SOME CASES
OF
FRACTURE OF LONG BONES FROM
SLIGHT CAUSES

IN CONNECTION WITH TABES DORSALIS, SYPHILIS,
AND PARAPLEGIA.

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IN the discussion on Charcot's Joint Disease at the Clinical Society in 1884-5 but slight reference was made to the occurrence of so-called spontaneous fractures in association with tabes. Attention was concentrated almost entirely on the joints and the articular extremities of the bones, and none of the speakers adduced cases of tabic fractures either occurring alone or in company with the characteristic articular lesions. This is an indication that tabic fractures are rarer even than tabic arthropathies, and this view is supported by an observation made by Mr. Jacobson that Professor Charcot's cases of spontaneous fracture in locomotor ataxy need confirmation in this country.¹ In a paper illustrating the advantage of rest in cases of locomotor ataxy published in the 'American

¹ Art. "Fractures," 'System of Surgery,' vol. i, p. 405. Reference to Charcot, "Sur quelques arthropathies qui paraissent dépendre d'une lésion du cerveau ou de la moelle épinière," 'Arch. de Phys.,' t. i, p. 161, and 'Diseases of the Nervous System,' Syd. Soc. trans., ser. ii, p. 305.

Journal of the Medical Sciences'¹ Dr. S. Weir Mitchell mentions four cases of fracture of the lower limbs in patients suffering from this disease.

In one the patient broke his thigh, and soon after getting about broke his leg. These accidents he attributed partly to the awkwardness of the patients and the habitual abruptness of the muscular acts, and partly, as he suspected, though it had not been proved, to an impairment of the nutrition of the bones. More recently Dr. Buzzard has placed on record some cases of fracture in association with tabes dorsalis, and has dwelt upon the importance and frequency of the gastric symptoms of the diseases of the nervous system.² As it is only by a comparison of observations collected from different quarters that sound conclusions can be drawn, I offer the following additional cases to the Society, accompanied with an expression of regret that they are not all so full or complete as I should have desired to make them.

CASE 1.—*Fracture of right humerus ; history of syphilis and locomotor ataxy.*—John M—, æt. 51, labourer, came into the London Hospital under me on the 22nd of January, 1876. Five days before, whilst pulling on his boot, he heard a crack, and found himself unable to move his right arm. On admission it was found that there was a simple fracture of the surgical neck of the right humerus, with extensive swelling of the soft parts over the shoulder. The patient had partial paralysis of both legs, and slight numbness and anæsthesia uniformly distributed over both arms. The pupils were contracted. He was unable to contain his urine. Four years previously he had noticed that his gait in walking was becoming unsteady. He gradually got worse, had pains in his stomach and diplopia, and his powers of progression became seriously impaired. For these and other symptoms he was twice admitted

¹ 'American Journal of the Medical Sciences,' July, 1873, pp. 113—115.

² 'Clinical Lectures on Diseases of the Nervous System,' 1882, pp. 85, 231, 236, 237, 250, 251.

into the hospital under Sir Andrew Clark. He had been a free drinker, and there was as definite a history of syphilis as one generally anticipates obtaining from hospital patients with short memories and slender powers of observation. Twenty-six years before he had a slight venereal discharge from his urethra with a hard lump in his groin. He had attended as an out-patient at St. Bartholomew's Hospital for rash over the forehead. His wife had had several miscarriages, but no children born dead. The fracture was treated in the way which I have adopted for years and found useful in cases of fracture of the surgical neck of the humerus, where the tendency of dressers is to apply splints to the lower fragment only, viz. by the application of a weight to the humerus, placed usually, though not invariably, at right angles to the trunk. In this instance a 5-lb. weight was used. A great deal of callus was thrown out, and the fracture united well. If I rightly remember, iodide of potassium was given during the treatment in deference to the suspicious but perhaps inconclusive syphilitic history; and it ought to be added that there had been no sign of a gumma affecting either the humerus or any other bone in the body.

