatment completely failed, and they have since had either thoracoplasty or lobectomy.

Phrenic Evulsion

If artificial pneumothorax fails the next step to consider is that of a phrenic evulsion. Though this has occasionally produced striking results (notably in six of our cases) one should always be prepared in the event of failure to proceed to more drastic measures, since the success in the first six months following the operation may not be maintained after the diaphragm has become a completely functionless sheet, and thus the final condition of the patient may be worse than before. This prevents phrenic evulsion from being the valuable method of trial which its freedom from immediate risk would suggest. A further point made by Tudor Edwards is that, should it be thought that lobectomy might have to be undertaken, a phrenic evulsion ought not to be performed, as it would appear to prevent re-expansion of the apex of the lung after removal of the diseased lobe. However, phrenic evulsion has been shown to be valuable as a preventive of secondary bronchiectasis in the lung area surrounding an abscess.

Thoracoplasty

Should the bronchiectasis be in all lobes of the lung and the last two methods of treatment have proved unsuccessful, a thoracoplasty may have to be considered because of the disastrous alternative. It is absolutely essential that the maximum amount of rib should be removed. A number of our lipiodol x-ray photographs show that even with the most complete thoracoplasty some cavitation invariably remains, and in thoracoplasties which are incomplete there is apt to be a rapid spread of the septic process to the other lung unless proper precautions (to be detailed elsewhere) are taken. Nevertheless, there was an exception in one case: the first stage, in which only a few inches of ribs ten to six inclusive were removed, was so successful that the patient continued almost symptomless for three years. Mediastinal flutter is now very rare owing to modern conditions of strapping and after-care. However, in our opinion thoracoplasty should never be undertaken for cases of unilobar distribution. It also appears that the degree of infection present does not contraindicate the operation, since four out of twelve of our cases so treated became "dry," although there was a considerable amount of sepsis before the operation was undertaken.

Lobectomy

Lobectomy is obviously the goal to be aimed at, in that it is the only way of producing a radical cure. It is extremely important, however, that the patient should be in a fit condition and that post-operative treatment and convalescence be in expert hands. Over 90 per cent. of cases, for instance, develop an effusion into the residual space during the first few days, for which effective drainage has to be maintained, often a difficult procedure. Further, it is essential before contemplating lobectomy for a given case that lipiodol should be injected into both sides of the bronchial tree and that the greatest care be employed to fill up anterior and posterior divisions of the descending bronchus. Thus the patient must always be turned on to his face immediately after the injection, as well as bent forward. The four cases treated by lobectomy which we include are the only ones we have been able to follow personally in the years under consideration. Accounts of two extensive recent series by the surgeons concerned are at present in the press.

Summary

To sum up the question of surgery, it has become increasingly obvious that the best results are achieved when the extent of the disease and the general toxæmia of the patient are alike minimal. Any young adult who is coughing purulent sputum and who is shown to have a unilobar saccular bronchiectasis should, in our opinion, have an artificial pneumothorax induced prior to lobectomy. In certain cases the sputum may be controlled and spread prevented over a sufficiently long period for the general condition to be rendered fit for excision of the lobe. Artificial pneumothorax, if successful, greatly facilitates the operative procedure, but failure to establish artificial pneumothorax does not signify that removal of the lobe will be impossible. We are in agreement here with Ellis's (*Arch. Dis. Child.*) remarks on such cases occurring in children, and we can mention as an example a child of 5, with a saccular left lower lobe lesion, whose 12 oz. of fetid sputum is being almost completely controlled by artificial pneumothorax with a view to subsequent radical operation. At the present time lobectomy has reached such a high standard of technique that we consider it justifiable to submit to the operation all cases of unilobar bronchiectasis that have either purulent or fetid sputum or hæmoptysis as symptoms. The following extract from a letter written by one of our patients who had a lobectomy in 1930 speaks for itself:

"I must say that I have never been so well in all my life. . . . I am cured of my trouble, which held me back in pleasure and in business, for I could not go out in company for that nasty stuff I used to bring up, but now I drive a three-ton lorry and work as hard as the next man, and I feel no effect of the operation that I have had. . . . My life is now well worth living."

EARLY DIAGNOSIS

In order that it may be possible to see fewer of the distressingly advanced cases that we have had to describe in this paper every attention should be directed towards the possibility of early diagnosis. In studying the past histories of our patients it becomes obvious how much time was in those days wasted between the onset of suggestive symptoms and the final diagnosis; and even now one frequently sees patients who have been labelled as pulmonary tuberculosis or chronic bronchitis or asthma for many years, until any possibility of effective treatment has gone by. Three sputum specimens should be sufficient, with the *x*-ray and clinical findings complete in a fortnight, to exclude active tuberculosis and render injection of lipiodol a necessary procedure.

