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PROGNOSIS OF POSTERIOR DISLOCATION OF THE SHOULDER

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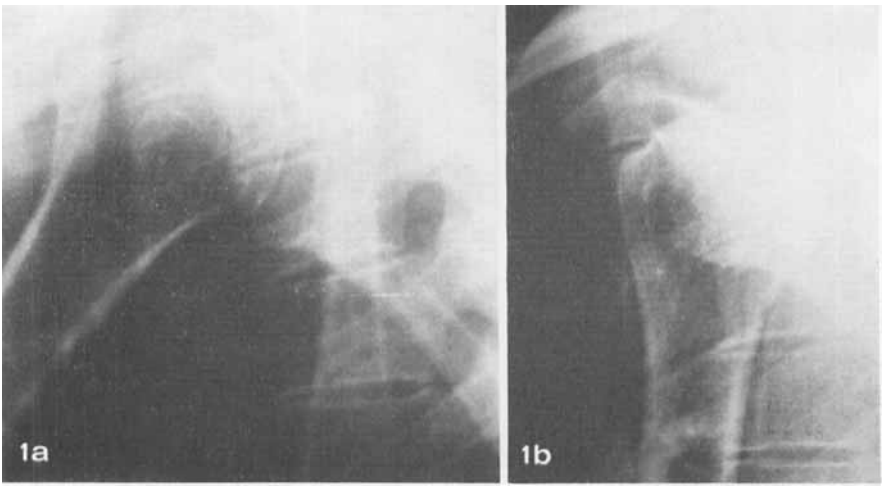
The occurrence of three posterior dislocations of the shoulder at Charity Hospital during 1968 aroused interest in this problem. The charts of all shoulder injuries requiring admission were reviewed from 1941 at Shreveport's Highland Hospital, from 1942 at New Orleans' Charity Hospital, from 1945 at the Ochsner Clinic, from 1950 at Shreveport's Confederate Memorial Hospital, from 1953 at the New Orleans' Veterans Administration Hospital, from 1960 at the New Orleans' Public Health Hospital, from 1964 at New Orleans' Southern Baptist Hospital, from 1964 at New Orleans' Touro Infirmary, from 1966 at Shreveport's Schumpert Memorial Hospital, and from 1967 at Kessler's Air Force Hospital. In addition, private orthopaedists were solicited for patients who had been treated for this dislocation. Forty-two posterior dislocations of the shoulder were found. This study is presented to ascertain the characteristics, complications, and prognosis of posterior dislocations of the shoulder.

DIAGNOSIS

Posterior dislocation of the shoulder is reported to be infrequently seen and frequently misdiagnosed. Characteristic histories are shoulder pain and/or disability preceded by convulsion, electric shock, or a force applied to the anterior aspect of the humeral head or to the long axis of a flexed, adducted and internally rotated humerus. Physical examination may reveal (1) the head of the humerus to be prominent posteriorily with a corresponding flatness anteriorily, (2) prominent coracoid, (3) the arm is held in internal rotation or neutral position, (4) limited abduction, and (5) absent external rotation. Recurrent posterior shoulder dislocation is said to usually cause little impair-



Figures 1A and B. A. *Normal arch formed by axillary border of scapula and posterior margin of the humeral neck and shaft, shoulder in reduced position.* B. *Moloney's line showing the posterior dislocation.*

ment of motion or pain. The above history and/or physical findings should alert the examiner to the possibility of a posterior dislocation of the shoulder.

Roentgenographic findings are diagnostic with axillary views which demonstrate the posterior position of the humeral head relative to the glenoid. In addition to the axillary view the transthoracic lateral is also diagnostic. However, the quality of this roentgenogram is not as predictable as the axillary. With a transthoracic view of good quality the scapulohumeral arch is visible. This arch is formed by the axillary border of the scapula and the posterior margin of the humeral neck and shaft. Normally, the arch is graceful. On posterior dislocation this arch is disrupted and becomes a sharp angle. Dorgan calls the interruption of the normal scapulohumeral arch Moloney's line (Figure 1A and B).

Although the diagnosis is usually not recognized on the anteroposterior roentgenograms, certain suggestive signs may be present:

1. *Internal rotation of the humeral head* (Figure 2) is indicated by the absence of the greater tuberosity whose sharp outline is present when the humerus is held in external rotation.