The foregoing case will doubtless be remembered by Sir Andrew Clark and by Mr. R. W. Parker, then Surgical Registrar, who evinced much interest in its ætiology and progress.

CASE 2.—*Ununited extra-capsular fracture of the neck of the femur, with symptoms of tabes in an early stage.*—Alfred A—, æt. 42, a Norwegian or Swedish sailor, was admitted into the London Hospital from the receiving room by Mr. Lipscombe, my house surgeon, on the 3rd of March, 1884. He stated that three months previously, whilst he was carrying a heavy weight on board ship, he twisted round, and suddenly felt something give way in his right hip. He remained in bed for six days after the accident. Then he got up and used crutches, and he had not been able to walk since without their aid. On exa-

mination the right leg measured $31\frac{1}{2}$ inches, and the left 34. Although he had been moving about on crutches, there was very little thickening about the parts or evidence of callus. The limb could be readily drawn down, and crepitus obtained. Under ether extension was made, and a long splint with 15 lbs. weight applied, the shortening being soon reduced to about an inch. At the end of six weeks the patient complained of great pain in his right leg. No cause was discoverable, but it was thought that the extension might have given rise to it, and accordingly the weights were removed. There was then no attempt at union. On the 28th of April, five months after the accident and nearly two since his admission, the patient was discharged at his own request, as he wished to return to his own country. There was still no union. The right hip was fuller than the left, and on making traction and drawing down the leg, instead of crepitus, only a slightly rough sensation was obtainable. The patient stated that he had suffered from rheumatism for four years before the accident, but was not lame during that time. The notes also said that he had had syphilis six years previously, but I could not gather the details which would establish the verity of the affection. The other tabic symptoms noticed in the hospital were absence of knee-jerks, defective sensibility in the lower limbs, and sharp pains in both legs. The pupils acted to light, the eyesight was good, and accommodation normal. As the patient was a foreigner and understood English sparingly, it was not easy to obtain a very satisfactory history.

It will be observed that the extent of the shortening, $2\frac{1}{2}$ inches, scarcely admits of any other conclusion than that the fracture was what is called "extra-capsular." The occurrence of an extra-capsular fracture at forty-two years of age from turning round suddenly is, to say the least, unusual; and equally unusual is it to find no attempt at union and absence of callus, especially under the conditions in which the leg was placed, a week after the accident. All these circumstances point to a constitutional cause,

such as locomotor ataxy, for the fracture in the first instance, and the absence of union and of callus in the second. The precursory symptoms of tabes, with the exception of the eye affection, were present.

CASE 3. *Ununited fracture of the neck of the left femur with definite history of tabes dorsalis.*—William B—, æt. 59, ship joiner, was admitted into the London Hospital on Tuesday, 6th of March, 1884, for a double fracture of the right fibula. On the previous Sunday, being intoxicated and quarrelsome, he had engaged in a row with a fellow-lodger, and was promptly knocked down and trampled on. One of the fractures was situated close above the external malleolus, the other a little higher. He also had extensive bruising on the inner side of the right leg and round the left eye.

Eighteen months before, the patient had been in the hospital under Mr. Hutchinson for left hip-joint disease. Five weeks previously to the first admission he had fallen on his left side, but he walked home without much inconvenience. A few hours later, whilst walking out, he was suddenly seized with violent shooting pains in the left hip-joint, and was unable either to walk or stand. He became an out-patient under Mr. Tay, walking with assistance to the hospital. Whilst in attendance as an out-patient swelling of the hip-joint appeared, and he was taken in under Mr. Hutchinson for "pain and lameness of five weeks' duration." The notes state that there was some swelling in Scarpa's triangle without thickening or shortening of the limb. He remained in the hospital nearly a month, when he was discharged, walking with more ease. He then departed to the hospital in Queen Square, where he was treated for tabes dorsalis, of which he appears to have had the usual symptoms. When he came under my care he was suffering from incontinence of urine, with stricture of the urethra and prostatic enlargement. The urine at first was normal. His extreme restlessness made it very difficult to treat the fracture of the fibula satis-

