A CASE OF COMPOUND RE-FRACTURE OF THE PATELLA, IN WHICH THE FRAGMENTS HAD BEEN ALREADY SUTURED.

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THERE are few subjects in surgery over which more battles have been fought than the treatment of fracture of the patella. The ambition of many surgeons is directed to the attainment of bony union, which they deem an absolute necessity in such cases. Apparatus, great and small, complicated and simple, have had their inventors and upholders; but all, it must be confessed, have had pretty much the same result—failure. Transverse fracture of the patella is an obstinate accident; it steadily resents interference, until not a few have come to believe in the treatment which is practically summed up in leaving matters alone. Within the past few years, however, the subject has taken a new development; and now we are not unaccustomed to hear of suture of the fragments with silver wire—not only as a proceeding suitable in cases which have resisted other treatment, but as justifiable immediately after the accident.

It may help to throw some light upon a difficult subject, if I submit the sequel history of a case in which such an operation was performed—the first, I think, in which we are able to examine the actual parts involved in what was regarded as a successful surgical proceeding.

I was sent for to my hospital, late one evening, to see a man who had just been brought in, and who was the subject of a very remarkable accident. He was aged about thirty-six, and had filled the position of first officer in a large foreign-going ship. I found him lying in bed, suffering from an extensive rupture of the knee-joint. There was a great gaping wound running directly across the knee, extending from condyle to condyle of the femur, with edges as sharply defined as if they had been made by a surgeon's knife. The patella was broken transversely; and, as the patient could not extend the limb, and the thigh and the leg lay at about right angles to each other, the condyles of the femur and the articular surface of the tibia were fully exposed. There was considerable oozing. As the case was one requiring very careful consideration, I determined to consult my colleagues next morning; and meanwhile dressed the wound with thymol gauze, etc.

The history I received from the patient was an interesting one. He had been operated upon by the late Mr. Amphlett, of Charing Cross Hospital, London, about a year previously. I subsequently wrote to that gentleman, not long before his lamented death, and received from him a letter, of which what follows is a portion.

"T. G. came under my care last autumn, while I was taking charge of the Seamen's Hospital, Greenwich, during Mr. Johnson Smith's absence from home. He had, about three weeks previously, fractured the left patella, for which he was treated at a foreign hospital (Amsterdam). When he came under my care, there was a very wide separation of the fragments, and the patient experienced the very greatest difficulty in locomotion on this account; and, as it did not seem to be a case at all suitable for help by means of any mechanical appliance, I (after consultation with my colleague, Mr. Davies-Colley) determined to make a resection of the broken fragments of the patella. This I accomplished, drilling the ends and passing stout silver wire. I effected drainage by means of two tubes passed right through the joint. The patient did very well—the temperature only rising to 100.3°. Some time afterwards, the wires were removed, and the fragments appeared to be united by bone. The joint, however, remained stiff."

Mr. Amphlett further said he had notes of the case, which he asked me to supplement; but I regret that his sad death disarranged our designs.

The patient stated that, after he left Greenwich, he gradually improved; but the joint had hardly any motion. It was slightly flexed, so as to cause him to walk on the anterior part of the foot, and he was unable to pursue his occupation. On the evening of the accident, he was leaving a shop; and when stepping down to the pavement, his toe caught in some obstacle; the limb was violently flexed as he tried to save himself from falling. He at once felt something snap, and an examination showed what terrible mischief had been done.

After a full consideration of the case, we believed that excision

offered a fair chance of success. This was accordingly at once performed. The fragments of the patella, and thin sections of the femur and the tibia, were removed; and the limb was put up in a thymol dressing, and in a plaster-of-Paris splint. The subsequent history may briefly be told. There was a good deal of suppurative, but there were no serious symptoms at any time; and the patient left hospital in eleven weeks, with the wound perfectly healed, a limb about three-quarters of an inch short, and much more useful than before the accident. I have seen him frequently since. He was able to lay aside artificial support soon after he left the hospital, and he walks so well that his lameness is hardly perceptible.

