

to obtain positive evidence on this point, and two separate methods of investigation were utilized. First, the incidence of tubal occlusion in cases of endometrial tuberculosis was studied, and, secondly, histological proof of tuberculous infection was looked for in tubes which had been found to be blocked.

The incidence of tubal blockage in endometrial tuberculosis was found to be 61.8%. This contrasts with an incidence of 26.2% over the total series of 1,478 sterile women, including those in whom endometrial tuberculosis was present.

The second line of evidence was more difficult to obtain, because only a small number of women were willing that an attempt should be made to restore patency of the tube by operation. So far I have had an opportunity of studying the histology of such tubes in 14 cases, a piece being removed in the course of salpingostomy (or of salpingectomy in the cases already described). The series is too small from which to dogmatize, but, nevertheless, it is striking that 12 of the 14 specimens showed tuberculous infection. Moreover, in the two negative cases (histologically) the appearances at operation were highly suggestive of tuberculous salpingitis. One further case (unilateral blockage) showed tubercle follicles in the resected portion of the blocked tube.

It must be borne in mind that, as in the endometrium, tubal tuberculosis is almost invariably a focal disease, and a single routine section may fail to show its presence although further sections may be positive.

In view of these findings I feel justified in putting forward the view that tubal blockage is in a considerable number of cases due to subclinical tuberculous salpingitis.

### Conclusion

The problems in the investigation of sterility are many, and I have been able to deal with only a few, but it is hoped that attention has been drawn to certain aspects in which some progress appears to have been made. The field, however, is large and much exploration remains to be done.

### REFERENCES

- Clauberg, C. (1938). *Zbl. Gynäk.*, **62**, 1034.  
 Guthmann, H. (1922). *Klin. Wschr.*, **1**, 1581.  
 Halbrecht, I. (1946). *Lancet*, **1**, 235.  
 Mikulicz-Radecki, F. V., and Nahmmacher, W. (1926). *Zbl. Gynäk.*, **50**, 1309.  
 Müller, J. H. (1944). *Mtschr. Geburtsh. Gynäk.*, **117**, 300.  
 Rubin, I. C. (1945). *Amer. J. Obstet. Gynec.*, **50**, 621.  
 Sharman, A. (1944). *J. Obstet. Gynaec. Brit. Emp.*, **51**, 85.  
 Siegler, S. L. (1944). *Fertility in Women*, Heinemann, London.  
 Solomons, B. (1935). *Surg. Gynec. Obstet.*, **60**, 352.  
 Sutherland, A. M. (1943). *J. Obstet. Gynaec. Brit. Emp.*, **50**, 161.  
 Westman, A. (1930). *Acta obstet. gynec. scand.*, **10**, 288.

The British Association of Physical Medicine has issued some suggestions on the place of physical medicine in the National Health Service. In teaching hospitals there should be a director of physical medicine, with a trained staff and trainees, to conduct treatment, teaching, and research. The department would co-operate closely with the disablement resettlement officers of the Ministry of Labour. Similarly there should be a director and staff in charge of a special department in central hospitals. In district hospitals there should be a physical medicine department under the direction of a visiting specialist, and domiciliary physiotherapy should be based on the district hospitals. Physiotherapy should not be provided at health centres, since there will be a serious shortage of physiotherapists for a number of years. The B.A.P.M. draws attention to the fact that too many patients who are fit to return to work, yet still require treatment, waste time and money attending physical medicine departments in the day-time: facilities for treatment in the evening should be arranged. For patients who must take tiring journeys from home to hospital and for whom the value of treatment is thereby diminished, transport should be arranged by voluntary organizations or at the public expense.

## LYMPH-GLAND BIOPSIES FOR SUSPECTED BONE AND JOINT TUBERCULOSIS

AN ANALYSIS OF 100 CONSECUTIVE CASES

BY

G. P. ARDEN, M.B., F.R.C.S.

AND

J. C. SCOTT, M.D., M.S., F.R.C.S.

(From the Wingfield-Morris Orthopaedic Hospital, Oxford)

Valls, of Buenos Aires (1933), first published the results of lymph-gland biopsy as an aid in the diagnosis of tuberculous bone and joint disease, and Seddon (1939) was the first to do so in Great Britain. More recently other papers on the subject have been published by Agerholm-Christensen (1941), Gellman (1941), and Webster (1942), but up to the present no large series of cases has been reported.

The object of our investigation was to determine the proportion of positive findings in 100 gland biopsies undertaken to assist in the diagnosis of arthritis in various joints, to report the subsequent clinical progress in these cases, and to describe the results of examination of lymph glands removed incidentally in the course of other operations or post mortem. Valls reported 19 gland biopsies (various joints) with 15 positive results; Seddon described 18 for the knee only, with 15 positive results; and Webster obtained 10 positive results out of 15 gland biopsies (several joints). None of these authors has produced a comparable series of incidental gland biopsies.

