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INGUINAL LYMPH GLAND BIOPSY IN THE DIAGNOSIS OF TUBERCULOUS DISEASE OF THE KNEE

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(WITH SPECIAL PLATE)

One of the gratifying features of the practice of orthopaedic surgery to-day, at any rate in the London area, is that most patients with tuberculous joint infection are sent to us for treatment at a very early stage. I take this opportunity of expressing my admiration for the vigilance of those general practitioners, tuberculosis officers, and school medical officers to whom this state of affairs is largely due. The result is that the well-known clinical picture of tuberculous joint disease is now rarely seen, and one is often faced with patients who complain of little more than a slight limp and some joint pain, and show the minimum of signs, either clinical or radiographic. The finesse of diagnosis has increased immensely; now one often sees cases so early that it is at first impossible to say with any certainty what form of joint infection is present. Of no joint is this more true than the knee.

I do not propose to discuss the signs that are of value in the diagnosis of tuberculous disease of the knee, but I am sure we agree that there are many cases in which all the available evidence (short of biopsy) is insufficient to justify even a provisional diagnosis. Certain surgeons are content to await events, trusting that some sign will ultimately appear to dispel the uncertainty. This often means waiting many months; and sometimes, as with others who once sought after a sign, "there shall no sign be given." If the patient is a child, treatment is instituted on the assumption that the joint is tuberculous—which retards or prevents the development of characteristic features. This is an unsatisfactory state of affairs, leading to waste of time and hospital beds, unnecessary confinement of the patient, and needless apprehension in the minds of all concerned. That is why exploration of the joint has become increasingly frequent. But this involves opening the largest joint of the body, and perhaps a prolonged search for an obscure juxta-articular focus. Although I have not encountered any unfortunate sequelae, such as sinus formation, in any of the joints that I have explored, I would hesitate to recommend the operation. Minor disasters sometimes occur: I have seen the results of them.

Two and a half years ago my friend F. P. Fitzgerald suggested that examination of an inguinal lymph gland on the affected side might give us valuable information, and this was when our investigation began. At that time the pioneer work of José Valls (1933) of Buenos Aires was unknown to us. To him is due the credit for describing this aid to diagnosis.

Forms of Tuberculous Infection of the Inguinal Lymph Glands

Tuberculosis of the inguinal lymph glands is known to occur under the following conditions: (1) As part of a generalized tuberculous adenitis—a rare condition (Battigelli, 1935). (2) As part of a generalized tuberculous adenitis associated with disease in the lungs—a rare condition (Benda, 1936). (3) As part of a generalized tuberculous adenitis associated with multiple bone foci—again a rare condition (Jungling, 1920; Jacobsen, 1936). (4) Secondary to tuberculous infection of the anal region or vulva. (5) Secondary to tuberculous infection of some part of the lower extremity: (a) skin (Carter and Smith, 1935); (b) tendon sheaths of the foot (one personal case—unpublished); (c) tarsal bones with infection of the soft parts (an unpublished case under the care of my colleague Mr. R. Y. Paton). The point I wish to establish is that there is no evidence that tuberculous inguinal adenitis occurs as an apparently isolated lesion. If it does it must be exceedingly rare. Therefore if it can be shown that a patient with arthritis of the knee occurring as an apparently isolated lesion also has tuberculous foci in the inguinal lymph glands on the same side, it is reasonable to presume that the lesion in the joint is of the same nature.

Although the existence of subsynovial lymphatic vessels in diarthrodial joints has long been known, the lymphatic drainage of human joints has still to be investigated. J. A. Key (1926, 1932) has carried out valuable work on the fate of indian-ink particles injected into the knee-joints of adult rabbits. A small proportion of the particles were carried to the popliteal lymph glands, but none to the inguinal.

It is curious that we have been so slow in arriving at the diagnostic possibilities of examination of lymph glands draining a suspected joint; for palpable enlargement of the external iliac glands has long been recognized, particularly in France, as a feature of tuberculous disease of the hip.

Technique

For removal of the gland local anaesthesia is employed, except in small children. If the glands are palpable, size and inferiority of position should guide the surgeon in his choice: a large gland situated low in the femoral triangle is promising. If no gland is palpable, the incision should be made about one inch below the site of the saphenous opening. Two glands may be removed if easily accessible, but it must be remembered that the operation is a biopsy and nothing more. A fragment of gland about 10 × 5 × 5 mm. is set aside for bacteriological examination (guinea-pig inoculation or culture), and the remainder is examined histologically.