2. *Absence of the half-moon overlap* (Figure 2) occurs when the humeral head does not overlap the glenoid. Normally, the head of the humerus overlaps the glenoid resulting in a half-moon appearance.

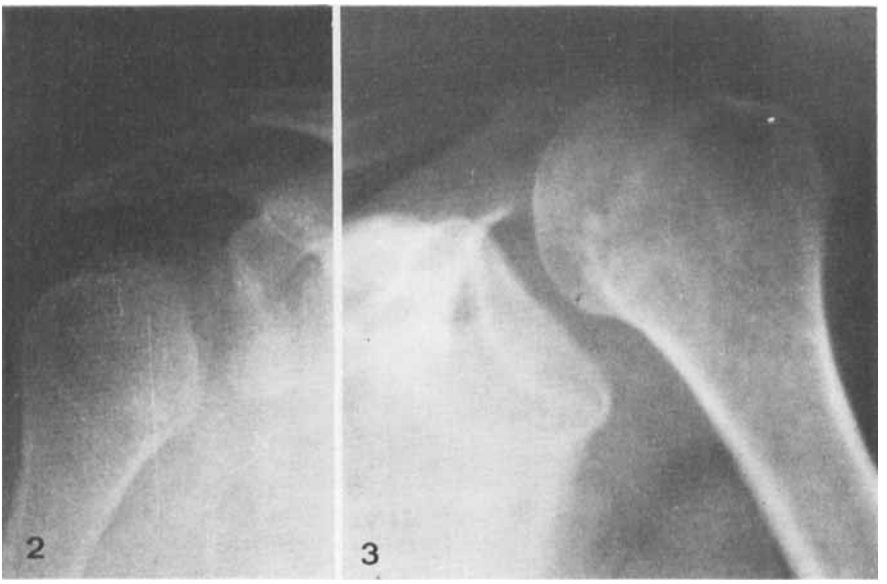


Figure 2. See text on suggestive signs seen on anteroposterior roentgenograms.

Figure 3. Velpeau position prior to reduction; note the upward displacement of the humeral head in relation to the glenoid.

3. *Flattening of the medial aspect of the humeral head* (Figure 2) occurs due to internal rotation of the humerus. In the neutral or externally rotated position the medial outline is convex. In posterior dislocation, this convexity becomes flattened. The flattening corresponds to McLaughlin's operative findings that there was "a deep vertical defect in the anterior aspect of the humeral head which was situated just medial to the lesser tuberosity".

4. *Reverse Velpeau or Velpeau position* (Figures 2 and 3) refers to downward or upward subluxation of the humeral head in relation to the glenoid respectively.

5. *Positive rim sign* (Figure 2) indicates that the distance between the anterior rim of the glenoid and the lesser tuberosity becomes greater than six millimeters with posterior dislocation.

6. *Cystic or hollow appearance of the humeral head* (Figure 2) is due to the greater tuberosity being anteriorly rather than laterally when the x-ray is being taken.

CLASSIFICATION

Posterior dislocations of the shoulder have been classified by Dorgan into three types: (1) rotational subluxation where the posterior glenoid lip is indenting the humeral head, (2) subacrominal or retroglenoid, and (3) subspinous. Nobel has described an additional type, the rare posterior subglenoid dislocation.

CLINICAL MATERIAL

Data on forty-one patients with posterior dislocations of the shoulder were analyzed as to sex, age, type of violence, associated injuries, neurovascular complications, length of follow-up, delay in diagnosis, treatment and results.

The male-female ratio was two and four tenths to one. The ages ranged from fourteen to seventy-eight years. Twenty-four patients sustained their initial posterior dislocation of the shoulder between the ages of fourteen and thirty-seven years. However, this injury is not limited to the young, as four patients were in their eigth decade when they first dislocated their shoulder.

The causes of the dislocations are: major trauma, seizures, and ordinary activity. Laxity of ligaments would appear to be a predisposing factor. Twenty-nine patients sustained posterior dislocations of the shoulder following major trauma, the most common being a fall. One patient sustained bilateral posterior dislocations following a ship explosion. Eight patients had convulsions which caused their dislocations. Two patients had brachial plexus injuries sustained at birth. One patient dislocated her shoulder while bending down to tie her shoe laces, and one patient had suffered from bilateral shoulder dislocations since childhood.