The fragments which were removed are now upon the table. They consist of the fractured patella and sections of the femur and the tibia. The latter two present examples of fracture *par écraquement*. On the tibia, just at the termination of the anterior arm of the external semilunar cartilage, is a thin plate of bone about the size of a sixpence, which has been torn out of a corresponding depression in the inner margin of the external condyle of the femur. The piece of bone is movable, and is attached to the tibia by a short fibrous structure. Just in front of the spine of the tibia is another minute piece; and along the inner margin of the articular surface, and somewhat anteriorly, is a strip about three-quarters of an inch in length and a quarter of an inch wide, from which bone has been torn. Finally, on the femur, about midway between the condyles, is a nodule of bone on a fibrous stump, torn from a depression half an inch in front of the spine of the tibia. The articular cartilages are smooth and healthy. The external inter-articular cartilage is perfect; but the inner one has disappeared altogether.

The patella itself is in two fragments. The fracture has taken place nearly in the line of the old injury; but there can be no doubt that osseous union existed in the bone after the original operation. Four holes remain (two above and two below the line of fracture) to indicate the position of the wire sutures. Union had taken place for about two-thirds of the distance across. Beyond that is a separation between the portions of the patella amounting to one-third of an inch. The fracture was almost extra-articular, only encroaching on the line of cartilage to the extent of half a line. The cartilage has nearly altogether disappeared, except round the margins.

This case presents many interesting features, and suggests some questions which it will be of advantage to consider. The character and the extent of the injury are remarkable. The fracture was not produced in the ordinary fashion, by muscular contraction, but very much in the same way that a long bone may be broken in its shaft by some violence applied at its distal parts. The difference I make is, that here the patella was fixed by the adhesions which had been set up after the operation, and entered into the formation of the practically ankylosed articulation. The whole joint was fractured; and the patella, as a constituent part of it, yielded to the same force, but not to the contraction of the quadriceps extensor muscle. The extent of the wound was also remarkable, for it reached from condyle to condyle; so that, when I came to excise the parts, I found it unnecessary to enlarge it in that direction, and had simply to convert it into an H by making an incision at each extremity of it. The rupture of the soft structures in this way was due to the previous operation. The integument had become adherent to the patella and other parts; it was very tense over the slightly flexed joint; and, when that flexure was increased, there was no possibility of the already much stretched skin resisting the sudden strain.

I am not aware of any case precisely similar to this; that is to say, of compound fracture of the patella (or rupture of the knee-joint) after bony union had been attained in the same bone for a previous fracture. This bursting of the knee-joint has occurred, however, on a few occasions, under somewhat different circumstances.

The late Mr. Poland, of Guy's Hospital, London, records a case in which a man had a wound on the patella about three inches and a half long, exposing the bone. The case progressed favourably, and the wound was nearly cicatrised, when, eight weeks after the first accident, he fell, tearing open the wound and fracturing the patella, so that the joint was opened. An attempt was made to save the limb by bringing the parts together, but pyæmia followed, and ultimately the patient was saved by amputation (*Medico-Chirurgical Transactions*, 1870).

Mr. Poland says he has only found one case, in the practice of Pelletan, bearing a strict analogy to the foregoing. There was first a wound, which was healed; and three months afterwards the patella was broken, and the newly cicatrised wound torn open. The parts were brought together; but gangrene threatened, there was delirium, and the patient died on the twentieth day, no opportunity for amputation having offered (*Clin. Chirurg.*, tome ii, p. 155).

In Sir Charles Bell's case, there was fibrous union of a fractured

patella, then rupture, laying open the joint. Immediate amputation followed (*Operative Surgery*, by Sir C. Bell, vol. ii, p. 204, pl. v).

Dr. Croker King mentions a similar case. There the patient refused secondary amputation, and recovered (*Medical Press*, December 8th, 1847, p. 353).