Results

The results in the eighteen cases of tuberculous disease in which our information is now sufficiently complete are set out in the table. In a few of these cases inguinal biopsy was not required to establish the diagnosis, since material from the knee was available from the first; how-

Table showing Results of Inguinal Lymph Gland Biopsy in Diagnosis of Tuberculous Disease of the Knee

Case	Duration of Arthritis before Biopsy	Radiographic Changes (general rarefaction present in every case)	Highest Recorded Erythrocyte Sedimentation Rate (Westergren)	Cases in which Material from Joint was Obtainable	Examination of Gland		Comments
					Section	Guinea-pig	
1	15 m.	Patellar nucleus enlarged	10	+ T.B. present	+	+	No tubercles found in gland from opposite groin
2	3 m.	Patellar nucleus enlarged	Not recorded		+	Died from other cause	
3	3 m.	Rarefaction	12	+ T.B. present	+	+	No tubercles found in gland from opposite groin
4	6 m.	Rarefaction	8		+	—	
5	4 m.	Erosion of joint surfaces	43	+ T.B. present	+	Insufficient material	Died : generalized tuberculosis : no tubercles found in glands from opposite groin or axilla on side of lesion
6	11 m.	Rarefaction	45		+	+	
7	12 m.	Rarefaction	44	+ T.B. present	—	Insufficient material	Tuberculous hip on opposite side
8	15 m.	Patellar nucleus enlarged : narrowing of joint space	Not recorded		+	+	
9	6 m.	Rarefaction	8.5		—	+	
10	About 3 years	Epiphyseal cavitation	11		—	+	
11	4 years	Erosion of joint surfaces	88	+ T.B. present	+	Died from other cause	
12	5 years	Rarefaction	Not recorded		+	—	
13	13 m.	Erosion of joint surfaces	50	+ T.B. present	—	—	Died : tuberculous peritonitis and pulmonary disease. No tubercles found in glands from opposite groin
14	4 m.	Rarefaction	Not recorded	+ T.B. present	—	—	
15	24 m.	Narrowing of joint space	7	+ T.B. present	+	+	
16	18 m.	Erosion of joint surfaces	Not recorded		+		
17	About 8 years	Slight narrowing of joint space	6	+ T.B. present	+		History and clinical signs not at all suggestive of tuberculous disease
18	3 m.	Erosion of joint surfaces	6		+		

The Mantoux reaction was positive in every case.

Analysis of Results

Examination of Glands :

Negative results	3 cases (Nos. 7, 13, 14)
Positive results	15 cases
	18

Positive Results :

Section and guinea-pig positive	5
Section positive, guinea-pig negative	2
Section negative, guinea-pig positive	2
Section positive, guinea-pig died from intercurrent infection	2
Section positive, insufficient material for guinea-pig inoculation	1
Section positive, guinea-pig inoculation not requested (last three cases in the series)	3
	15

ever, we felt justified in removing glands from these patients in order to establish the reliability or otherwise of the method. That there should be only three negative results in a series of eighteen cases is remarkable. Even if we believe that a subclinical tuberculous adenitis is a constant concomitant of disease in the knee, it is conceivable that certain glands escape infection, and there is a real chance of obtaining a normal gland in what might pardonably be described as a "lucky-dip" biopsy. Fig. 1 on the Special Plate shows a remarkable state of affairs in the single gland removed from Case 16. One half of the gland is stuffed with tubercles, the other is entirely free. It is likely that neighbouring glands escaped altogether. A state of affairs such as this may explain the discrepancies between the histological and the bacteriological results. If this particular gland had been bisected at its isthmus, instead of being cut in a longitudinal plane, the result from one half would have been negative ; from the other, positive.

Valls mentions cases in which a gland appeared normal histologically but showed the presence of tubercle bacilli bacteriologically—as in Cases 9 and 10 in my series. He suggests that the bacilli had merely lodged in the gland, which had not yet had time to produce a characteristic

cellular reaction. There is no need to make any such assumption. Until it is shown that bacilli can remain in a gland for an appreciable time before provoking any cellular abnormality, it is wiser to postulate a patchy distribution of the tuberculous foci. This would explain the discrepant results in his cases and mine ; for one and the same piece of material cannot be used for guinea-pig inoculation and for the preparation of sections. It is significant that similar discrepancies were found by Scarff and Whitby (1928) in examining tonsils for tuberculous disease.

A positive result is of the greatest possible value, but a negative finding cannot be taken to exclude tuberculous disease of the joint. All the same, a method of diagnosis yielding about 80 per cent. of positive results very greatly reduces the degree of uncertainty and, in consequence, the need for joint biopsy—itself not an entirely reliable diagnostic aid. To ensure that a positive finding could not possibly be fortuitous we removed glands from other regions in four cases (Nos. 1, 3, 5, 13) ; in none was there any evidence of tuberculous disease. Nothing need be said here of the ten cases in which biopsy was negative and in which the subsequent course of events justified a diagnosis of non-tuberculous arthritis. It is, however, necessary that we should keep these patients under observation over a considerable period, since it is remotely possible that one or other of them may, after all, prove tuberculous. This would diminish still further the value of a negative biopsy report.

Valls's figures are much the same as mine. He obtained positive results in fifteen out of seventeen biopsies—though his examinations were not confined to the inguinal glands and the knee-joint ; there were also ten cases that proved negative both clinically and on biopsy of the glands.

