Original Article

Chronic pyogenic osteomyelitis of long bones at specialized hospital in Nigeria

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ABSTRACT

Introduction: Chronic pyogenic osteomyelitis of long bones is common and difficult to treat.

Objectives: The aim of this study was to examine the pattern of presentation and outcome of treatment of chronic osteomyelitis of long bones at specialized hospital in Nigeria.

Patients and methods: Case records of patients who were managed for chronic osteomyelitis between January 2009 and December 2011 at Nongu u Kristu u I Ser u sha Tar (NKST) Rehabilitation Hospital, Mkar, were retrieved from the Medical Records Department and analyzed retrospectively for age, gender, bones involved, microbiological isolates, treatment modalities and recurrence.

Results: Fifty-three patients with chronic pyogenic osteomyelitis of 57 long bones were studied. This consisted of 30 males (56.6%) and 27 females (43.4%) giving a male-to-female ratio of 1.1:1.The age range was 3 – 60 years (mean 20.34±13.48). Poorly-treated or neglected acute haematogenous osteomyelitis was the predominamt cause of chronic osteomyelitis (n=40, 70.2%). The involved bones include tibia (n=29, 50.9%), femur (n=11, 19.3%), humerus (n=9, 15.8%). Staphylococcus aureus was the most common offending organism isolated (n=13, 52%).
Sequestrectomy and curettage (n=51, 96.2%) was the main surgical procedure carried out.

Conclusion: Chronic osteomyelitis is mostly a disease of children and predominantly affects the tibia. Poorly-treated or neglected acute haematogenous osteomyelitis is the predominant cause of the disease.

Keywords: Chronic osteomyelitis, Pattern, Causes.

Acute bacterial osteomyelitis carried a 50% mortality in the pre-antibiotic era because of overwhelming sepsis with metastatic abscesses[1]. Advancements in antibiotic technology and surgical techniques have greatly improved its outlook but the chronic form of the disease isstill difficult to treat and fraught with recurrence.

Chronic osteomyelitis is common in Nigeria[2,3]. It is said to be more common in developing countries, owing to a combination of the virulence of pathogenic bacteria in those countries, late presentation for treatment, poor nutritional and immune state of the patients, and relatively poor access to antibiotic drugs[4].

While majority of cases in developing countries result from complications of acute haematogenousosteomyelitis[3,5], thepost-traumatic forms are the most common in Europe[6].

Chronic osteomyelitis is a highly debilitating condition that causes significant morbidity and can be extremely difficult to manage[7]. Pathological fractures, septic arthritis with joint destruction, physeal damage, non-union or segmental bone defects and malignant transformation are some of its complications[8].

The aim of thisstudy Was to examine the pattern of presentation and outcome of treatment of chronic osteomyelitis of long bones at NKST Rehabilitation Hospital,

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Mkar, Nigeria. It is specialized trauma and orthopaedic hospital serving patients of North-central Nigeria and surrounding areas.

Materials and methods:

Case records of all patients managed for chronic osteomyelitis of long bones from January 2009 to December 2011 were retrieved and examined for age, gender, bones involved, microbiological isolates, treatment modalities and recurrence. Patients with incomplete records and non-pyogenic osteomyelitis were excluded from the study.

Data collected were analyzed using the software Statistical Package for Social Sciences for Windows version 15.0 (SPSS, Inc; Chicago, Illinois). Descriptive statistics were used to display single variable quantities using means and standard deviations (SD) for continuous variables or proportions for categorical variables unless otherwise stated.

Results:

Fifty-three patients with chronic pyogenic osteomyelitis of 57 long bones were studied.This consisted of 30 males (56.6%) and 27 females (43.4%) giving a male-to-female ratio of 1.1:1 The age range was 3 – 60 years (mean 20.34±13.48). Majority of patients (n=32, 60.4%) were less than 20 years of age. Figure- 1 shows the age distribution of patients.

The causes of chronic osteomyelitis were poorly-treated or neglected acute haematogenous osteomyelitis (n=40, 70.2%) and open fractures (n=17, 29.8%). There were no cases following operative treatment of fractures. 47.1% of patients who had open fractures had visited traditional bone setters at the time of the injury.

The tibia was the most common site involved (n=29, 50.9%) followed by femur (n=11, 19.3%). Table 1 shows the distribution of chronic osteomyelitis by bone site. Multi-ostotic chronic osteomyelitis was seen in 4 patients (7.5%). The breakdown is shown in Table 2.

Staphylococcus aureus was the most common offending organism isolated (n=13, 52%) in patients who had a positive culture. There were no Salmonella spp. cultured in the study; not even among the 17 cases of sickle cell disease.No organisms were cultured in more than half of the patients (n=28, 52.8%). The distribution of isolates is depicted in Table 3.

Fifty-three operative treatments were carried out. Most of them weresequestrectomyand curettage (n=51, 96.2%) with primary closure or open management of dead spaces while the rest had bone resection (partial fibulectomy). There was a recurrence rateamong those who had sequestrectomy and curettage was 29.8% over a follow-up period of 2 to 5 years.

