ORIGINAL RESEARCH PAPER
Volume - 9 | Issue - 6 | June - 2020 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

SURGERY IN ACUTE AND CHRONIC OSTEOMYELITIS IN CHILDREN. LESSONS LEARNT.

Orthopaedics

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ABSTRACT

Acute and chronic osteomyelitis of haematogenous origin is very commonly seen in a developing country like India. This study articulates the surgical procedures that may be needed.
13 children, ages ranging from 3-14 yrs , who were treated surgically for sequelae of acute and chronic haematogenous osteomyelitis were studied. There were 6 girls and 7 boys.
10 cases involved the femur, 2 the ulna and 1 the tibia.
Treatment ranged from sequestrectomy to reconstructive surgery. treatment could have prevented some of the complications seen. Staphylococcus aureus (MSSA and community acquired MRSA) was responsible for most infections.
Reconstructive surgery was most commonly needed for femur and distal ulna involvement. Aggressive early surgical intervention may have avoided the need for reconstructive surgery in some patients

KEYWORDS

Osteomyelitis, children, reconstructive surgery

Introduction

Acute haematogenous osteomyelitis, and its most common complication, the chronic form, is commonly seen in India. Contributing factors are poverty, overcrowding, poor hygiene and malnutrition. Most cases can be treated with antibiotics and surgical debridement.

We analyzed 13 cases of acute and chronic osteomyelitis which needed more than the standard treatment of antibiotics and surgical debridement.

Surgical debridement in the early stages of the disease could have prevented some of the complications seen especially with regard to the proximal femur. In at least two cases where reasonably early debridement was done, there was extensive infection of the distal femur and ulna resulting in loss of bone, and need for surgical reconstruction. One of the reasons may have been an inadequate debridement. Another could be poor immunity of the children in the face of a virulent infection.

Materials and Methods

13 children with complications of acute and chronic osteomyelitis who needed or would need surgical reconstruction were identified. There were 6 girls and 7 boys with ages ranging from 5 months to 11 yrs.

10 of the patients had involvement of the femur. Of these, 2 adolescent girls had diphyseal involvement with pathological fractures, 2 presented with non unions of the distal femur with no active infection, 2 needed sequestrectomy for the bone to unite. One of the patients, a 3yr old male was treated for septic shock at a private nursing home before presenting to our hospital with florid infection of the distal femur. He needed 4 debridements and 2 antibiotic tens nailings before the infection could be controlled. Inspite of doing a subsequent bone grafting, the bone has not united, and he will need further reconstructive surgery.

3 patients had shaft and proximal physeal involvement. Of these, one patient had femoral shaft involvement with acute slip of the capital femoral physis. Aggressive debridement of the shaft with reduction and fixation of the capital physis ensured a good result. (fig 1)

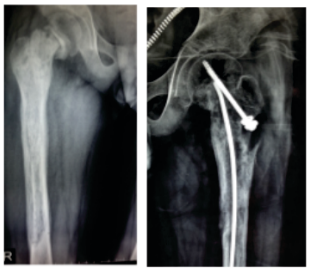

figure 1 9yr/ M with whole shaft involvement and slipped capital femoral physis. The hip joint was decompressed and the physis stabilized with 2 x 4mm cc screws. The femoral shaft was reamed with the entry distal to the trochanteric physis, and a tens nail inserted.

The 2nd patient with whole shaft involvement who was treated only with antibiotics ended with destruction of the capital femoral physis.

The 3rd case had a joint debridement, but the cartilage was already destroyed at the time of the surgery, and he will need an arthrodesis.

Of the 2 ulna osteomyelitis, one of the patients was a 5 month old girl. In spite of debridement, the distal half of the ulna including the DRUJ was destroyed. She had to have a single bone forearm as a salvage surgery. The other patient, a gap non union of the distal ulna was treated by fibula graft and tens nail.