factorily. Unfavorable symptoms soon manifested themselves—cystitis, fever, bedsores over the sacrum and other parts in contact with the bed, and he died exhausted six weeks after admission. At the post mortem, cystitis and suppurative nephritis were found. The fractures of the fibula had united. The left femur presented only the root of the neck, the remainder having been removed apparently by friction on the dorsum ilii et ischii, on which a new articulation had been formed. In the cotyloid cavity was the remaining portion of the head of the femur exactly filling its cavity, and attached to its floor by the round ligament. Apparently the portions of the neck belonging to both fragments had been worn down by the play of the shaft of the femur.

The specimen is now in the museum of the London Hospital Medical College, and bears date April 16th, 1883. It is entered as os innominatum and head of femur, tabetic arthropathy. In a letter to me dated December 19th, 1884, Dr. Turner says, "I took the specimen of hip-joint to the Clinical Society on the first night of the debate, and had then some thought of making some observations regarding it. It does not, however, show the appearances of Charcot's joint very characteristically. It might be of interest in connection with other cases as presenting changes modified by ataxy."

CASE 4.—*Fracture of right tibia and fibula following disease of the right knee-joint, with definite history and symptoms of locomotor ataxy.*—Maria H—, æt. 55, was admitted into the London Hospital on July 6th, 1883. She had been an out-patient under Mr. Treves for an affection of the right knee-joint diagnosed as Charcot's joint disease, and had been treated for a long time for locomotor ataxy. She suffered from severe lightning pains, and she "walked funny." Her pupils did not contract or dilate either to light or for accommodation. Her right knee-joint was much increased in size. The patella grated freely upon the femur. There was not

much pain in the joint itself, swelling and weakness being the chief symptoms. No other joints were affected. She had been taking Tinct. Ferri Perchlor. with marked relief. There was no history of syphilis, and the family history was good.

The patient was leaving the hospital on July 6th, when her leg gave way under her. She fell and was brought into the building. The right tibia and fibula had given way about three inches below the knee-joint. The leg was swollen and cedematous. It was put up in splints. Rest in bed reduced the size of the knee-joint considerably, but union was slow, and the cedema of the leg had not altogether subsided on the 10th of October. On 31st October, nearly four months after the fracture, the splints were abandoned altogether. There was fair union, but some cedema remained. The patient was ordered a knee-cap and bandage, and was allowed to go home.

CASE 5.—*Extra-capsular fracture of the upper end of the right femur in a patient with symptoms of tabes.*—Maria G—, æt. 46, married, of 58, Cottage Street, High Street, Poplar, a stout, heavy woman, was admitted into the London Hospital under my care on December 29th, 1884. She was carrying a wash-tube half full of water, and twisted her right foot inwards. She felt something give way in her right hip, fell on her left side, and could not get up from the ground. When brought to the hospital she was found to have sustained an extra-capsular fracture of the neck of the right femur. Crepitus was detected, and the fracture was diagnosed to be about the level of the lower border of the great trochanter. The right leg was one inch and an eighth shorter than the left. A long splint was put on and extension applied. Soon after the setting of the fracture a lump was detected about the junction of the upper and middle third of the femur, and this was supposed to be the proximal fragment of the fractured shaft. No signs of this could be felt before the patient was put up in the long splint. On January 14th