There were nineteen associated fractures. Fifteen patients had compression fractures of the humeral head. One patient sustained an associated fracture of the greater tuberosity. One patient had a fracture of the ipsilateral humeral head. One patient had a fracture of the ipsilateral clavicle, and one patient a fracture of the contralateral right second metacarpl in addition to the compression fracture of the humeral head.

Two patients had neurologic complications. One had a transient radial nerve palsy which cleared three months after the injury; the other patient had an axillary nerve palsy which was detected one month after the injury. Sensation over the deltoid returned six and one-half months after the injury, with motor impairment still being present two and one-third years after the injury.

Length of follow-up for the forty-one patients ranged from one day to sixteen and three-quarter years. Average length of follow-up was 22.7 months. Sixteen patients had follow-up of eighteen months or more. Ten patients had medical supervision for less than two months.

Twenty-seven patients had their dislocation diagnosed on admission. Delay in diagnosis for the remaining patients ranged from three days to seven years.

TREATMENT

Of the forty-one patients twenty-four had conservative therapy. Eleven patients had surgical repairs of their shoulder dislocations. Six patients were lost to follow-up.

After closed reduction shoulder immobilization ranged from two to eight weeks depending on the physician in charge. Three patients refused to be immobilized after reduction. Immobilization was accomplished by Velpeau dressing, shoulder spica, sling and swath, Richard belt and airplane splint. Nine patients had recurrences after this conservative therapy, and five of these recurrences occurred in patients whose shoulders were immobilized for less than three weeks. Three patients were immobilized for five and one-half, six, and eight weeks respectively. The remaining patient's treatment for his initial dislocation is not known. Of the nine patients eight were thirty-seven years of age or younger. Four of the patients were female and five male. One patient initially had an anterior dislocation which after surgical repair recurred posteriorly. One patient two years prior to the diagnosis of a posterior dislocation of the shoulder had an anterior shoulder repair. One week after his posterior shoulder arthroplasty an anterior shoulder dislocation was diagnosed and reduced without surgery. Two patients with initial posterior dislocations recurred anteriorly. Confirmatory roentgenograms on these last four patients are not available.

RESULTS

Shoulder function was graded excellent, good, fair or poor. An excellent result meant that the injured shoulder could not be distinguished from the normal shoulder by the examiner. A good result meant there was no pain, but shoulder motion was not equal to the normal shoulder. However, the slight limitation of motion did not prevent customary activities. A fair result meant there was discomfort, and the limitation of motion prevented some customary activities. A poor result meant there was pain and the limitation of motion prevented most activities.

Fourteen patients treated conservatively without recurrences were analyzed. Results were excellent in five patients (ages twenty-two, twenty-six, forty, fifty-nine and sixty-one years), good in four patients (ages thirty-one, thirty-six, thirty-seven and thirty-nine years), fair in three patients (ages fifty-four, seventy-three and seventy-seven years), and poor in two patients (ages fifty-five and seventy-eight years).

Eleven patients underwent fifteen operations for recurrences, pain and/or old dislocation. Various procedures used include posterior Putti, Platt, osteotomy of glenoid neck with posterior shoulder arthroplasty, posterior bone block, Neer prosthesis, Reverse Bankhardt, subscapularis lengthening, and L'Episcopo procedure. Shoulder dislocations recurred after posterior bone block, muscle tightening, and Reverse Bankhardt repair. Excellent results were obtained with the

posterior Putti Platt, subcapsularis lengthening, and Reverse Bankhardt repair.

Two patients had old posterior dislocations of the shoulder which required surgical treatment. The twenty-nine year old male who had a four and one-half month old dislocation achieved an excellent result with a posterior bone block and capsule repair. The fifty-six year old male with a thirteen-month-old dislocation was pleased with the prosthetic replacement. His pain was relieved and his range of motion was good.

Three patients had had posterior dislocations of the shoulder for eighteen months or more. On examination of these patients, the authors found that they had functional shoulder fusions. The position of the shoulder was unphysiologic in that the patients held the shoulders in some adduction and there was an internal rotation contracture.

Eighteen patients had associated shoulder fractures. Results were excellent in three patients (ages forty, fifty-nine and sixty-one years), good in six patients (ages nineteen, twenty-nine, thirty-one, thirty-six, thirty-seven and thirty-seven years), fair in one patient (age fifty-four years), and poor in five patients (ages forty-six, forty-eight, fifty-five, sixty-four and seventy-eight years). Of the remaining three patients, two were lost to follow-up and the other had no range of motion recorded. Four of the five patients with poor shoulder function were in a dislocated position for more than one year.

