

## LIPOHEMARTHROSIS\*

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**T**RAUMATIC lipohearthrosis may occur in any joint in which an intracapsular fracture has occurred, allowing blood and fat to extrude into the joint space. Clinicians have traditionally used the presence of fat in the joint aspirate to distinguish a fracture from simple hemarthrosis. Radiologists have recognized fat blood fluid levels in the knee and the shoulder,<sup>1-6</sup> and have used this as a diagnostic sign of fracture. In the shoulder joint, this finding has always heretofore been associated with a fracture dislocation<sup>6</sup> (Fig. 1, *A* and *B*). The presentation of a fat blood fluid level in a patient with only simple dislocation prompted a review of our experience with shoulder trauma.

### MATERIAL

From 1962 to 1971, 80 positive cases of shoulder trauma were seen at the Hospital of the University of Pennsylvania. Of these 80, 44 had roentgenograms available for review. There were 27 fractures, 8 fracture dislocations and 9 simple dislocations of the shoulder joint. Fat blood fluid levels were present in 2 of 27 fractures (8 per cent), 5 of 8 fracture dislocations (63 per cent), and 4 of 9 simple dislocations (45 per cent). In reviewing the roentgenograms, it was evident that many roentgenograms were not made in the erect position, the traditional posture. In severely injured patients, the examination was often made in the supine position, so that the fat blood fluid

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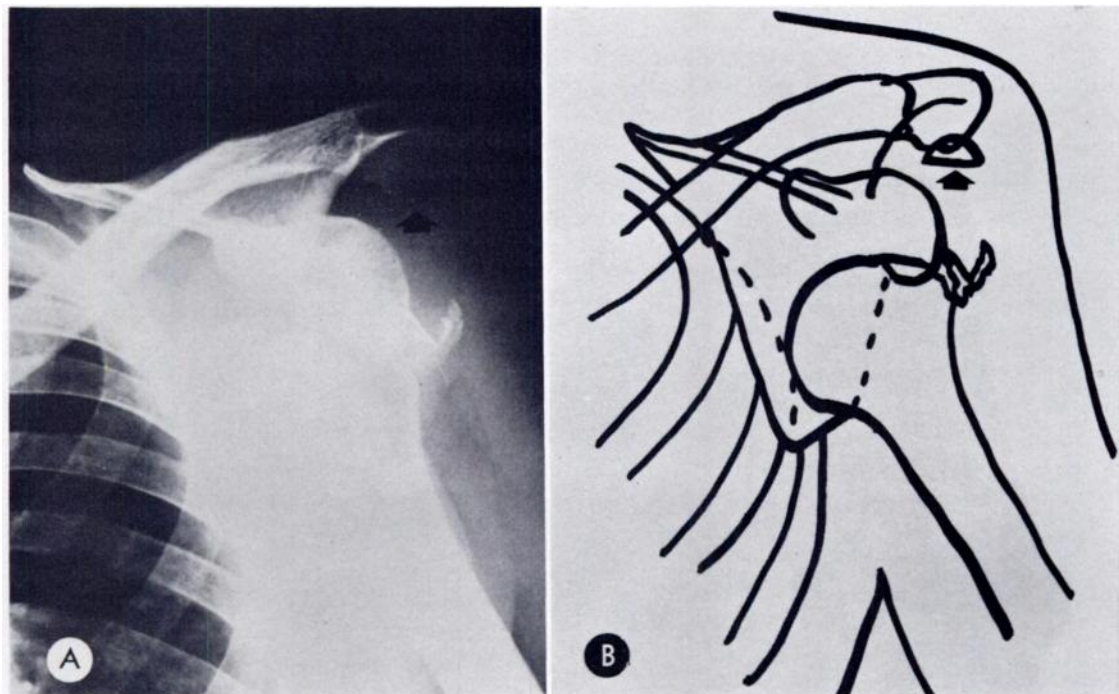


FIG. 1. (*A*) Classic fracture dislocation of shoulder with fat blood fluid level (closed arrow). (*B*) Schematic drawing of *A*.

