

at the bedside, not on work in the laboratory, that we have in the main to rely in the diagnosis and prognosis of our cases; and we will all do well to beware lest, in our eagerness to employ the more recondite proceedings which are continually being offered for our aid, we neglect the first principles of clinical investigation—the training of the eye, the hand, and the ear.

A Clinical Lecture

ON A

CASE OF BACILLUS PYOCYANEUS PYAEMIA SUCCESSFULLY TREATED BY VACCINE.

DELIVERED AT THE BRISTOL GENERAL HOSPITAL.

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GENTLEMEN,—The boy you see before you to-day, with bright eyes and fat cheeks, is so different from the wretched spectre whom some of you saw with me last autumn, that it may be difficult for you to believe that it is the same patient. But although he has emerged victorious from the struggle with disease, he has been left with lifelong scars of the strife, which afford a ready means of identification.

History.

There seem to be no facts in his past or family history which have any bearing on the case until November, 1907, when at the age of 8 years he developed two abscesses, one over the right Poupert's ligament, and the other on the inner side of the left thigh. He remained in bed for this condition and the right abscess quickly healed, but the left much more slowly; when it had healed he still remained with a painful stiff left hip-joint.

He first came under my care, at the age of 10, in August, 1908, for lameness, due to fixation of the left hip-joint. He had marked adduction of the thigh, which necessitated the pelvis being tilted up on the left side, so as to cause much apparent shortening of the limb. There was also about 1 in. real shortening—that is to say, that whilst the left heel was 3 in. off the ground when the boy stood upright, two-thirds of this was due to the tilting of the pelvis, and only one-third to loss of length in the hip. The left hip-joint was the seat of firm fibrous ankylosis, upon which weight extension had no appreciable effect. A skiagram showed thickening of the neck of the left femur, irregularity of the surface of the head, with a partial upward dislocation. The acetabulum was enlarged upwards—no doubt by a process of caries affecting its superior margin.

Operation.

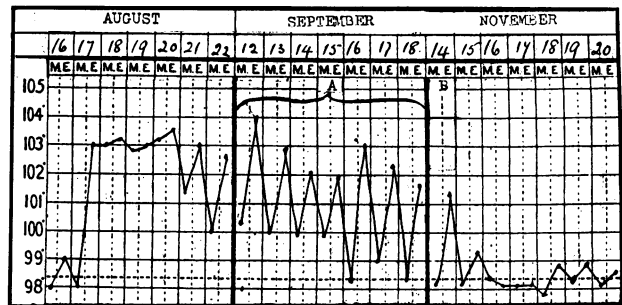
On August 17th, 1908, the left hip-joint was exposed through an anterior incision and the capsule opened. The head of the femur had not left the acetabulum, but the latter cavity had extended upwards and backwards. The head of the femur and the surface of the hip-socket were carious and divested of cartilage. The diseased bone was thoroughly scraped away and the adducted position of the leg corrected forcibly after tenotomy of the tendons of the adductor muscles. There was much oozing from bone and muscles, and a drainage tube was left in the wound. The aseptic method was used throughout the operation, the skin having been prepared with 1 in 500 spirit and biniodide lotion, and dry swabs, with sterilized water for flushing were employed for cleaning the wound. The limb was put up in extreme abduction and with weight extension.

After-history—Pyaemia.

The next day, in the evening, the temperature rose to 103° F., and it remained near this point for five days, after which it underwent those daily fluctuations characteristic of a hectic fever. The wound was opened up, but the discharge was scanty and more sanious than puriform. I need hardly remind you that this scantiness of purulent discharge from the primary focus of septic infection is always of ominous import, and indicates that the vital powers of resistance and reaction are overwhelmed and that the sepsis is spreading further. A urethral discharge often ceases when acute epididymitis occurs, and the stinking matter from the middle ear dries up when the mastoid or lateral sinus are affected.

The boy became noisy, delirious, and extremely ill, so that he had to be moved to the isolation ward. It was very difficult to get him to take even liquid food, and he became very rapidly emaciated. On August 21st he developed an inflamed swelling of the right thumb. This was opened and found to contain thick gelatinous pus in the last joint. Unfortunately, owing to the pathologist being away on his holiday, the swab taken from this abscess was not examined. During September and October other abscesses developed, and these were chiefly in the region of the pelvis, one very large one being over the right hip-joint. These occurred very rapidly and attained a great size in a very short time. He was treated with injections of various polyvalent antistreptococcus serums without any effect.

Very foolishly I imagined that it was a condition of mixed infection, and I thought, therefore, that vaccines or serums could not be expected to do much good. However, fortunately for the boy, this unwarranted assumption was not allowed to go unchallenged, and on October 25th I asked the pathologist, Dr. Dunkley, to see him. He took swabs from the original wound over the left hip, and from this, to my great surprise, obtained a pure culture of the *Bacillus pyocyaneus*. Now this is a germ which we are too apt to treat lightly. It is true that when it causes blue pus on the surface of an exposed wound it may do but little harm, but this is also the case with other pyogenic organisms—for example, streptococci or staphylococci—but when it exists in pure culture in the depths of the tissues it causes a most deadly septic infection. This has been demonstrated in the case of the peritoneum, for example, by Dudgeon and Sergeant.