an interval was felt between the two ends of the bone, as if the distal end of the proximal fragment was anterior to or riding over the proximal end of the distal fragment. The displacement was rectified by placing a cushion under the lower fragment, and raising it to a level with the upper. On the 20th measurement showed that the amount of shortening had been reduced to three quarters of an inch. On February 9th the splint was temporarily removed and the limb placed between sand-bags. A large amount of callus had been thrown out, and the patient was able to raise the limb from the bed. On the 15th the limb was put up in a Bryant's splint as the union was not firm, and on the 20th the upper and front part of the thigh was painted with iodine liniment, and the application was repeated at intervals of a few days. On March 14th there was only one half-inch shortening. Bryant's splint was still being used, and apparently under the influence of the iodine liniment the callus was disappearing. On the 10th April the splint was removed. On the 15th the patient got up for a few hours, and on the 20th she was allowed to go home. A bandage could not be fixed, but she was provided with crutches for use when she could get about again. On returning home she went to bed, and after some time she was shifted to a chair, and it was three months before she was able to get about with crutches. One day in December she was poking the fire when her husband spoke to her, and she turned round from left to right. She heard a crack, and thought she had re-fractured her thigh-bone. She was taken to the hospital and admitted under Mr. Couper. Shortening to the extent of an inch and three quarters, eversion, and much thickening perceptible to the eye, and looking like a tumour on the upper third of the thigh, were observed, but the surgeon in charge of the case was not satisfied that a re-fracture had occurred. She remained in the hospital a fortnight, and was then sent home, and she remained in bed there for weeks. She almost went out of her mind, was light-headed and

delirious at times, occasioning her husband much alarm. On a Sunday evening three years ago she was coming up the stairs, which are very steep, when one of her crutches slipped, and she felt something crick in her right knee. Since then the right knee has been weak and lax. She notices that when she lies in bed the leg is not straight, but turns inwards below the knee.

I last saw her on the 2nd November, 1892. She was sitting in a chair by her bedside, and her crutches lay on the bed. She never goes out, and can only get about the room a little on her crutches. The right leg is two inches shorter than her left. The callus has all disappeared from the thigh, and as she is very well covered it is extremely difficult to trace the femur. An equal difficulty was experienced when she was first in the hospital. The right knee, tolerably firm when extended, slips about when flexed, and can be bent laterally. She does not sleep well and her appetite is bad. She can see to read a little with the aid of her glasses. The pupils contract for accommodation, but not to light, and she experiences "shocking pains" in her right leg and foot, and sometimes also in the left. She was the subject of lightning pains, and had the Argyll-Robertson symptoms when she was first in the hospital for the fractured femur. There is no definite evidence of syphilis. She has never had any skin eruption or enlargement of glands, but she lost two children in infancy, and had two or three miscarriages.

Her present address is 21, Bow Common Lane, Burdett Road, E. I have only to add that, owing to the thick covering of soft parts, I could not satisfy myself as to the exact line the fracture took in this case, and I believe that it was rather below the trochanter and the neck than through either. She was never examined under an anæsthetic.

By way of contrast to the foregoing cases, I append the particulars of a case of comminuted fracture of the right tibia and fibula in a patient who had been paralysed for fifteen years, and whose limbs were atrophied.

CASE 6.—*Comminuted fracture of right tibia and fibula in an atrophied limb, the effect of paraplegia of fifteen years' duration; good bony union in six weeks.*—Miss Julia McC—, æt. 35, enjoyed perfect health up to the age of twenty years. In the summer of 1869 she was returning home in a steamer from a visit to Margate and was violently sea-sick. Whilst writhing on the floor of the cabin and retching she suddenly lost the power of moving her lower extremities, and she has never walked since. This was followed by wasting of the legs, sloughing over the sacrum with exfoliation of bone, paralysis of the rectum and bladder, great weakness and wasting, nervous debility, and prostration. All the bones of the lower extremities were atrophied. The circulation was feeble. She was accustomed to go out in an invalid chair. One day the butler in lifting her into the chair struck her right foot against the wheel, occasioning a comminuted fracture of the tibia and fibula in the lower third. A great deal of bruising, with the formation of blebs and effusion of bloody serum, accompanied the fracture. The patient was under the care of Mr. Edward Berdoe, of Hackney, who asked me to see her in consultation with him. We put up the leg in splints, and bony union was accomplished in six weeks. From the great prevailing atrophy, extensive comminution, and damaged appearance of the soft parts of the leg, it was feared that bony union might not take place, and that there was some probability of the patient having to lose her leg; but the ecchymosis cleared without breach of surface, and there was no noticeable retardation in the reparative process.