With the aetiology from the theoretical point of view we are unable to deal here, but we would stress, in addition to congenital stenosis, the significance of influenzal pneumonia as contrasted with the strictly lobar variety. Gaskell has convinced one of us, with his sections of lung in experimental pneumonia, that in lobar pneumonia the bronchial epithelium is left comparatively undamaged, whereas in the low-grade pneumococcal (Group IV) and the streptococcal pneumonias the epithelium is extensively damaged and ciliary action is lost. Further, there is usually some temporary collapse of the lung, and this is aggravated by that common complication of influenzal pneumonia, pleural effusion, which causes a renewed rise of temperature and which is put down so often to "delayed resolution." We feel that collapse of the lung, if maintained over sufficient length of time, is a potent factor in the causation of bronchiectasis, and it is possible to show that even the collapse produced by therapeutic measures has resulted in the conversion of a fusiform into a saccular and more advanced form.

A history of oro-nasal sepsis or of suppurative conditions of the ear is also of importance. Patients who have complained for years of catarrh, of bronchitis, of attacks of congestion, and who have finally begun to produce copious purulent sputum, are met with so frequently that sepsis of the upper respiratory tract must, it seems, be prevented if treatment for the local condition is to be effectual. Graham, in the paper referred to above, details very carefully the relation between the nasal and the bronchial mucosa. In studying the histories of a large number of patients it is noteworthy that there has nearly always been at one stage a localizing symptom or sign in the course of chronic bronchitis, such as subscapular pain, shoulder pain of phrenic type, pleurisy, or congestion, which, to our mind, demands insertion of lipiodol in order to diagnose a case of bronchiectasis in an early stage. The presence of a silent bronchiectasis may be also unmasked by the anaesthetic used in various minor operations, giving the impression that the inhalation of septic material has been the starting-point of a disease in reality already well established.

Although the "straight" *x*-ray photograph is well known to be deceptive in this condition, so that when honeycombing or cavitation is shown the condition is really advanced, yet one very suggestive sign is that of fixation of the diaphragm on screening. Observation of the movements of the diaphragm should, in our opinion, always be taken into consideration in deciding on the diagnosis and treatment of chronic chest conditions. Fixation of the diaphragm appears to be a very usual preliminary to basal bronchiectasis, and it might be said that in the absence of pulmonary tuberculosis it would form another indication for the injection of lipiodol. Further, it is of obvious importance to avoid wasting time by prescribing prolonged breathing exercises and convalescent treatment for a patient with a firmly fixed diaphragm. It is precisely in the prevention of this fixed diaphragm that, in our opinion, the prophylaxis of bronchiectasis consists. At the very least, the first appearance of fetid sputum in a young adult, or the recurrence of hæmoptysis (proved non-tuberculous with a negative skiagram), should call for active measures, since we hope to have shown how spread takes place in a comparatively short time and thus prevents a case from being suitable for radical cure which, with earlier diagnosis, could have been undertaken.

SUMMARY AND CONCLUSIONS

1. One hundred and six cases of all types of established bronchiectasis have been studied for a period of from three to six years with regard to their general and local condition and the character of their sputum in relation to various types of treatment.

2. A division has been made into "dry" cases in which there is no expectoration and "septic" cases in which the sputum is purulent. These do not bear an exact relation to the x -ray cylindrical and saccular varieties, which largely depend for their prognosis upon the infective factor. Those infected cases which have progressed to copious foul sputum are classed as "fetid."

3. Cases with occasional sputum, here classed "simple," are shown to have as bad a prognosis as those persistently septic.

4. Ten of our fourteen dry cases treated medically have become infected within six years, and of these three patients are dead and two totally incapacitated.

5. Cases with infected sputum, whatever the anatomical distribution of the disease, progress, with rare exceptions, steadily to a fatal issue if treated medically.

6. Bronchiectasis with only medical treatment is an extremely fatal disease, for out of forty-nine patients twenty-three are dead and nine totally incapacitated, and of the remainder only four are "dry" after five years from diagnosis.

