

# BACTERIOLOGICAL STUDIES IN OSTEOMYELITIS AT FAISALABAD

Pages with reference to book, From 43 To 47

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## Abstract

Investigations were carried out to study the organisms associated with 80 cases of osteomyelitis at Faisalabad. Seventy eight had infection with single organism; whereas there was no growth in 2 cases. On culture, the frequency of the organisms was Staphylococcus aureus in 30 (37.5%), Streptococcus pyogenes in 28 (35%); Escherichia coli in 16 (20%); Salmonella in 3 (3.2%) and Proteus vulgaris in 1 (1.3%) case. (JPMA 38: 43, 1988).

## INTRODUCTION

Osteomyelitis is a common orthopedic problem because bones are prone to infection through traumatic<sup>1</sup>, iatrogenic and hematogenic routes.<sup>2</sup> Various organisms are associated with the infection, of which Staphylococcus aureus is the commonest and is followed by Streptococcus pyogenes, E. Coli, Pseudomonas and Cryptococcus.<sup>3</sup> Although the frequency of osteomyelitis is high in various hospitals of Faisalabad but the information about the infecting organisms is scarce. The present study is an attempt to find out the causative organism of osteomyelitis under our circumstances.

## PATIENTS AND METHODS

The samples were collected from 80 patients with osteomyelitis of different bones through swabs, syringes and sequestrum from various hospitals of Faisalabad city, between January and July, 1983 (Table I).

**TABLE –I**  
**Specimens Cultured from various manifestations of Osteomyelitis.**

Sources	Abscess	Sinus	Ulcer	Sequestrum	Total
Swab	—	12	48	—	60
Syringe	4	1	11	—	16
Sequestrum	—	—	—	4	4
Total	4	13	59	4	80

Swabs were taken from ulcers caused by osteomyelitis from exposed bone surfaces and from the

sinuses which were in direct contact with the site of lesions pouring generous discharge. Syringes were used for aspiration of exudate in the deep lying abscesses and from small abscesses present at the margins and floor of ulcers. The pieces of sequestrum obtained through sequesterectomy operation were used for inoculation.<sup>4,5</sup>

Isolates from Osteomyelitis Cases of Man.

Pus material from each case was examined by direct smear examination. The Burke's modification of Gram's staining method was adopted. Each slide was examined, under oil immersion lenses for the shape and staining reaction of organisms.<sup>6</sup>

Inoculation of Media:

The primary cultures were obtained by rubbing the swab, sequestrum or the aspirate on the surface of blood agar. The nutrient agar plates were used for maintaining the stock cultures of pure isolates.

Subsequently the cultures were done, on the Sabourad's dextrose agar, MacConkey's agar and Staphylococcus medium No 110 for identification and characteristic studies of specific organisms<sup>6</sup>.

### **MORPHOLOGICAL EXAMINATIONS**

Stained slides were examined under microscope using oil immersion lenses for studying the shape of the organisms, arrangement of the cells and staining reactions. The size of the cells was determined with the aid of stage and eye piece micrometer.<sup>6</sup>

### **BIOCHEMICAL TESTS**

Biochemical tests were performed, by standard methods used for identification and confirmation of the microorganisms isolated in each case<sup>6,7</sup>

### **RESULTS**

Material examined from 80 human cases of osteomyelitis revealed infection with single organism in 78 cases whereas there was no growth in 2 cases. The cultures grown showed Staphylococcus aureus in 30 (37.5%), Streptococcus pyogenes in 28 (35%), Escherichia coil in 16 (20%), Salmonellae in 3 (3.7%), Proteus vulgaris in 1 case (13%) and no organisms were seen in 2 (2.5%) cases Table II.

**TABLE II**  
**Isolates from Osteomyelitis Cases of Man.**

Organisms	Number of cases	Percentage
Staph. aureus	30	37.5
Strep. Pyogenes	28	35.0
E. coli	16	20.0
Salmonellae	3	3.7
Prot. vulgaris	1	1.3
No organisms	2	2.5
<b>Total :</b>	<b>80</b>	<b>100.0</b>

I. Organisms identified from different Specimens:

Organisms isolated from various specimens such as swabs, syringes, sequestrum, were as follows:— Cultures from 60 swab specimens. Showed Staphylococcus aureus in 22, Streptococcus pyogenes in 21, Escherichia coil in 14, Salmonella in 1, Proteus vulgaris in 1 and no growth in 1 case. Cultures from 16 syringe specimens revealed Staphylococcus aureus in 7, Streptococcus pyogenes in 6, Escherichia coil in 1 and Salmonellae in 2 cases. Four sequestrum specimens revealed Staphylococcus aureus in 1, Streptococcus pyogenes in 1, Escherichia coil in 1; whereas no organism was observed in 1 case (Table III).

