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Rupture of Pectoralis Major Muscle

A CASE REPORT AND REVIEW OF LITERATURE

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Rupture of the pectoralis major muscle is very rare. This was first described in 1822 by Patissier, followed by Letenneur in 1861⁷. In 1881, Weinlechner reported two cases in infants⁷. We would like to add our case to the previously reported twenty-nine cases^{1,3-11,13-17} in the English literature and discuss etiology, location of rupture, age distribution, and final results. We believe this is the first attempt to demonstrate statistically the incidence, cause, symptoms, signs, location, and results of the rupture of the pectoralis major muscle.

Case History

A thirty-one-year-old white male dentist was admitted to the Veterans Administration Center, Dayton, Ohio, on July 11, 1968. He had been healthy until June 25, 1968. Then, while he was coming down from the attic, his ladder skidded, causing him to fall. The opening of the attic was .232 square meters, and as his elbows were caught in the opening, he made an effort to prevent his fall. His left arm went through the opening and his body twisted to the right while he was still trying to break the fall by putting tension on his right arm. He felt a sudden sharp pain in the right shoulder followed by a warm numbness and cramp-like contraction in the right arm and chest. Later he also noted bluish discoloration of the skin over the right shoulder and medial aspect of the right arm. The following day the ecchymosis had spread to the right elbow. On seeing himself in a mirror he noticed a depression of the right anterior part of the chest. There was a mild, constant pain in the right shoulder area for the first few days, and he felt considerable weakness of the right arm.

The patient was a well developed, moderately muscular man in no acute distress. There was a fading ecchymosis in the right anterior part of the chest wall and medial aspect of the right arm. The right anterior axillary fold was less prominent than the left (Fig. 1). There was a tender soft-tissue mass in the right pectoral region, especially on contraction of the pectoralis major. Considerable weakness was elicited in medial rotation and flexion as well as adduction of the right arm. The right shoulder was lower than the left. Roentgenographic examination failed to demonstrate fracture or dislocation but showed absence of the normal soft-tissue shadow of the right anterior axillary fold. The preoperative diagnosis was rupture of the pectoralis major muscle.

On July 12, 1968, he underwent exploration through incision along the right anterior axillary line. Rupture of the pectoralis major muscle was verified. There was 200 cubic centimeters of dark liquified hematoma between ends of ruptured pectoralis major muscle. The rupture was found at the musculotendinous junction with medially contracted proximal muscle mass (Fig. 2). Four drill holes were made through the cortex of the humerus just lateral to the bicipital groove, and the proximal stump of the muscle was sutured to the humerus through these holes while the arm was internally rotated and adducted. The distal tendinous stump was also sutured to the proximal stump. The right arm was immobilized in adduction with Velpeau's dressing for the first two weeks, after which a sling was applied for the next two weeks. The postoperative course was uneventful, and active exercise was started in the fourth week after operation. At the time of this writing, three months after operation, the patient has regained full function, muscle strength, and normal contour of the right anterior chest.

Discussion

In the twenty-nine reported cases, the age range (where specified) is from infancy to seventy-two years with the highest peak from twenty to thirty years (Table I). Rupture of the pectoralis major muscle has been reported exclusively in males,

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and the occupations of the patients included two wagon or truck drivers, two mechanics, and two laborers, and one of each of the following: miner, salesman, gardener, soldier, student, drill press operator, wrestler, dentist, and boxer.

The commonest cause of rupture of the pectoralis major muscle is heavy lifting from improper muscle coordination, present in seven. The next commonest is crush injury from being run over by a wheel, present in five. Other causes were as follows: three from direct blows, three from violent involuntary contraction, three spontaneous, two received by infants during delivery, two from forcible adduction, two from a strong pull of the arm, two from a strong push, and one from boxing although the patient was not struck.