The patient with distal tibia involvement was diagnosed late. This is another concern commonly seen in the developing world. Had he been treated from day one, he would have had a good result. Now he has distal tibia physeal involvement and may develop an ankle deformity.

Table 1.

Sr no	Site of involvement	Procedure done	Age at primary surgery Sex	Number of procedures required	Interval between onset of disease and intervention (approx.)	Sequelae
1.	Femur shaft	Sequestrectomy soft tissue release.	8 yr M	5	1 yr	Distal femoral physeal growth arrest. Knee stiffness

2.	Femur shaft	Sequestrectomy and LRS of shaft	9 yr/ F	1	1 year	Distal physeal arrest. Stiff knee.
3.	Slipped Femur capital physis with shaft	Hip joint capsulotomy with fixation of capital physis and reaming and tens nailing of shaft	9 yr M	1	2 weeks	None
4.	Non union distal femur	Plating and bone grafting	6yr F	2	1 yr	Shortening
5.	Non union distal femur	Plating and bone grafting	5yr F	1	2yr	Shortening
6.	Gap Non gap non-union ulna	Fibular Grafting and tens nail	3 yr M	2	4 months	None
7.	Loss of ulna	Debr and cement spacer Single bone forearm	5 mo F	2	2 mo	Loss of distal two thirds of ulna
8.	Pathological # femur shaft	Debridement and antibiotic nail	7 yr F	1	1 month	None
9.	Pathological # femur shaft	Antibiotic nail followed by exchange nailing	12 yr F	4	6 months	None
10.	Whole femur involvement	None.	5 yr M	0	-	Destruction of hip joint shortening
11.	Distal femur	Debridement. Antibiotic nail followed by bone graft	3yr M	4	15 days	Involvement of distal femoral physis
12.	Distal tibia	Debridement	5 yr M	2	3 weeks	Distal tibial physis involvement
13.	Femur shaft with septic arthritis hip	Debridement. Will need arthrodesis or hip reconstruction in future	12 yr M	2	2 months	Destruction of the hip joint

RESULTS

10 patients were treated for acute or acute on chronic infection. 3 patients were treated for sequelae with no evidence of active infection. 77 % of our patients had involvement of the femur.

Apart from surgical debridement the following surgical interventions were required :

Sequestrectomy of large diaphyseal fragments.

Stabilization of capital femoral physis after decompression of the joint.

Fibular graft for gap non union
Plating and bone grafting for non union
Single bone forearm for loss of distal ulna
Debridement and bone transport using the LRS
Use of antibiotic coated nail followed by exchange nailing

Discussion

The following lessons were learnt regarding treatment of osteomyelitis:

The main reasons leading to sequelae of osteomyelitis is delay in diagnosis or therapy.

Even after early diagnosis and antibiotic treatment are begun, non adaptive treatment will lead to complications.

Treatment should be tailored to the patient. Early surgical debridement especially sequestrectomy or hip drainage and capital physeal stabilization can save the joint.

Surgical debrima should include local antibiotic therapy. This can be in the form of cement beads or cement coated nail. Since Staphylococcus aureus is the most common growth, Vancomycin is the drug of choice. A minimum of 4 g Vancomycin in 40g cement is recommended.

Depending on the severity of infection, intravenous antibiotics are given from anywhere between 5 days to 3 weeks followed by oral antibiotics for a total of 6 weeks to 3 months.

Repeated surgical debridement may be required in florid infections with poor local control.

The distal and proximal femur and distal ulna involvement have a high rate of complications including non union, physeal growth arrest and segmental loss of bone.

Especially if the whole femur is involved on xray or MRI, it is better to surgically decompress the canal even if the patient seems to be responding to antibiotics.

Aggressive surgical decompression in addition to iv antibiotics will alter the natural history and lead to better outcomes

Conclusion

In the author's opinion, the single most important factor affecting the long term outcome of acute osteomyelitis is early diagnosis and initial debridement and local control of infection in cases not responding to antibiotics alone.

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