**TABLE III**  
**Microbiological Isolates from various Specimens.**

Sources	ORGANISMS						Total
	Staph. aureus	Strep. pyogenes	E. coli	Salmonellae	Prot. vulgaris	None	
Swabs	22 (36.7%)	21 (35%)	14 (23.3%)	1 (1.7%)	1 (1.7%)	1 (1.7%)	60
Syringes	7 (43.8%)	6 (37.5%)	1 (6.2%)	2 (12.5%)	—	—	16
Sequestrum	1 (25%)	1 (25%)	1 (25%)	—	—	1 (25%)	4
<b>Total:</b>	<b>30</b>	<b>28</b>	<b>16</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>80</b>

## II. Organisms identified from various manifestations of Osteomyelitis:

The organisms identified from various manifestations of osteomyelitis have been tabulated (Table IV)

**TABLE IV**  
**Organisms isolated from different manifestations of Osteomyelitis in Man.**

Manifestation	Staph. aureus	Strep. pyogenes	E. coli.	Salmonellae	Prot. vulgaris	No organism	Total
Abscess	2 (50%)	2 (50%)	—	—	—	—	4
Sinus	6 (46.2%)	5 (38.5%)	2 (15.3%)	—	—	—	13
Ulcer	21 (35.6%)	20 (33.9%)	13 (22%)	3 (5.1%)	1 (1.7%)	1 (1.7%)	59
Sequestrum	1 (25%)	1 (25%)	1 (25%)	—	—	1 (25%)	4
<b>Total :</b>	<b>30</b>	<b>28</b>	<b>16</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>80</b>

and their details are as follows: Four abscess samples showed Staphylococcus aureus in 2 and Streptococcus pyogenes in 2 cases. Samples from 13 sinus samples revealed Staphylococcus aureus in 6, Streptococcus pyogenes in 5, Escherichia coli in 2 cases. Fifty-nine cases manifested by ulcers showed Staphylococcus aureus in 21, Streptococcus pyogenes in 20, Escherichia coli in 13, Salmonellae in 3, Proteus vulgaris in 1 whereas no growth was seen in 1 case. Four sequestrum samples revealed Staphylococcus aureus in 1, Streptococcus pyogenes in 1, Escherichia coli in 1 and no organisms in 1 case.

## DISCUSSION

Pus samples were collected from 80 osteomyelitis patients from various hospitals in and around Faisalabad. Bacterial growth was present in 78 (97.5%) cases while two samples did not show any bacterial growth. Single organisms were grown from each of the 78 cases. The cases of osteomyelitis studied were chronic and had been under some kind of antibacterial treatments. This may explain the absence of any organism in some cases. Isolation of only one type of organisms indicate that either the choice of antibiotic was wrong or the organisms had become antibiotic resistant. Bacterial antagonism may have played some part in reducing the type of organisms in some cases.<sup>8</sup> Two cases did not show any growth. Aseptic osteomyelitis has also been reported by other workers<sup>9,10</sup> Seventy eight isolates of different bacteria in this study comprised 30 isolates (37.5%) of Staphylococcus aureus, 28 (35.0%) of Streptococcus pyogenes, 6 (20.0%) of Escherichia coli, 3 (3.7%) of Salmonellae and 1 isolate (1.3%) of Proteus vulgaris. Similar bacteria have been isolated from osteomyelitis patients by other workers<sup>11-17</sup>. Osteomyelitis has also been due to other bacterial infections namely Neisseria gonorrhoea<sup>18</sup>, Bacillus<sup>19</sup>, Serratia, Marcescens<sup>9,20</sup> Enterobacter aerogenes<sup>21</sup>, Rhodococcus<sup>22</sup>, and Pseudomonas<sup>23</sup>, while other workers have isolated Hemophilus influenzae, Haemophilus aphrophillus and Coccobacilli<sup>1,24</sup>. These organisms were not isolated from the patients in the present study. This may be due to lower incidence of these species in Faisalabad.

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