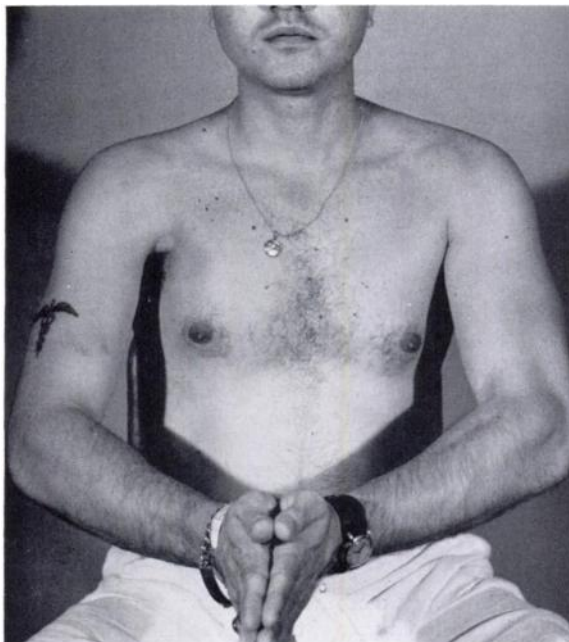


FIG. 1

Absent right anterior axillary fold; fading ecchymosis on arm and anterior chest wall. Right shoulder is lower than the left one.

In 1924, Moulonguet reported spontaneous rupture of the pectoralis major muscle following sudden cold exposure in a seventy-two-year-old man⁷. The autopsy finding was partial rupture of the right pectoralis major muscle, thought to be due to senile change of the muscle. This type of muscle rupture occurs more often in extremely muscular athletes when the muscle is isometrically holding at maximum power.

Location of Rupture

Among twenty-four cases in which the extent of rupture was described, there were five total ruptures and nineteen partial ruptures. In four cases with total rupture, the tendinous insertion was involved and in one case the mid-muscular portion ruptured. No case of total rupture occurred at the musculotendinous junction. In contrast, rupture at this junction occurred in six of the reported nineteen partial ruptures. The other frequent locations of partial rupture were the muscle mass itself in seven and the tendinous insertion in five. The pars sternocostalis was involved in twelve cases; the pars abdominalis in four. In animal experiments by McMaster, it was noted that under heavy load the tendinous insertion or musculotendinous junction would rupture rather than the tendon itself. "Rupture of the

musculotendinous junction is more common in younger people than in older ones whose tendons have undergone degenerative changes"¹².

Symptoms and Signs

The commonest symptom is a sudden, sharp pain in the arm and shoulder at the time of injury, described in fifteen of twenty-two cases. Three patients experienced a snap or felt something give in the shoulder at the moment of injury.

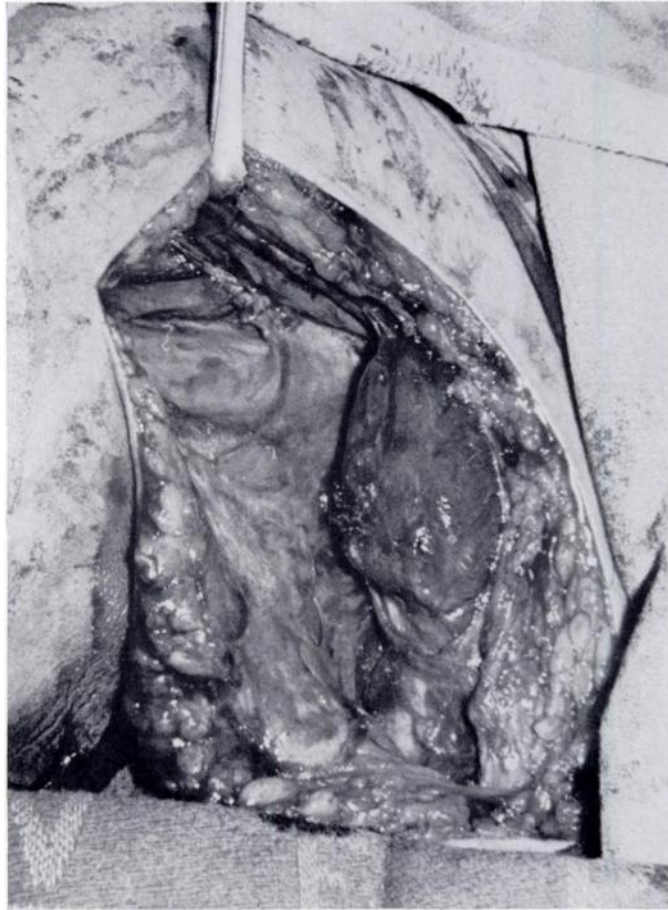


FIG. 2

Retracted proximal muscle end and distal tendinous insertion.