### Lymph Drainage from Joints

Information on this subject is very conflicting. Most of the experimental work has been carried out on rabbits (Key, 1926; Kuhns, 1933), and there is no real evidence that the drainage in man follows a similar pattern. Webster (1942) in his report of 15 biopsies discusses the subject at some length and points out evident contradictions between the experimental findings, the accepted anatomical description of lymph drainage, and the results of biopsies. Trueta and Barnes (1940) showed that a considerable lymph flow was stimulated by a passive joint movement in cats, a finding which might be of assistance in determining the paths of flow from various joints.

That there may be different lines of drainage from one joint, depending on what tissues are involved, must also be borne in mind. We know very little about lymph drainage from bone: superficial tissues usually drain to the first chain of superficial glands. The fact that this form of biopsy has been more helpful in arthritis of the knee than in other joints may be due to the fact that tuberculous disease in the knee is usually confined to the synovial membrane in its early stages and is seldom a primary osseous infection. Tables I and II show the exact sites of glands removed in disease of various joints.

### Technique

Before discussing the results a brief review of the technique employed is essential. Iliac-gland biopsy was the routine for hip and upper femoral disease, inguinal-gland biopsy for infections of the knee, ankle, and foot, and axillary biopsy for all joints of the upper limb. The youngest patient was aged 2 years and the oldest 69. General anaesthesia was considered the most satisfactory method, and was used in all cases. Inguinal-gland biopsy

was performed through either an oblique or a vertical incision over the fossa ovalis. The termination of the saphenous vein was exposed and a superficial gland removed from this region; a deep gland was usually found lying between the saphenous and the deep femoral veins.

Iliac-gland biopsy was performed through an oblique incision in the iliac fossa, the peritoneum was stripped forward, and the iliac glands were sought in the region of the bifurcation of the common iliac artery. In one patient with hip disease an obturator gland was removed and this gave a positive result. In one case an iliac-gland biopsy was performed for a knee infection, and in another an inguinal-gland biopsy in a patient with hip disease; neither was positive.

Axillary biopsy was performed through a vertical incision over a palpable gland, which was dissected out and removed. Half of each gland removed was put into 10% formal saline for histological examination and the other half into saline for culture and guinea-pig inoculation.

### Results

Gland biopsy for this purpose was first performed at this hospital in 1936, and since May, 1939, it has been done in most cases of suspected tuberculosis. The cases analysed were dealt with during the period May, 1939, to December, 1946; for various reasons complete details are not available in every case. One hundred cases have been analysed; 62 patients were below the age of 21 (29 females, 33 males) and there were 38 adults (17 females, 21 males). Two patients have died, one from miliary tuberculosis (aged 29) and the other from cerebral haemorrhage (aged 67). In five cases no gland was found at operation (all iliac), but in two of these an inguinal-gland or obturator-gland biopsy was done instead. In two cases no record can be found of the gland-biopsy result. A histologically positive gland biopsy was obtained in 32 cases, and in one further case the guinea-pig inoculation was positive, though no histological evidence of tuberculosis was found in the gland. A guinea-pig inoculation was performed in only 47 cases; if this had been carried out in every case and if serial sections of the gland had been examined and culture performed, it is probable that the number of positive results would have been greater. No positive results were obtained in the few cases cultured. In five cases the gland histology and guinea-pig inoculation were both positive; in one case the histological report was positive and the animal inocu-

TABLE I

Joint	No.	Gland	Positive	Negative
Hip .. .. .	29	Iliac 24; 1 obturator; 1 inguinal	8	18*
Knee .. .. .	60	Inguinal	23	35
Ankle .. .. .	5	"	—	5
Elbow .. .. .	3	Axillary	2	1
Subastragalar .. .. .	1	Inguinal	—	1
Trochanter .. .. .	2	"	—	2
Hip .. .. .	{ 18 negative (7 clinical progress .. .. . Proved Tb.) 8 positive (4 .. .. . " not Tb.) 35 negative (11 .. .. . " Tb.)			
Knee .. .. .	{ 23 positive (1 .. .. . " not Tb.) 2 no result†			
Ankle .. .. .	{ 5 negative (1 .. .. . " Tb.) 2 .. .. . (2 .. .. . Doubtful)			
Elbow .. .. .	1 negative .. .. . Proved Tb.			
Subastragalar .. .. .	1 negative .. .. . " "			

\* No gland removed in three cases.

† No record of result in these two.

