Acute haematogenous osteomyelitis: 
microbial conversion and unusual 
age presentation

H.A. Mousa¹ and M.G. Abaid²

Abstract: From 1983 to 1989, 110 cases of haematogenous osteomyelitis were studied retrospectively. The most commonly affected were children under 1 year. No adult cases were reported. Staphylococcus aureus was isolated from 72.7% of cases. During 1992–1997, 80 cases were studied prospectively. The most commonly affected were children aged 9 years. This group included 19 adults. S. aureus was isolated from 43.7% of the cases. There was a clear difference in the incidence of S. aureus and age presentation in the cases before and after the Gulf conflict. Working children and malnutrition might have caused changes in the infecting organisms and age presentation in recent years.

Ostéomyélite nématogène aigue: conversion microbienne et profil d’âge inhabituel


¹Department of Microbiology, College of Medicine, University of Basra, Basra, Iraq.
²Department of Orthopaedics, Basra University Teaching Hospital, Basra, Iraq.

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Introduction

Staphylococcus aureus is the most common pathogen isolated from patients with acute haematogenous osteomyelitis. It has been reported to be the causative agent in 61%–96% of cases [1–11].

In industrialized countries, acute haematogenous osteomyelitis is uncommon. In developing countries, the disease still exists and the morbidity appears worst in lower socioeconomic groups [12].

We investigated differences in the incidence of the causative agents and age presentation during two economic periods in Iraq.

Patients and methods

We studied 80 cases of acute haematogenous osteomyelitis prospectively between November 1992 and March 1997. They were compared with 110 cases from 1983 to 1989 reviewed retrospectively. All cases had been admitted to Basra University Teaching Hospitals, which receives patients from all areas of Basra Province.

The selection of cases was based on clinical, bacteriological, radiological and histopathological evidence of osteomyelitis. Only cases with positive bacterial culture were included. The specimens for culture were obtained directly from the infected bone or accumulated material in the soft tissues or blood. The bacteria isolated were identified by the same conventional methods in both studies.

Results

In the study of 110 patients from 1983 to 1989, children aged ≤ 1 year were most commonly affected (16 patients). Mean age was 6.5 ± 4 years and ages ranged from 16 days to 14 years. The socioeconomic status was poor for 12 patients (10.9%). S. aureus was isolated from 80 patients (72.7%) (Table 1). The second most frequent causative agent was Haemophilus influenzae in which all of the infected patients were aged ≤ 4 years. Less frequently found were Streptococcus pyogenes and Salmonella sp.

Table 1 Organisms isolated from 110 patients during 1983–1989

<table>
<thead>
<tr>
<th>Microorganism</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staphylococcus aureus</td>
<td>80</td>
<td>70.2</td>
</tr>
<tr>
<td>Haemophilus influenzae</td>
<td>24</td>
<td>21.1</td>
</tr>
<tr>
<td>Streptococcus pyogenes</td>
<td>6</td>
<td>5.3</td>
</tr>
<tr>
<td>Salmonella sp.</td>
<td>3</td>
<td>2.6</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>Total</td>
<td>114</td>
<td></td>
</tr>
</tbody>
</table>

*All the patients had sickle-cell anaemia.

Table 2 Organisms isolated from 80 patients during 1992–1997

<table>
<thead>
<tr>
<th>Microorganism</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staphylococcus aureus</td>
<td>35</td>
<td>41.7</td>
</tr>
<tr>
<td>Klebsiella sp.</td>
<td>10</td>
<td>11.9</td>
</tr>
<tr>
<td>Escherichia coli</td>
<td>8</td>
<td>9.5</td>
</tr>
<tr>
<td>Streptococcus pyogenes</td>
<td>5</td>
<td>6.0</td>
</tr>
<tr>
<td>S. epidermidis</td>
<td>5</td>
<td>6.0</td>
</tr>
<tr>
<td>Salmonella sp.</td>
<td>4</td>
<td>4.8</td>
</tr>
<tr>
<td>Haemophilus influenzae</td>
<td>3</td>
<td>3.6</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>3</td>
<td>3.6</td>
</tr>
<tr>
<td>Proteus sp.</td>
<td>2</td>
<td>2.4</td>
</tr>
<tr>
<td>Brucella sp.</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>Anaerobic bacteria</td>
<td>8</td>
<td>9.5</td>
</tr>
<tr>
<td>Total</td>
<td>84</td>
<td></td>
</tr>
</tbody>
</table>

*All the patients had sickle-cell anaemia.

*Four patients were infected with two organisms.
genes, Salmonella sp. and Pseudomonas aeruginosa.

From November 1992 to March 1997, 80 patients were studied. The most commonly affected were children aged 9 years (13 patients). The mean age was 15.6 ± 14.8 years and ages ranged from 3 years to 74 years. There were 19 patients over the age of 16 years. The socioeconomic status was poor for 62 patients (77.5%). S. aureus was isolated from 35 patients (43.8%) (Table 2). The second most frequently isolated pathogen was Klebsiella sp., followed by Escherichia coli, Strep. pyogenes and S. epidermidis.

The variation in the frequency of S. aureus during both periods was statistically significant ( χ² = 16.27, P < 0.01). During both periods, Salmonella sp. was only recovered from patients with sickle-cell anaemia.

Discussion

We found a significant difference in the incidence of S. aureus and age presentation among patients with acute haematogenous osteomyelitis during the 1980s and 1990s. This indicates an emergence of relatively low virulent organisms as causative agents. Older children and adults were found to be more frequently affected in the recent years. During the period of economic sanctions (1990–1997), most families sent their children to work where they might have been exposed to bone trauma. Thus malnutrition [13] and child labour might have played a role in changing the behaviour of causative agents and the unusual age presentation. Although adults are very rarely affected by haematogenous osteomyelitis [12], we found a high rate of infection in adults in the 1990s.

The incidence of S. aureus infection was 72.7% during the period 1983–1989. This is similar to that reported in previous studies [3,9]. S. aureus incidence was 43.8% during the period 1992–1997. This is lower than that reported in other studies. Previous studies have found the incidence of S. aureus to be 61%–95% of cases [1–11].

References


**ANNOUNCEMENT**

An international course in Laboratory Methods for the Diagnosis of Leptospirosis will be held in Amsterdarn, the Netherlands from 19 to 23 February 2001. Further information of course details and a printable application form can be found on the website at:

<http://www.kit.nl/biomed/html/course.htm>

Otherwise a brochure and application form can be obtained from:

Dr N.A. Hartskerkl
Head, Leptospirosis Reference Laboratory
Biomedical Research
Royal Topical Institute (KiT)
Meibergdreef 39
1105 A2 Amsterdam
The Netherlands
Tel: (31)205665454
Fax: (31)206971841
E-mail: bo@kit.nl
Internet: http://www.kit.nl