Since this paper was written Dr. Stephen Mackenzie has kindly communicated to me the following case.

CASE 7.—*Transverse myelitis, probably hæmorrhagic, in mid-dorsal region, with secondary degeneration and spastic paraplegia causing "spontaneous" fracture of femur.*—Kate C—, æt. 17, was admitted into the London Hospital on 9th of September, 1892, under Mr. Treves. She had had

no previous illness except measles in childhood, and was living at home in Bromley-by-Bow. For about three months she had been ill and weak; she had lost her colour, and had not menstruated for eight months. On 27th of December, 1890, she got up and breakfasted as usual, and she was sitting at breakfast between 9 and 10 a.m., when she was suddenly seized with violent pain, which went through from her chest to her back. She took chlorodyne and had hot flannels applied to her chest. The pain lasted about twenty minutes, but she sat a little while longer. She had difficulty in getting on to her legs, and when she got up she fell down. She sat again in the chair for two hours, and then had her feet put into mustard and water. It was found that she could not feel the heat, and a doctor was sent for, and not being able to walk or stand, she was carried up to bed. About one week after the seizure the legs used to be painful, but the pain ceased, and she has had no return of it. She was feverish, her temperature five days after the attack being 103° , and she remained feverish about a fortnight. She lost all power over urination and defæcation from the first. A bed sore over the sacrum formed in four days, and there have been sores on the heels, knees, trochanters, and ears, from lying on them. Starting of the legs commenced early, increased, and became very severe. At first when the legs started they used to go down again, but later they became drawn up and were much stiffer. She had no power over them; they would become drawn up every night, and she would push them down with her hands in the morning and during the day as often as they became drawn up. Sometimes they would be straightened out and stiff.

On September 8th, 1892, when pushing the legs down in the morning, she heard and felt a snap in one of them. The leg seemed to swing round. It ached a little and swelled a great deal. A doctor was sent for and she was advised to come to the hospital, which she did the following day. The right thigh was then enormously swollen with

external bruising, but no laceration of skin. Extension with weights from 10 lbs. to 18 lbs. was used, but the leg used to start and jerk very much in spite of them. Gradually the fracture united with an enormous mass of callus.

At the present time there is absolute loss of voluntary power over the legs. Reflex movements are active. The knee-jerk is absent, and there is no ankle-clonus owing to the spastic condition of the limbs. The muscular nutrition is fairly good. There are spontaneous and uncontrollable movements of the legs and constant tonic contraction. The legs are drawn up unless kept down by weights. For the first two days the legs were very cold, but she did not feel it then; they have not been cold since. The only feeling she has is in the right foot. There is vasomotor paralysis. Contact with the skin produces papules and wheals (*tache cérébral*). Anæsthesia exists from two inches below the umbilicus; paræsthesia from the third rib to two inches above the umbilicus, with a patch of paræsthesia on the left side in the line of the seventh ribs. Sensation about the third rib is normal. There is complete paralysis of the bladder and rectum. The bed-sores over the sacrum, left trochanter, and right knee, the general condition, nutrition, and mental state are good. The fracture of the right femur was in the middle third; it is now firmly united, and surrounded by a mass of firm and apparently dense smooth callus of a more or less globular shape.

Remarks.—1. Of the five cases of fracture of the long bones in connection with *tabes dorsalis* narrated in this paper, it will be observed that in all the seat of fracture was in the immediate vicinity of one of the joints. One case was a fracture of the surgical neck of the right humerus, three cases were fractures of or near the neck of the femur, two on the right side and one on the left; and the fifth case was a fracture of the right tibia and fibula 3 inches from the knee-joint.

