Remarks

ON

CERTAIN INJURIES COMMONLY ASSOCIATED WITH DISPLACEMENT OF THE HEAD OF THE HUMERUS.

ILLUSTRATED BY A SERIES OF TWENTY-SIX SKIAGRAPHS.

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In my experience the most common complication of fracture of the upper end of the humerus is dislocation of the shoulder. I find I have twenty-two radiographs taken of my own cases where this complication is depicted, and I can recollect in addition at least four cases where the diagnosis was obvious, but the condition of the patient would not allow of an examination by means of *x* rays. On three occasions when consulted regarding a fracture through the surgical neck, I have been told by the practitioner that the dislocated head had been present and had been reduced. Before Roentgen's discovery, both in the exceptionally large practice of H. O. Thomas and in my own, I can recall several fractures of the neck complicated by dislocations of the humerus.

In order of frequency, I would tabulate fractures of the shoulder connected with dislocation as follows:

1. Fracture through the surgical neck (Figs. 3, 6, 8, 9, 10, 11, 12, 13, 14, 17, 20, 23, 25).
2. Separation of the greater tuberosity (Fig. 5).
3. Fracture through the anatomical neck embracing the tuberosities (Fig. 7).
4. Fracture through the neck of the scapula embracing the coracoid.
5. Separation of the lesser tuberosity (Figs. 15, 16).
6. Fracture of the glenoid (Fig. 21).
7. Separation of the glenoid, anatomical neck (Fig. 18).
8. Separation of the anatomical neck of the humerus, not including the tuberosities (Fig. 22).

Out of 200 consecutive cases of complicated dislocations of the shoulder radiographed, I found 16 connected with fractures of the surgical neck. In all the cases the patients were over 30 years of age, and most commonly between the ages of 40 and 50.

The occurrence of this complication was well known and described by many of the older surgeons. Indeed, fifty years before the Christian era, Pasicrates (quoted by Malgaigne), in describing the injury, expressed his opinion that he preferred first to reduce the dislocation, and then to allow union of the humerus. Aristion, on the contrary, endeavoured so to arrange traction that it would act upon both head and shaft simultaneously, which presumably involved waiting for union before any attempt at reduction. Heliodorus supported the contention of Pasicrates; and so it will be noticed that in olden times, just as nowadays, schools existed, the one in favour of immediate reduction, and the other in favour of allowing the shaft to unite before proceeding with the displacement of the head. In the latter half of the fourteenth century Guy de Chauliac laid down precisely the law that, if a fracture of the shoulder is complicated by a dislocation, the dislocation should be first reduced, if possible; if it is not possible, then the fracture should be allowed to become firm, and the dislocation be subsequently reduced.

In recent times the best description of the injury, both in its pathological and clinical aspect, is that of Sir Astley Cooper, who had seen many cases in the living, and took the opportunity of dissecting three of them after death. In one, an old merchant who died in 1824, Sir Astley says: "I attended him in his last illness with Mr. Arnott, and as he had promised me the dissection of his arm, I claimed it of his executors and examined it with all the care of which I was capable." Cooper found the deltoid, teres major, and coraco-brachialis unaltered, the supraspinatus and teres minor wasted. The infraspinatus was put upon the stretch. The subscapularis passed over the head of the bone and adhered to its cartilaginous surface. The capsular ligament had been torn under the subscapularis tendon, but every other part was entire. The head of the os humeri had been broken off, and was

found in the axilla behind the coracoid, and it was firmly attached to the inner side of the scapula. The fractured neck of the shaft of the humerus impinged on the glenoid cavity widely separated from the head of the bone, and the shaft formed a good articulation with the glenoid. A capsular ligament had formed, and a ligamentous structure passed from the broken end of the shaft into the inner surface of the glenoid. The tendon of the biceps remained in the bicipital groove. In all three instances, it is curious to note, the upper end of the shaft of the humerus was snugly lodged in the glenoid. Hamilton, writing fifty years ago, refers to the records of many such accidents, and reports a case of fracture of the neck where he was able to reduce the accompanying dislocation on the eighth day. In 1861 Thamhain collected 68 cases, the accompanying fracture in 14 being through the anatomical and the rest through the surgical neck. Ten years ago McBurney collected 117 cases, including the separate collections of Oger and Poirier and Manclair, the diagnosis in all instances being based solely on clinical evidence, radiographic confirmation not being, of course, available at so early a date. Still more recently Stanley Boyd, in Treves's *System of Surgery*, refers to the complication as the most common in connexion with dislocation, and he adds that it presents symptoms very similar to that of dislocation of the head. Every surgeon of observation and with experience of fractures will recall this combination of injuries, and yet I cannot remember seeing in any recent textbook or monograph, among the many radiographs printed, a single instance of fracture of the humerus high up with dislocation of the head. This omission I make good by publishing several examples gathered from a great number which have come under my observation, together with radiographs of other complications likely to be mistaken for them.