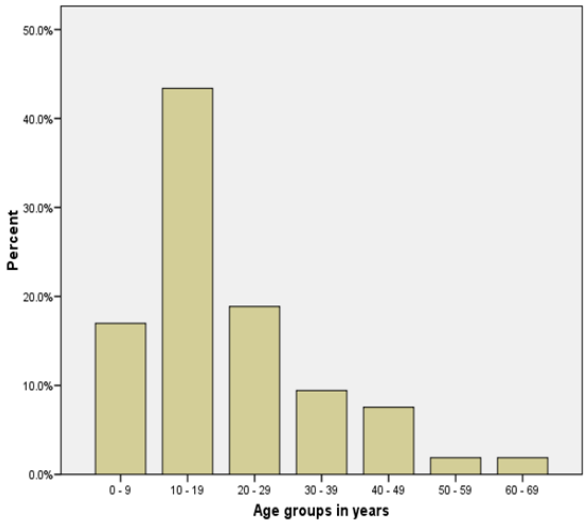

Figure 1: Age distribution of studied patients.

Table 1: Distribution of chronic osteomyelitis by bone site among the studied patients**.**

Bones involved	Number	Percentage
Tibia	29	50.9
Femur	11	19.3
Humerus	9	15.8
Fibula	4	7.0
Radius	3	5.3
ulna	1	1.8
Total	57	100.0

Table 2: Characteristics of studied patients who had multi-ostotic chronic osteomyelitis

Age (Years)	Sex	Bones involved
3	M	Tibia and Humerus
14	F	Tibia and Humerus
23	M	Tibia and Humerus
18	M	Femur and Radius

Table 3: Organisms isolated from the studied cases

Organism	Number	Percent
Staphylococcusaureus	13	52
Pseudomonas spp.	6	24
Escherichia coli	4	16
Kliebsiela	1	4
Proteus	1	4

Discussion:

Chronic osteomyelitis commonly results from untreated acute haematogenous osteomyelitis, traumatic injuries or as a complication of open reduction and internal fixation of fractures[8].Majority (64.2%) of the cases of chronic osteomyelitis in this study were sequel to poorly-treated or neglected acute haematogenous osteomyelitis. This is in consonance with patterns from developing countries which attribute majority of chronic osteomyelitis to prior poorly-managed acute haematogenous osteomyelitis[2,5,6]. This is in contradistinction, however, to reports from developed countries where most cases result from open fractures or gunshot wounds[9].

While antibiotic use and aggressive surgical treatment have reduced the morbidity of acute haematogenous osteomyelitis in the western world, high virulence of pathogenic bacteria, late presentation for treatment, poor nutritional and immune states of the patients, and relatively poor access to antibiotic drugs make it prevalent in developing countries[4].

The mean age of patients in this series was 20.34±13.48. This compares favorably with an earlier study[2].Over 60% of the study population were less than 20 years of age; a finding similar to prior studies[2,10].This is likely to be because acute haematogenous osteomyelitis, the leading predisposing factor to chronic osteomyelitis in this study, is almost invariably a disease of children[11].

Studies from developing countries report the femur as the most common site for chronic osteomyelitis[12,13]. The most probable reason for this is that acute haematogenous osteomyelitis, the leading cause in this part of the world, most commonly affects the femur[14]. In contrast, the tibia was the most predominant bone involved in this series. The tibia is usually the predominant site of chronic osteomyelitis in the western world being particularly prone to trauma[15]but the reason for our finding is not known.

Over a third of the patients surveyed had chronic osteomyelitis following open fractures. This figure is higher than those quoted in studies from developing countries[2]. The reason for this may be ascribed to the fact that about half of this group of patients (47.1%) had sought traditional bone setters' care whose non-orthodox ways of handling wounds may allow infection to establish.

Staphylococcus aureus was the most frequently cultured causative pathogen, a finding consistent with earlier reports from developing countries[10,12,13].Staphylococcusaureus has selected virulence factors that enhance pathogenicity for osteomyelitis, including adhesins allowing attachment to bony matrix and catalytic and proteolytic enzymes that allow compromise of the integrity of local structures and host immunity, promoting extension of infection into contiguous tissues[14].

A number of studies from Nigeria have shown an association between chronic osteomyelitis in sickle cell disease patients and Salmonella infection[16,17]. However no salmonellae were isolated among the sickle cell disease patients in this study. Work done by Ogunjumo[18] and Nwadiaro[19] have also not confirmed this association.

There was a recurrence rate of 29.8% among patients who had sequestrectomy, and curettage. This is higher than the figure reported by Olawoyeet al[12]. The relatively high figure may be due to direct closure of skin in most instances as modality of dead space management. Methods put forward for the management of post-sequestrectomy dead

space include soft tissue transfer, closed suction drains, polymethylmethacrylate antibiotic bead chains, open bone grafting[20] and the open method. Expertise and material lacklimits the usefulness of most of the methods in a developing country. However, Onuminya et al[21] showed a statistically significant higher rate of recurrence in patients whose post-sequestrectomy dead spaces were managed by primary closureover those managed by the open method.

Conclusion:

Chronic osteomyelitis was found tobe mainly a disease of the young in this study. It affects the tibia mainly and it is mostly a sequel to poorly-treated or neglected acute haematogenous osteomyelitis.

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