7. In order to secure early diagnosis, all doubtful cases of haemoptysis and cough in which tuberculosis has been excluded by a single x -ray photograph should be x -rayed again after injection of lipiodol, making sure that a lateral skiagram is taken in those cases in which antero-posterior screening shows an apparent unilobar distribution of the opaque medium.

8. Phrenic evulsion alone is of doubtful value, and not indicated if the operation of lobectomy is at all possible. It is better combined with artificial pneumothorax.

9. Thoracoplasty may, and sometimes will, prolong the life of a patient with advanced unilateral disease, and will certainly make existence more tolerable for the patient and his relatives; it should never be performed for unilobar disease.

10. Artificial pneumothorax is mainly useful as a preliminary to lobectomy.

11. Lobectomy has proved to be the greatest advance in the treatment of this condition, but depends upon diagnosis with certainty at an early age and experienced attention to pre- and post-operative measures.

We are indebted to the physicians and surgeons on the honorary staff of the Brompton Hospital for permission to use their cases and for their advice, and to Dr. Stanley Melville and the staff of the x -ray department for their co-operation in the matter of lipiodol examinations and for their reports. Dr. Thomas Larkworthy has been of great assistance in collecting cases and in carrying out some of the lipiodol examinations; and we are grateful to the staff of the lady almoner's department and to Miss Spero, research clerk, for the follow-up work.

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HYSTERECTOMY: A CRITICAL SURVEY WITH A REPORT OF 210 CASES*

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The operation of hysterectomy has gained greatly in popularity within recent years. It is so extensively employed that its indications have far passed the confines of the original textbook teaching. It is therefore necessary to pause and to examine its present status, to evaluate its results, and to determine its safety and after-effects. In order to do so I have made a survey of my own hospital and private cases for the past seven years, and have sent out a questionnaire to as many patients as possible. An inquiry was made into the general health since operation, the occurrence and severity of the surgical menopause, and especially into the sexual life following the ablation of the uterus. I have endeavoured to analyse the symptoms complained of, the indications for operation, and the type of operation with its immediate and remote results. I have read through a considerable quantity of the literature, and have ascertained the views of leading gynaecologists on the subject. I have endeavoured to preserve an unbiased frame of mind, and wish to present the conclusions arrived at from my own experience.

Of 210 hysterectomies which I have performed, 165 were total, thirteen subtotal, twelve vaginal, and twenty according to the Wertheim technique for carcinoma of the cervix. Excluding the Wertheim operations, in which the mortality was 10 per cent., there were three deaths among the remainder, or a percentage mortality of 1.58. It will be seen that the total operation is almost exclusively employed, and the mortality in this series is 1.8 per cent.

I do not wish to introduce the question of total *versus* subtotal hysterectomy, except to state that I have now

* Read in the Section of Obstetrics at the Annual Meeting of the British Medical Association, Dublin, 1933.

definitely and exclusively adopted the total technique, and for the following reasons.

1. My mortality rate compares favourably with that of any published series of the subtotal operation.

2. Convalescence has been most uneventful, the average length of stay in hospital being sixteen days.

3. Operative and post-operative complications have been few. In one case the ureter was accidentally cut, and in three others a pelvic haematoma formed owing to inadequate haemostasis of the utero-sacral ligaments. There were two cases of pulmonary embolus, one of which recovered, and two of thrombosis of the femoral vein; there were only two cases in which infection occurred in the abdominal wound. Of the three deaths one was due to pulmonary embolus occurring on the tenth day, one to an ascending urinary infection, and one to a generalized septicaemia originating in the operation site.

4. Marital life subsequent to operation has been extremely satisfactory. Of fifty women who answered my query on this point only one complained of dyspareunia, and all but three said that intercourse was as satisfactory as before, and in a few cases more satisfactory. I therefore conclude that removal of the cervix does not shorten the vagina or cause dyspareunia, and that it does not decrease libido—the latter applies whether the ovaries are removed or not. Nor does it cause prolapse of the vaginal vault. I have examined and questioned many of the patients on this point, and in only one case was there evidence of this complication.

5. With regard to ease and duration of operation there is very little difference between the total and the subtotal technique. When one becomes facile in technique a simple total operation can be done with safety in thirty minutes, and a complicated case should not occupy more than fifty or sixty minutes. As regards haemorrhage, if the blood supply of the vaginal angle and the utero-sacral ligaments is properly controlled, it should be as easy to achieve a bloodless hysterectomy in the one case as in the other. It has been argued that the subtotal operation is safer in the hands of an inexperienced operator. But hysterectomy should only be undertaken by an experienced gynaecologist.