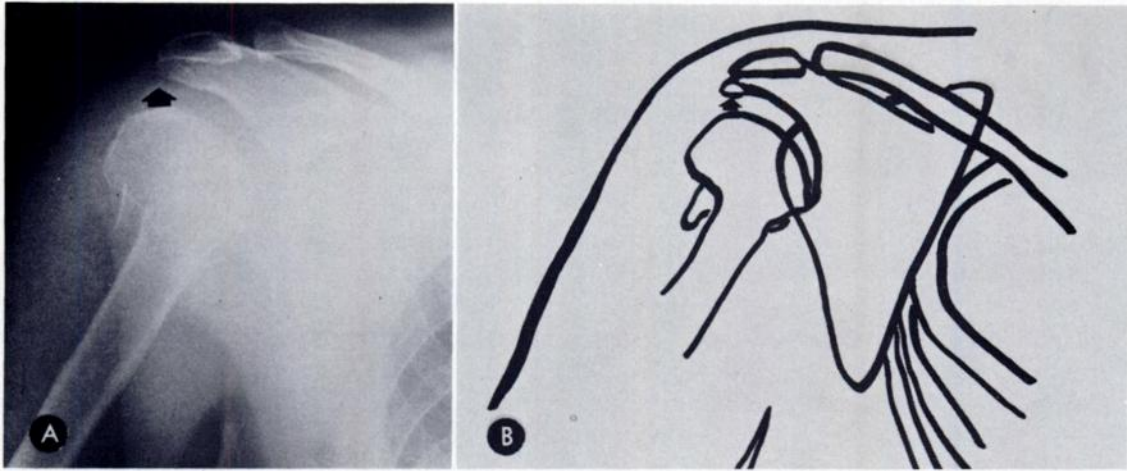


FIG. 2. (A) Extracapsular fracture without dislocation showing small fat blood fluid level (closed arrow). (B) Schematic drawing of A.

level would not be seen. It seems likely that fat blood fluid levels about the shoulder may be seen in even a higher percentage than is indicated by our review.

#### DISCUSSION

Lipohemarthrosis of the knee following

trauma was first described by Kling<sup>3</sup> in 1929. He found fat in the joint aspirate of 6 of 15 patients (40 per cent). Holmagren<sup>2</sup> first reported the roentgenographic demonstration of fat blood fluid levels following knee trauma by making a lateral roentgenogram with a horizontal beam. He found a

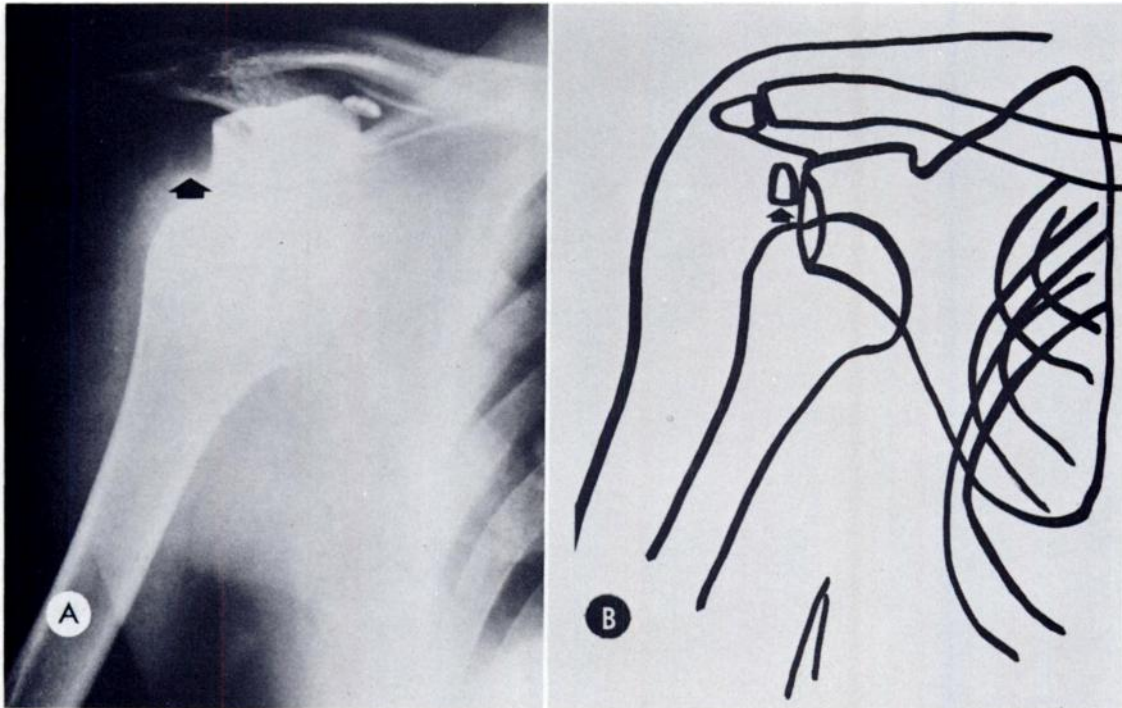


FIG. 3. (A) Fat blood fluid level in simple dislocation without fracture (closed arrow). (B) Schematic drawing of A.

