

Four cases of purulent arthritis of the shoulder secondary to hematogenous osteomyelitis

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In 4 cases of acute hematogenous osteomyelitis, the purulent process had penetrated the cortical bone to or lateral to the groove of the long biceps tendon. In 3 of the cases the process had spread along the tendon to the shoulder joint. In 1 case the periosteum was still intact, and the shoulder joint was not involved.

The osteomyelitic focus should be reamed out until normal cancellous bone is reached. Suction irrigation drainage of the osseous cavity is recommended instead of the placement of gentamicin beads.

After the age of 1-2 years, the growth plate prevents the spread of metaphyseal osteomyelitis to the epiphysis^{1,2}.

If the metaphysis is intraarticular, as in the neck of the femur, the metaphyseal abscess may rupture into the joint and cause a secondary suppurative arthritis³. Another route for the penetrating metaphyseal abscess to gain entrance to a joint is along an intraarticularly attached tendon.

Patients and methods

Four children were operated on for acute hematogenous osteomyelitis in the proximal metaphysis of the humerus (Table 1). They all had constant pain with acute onset in the shoulder region, and they had chills. All of them had tenderness over the proximal metaphysis of the humerus and the long biceps tendon, and in 3 cases there was swelling and fluctuation in the shoulder joint.

Three patients had been treated preoperatively for sepsis with antibiotics focused on the pathogenic bacteria found in cultures of the aspiration samples. The osteomyelitis was in all the cases treated by fenestration of the cortical bone, removal of the necrotic infected bone, and irrigation with saline. In 2 cases, gentamicin beads were operatively introduced into the bony cavity, but both of these cases had to be reoperated on because of pain and fistulization.

In Cases 1-3, purulent osteomyelitis of the proximal metaphysis of the humerus, with perforation of the cortical bone to the groove of the long biceps tendon, was found at surgery; the long biceps tendon was swollen, and the pus had spread to the shoulder joint. Subperiosteal cortical bone penetration lateral to the long biceps tendon without penetration of the periosteum was observed in Case 4; the periosteum over the perforated cortical bone was still intact, and the joint was free of pus.

At reinvestigation 1 to 12 years later, all the patients were free from pain, with a normal range of motion in the shoulder joint.

Discussion

In all the cases the onset of symptoms and the clinical signs were typical of acute hematogenous osteomyelitis. Plain skeletal radiographs taken immediately before surgery were normal in all the cases, as observed by Petersen et al.⁴ and Danielsson and Udén⁵. In two cases the WBC was normal which is usual⁴. Normal scintigraphy in acute hematogenous osteomyelitis has also been repeatedly reported⁵⁻⁷. In Case 4, intravenous antibiotics probably partly masked the symptoms and resulted in a negative blood culture. Antibiotics effective against the pathogenic bacteria according to sensitivity tests and administered intravenously in appropriate dosage were insufficient preoperatively to cure the infection, to prevent the penetration of cortical bone, or to stop extension to the shoulder joint.

The special anatomic position of the long biceps tendon located both extraarticularly and intraarticularly favors spread of pus from a cortical penetration in the

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Table 1. Four children with hematogenous osteomyelitis in the proximal metaphysis of the humerus

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	M/16	42.0	14	70	s	n	-	0/-	15	2	2	2	4 + 9	3
2	M/16	39.9	15	107	s	n	P	4/1	10	2	3	2	-	1
3	M/15	39.1	8	53	s	n	-	5/2	12	2	1	1	-	12
4	F/12	39.7	9	52	n	n	n	3/3	6	1	2	-	1	1

A case

B sex/age at diagnosis

C maximum temperature degrees C

D initial WBC 10⁹/L

E initial ESR

F blood cultures: s *Staphylococcus aureus*, n negative

G plain radiograph: n normal

H bone scan ^{99m}Tc-MDP: p positive, n negative, - not done

I antibiotics before surgery (days/type)

1 cefuroxime i.v. 1 g 6 hourly + clindamycin i.v. 250 mg 6 hourly

2 cloxacillin i.v. 1 g 6 hourly

3 cloxacillin i.v. 500 mg 6 hourly

J days between onset of symptoms and surgery

K surgical findings

1 purulent osteomyelitis + perforation of the cortical bone

2 purulent osteomyelitis + perforation of the cortical bone + purulent arthritis of the shoulder

L surgical treatment of bone

1 fenestration + curettage

2 fenestration + curettage + gentamicin beads

3 fenestration + curettage + suction-irrigation drainage

M surgical treatment of shoulder joint

1 arthrotomy

2 arthrotomy + suction-irrigation drainage

- no arthrotomy

N reoperation after initial surgery (months)

O follow-up after healing (years)

metaphysis along the long biceps tendon to the shoulder joint⁵. Schmidt et al.⁸ described the synovial pouch with pus around the long biceps tendon in cases with septic arthritis with or without hematogenous osteomyelitis, but they suggested that the spread from a metaphyseal focus was either due to vessels perforating the growth plate or to partial intraarticular location of the metaphysis.

Early surgical intervention is strongly recommended when acute hematogenous osteomyelitis in the proximal humerus is suspected. If the condition is associated with suppurative arthritis, the shoulder joint should be opened and thoroughly irrigated. The osteomyelitic focus should be reamed out until normal cancellous bone is reached. It is helpful to use an image intensifier in order to avoid injury to the growth plate. The cortical bone over the intraosseous abscess should be removed especially in the distal, lower part of the infected area to insure effective drainage. Suction-irrigation drainage in acute hematogenous osteomyelitis is recommended instead of gentamicin beads.

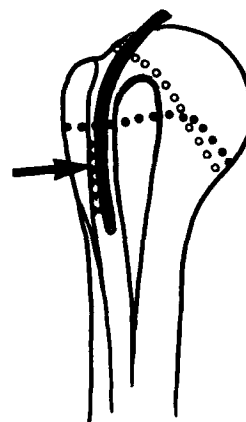


Figure 1. Anatomy of the proximal humerus with the bicipital groove and the long biceps tendon.

● Attachment of the capsule.

○ The growth plate.

→ Location of the cortical perforation.

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