Cases of compound fracture of the patella, from whatever cause arising, are fortunately of comparative rarity, for the mortality is at least 25 per cent.; and, as to the rest, very few indeed recover with perfectly useful joints. Mr. Poland, in the paper already referred to, has collected sixty-nine cases of this injury, including gunshot-wounds. In twenty, the fragments of the patella were removed at once, with three fatal results; there was one secondary resection of the joint; four primary amputations with two recoveries; and five secondary amputations with four recoveries. Several recovered with stiff joints, after passing through long periods of suppuration.

The treatment pursued in this case may be questioned, especially by those who believe that, under the conditions of antiseptic surgery, wounded joints are not of serious moment. But we had here to weigh the probabilities of recovery by a treatment which would have consisted in bringing the fragments together and waiting for repair; or by the removal of the articular portions and the bringing together of vivified surfaces of bone as in excision. Between these, I had no doubt as to the course to be pursued. The joint was already a disabled one; it had lost its natural movement; it had been freely exposed to septic influences; and the result at best would have been ankylosis in the flexed position. But that ankylosis would have been reached through the tedious process of exfoliation of the cartilages, with all the attendant dangers of suppuration. The shock to the patient was but very slightly increased by removing the ends of bones already fully exposed, while the probability of speedy recovery with a sound and healthy ankylosis was rendered more sure.

But another and more important question is suggested by this case, and that is, as to the treatment of transversely fractured patellæ by cutting down upon the fragments, and directly suturing them by silver wire. This method of dealing with such accidents appears to have been first practised by Professor Cooper of San Francisco. In the *Medical Times and Gazette* of November 2nd, 1861, he writes: "Our method of treating transverse fractures of the patella, and one which has thus far been invariably successful, is as follows. Make a longitudinal incision of sufficient length to expose the fragments; drill the anterior margins of them with a drill one line in diameter; then pass a silver wire through the holes thus made, and, by crossing the ends and pulling stoutly upon them, bring the separated parts together. A knot is then made by twisting the ends of the ligatures together, which holds the fractured portions of the patella in apposition, by which a bony union always takes place." As essential to success, he insists that the wound be healed by granulation, and not by first intention. Lint should be placed in the wound, and the limb tightly bandaged from the toes to the middle of the thigh. The wires are removed about the sixth or eighth week.

Dr. Hector Cameron, of Glasgow, was the first in this kingdom to perform the operation, protecting it by all the safeguards of the Listerian method, and he has since been followed by many surgeons not only here, but on the Continent and in America.

Now we have arrived at a time when suture of the patella is advocated and practised not only in cases of non-union, but in every instance as a regular treatment. But when we come to look at the results which have been obtained, we are not impressed by the magnitude of the success. It is true that the patients generally recover, but some of them have narrowly escaped death, and such a risk would demand a very considerable advantage as its reward. In the cases reported by Henry Smith (*Lancet*, August 1878), Rose (*Lancet*, November 22nd, 1879), Royes Bell (*Lancet*, November 1st, 1878), Holmes (*St. George's Hospital Reports*, vol. x, 495), Lister (*BRITISH MEDICAL JOURNAL*, June 11th, 1881), movement of the joint was retained in a few instances, but it was not apparently free, and patients are described as walking with a slight limp, using a stick, and so on.

Is a fractured patella, united by ligamentous bonds, which afterwards stretch, so great a misfortune after all? I have never seen a case of osseous union in a living subject, and I have never seen a case in which a patient was disabled to any great degree by his fractured patella. Every surgeon has met with cases which get on very well without bony union, and without any special apparatus. I do not mean to say that in no instance ought this operation to be done, but I think it ought only to be recommended where the injury has become an absolute impediment to the patient's progression. In the present case, at all events, the man's position was not improved. He had a too flexible joint before the operation and a stiff flexed one after it, a condition which might have been practically secured by a properly adjusted

knee-cap. Moreover, I think we render these persons so operated upon often liable to such an accident as is here reported; for we may have, instead of movement, a spurious insecure ankylosis, with a joint covered by cicatrised and tightened integuments, liable to rupture on very slight provocation.