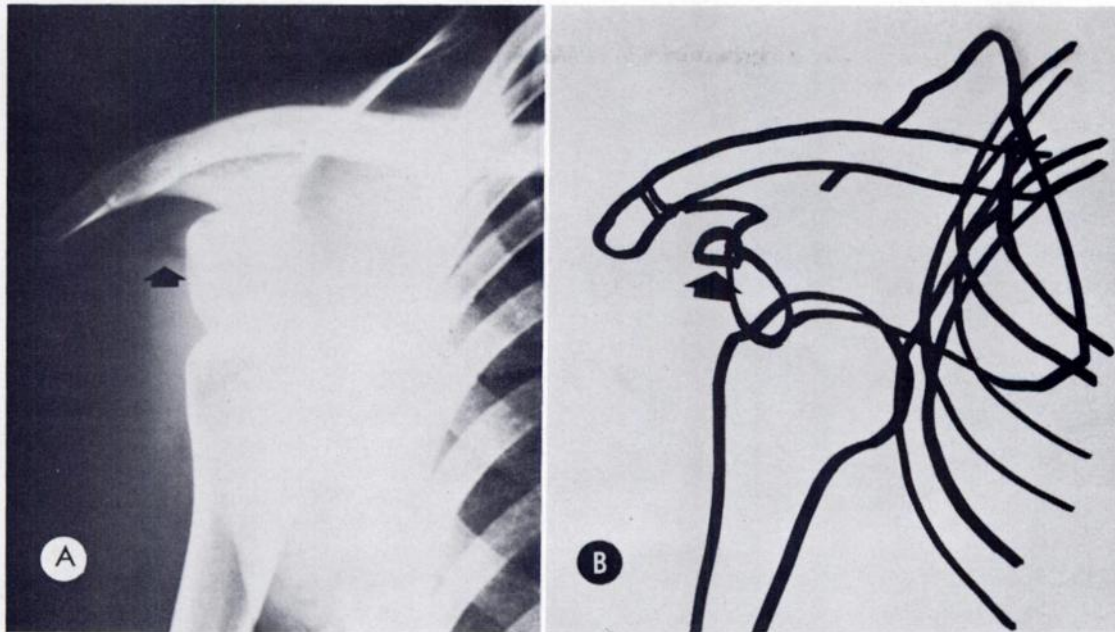


FIG. 4. (A) Fat blood fluid level in simple dislocation without fracture (closed arrow). (B) Schematic drawing of A.

fat blood fluid level in 50 per cent of 65 cases.<sup>2</sup>

Additional authors have reported this in the knee.<sup>1,4,5</sup> In 1962, a fat blood fluid level was reported on shoulder roentgenograms by Saxton<sup>6</sup> in 6 fracture dislocations.

The source of the fat in the joint space is assumed to be the bone marrow. Pierce and Eaglesham<sup>5</sup> have postulated that tearing of a synovial membrane and its associated fat might cause lipohemarthrosis, but they reported no cases without associated fracture.

Saxton<sup>6</sup> stated that 2 prerequisites are necessary for demonstration of a fat blood fluid level. These are: (1) a roentgenogram taken with a horizontal beam; and (2) a distensible joint well filled with blood and fat, preferably with the fat lying clear of the bone. He showed that in the knee joint 10 to 20 ml. of fat and 80 to 100 ml. of blood are necessary to show a fat blood level.

Several of our cases pose interesting problems regarding the origin of the fat in the shoulder joint following trauma. While

a fat blood fluid level has not been demonstrated heretofore in a simple fracture of the shoulder without dislocation, its appearance might readily have been predicted. Case II (Fig. 2, A and B) is a patient with a fracture of the proximal humerus without dislocation. The fracture in this case is not intracapsular, indicating various origins for the fat blood levels.

Cases III and IV (Fig. 3, A and B; and 4, A and B) are 2 of 4 simple dislocations in which a fracture could never be demonstrated on either pre- or postreduction roentgenograms.

We can only speculate about the origin of the fat in the shoulder of patients without intra-articular fracture. Presumably, it must come from trauma to the synovium and associated intra-articular or periarticular fat. It is possible that a minute fracture of the humeral head or glenoid was overlooked, but a careful search was made and no fracture could be seen on any roentgenograms. It seems likely that lipohemarthrosis occurs without an associated intra-articular fracture.

## SUMMARY

Lipohemarthrosis of the shoulder is discussed.

The association of this entity with simple shoulder fractures and simple dislocations is demonstrated.

Fat blood fluid levels in the shoulder joint in extracapsular fractures and simple dislocations suggest that on occasion the fat may arise from some other source than bone marrow.

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