DISCUSSION

The authors examined sixteen of the forty-one patients. Roentgenograms are available for study on twenty-eight of the forty-one patients discussed in this paper. Axillary and transthoracic laterals were not taken routinely and/or are not available on some of the above twenty-eight patients. The diagnosis was made in certain instances by the clinical picture and the suggestive signs seen on the anteroposterior roentgenogram.

Due to the lack of adequate roentgenograms, the forty-two posterior dislocations of the shoulder cannot be tabulated according to type. We can conclude from available information that the most common is the rotational subluxation type where the posterior glenoid lip is indenting the humeral head. If the subluxation becomes a retroglenoid type, the compression fracture of the humeral head progresses and the humeral head is sheared into at least two separate parts (Figure 4).

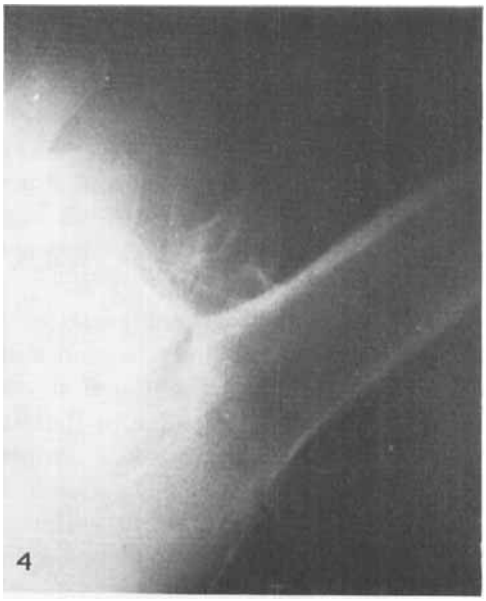
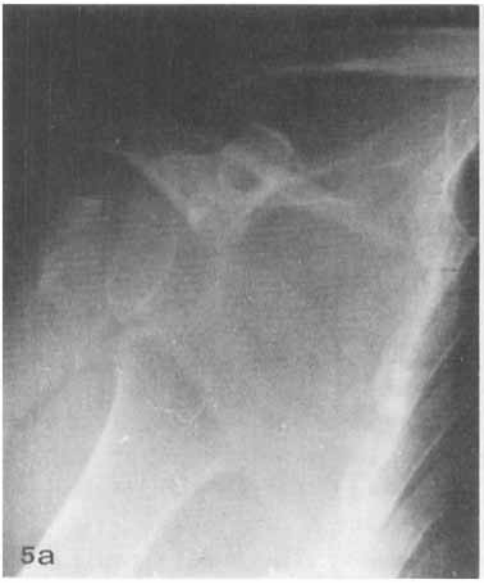


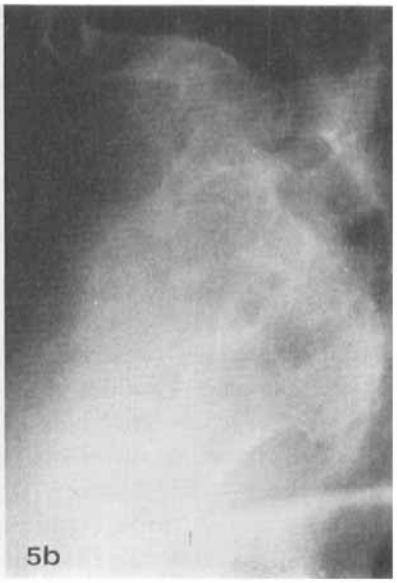
Figure 4. Retroglenoid type of dislocation with the humeral head sheared into two separate parts.