The most common physical findings were the presence of ecchymosis and a sulcus at the point of rupture followed by a bulging muscular mass on contraction and weakness in adduction and internal rotation of the arm. Heimann reported the persistence of a flaccid muscle and a decrease in circumference of the affected arm five months after rupture at its sternal origin of pars sternalis. Kingsley, in his case, noted some residual weakness of pectoralis major muscle eight years after injury. The roentgenographic demonstration of absence of the pectoral shadow is a reliable sign and is helpful in making a preoperative diagnosis as in our case.

Results

There are varied descriptions of the final results of treatment in the thirty reported cases. They are as follows: completely restored function, ten cases; no men-

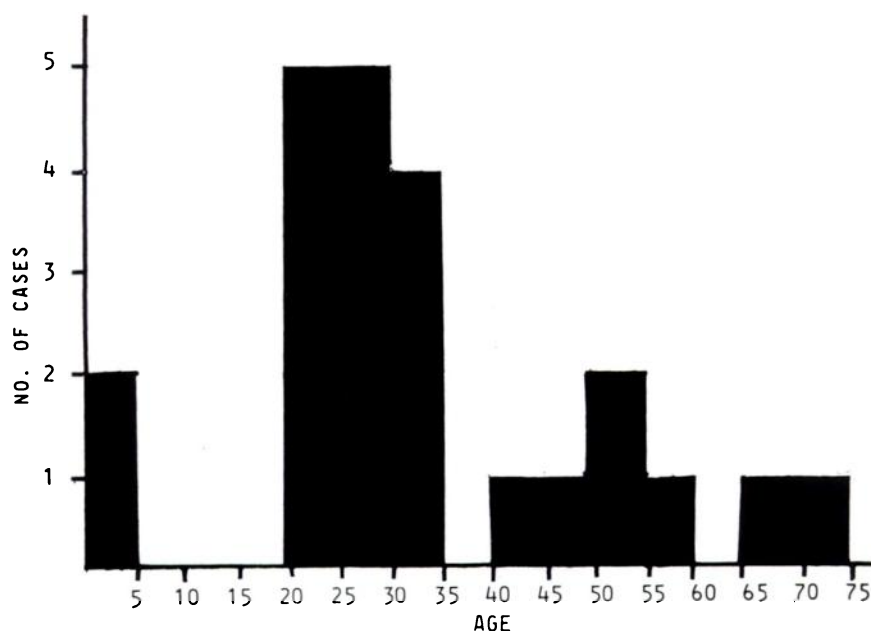
AGE DISTRIBUTION OF 24 CASES

FIG. 3

TABLE I
TREATMENT AND RESULTS

Treatment	No. of Cases	Results	No.	Per cent
Surgical	10	Excellent	8	80
		Good	1	10
		Not mentioned	1	10
Conservative	12	Excellent	2	17
		Good	7	58
		Fair	2	17
		Died (infection)	1	8
None	3	Favorable	1	33
		Not mentioned	2	67

tion, eight; fairly good result, three; visible pectoral defect, two; 25 to 50 per cent disability, two; died, two; excellent, one; no permanent disability, one; and progressively favorable, one.

We graded these results, including our case, according to the criteria shown in Table I. Among thirty-one patients, ten were treated surgically, and twelve conservatively. Three had no treatment, and in six, the treatment was not mentioned.

The surgical treatment resulted in 80 per cent excellent, 10 per cent good, as compared with 17 per cent excellent and 58 per cent good under conservative group. One patient, under conservative treatment, died of an infected hematoma and another whose treatment was not mentioned died of pneumonia.

In the conservative group, there were varying degrees of weakness in adduction and internal rotation in seven patients. This was particularly true in the early stage following rupture of the pectoralis major muscle, because the teres major,

subscapularis, deltoid, and latissimus dorsi muscles slowly take over the function of this muscle. However, complete recovery of strength and contour are seldom obtained in conservative treatment.

Summary

Surgical repair of the ruptured pectoralis major muscle is important to restore complete function and contour, especially in young athletes, although loss of strength is not complete in conservative treatment.

We have presented a case of rupture of the pectoralis major muscle in a thirty-one-year-old dentist who regained complete function and contour three months following surgery.

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