A. This represents the actual temperature on the dates given, but it almost exactly represents the course of the temperature for twelve weeks—namely, from August 22nd to November 14th.
B. Second injection of vaccine.

Dr. Dunkley prepared an emulsion of the very bacilli grown from the patient's wound, and this, having been heated to 60° C. for an hour, was used as a vaccine. On November 6th 40 millions of the dead bacilli were injected, but there was no appreciable result. On November 14th a further dose of 60 millions was administered, and the next day the temperature remained normal and has remained so ever since. On November 24th, December 8th, January 1st and 16th the injections were repeated, 100 million bacilli being used each time. From the date of the second injection the boy's whole condition has rapidly improved. He has slept quietly, taken his food well, become plump and well nourished, and all the abscesses and sinuses have healed except a small one on the inner side of the left thigh which is quite superficial.

A more striking example of the potency of vaccine-therapy could hardly be imagined.

One further point remains to be told. When his general condition had ameliorated and he could bear to be touched, it was found that the right hip was deformed and displaced. It was much shortened and adducted, and the head of the femur was felt in the buttock. Undoubtedly the joint had been the seat of a pyaemic abscess which by a distension of the capsule with pus had led to a dislocation of the joint. Curiously enough this one patient has exhibited three different varieties of pathological dislocation of his joints: They are:

1. Dislocation by destruction of bony surfaces; illustrated by the tuberculous left hip.
2. Dislocation by destruction of ligaments and the traction of muscles; illustrated by the right thumb.
3. Dislocation by distension of the capsule; illustrated by the right hip.

A skiagram showed the dislocation of the right hip into the sciatic notch, and also the fixation of the left hip in the acetabulum in a position of abduction, a position which compensates for real shortening by a tilting down of the pelvis on that side.

[Note.—The dislocated right hip was reduced by manipulation under an anaesthetic on April 2nd, and put up in a position of eversion and abduction.]

CONCLUSION.

I would summarize the points which I have learnt from this case as follows:

1. The danger of trusting to an "aseptic" system of surgery when dealing with the region of the groin. I now always use 1 in 2,000 biniodide of mercury as lotion for these cases when a sepsis is doubtful.
2. The absolute importance of an exact bacteriological diagnosis in every case of suppuration.
3. The great gravity of *Bacillus pyocyaneus* infection.
4. The potency of vaccinal treatment of this infection.

A CASE OF TUBERCULOUS MENINGITIS WITHOUT TUBERCLES.

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The following case of tuberculous meningitis seems worthy to be recorded, as it exhibited several unusual and important features:

C. M., a boy aged 8 years, was admitted to St. George's Hospital under Dr. H. D. Rolleston. The history obtained from the patient's mother was as follows: Onset gradual and indefinite. The child had "two severe frights" six weeks and two weeks respectively before admission to hospital. Since the latter the patient has been "morbid," and has complained of pains in the head and has vomited frequently. During the last few days it has been increasingly difficult to get the child to take his food. No history of any head injury. No previous illness except measles. History of tuberculosis in family of maternal grandmother.

Condition on Admission.

Child looks very ill. Lies quite listless, but cries when disturbed. Occasionally shows signs of understanding what is said to him. Some external strabismus of right eye. No voluntary movements of eyes performed. Edges of optic discs blurred, but no definite optic neuritis. Some paresis of left side of face. Occasional twitching movements of orbicularis oris, and clonic movements of the muscles of the upper extremities and of the hamstring muscles on both sides. No note of any head retraction or stiffness of neck. Muscles well nourished. No definite loss of power in any group of muscles. No hypertonicity. The legs are kept flexed at hip and knee, but can be readily extended passively. No loss of pain sensation. Knee and ankle jerks absent. Plantar reflex gives flexor response on both sides. Superficial reflexes absent. Incontinence of urine and faeces. Respiration rapid (36 per minute). Pulse 128. Temperature 102.5° F. Urine acid, specific gravity 1020; no albumen; chlorides normal. No abnormal signs in chest and abdomen. Lumbar puncture was performed on the day after admission, and one and a half test-tube full (about 30 c.c.m.) of turbid flaky fluid was withdrawn. The patient became progressively worse, and died comatose two days after admission with temperature 100.6° F. and respirations 48. The bowels had acted normally once or twice a day while the child was in hospital, and no further vomiting had occurred.

Post-mortem Examination.

This was performed nine and a half hours after death. Fairly nourished body. Rigor mortis present.