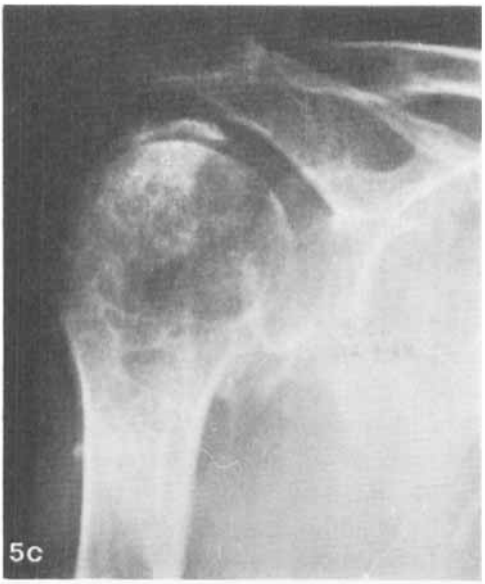
One question which should be answered is: Do the different types of posterior dislocations of the shoulder have the same prognosis? It would appear that the least amount of damage to bone and soft tissue occurs with the rotational subluxation type. Damage is increased with the retroglenoid and subspinous types. The rare posterior subglenoid type causes the most damage. If prognosis depends on the amount of damage the rotational subluxation type would have the best prognosis, and the posterior subglenoid type of posterior dislocation of the shoulder (Figures 5A, B and C) would have the worst prognosis.

Analysis of data relating to patients shows that the presence of associated fractures may have delayed diagnosis of the posterior dislocation. Faulty or late diagnosis may be avoided by axillary and/or transthoracic roentgenograms.

Prior to the current report there had been presented in the literature only one patient with an associated neurologic complication which was transient. However, two of the patients in this series had neurologic deficits. It had been assumed by some authors that since the dislocating humeral head's position was posterior this complication was most rare. Neurovascular complications may be caused not only by the dislocating head but also by the trauma causing the dislocation. Therefore, it is







Figures 5A, B and C. A and B. *Admission X-rays of subglenoid type of posterior dislocation with fracture of the greater tuberosity.* C. *6 months after dislocation was reduced showing soft tissue calcification in supraspinatus tendon.*

suggested that thorough examination may disclose additional instances of neurovascular complications.

With immediate diagnosis, reduction and immobilization for three weeks, the prognosis of initial posterior dislocatons of the shoulder

should be good. The greater the delay in treatment the poorer the results. Recurrence of the dislocation is unlikely after the age of fifty. Our data suggest that the functional results are good to excellent in patients under forty years of age and fair to poor in patients over fifty-five years of age. However, two patients fifty-nine and sixty-one years of age had excellent results.

The use of various surgical procedures implies that no single operation is generally accepted. It also suggests the difficulty of obtaining predictable success with any given method. Since more than one anatomic lesion can predispose to recurrent posterior shoulder dislocation, the surgical repair selected must take this into account. Tears or laxity of the posterior shoulder capsule, defect in the posterior glenoid rim, and/or forced internal rotation of the arm are some of the factors which must be considered in selecting the proper procedure. Cadaver experiments have shown that forcible internal rotation of the arm produces a tear in the posterior portion of the capsule. This tear allows the shoulder to dislocate posteriorly. The inciting cause is the strong contraction of the subscapularis. Wilson has treated one patient with a recurring posterior shoulder dislocation with lengthening of the subscapularis tendon and a posterior bone block. The patient is thirty-three months postoperatively without a recurrence. The posterior bone block is no longer visible on roentgenogram. Wilson feels that reduction has been maintained by removing the inciting cause. The authors conclude that in addition to surgical repair of the posterior capsule or posterior bone block, lengthening of the subscapularis tendon should be done.

Management of old unreduced posterior shoulder dislocations should be surgical if there are no medical contraindications. The authors are in agreement with Carroll who holds that functional shoulder fusions in poor position are undesirable. Old unreduced dislocations should have an open reduction, a posterior bone block and/or posterior repair of the capsule if prior to surgery the shoulder can be reduced under general anesthesia. Lengthening of the subscapularis tendon should also be done. If the dislocation is not reductible a prosthesis or shoulder fusion is indicated.

SUMMARY

Forty-one patients with posterior dislocations of the shoulder are analyzed with respect to age at time of injury, sex, associated injury, neurovascular complications, treatment, results, length of follow-up,

and delay in diagnosis. The results after treatment are affected by the patient's age. Good function occurs in the younger patients. Recurrence of the dislocation is uncommon when the initial dislocation occurred after the age of fifty. The authors conclude that the initial dislocation should be immobilized for three weeks in abduction, extension, and external rotation. The recurrent posterior shoulder dislocation should be managed surgically with lengthening of the subscapularis tendon. The old unreduced posterior shoulder dislocations should have a posterior bone block and/or posterior repair of the capsule if prior to the surgery the shoulder can be reduced under general anesthesia. Lengthening of the subscapularis tendon should also be done. If the dislocation is not reducible a prosthesis or shoulder fusion is indicated.

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