2. All five patients were under 60 years of age, the

respective ages being 42, 46, 51, 55, and 57 at the time of the fracture.

3. The causes of the fractures were slight. The humerus was broken by muscular action in pulling on a boot or by slight twisting of the bone during that process. The tibia and fibula gave way under the patient's weight whilst she was going down steps. Two of the femora were fractured through the patients' twisting round whilst carrying a weight. The third femur gave way after a fall whilst the patient was walking.

4. Union of the fracture in the majority was either unaccomplished, defective, or delayed. In two cases the fractures—both being of the neck of the femur—did not unite at all. In a third fracture of the femur the union was incomplete. The patient with fracture of the tibia and fibula was nearly four months in bed.

5. In two of the cases in which union occurred a large amount of callus was thrown out, as observed by Charcot in the case of his patient A. C—, æt. 57, domestic servant, related in the Lectures published by the New Sydenham Society. In one case of union with abundant callus, this callus ultimately became absorbed. Probably absorption is the ultimate fate of callus in tabic patients, although the bones in the immediate vicinity of a joint affected with tabic arthropathy may occasionally undergo great condensation and hypertrophy.

6. The fractures in connection with locomotor ataxy occur like the joint disease in the prodromic stage and before the onset of true ataxic symptoms. They are as sudden and "spontaneous" as the joint affections themselves, and are due to the atrophy and rarefaction without inflammatory changes which are conspicuous in the articular ends of the bones in the joint disease. Both are directly dependent upon lesions of the nervous system.

7. One or two of the cases had a more or less pronounced history of syphilis, but if they were syphilitic it cannot be affirmed that that disease had any direct influ-

ence upon the bones so as to be an efficient cause of the fractures. Syphilitic fractures are usually due to gumma, and may then occur from very slight causes. A case of fracture of the right humerus from gumma was under my care at the London Hospital a few years ago, but after a long search I have not been able to find the notes of the case.

8. Cases of the kind here narrated have in times gone by either passed unrecognised or possibly have been vaguely included under the head of fragilitas ossium or mollities ossium. Even at the present time it is doubtful whether surgeons are sufficiently alive to the association of fracture from slight causes with locomotor ataxia. Whilst Charcot's ataxic joint disease is as familiar as a household word, ataxic fractures can scarcely be said to have attracted the attention which they deserve.

Postscript.

Mr. J. R. Lunn, medical superintendent of the Marylebone Infirmary, has kindly shown me two cases of fracture from slight causes which have been under his care in the wards. The first was the sequel to an example of Charcot's joint disease, contributed by Mr. Lunn to the collection of cases made by the committee of the Clinical Society in 1887 ('Clin. Soc. Trans.,' vol. xx, p. 320).

CASE 8.—Janet S—, æt. 65, was being wheeled out of the garden, when her leg was knocked slightly against the wall. The left tibia and fibula were found to be fractured near the ankle-joint. The limb was put up in plaster-of-Paris, and the fracture united at the end of eight weeks, some deformity remaining. The joint affected was the left knee-joint.

CASE 9.—*Fracture in a case of spina bifida.*—Ellen M—, æt. 12, was born with a large fluctuating swelling over

the lumbar spine. It was not treated, and gradually became smaller and harder. The patient has never been able to walk or stand, and has never had any control over bladder or rectum. There is complete anæsthesia of both legs and the lower two-thirds of both thighs. Sloughing sores on the buttocks and vulva healed under treatment. For five years she has been an inmate of the hospital. She is very fat, and has large breasts.

In January, 1891, the sister noticed that the left leg was unusually limp after the patient had been carried from chapel by a porter. A fracture of the left femur close to the knee-joint was found. It was put up in plaster-of-Paris and united firmly in fair time. The left knee-joint is very lax and moves unnaturally.

The fracture in this case was evidently dependent on the nerve lesions.

(For report of the discussion on this paper, see 'Proceedings of the Royal Medical and Chirurgical Society,' Third Series, vol. v, p. 67.)