If, however, the operation in such cases should be rarely resorted to, it seems to me that it cannot be justified in recent accidents. Experience shows us every day the admirable results which may be attained by simple methods, and the facility with which persons with broken patellæ may pursue their avocations. Is it to be laid down as a rule that we are to wipe out such probabilities altogether, and to lay open a man's joint at once? If we could be assured of perfect motion with perfect union the justification would be strong, but who can assure us? Passive motion is always late and limited, because we cannot disturb the uniting fragments; and, meanwhile, changes are being effected in the synovial membrane, the cartilages and the ligaments generally, which may end in giving us a much worse joint than if we had left it alone. I am quite conscious of the great advances in operative work which the Listerian method has allowed to be made; but, thorough believer as I am in its efficacy and its complete safety where accurately carried out, there are risks which will always surround it, as they surround every scientific method. It has enabled us to do great things, but even with its help I cannot believe that we are justified in attempting to do what is unnecessary, when that proceeding is attended not only with danger to limb but to life also.

Mr. JESSOP (Leeds) advocated the treatment of fractured patella by direct union by wire-suture, and related two cases which had lately been under his care in the Leeds Infirmary. The first was one of compound fracture in a young man who, after falling from a considerable height in a quarry, lay exposed without help several hours. The wound (which extended quite across the joint), the fractured surface, and the joint itself, were filled with ashes, lime, and dirt. Much time and pains having been spent in cleansing the injured parts and in rendering them aseptic, the fragments were united by means of two silver wires passed through holes drilled through the bone, and the wound was dressed, and subsequently throughout treated antiseptically. The course of the case throughout was quite equable, and free from all inflammatory complications; union of the fragments took place without perceptible movement, and a perfect joint resulted. The second case was one of simple fracture of the patella, in which, from two to three weeks after the receipt of the injury, the fragments were exposed by incision and wired together, as in the former case, and with a like satisfactory result.

Mr. WHEELHOUSE (Leeds) related two cases of fracture of the patella—one compound, the other simple and of long standing—in which the joint was freely laid open, carefully cleansed under antiseptic precautions, and the bone sutured with silver wire. In both, cure was complete and lasting.

Dr. MOORE (Belfast) spoke of the sudden swelling in cases of fractured patella as indicating blood-effusion, and advocated the use of the aspirator to remove this. He also referred to the too frequent neglect of early treatment, and its influence in producing deformity.

Mr. TEALE (Leeds) related a case of badly united fracture of the patella of several months' standing. The fragments were widely separated, and the patient was constantly in danger of falling, especially in going downstairs or down a hill. Mr. Teale cut down upon the fragments, sawed off a disc from each, and united them by wire. Some difficulty in approximating the fragments was overcome by aid of Malgaigne's books. Full Listerian precautions were adopted. The patient made an uninterrupted recovery. Mr. Teale also stated that, for the last fifteen years, he had abandoned all mechanical appliances in the treatment of fractured patella, the limb being allowed to rest in an unconstrained position, supported by sand-bags. He believed that attempts to approximate fragments by external appliances were simply useless; the approximating forces being represented by ounces, whereas the separate forces, muscular, and from effusion, were represented by pounds.

AN examination for local surveyors and inspectors of nuisances was held by the Sanitary Institute of Great Britain on June 8th and 9th. There were thirteen candidates. The Institute's certificate of competency to discharge the duties of local surveyors was awarded to F. Hubber and J. W. Witts; and the Institute's certificate of competency to discharge the duties of inspectors of nuisances was awarded to H. Abrams, W. Atkins, J. Baxter, S. C. Fairchild, A. Finlay, T. Lightfoot, G. Steers, and N. Wright.

Dr. H. SLADE, retired fleet-surgeon, R.N., committed suicide at Bodmin by severing some of the arteries in his right thigh.