The etiology of the injury is not clear. It is quite possible that on odd occasions the fracture follows the dislocation, but in the great majority of instances it occurs most probably synchronously. This theory is borne out by the fact that in nearly all cases the injury is brought about by a fall on the shoulder. McBurney, in discussing the mechanism of the accident, ascribes it to a sudden abduction of the arm which first dislocates it, continued abduction producing fracture against the edge of the glenoid or the acromion. My cases are quite opposed to this theory, as in nearly all of them fracture occurred in consequence of a direct fall upon the shoulder. As the plates show, the head of the bone may take any position. It may be rotated and even at times so completely reversed that the fractured end of the upper fragment is in apposition with the glenoid (Fig. 23).

In a recent case the symptoms suggest a dislocation of the shoulder or a fracture through the neck of the scapula. Careful examination, however, should always make the distinction clear. The deltoid is flattened, there is considerable haemorrhage in the axilla, the head may be felt there, while the arm is flexed and only slightly abducted. The symptom which should clear the diagnosis is the absence of the head from the socket and its independence of the shaft. In only one instance in a recent case have I found the head of the bone respond to the movements of the shaft. In dislocation accompanied by fracture the axillary haematoma is more marked and the pain more severe, while the mobility at the shoulder is distinctly more pronounced than in a simple dislocation. Fracture of the neck of the scapula may be known by the ease with which it is reduced, the crepitus on reduction, and the immediate return of the deformity when the arm is allowed to hang.

My experience tells me that the shoulder should be reduced at the earliest possible moment. Delay may seriously complicate the result. An unreduced dislocation is often the forerunner of an ununited fracture. In two of Sir Astley Cooper's three dissections he found the humerus attached to one part of the scapula and the head to another, but no union between the broken ends. In the third he found vicious union by means of a small spicule of bone. The combination of unreduced dislocation and fracture is extremely serious. The head of the bone, as some of the radiographs show, is so displaced and the ineffective callus so exuberant that the arm is not merely seriously restricted in movement, but painful pressure symptoms result. One case, a drayman, who for two years

had an ununited and unreduced head in the axilla, could neither work nor rest. The condition of his arm began to be suggestive of that grave condition known as Volkmann's ischaemic paralysis. The fingers and wrist were stiffened, bluish, glazed, and emaciated, and I only partially relieved his symptoms by excising the head of the bone. The head was adherent by fibrous tissue to the inner border of the scapula, and had to be carefully dissected from the soft tissues around the vessels. In another case, in which I attempted reduction in the sixth week by Kocher's method, I refractured the humerus, and while I succeeded in materially improving the position of the detached piece, which was never reduced, the joint limitations will ever remain very marked. Twice I had the opportunity of examining patients some weeks after their accident, one case being that of a medical friend, and in each case I found the range of movement sufficiently promising to warrant a decision against operation; and in two instances, when I have suggested excision of the head, the operation has been refused.

Immediate reduction may be very simple, very difficult, or quite impossible. The difficulty may be due to the position or retention of the head, or to the rent in the capsule, and is very much increased when the articular end has turned so that it faces outwards. In some of my cases so complete was the displacement and so divorced was the head from its surroundings that the fractured end articulated with the glenoid. In another case, where the conditions were more favourable reduction, took place while the patient was being prepared for an anaesthetic. In February last it took my friend, Mr. Newbolt, and myself nearly half an hour to reduce a case only two days old. We tried many methods—toes in the axilla, manipulation, rectangular extension—and we finally succeeded when the arm was well pulled directly upwards and the head strongly forced towards the axilla.

It is unscientific to suggest any routine method for the reduction of the loose head, which may have taken any of half a dozen different positions. Sir Astley Cooper, who was very pessimistic with regard to treatment, wrote "If reduction be ever effected it will probably be by an extension with the heel or knee in the axilla. It was the practice of H. O. Thomas, with whose work I was familiar, to place the patient on a chair, fix the scapula, place his knee under the axilla, and get an assistant to extend the arm forcibly in a rectangular direction. This very much resembled in principle the method by the foot in the axilla, and he succeeded in two recent cases with very little effort.

The method which has proved most successful with me is the forcible extension of the arm held vertically, with often very hard pushing upwards of the fragment. We must remember that to succeed in reducing this displacement, even in a recent case, is very creditable, as the difficulties are often insuperable. Of 80 recent cases where manipulation, gentle and forcible, was tried, only thirty-six reductions were accomplished, while forty-four failures occurred.