In five no iliac gland was found; 1 obturator (+) and 1 inguinal (-) gland were removed instead in two cases.

was negative and in the other it was not done. In three cases the deep inguinal gland proved to be positive histologically while the superficial inguinal gland was negative; in one case the opposite occurred; and in three cases both superficial and deep glands were positive.

Of these cases 59 were regarded as tuberculous on clinical grounds; 35 were regarded as non-tuberculous; in two there was some doubt. Four cases were too recent for positive assessment. Nine cases, all in the knees, were proved to be tuberculous by examination of the synovial fluid, synovial membrane, or bone (following excision), and one was indefinite; in seven out of these nine cases the gland biopsy was negative. In five cases (see Table II) positive at gland biopsy the joint recovered over two-thirds of the normal range of movement, and in one of these recovery was complete. In none of these five cases has there been any definite confirmation of the diagnosis by other means.

TABLE II

Case	Age (yrs)	Skiagram	Joint	Highest E.S.R.	Clinical Progress
1	12	Acetabular focus	L. hip	27 mm.	2/3 movement 3 yrs. after
2	13	Decalcification	L. hip	10 "	2/3 " 6 " "
3	10	"	L. hip	17 "	2/3 " 5 " "
4	10	Epiphysial focus in femur	R. hip	45 "	2/3 " 21 " "
5	6	Nil	L. knee	5 "	Normal knee 4 " "

In 10 cases with a positive gland biopsy the highest erythrocyte sedimentation rate while in hospital was 10 mm. or less; of these 10 cases three would not be regarded as tuberculous on clinical grounds alone. In this series there are records of 47 Mantoux and/or patch tests: 36 were positive, and of the 11 negative three were adults. All 33 positive gland biopsies were positive to a Mantoux or patch test. In only 17 of the 33 positive gland biopsy cases did skiagrams show definite changes, that is, joint destruction or a bony focus. Of 22 biopsies done within three months of the onset of symptoms 11 were positive. Twenty-three positive results were obtained in the 62 cases under 21, and 10 positive results in the 38 adults.

TABLE III.—Control Series

	Age 50+	Age 20-50	Age 0-20
Natural .. .. .	14	11	1
Scarred .. .. .	20	5	2
Fibrosed .. .. .	11		
Fatty infiltration .. .. .	6	0	0
Tuberculosis .. .. .	0	0	1

Over a period of three months 71 inguinal lymph glands were removed—60 at necropsy and 11 during the course of operations for other conditions, mostly herniotomies. Table III shows the results. Only one of this control series had tuberculosis of the gland. In that series there are two points worthy of note. The first is the age distribution, the second the number reported as scarred or fibrosed. We include these figures for the control series as they are of interest; but we do not feel that any definite conclusions with regard to the value of adenopsy can be drawn from them, and we propose to continue the series, including only the younger patients, in an attempt to learn something about the cause of the scarring which is so common in the older age group. In reporting on this series the pathologists point out that although there is no definite evidence of tuberculous infection in these glands it is not possible to state definitely that the scarring is not due to old healed tuberculosis.

### Discussion

The importance of all ancillary methods of narrowing down the differential diagnosis in arthritis of every kind

lation negative, while in another the opposite state of affairs existed. In two cases the histology was such that, although it suggested a tuberculous infection, no definite opinion could be given; in one of these the guinea-pig inoculation

needs no emphasis. Unfortunately many of the procedures upon which the surgeon or physician must rely are not altogether reliable.

The removal of regional lymph glands as an aid to diagnosis in chronic arthritis of uncertain origin is a comparatively new procedure and the degree of accuracy is not well established. Most of the series of cases that have previously been published have been relatively small and the follow-up of short duration. Here we have been primarily concerned with three things: whether the right gland has been removed; whether the clinical course has borne out or contradicted the pathological findings; and, in an unselected series of apparently normal glands obtained from the living or at necropsy, the proportion showing tuberculous changes. So far as the first point is concerned there is not enough information available to give any reliable opinion, though it is obviously necessary to take both superficial and deep glands when the knee is involved. The one case of hip disease in which the iliac gland was negative and the obturator positive is worthy of note.

The accuracy of the procedure can be related only to the hip and the knee, as the numbers are too small in relation to the other joints. In the hip the clinical progress of the lesion in approximately one-third of the cases in which the biopsy was negative established a diagnosis of tuberculous disease, and in half of those in which biopsy was positive subsequent progress suggests that the lesion is not tuberculous. In relation to the knee-joint the findings are similar so far as the negative results are concerned, nearly one-third having been proved tuberculous; however, of the cases giving positive results one alone has progressed in such a way that a clinical diagnosis of tuberculosis is impossible.