Until very recently we have confined our attention to one joint, the knee. Having established that gland biopsy

is a worth-while procedure, the next step is to apply it to doubtful cases of arthritis of other joints. Valls describes cases of disease in the elbow and wrist with positive findings in the epitrochlear gland. In September, 1938, I obtained a positive result from an inguinal gland in a case of disease in the ankle and from an external iliac gland in a case of hip disease. Mr. H. Osmond Clarke tells me that he has had considerable experience of this last investigation: I confirm his opinion that it is a justifiable procedure, for a gland can be removed extraperitoneally through a very small incision.

Summary

The diagnosis of tuberculous disease of a joint at an early stage is often a difficult problem. A positive diagnosis, at any rate in disease of the knee, may often be obtained by pathological examination of the regional lymph glands. A negative finding cannot be accepted as conclusive.

The merit of the method is its simplicity and safety.

I gratefully acknowledge my indebtedness to Professor E. C. Dodds, pathologist to the hospital, and to Professor McIntosh, Director of the Bland-Sutton Institute of Pathology, Middlesex Hospital, for conducting the pathological work on which the investigation was so dependent.

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* These papers are not the first to describe the conditions referred to, but are chosen as useful examples.

THE ELECTRO-ENCEPHALOGRAM IN A CASE OF PATHOLOGICAL SLEEP DUE TO HYPOTHALAMIC TUMOUR

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Hypersomnia occurring in attacks or for prolonged periods is well known as a symptom of hypothalamic tumours, but cases in which the symptom is of localizing value and is not associated with increase of intracranial pressure are uncommon. The following case is considered particularly worthy of record as it permitted electro-encephalographic observations to be made during pathological sleep.

Case History

The patient, a widow aged 62, was admitted to the Maida Vale Hospital on August 5, 1937, under Dr. Wilfred Harris. She died on August 26, 1937. There was nothing of note in her family history. At the age of 57 she had an illness associated with indefinite nervous symptoms—dragging of the feet and a tendency to fall about. Then she appeared to lose

her speech for some days, became doubly incontinent, and was confined to bed for five weeks. When she got up she complained of giddiness, but gradually made a complete recovery.

She remained quite well up to two and a half months before admission to hospital, when she began to complain of general weakness and exhaustion. She had been gaining greatly in weight, and the symptoms were attributed to a weight-reducing diet. She got gradually worse, however, and soon her daughter noticed that she was becoming confused, disorientated as regards time, and failed to recognize her friends. Four weeks before admission she had become extremely sleepy, and there was difficulty in rousing her. The symptoms became gradually worse, and five days before admission she became incontinent of urine and faeces. At no time did she complain of headache, vomiting, or visual symptoms.

Examination.—The patient was observed to be very obese generally, with no special distribution of the subcutaneous fat. She was extremely drowsy, and lay in bed on her back with

FIG. A.—An electro-encephalogram of the case, taken on August 21.

her eyes closed. Her respirations were regular and deep at 20 a minute. She resisted any attempt to open her eyes, but with further stimulation she could gradually be roused, so that she would open her eyes, stir, perhaps smile, and mutter a few meaningless words. At other times she was more awake, and then it was noticed that she moved all her limbs normally and also opened her eyes on command. She was incontinent of urine and faeces. In the cranial nerves there were no abnormal physical signs. The blink reflex was present on both sides and there was no papilloedema. There was no muscular wasting. Tone was normal in all the limbs. Power could not be tested, but there was no difference in the spontaneous movements on the two sides on admission. The reflexes were normal in the arms, but the abdominal reflexes and the deep reflexes in the legs were absent, and the plantars were flexor. The sensation of pain appeared to be appreciated everywhere.

The pulse was regular at 70 a minute, and the blood pressure was 180 mm. Hg systolic and 110 mm. Hg diastolic. The urine was normal; it was not measured, but there was no indication of polyuria or polydipsia. The cerebrospinal fluid was under normal pressure (140 mm. C.S.F.); it was clear and colourless, the total protein was 0.1 per cent., and there were 39 lymphocytes per c.mm. The Lange colloidal gold curve was positive (0113333222) and the Wassermann reaction was negative in the blood and cerebrospinal fluid.

The electro-encephalogram was first taken on August 21, and it showed a continuous slow high-voltage discharge from all areas of the cortex (Fig. A). This was repeated on several occasions during the next few days, similar records being obtained. The discharge persisted almost unchanged when the patient was partially roused. There was no trace of the normal alpha and beta rhythms, but the potential of the slow discharge decreased by about 20 per cent. when the patient was awakened as much as possible, the rhythm remaining the same.

On August 22 the morning temperature was subnormal, and towards evening the patient's condition suddenly changed. She became pale and cold; her pulse was 48 a minute, but was so weak that her blood pressure could not be accurately measured. Her respirations became shallower at 16 to 18 a