The surgeon should be urged to try any and every method to reduce the head rather than submit the patient

to the very positive risks of operation. Only two operations need be discussed: one is excision of the head of the bone, and the other McBurney's ingenious method of reduction. Either operation should be postponed until the absorption of blood clot. Excision of the head should only be performed in old cases in which pressure or obstructive symptoms demand it. McBurney's operation should be performed in all cases in which manipulation has failed and before union of the shaft is advanced. McBurney's operation consists in making an incision in the soft parts on the outer aspect of the upper fragment down to the bone; a hole is then drilled in the bone, a stout hook inserted, and direct traction made upon the upper fragment in the proper direction. Four successful cases have been reported.

Having reduced the dislocation, the fracture of the humerus is of comparatively little moment and need not be dwelt upon. If the patient's condition will allow, he should be permitted to sit up from the first, as this is the least harmful method of applying extension to the lower fragment. Perfect end-to-end apposition is rarely available, and the most perfect appearances, from an artistic point of view, are often those in which the lower end of the shaft is impacted into the upper (Figs. 3 and 6). Fortunately, perfect apposition is not necessary to obtain a good practical result. I have seen very perfect movement in cases in which the union was not pleasing to look at (Fig. 20), and have experienced disappointment in cases in which inspection of the bond of union leaves nothing to be desired. The explanation is not far to seek. The serious disabilities which follow fractures and dislocations at the shoulder are due, in the great majority of cases, to injuries inflicted at the moment of accident, and bear but little relationship to the position of fragments. For this amongst other reasons I would strongly deprecate the wiring of fragments in fractures through the surgical neck. I have seen many hundreds of cases of this fracture, and I cannot recall an instance in which I think wiring would have been of service. As every practical surgeon knows, the operation is one of the most difficult in surgery, involving as it does exposure of the joint. To

my own knowledge, in the hands of good men it has resulted in disaster, and the so-called successes are no better than the average result obtained by simple and safe procedures. Indeed it is rare to find any worse disability following this fracture than a varying degree of limitation in movement, and this is often due to the formation of adhesions which the surgeon can easily control. To prevent this, massage and passive movements should be systematically practised between the fourth and eighth week.

THE JOURNEY TO TORONTO.—We are informed by Messrs. Stockwell and Co., 8-10, Beak Street, W., that they have received official intimation that the Canadian Pacific Railway Company's steamship *Empress of India* will sail for Quebec and Montreal on Friday, August 10th, instead of August 4th, as previously advertised, and the Allan Line turbine steamers will sail one day later than advertised, namely, ss. *Virginian* on July 20th, and the *Victorian* on August 3rd.

RADIOGRAPHS OF MR. ROBERT JONES'S CASES,
BY DR. DAVID MORGAN.

1. Split fracture of shaft of humerus with subcoracoid dislocation.
2. Oblique fracture of upper end of humerus with subcoracoid dislocation and separation of greater tuberosity.
3. Fracture of surgical neck of humerus with impaction.
4. Subglenoid dislocation of humerus with fracture of tuberosity and ossification of muscle.
5. Fracture of greater tuberosity of humerus.
6. Fracture of surgical neck of humerus, showing well the lower fragment driven into the upper.
7. Subglenoid dislocation of humerus with fracture of anatomical neck and separation of greater tuberosity; also oblique fracture through middle of shaft.
8. Fracture of surgical neck of humerus with dislocation of head.
9. Fracture of surgical neck of humerus with dislocation of head.
10. Fracture of surgical neck of humerus with subclavicular dislocation and separation of greater tuberosity, upper end of shaft resting in glenoid cavity.
11. Fracture of surgical neck of humerus, with displacement upwards of head and inwards of shaft.
12. Oblique fracture of humerus extending downwards from surgical neck.
13. Fracture of surgical neck of humerus.
14. Fracture through neck of humerus and scapula, dislocation of head and separation of greater tuberosity; note the impaction of shaft into head.
15. Subglenoid dislocation of humerus, with separation of greater tuberosity to outer side and lesser to inner side.
16. Subcoracoid dislocation of humerus, with fracture of greater tuberosity.
17. Fracture through surgical neck of humerus, with dislocation of head downwards and inwards (outline intensified).
18. Fracture of anatomical neck of scapula.
19. Normal shoulder.
20. Fracture of surgical neck of humerus, with displacement outwards and backwards of shaft.
21. Fracture of the glenoid cavity.
22. Fracture of the anatomical neck of humerus.
23. Fracture of surgical neck of humerus, with displacement outwards of head, upper end of shaft in axilla; also oblique fracture of shaft extending along upper third.
24. Ditto.
25. Oblique fracture of upper end of humerus in a child.
26. Subspinous dislocation of humerus.

Fig. 1.

Fig. 4.

Fig. 2.

Fig. 5.

Fig. 3.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

Fig. 12.

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Fig. 18.

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Fig. 23.

Fig. 20.

Fig. 24.

Fig. 21.

Fig. 25.

Fig. 22.

Fig. 26.