Meninges.—Some excess of turbid fluid at the base of the brain. The membranes generally are hyperaemic and "sticky" in appearance. No exudate or tubercles on the convexity. A thick layer of fibrino-purulent exudate is present on the inferior surface of the pons. Similar exudate in rather less amount is present in the interpeduncular space. The superior surface of the medulla is adherent to the middle lobe of the cerebellum. There is also similar exudate to that at the base around the vessels in the pia mater deep in the Sylvian fissures. A careful search reveals no tubercles anywhere on the vessels of the meninges or in the exudate. Brain 47 oz., hyperaemic and rather soft. Moderate dilatation of the ventricles, which contain excess of slightly turbid fluid. No tubercles are visible in the choroid plexuses, which appear normal. The brain is not otherwise abnormal. There are no tuberculous foci in it.

Spinal Cord.—The spinal meninges contain a slight excess of turbid fluid, especially in the lumbar region. The cord itself looks oedematous but otherwise normal. No tubercles are visible in the spinal meninges and there is no fibrinous or purulent exudate thereon.

Thorax.—Pleurae normal. Lungs (right 10 oz., left 8 oz.) are congested. There are no signs of miliary or other form of tuberculosis in them. Around the left main bronchus is an actively caseating tuberculous gland, the size of a Barcelona nut. Its capsule appears intact.

Larynx, trachea, and thyroid, normal.

Pericardium normal; heart 6 oz., normal, except for moderate dilatation of the right ventricle and tricuspid orifice.

Abdomen.—Peritoneum and mesenteric glands normal; no tubercle. Alimentary tract normal; no ulceration or tubercles. Liver and kidneys normal. Gall bladder and ducts normal. Pancreas congested. Spleen 2 oz., congested; consistence normal. Suprarenals normal. Bladder normal, distended; no obstruction to outflow of urine.

No surgical tuberculosis present. All the organs were searched for miliary tubercles, but none were seen.

Microscopical Examination.

Sections of the cortex of the brain were made, showing also the meninges and exudate. Acute inflammation of the meninges and superficial brain substance was present. The meningeal exudate consisted of fibrin and round cells. The cells were mainly large and small lymphocytes, but some polymorphonuclear leucocytes were present. The cells were not spread uniformly throughout the fibrinous mass; in some parts they were thickly aggregated in large irregular clumps, while in other parts there was fibrin with comparatively few cells scattered in it.

All the arteries were surrounded by collections of round cells, and the arterial walls themselves were infiltrated with leucocytes, but no definite endarteritis was present. Many of the cells of the exudate took the stain badly, and appeared necrotic, but nothing suggesting miliary tubercle formation was seen; there were no giant cells and no epithelioid cells seen in the sections examined. Similar sections stained by the Ziehl-Neelsen method showed the presence of a considerable number of tubercle bacilli scattered throughout the cortex and exudate (each field containing 12 to 20 bacilli).

The organisms were especially numerous in the close vicinity of the blood vessels.

The examination of the cerebro-spinal fluid removed a few hours before death (the report on which was not received until after the necropsy) showed that the cells were chiefly polymorphonuclear leucocytes, there being only a few lymphocytes. A considerable number of tubercle bacilli were found in the fluid after centrifugalization, and no other organism was present. The lungs and other organs were unfortunately not examined for isolated tubercle bacilli.

The unusual features of the case are: (1) The presence of tuberculous meningitis with much fibrino-purulent exudate at the base of the brain without any miliary tubercle formation; (2) the absence of miliary tuberculosis of the lungs and other organs; and (3) the great predominance of polymorphonuclear leucocytes over lymphocytes in the cerebro-spinal fluid.

The child only lived two days after admission to hospital, but a diagnosis of tuberculous meningitis was made from the history and physical signs. At the necropsy, however, doubt was thrown on this diagnosis, as, although there was an actively caseating bronchial gland to serve as a primary focus, there was no generalized miliary tuberculosis and no tubercles in the meninges, which, moreover, showed much thick fibrino-purulent exudate, mainly posterior-basal in distribution. On the other hand, the general "stickiness" of the meninges and the presence of some exudate around the vessels in the Sylvian fissures favoured the diagnosis of tuberculous meningitis. The doubt as to the diagnosis was accentuated by the cytological examination of the cerebro-spinal fluid. The bacteriological examination of the centrifugized fluid and the sections of cerebral cortex settled the question.

The presence in the sections of cortex and meninges of "diffuse leucocytic infiltration, predominantly perivascular," as described by Delille, is noteworthy, as also is the presence of inflammatory cells scattered diffusely throughout the walls of the arteries. There was, however, no obvious tendency to the formation of circumscribed nodules consisting only of round cells without giant cells or epithelioid cells, such as is sometimes seen in miliary tubercles in the lungs and elsewhere in the more acute cases of generalized tuberculosis.

A case reported to the Société Médicale des Hôpitaux de Paris by MM. Sireday and Tinel¹ is similar to the present case in that there was tuberculous meningitis without tubercles, and microscopically there were numerous tubercle bacilli with cellular exudate, "chiefly perivascular," but in their case there was little fibrinous or purulent exudate in the meninges, and "diffuse tuberculous granulations" were found in the lungs. Further, the cerebro-spinal fluid contained chiefly lymphocytes, as is usual in cases of tuberculous inflammation. The