It is likely, as has already been pointed out, that routine serial sections of glands and guinea-pig inoculations would increase the number of positive findings. As things stand at the moment it seems that no great reliance should be placed on a negative finding from the regional gland biopsy, and that if the result is positive it is likely that, in the presence of a suggestive clinical picture, this can be accepted as confirmatory evidence.

### Conclusion

Gland biopsy is a valuable accessory means in the diagnosis of tuberculous infection of bones and joints. There were 33 (56%) positive results in 59 cases of tuberculous infection—a lower rate than those given by other authors.

A positive biopsy does not necessarily mean that the joint is tuberculous.

A higher proportion of positive results appears to be obtained if the biopsy is done early in the disease—10 out of 14 cases (71%). (21 biopsies were done within three months, but only 14 of these cases could be regarded as tuberculous on clinical grounds.)

An early positive gland biopsy gives strong support to a diagnosis of tuberculous infection before any changes that can be shown by x rays are present.

As is well known, a normal erythrocyte sedimentation rate is of no value in excluding tuberculous disease of the joints, 10 cases out of 59 having shown a normal E.S.R.

Clinical findings and progress, x-ray appearances, gland biopsy, and E.S.R. must all be taken together to obtain the most accurate diagnosis in chronic bone and joint disease.

We are indebted to the surgeons at the Wingfield-Morris Hospital for their permission to review these results and for helpful suggestions. We are also grateful to Dr. A. H. T. Robb-Smith and the

pathological department at the Radcliffe Infirmary for help with the paper and for doing all the control series.

### REFERENCES

- Agerholm-Christensen, J. (1941). *Ugeskr. Læg.*, **103**, 214.  
 Gellman, M. (1941). *Bull. Sch. Med. Maryland*, **25**, 135.  
 Key, J. A. (1926). *J. Bone Jt. Surg.*, **8**, 666.  
 Kuhns, J. G. (1933). *Arch. Surg.*, **27**, 345.  
 Seddon, H. J. (1939). *British Medical Journal*, **1**, 105.  
 Trueta, J., and Barnes, J. M. (1940). *Ibid.*, **2**, 46.  
 Valls, J. (1933). *Brux.-méd.*, **13**, 1151.  
 Webster, R. (1942). *Med. J. Austral.*, **1**, 160.

## THE TREATMENT OF INEVITABLE, INCOMPLETE, AND SEPTIC ABORTION

### AN ANALYSIS OF 600 CONSECUTIVE CASES

BY

J. McD. CORSTON, M.B., D.Obst.R.C.O.G.

*Obstetrical and Gynaecological Registrar*

AND

JOHN STALLWORTHY, F.R.C.S.

*Honorary Obstetrician and Gynaecologist, Radcliffe Infirmary,  
Oxford*

Abortion is the most common serious complication of pregnancy, with an incidence of probably 25%. It is responsible for a greater wastage of potential and actual citizens than any disease, for it carries a mortality of 100% for the foetus and is associated with grave risks to the life and health of the mother. It is estimated that 700,000 infants are lost annually by abortion in America and that 3,500 mothers die in the United States every year as a result of this complication (McCormick, 1944). It is true there is evidence to suggest that the incidence of foetal deformity is high in these cases, but none the less the loss of potentially healthy citizens is great.

The purpose of this paper is not to discuss the prevention of abortion but to consider its treatment once it has become inevitable, incomplete, or septic. For that reason the discussion is concerned only with the maternal aspect of the problem. Throughout the series analysed we have accepted the following criteria for the diagnosis of these three conditions: (1) An abortion was considered inevitable when bleeding was associated with uterine contractions and dilatation of the internal ostium. (2) An incomplete abortion was diagnosed when bleeding persisted following the abortion and examination revealed a bulky uterus, usually with a patulous cervical canal, or when it was known for certain by inspection of the material passed that placental tissue had been retained. The subsequent removal or passage of placental fragments confirmed the diagnosis. (3) An abortion was considered septic when it was associated with pyrexia for which no other cause was found, offensive or purulent discharge, or evidence of pelvic inflammation. It should be noted in this respect that on occasion there is pyrexia and even hyperpyrexia during the process of spontaneous evacuation of a uterus with no preceding or subsequent evidence of uterine, pelvic, or general infection. Such cases were not included as septic abortions in the series analysed.

The recognized immediate dangers to the mother are death or serious illness as a result of haemorrhage or infection, and the following are figures given by different authorities as an assessment of the extent of these dangers. McCormick (1944) states that in America 25% of maternal deaths are due to abortion and that five in every 1,000 mothers who abort die as a result. Parish (1935) states that in 1933 463 maternal deaths were registered in England and Wales as being due to abortion, and