นิพนธ์ต้นฉบับ

Clinical features of bacterial arthritis (non-gonococcal arthritis)

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Between 1976 and 1985, 94 cases of bacterial arthritis, diagnosed by positive Gram-staining studies, or positive cultures for causative micro-organisms in the synovial fluid, or positive blood cultures, who were admitted to the Medical Service of Chulalongkorn Hospital, were reviewed. The incidence predominanted among males (61.7%), although equal age-distribution was observed. Acute onset of monoarticular arthritis (69.1%) with fever (96.8%) was the main clinical feature. The knee joint was the most commonly affected joint (69.1%) followed in frequency by the ankle (14.9%) shoulder (12.8%), wrist (10.6%) and hip (9.6%). The spine and sacroiliac joint were affected in 2.1 and 1.1 per cent of the patients, respectively. Staphylococus aureus was the most common micro-organism (50%) followed in frequency by the streptococcal group (35.7%) and enterobacter (7.1%). Bacteremia was evident in 39.4 per cent of the total number of cases. The presence of potential foci of infection and underlying disease was observed in 45.7 and 41.9 per cent of the patients, respectively. The greatest majority of patients responded well with the administration of proper antibiotics together with closed needle aspiration (88.6%) and death occurred in 6.4 per cent of the total.

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คณะผู้รายงานได้ทำการศึกษาผู้ป่วย 94 ราย ที่เป็นโรคข้ออักเสบซึ่งเกิดจากติดเชื้อหนองที่ไม่ใช่ทั้งเชื้อหนองในหรือเชื้อวัณโรคที่รับไว้รักษาในแผนกอายุรกรรมโรงพยาบาลจุฬาลงกรณ์ ระหว่างปี พ.ศ. 2519-2528 ผู้ป่วยทุกรายได้รับการวินิจฉัยโรคนี้โดยการพบเชื้อจากการย้อมแกรม หรือจากการเพาะเชื้อในน้ำไขข้อหรือจากเลือด จากการศึกษาพบว่าในร้อยละ 61.7 ของผู้ป่วยเป็นเพศชาย โรคนี้เกิดได้ในทุกวัยลักษณะอาการทางข้อมักจะเป็นแบบข้ออักเสบชนิดข้อเดียวในอัตราร้อยละ 69.1 ของผู้ป่วยร่วมกับอาการแบบเฉียบพลัน และมีไข้ร่วมด้วยร้อยละ 96.8 เป็นที่บริเวณข้อเข่าร้อยละ 69.1 ข้อเท้า 14.9 ข้อไหล่ 12.8 ข้อมือ 10.6 และข้อสะโพกร้อยละ 9.6 ส่วนที่ข้อกระดูกสันหลัง และข้อกระดูกเชิงกราน พบได้ในอัตราร้อยละ 2.1 และ 1.1 ของผู้ป่วยตามลำดับ เชื้อที่พบเป็นชนิดสะแตปโตคอคคัส ออร์เรียส ร้อยละ 50 และ ในกลุ่มเชื้อสะเตรปโตคอคคัส ร้อยละ 35.1 เชื้อเอ็นตะโรแบคเตอร์ร้อยละ 7.1 นอกจากนี้ยังพบอีกว่าในร้อยละ 39.4 ของผู้ป่วยพบว่ามีเชื้ออยู่ในเลือดด้วย และในร้อยละ 45.7 พบหลักฐานตำแหน่งจุดแพร่เชื้อ และร้อยละ 41.9 พบว่ามีโรคอื่นร่วมด้วย ผลการรักษาปรากฏว่า การรักษาด้วยการใช้ยาปฏิชีวนะร่วมกับการดูดหนองออกด้วยวิธีธรรมดาได้ผลดีถึงร้อยละ 88.6 และมีผู้ป่วยเสียชีวิตร้อยละ 6.9 จากผู้ป่วยทั้งหมด

Bacterial, or pyogenic, arthritis is a curable form of arthritis because its causes are known; however, bacterial arthritis can cause morbidity or mortality if diagnosis and initiation of therapy are delayed.[1-3] The clinical features of bacterial arthritis, micro-organisms and outcome of therapy have been studied extensively, but not so much in Thailand.[1-18]

The purpose of this study is to present clinical features of bacterial arthritis (non-gonococcal) seen over a 10-year period at the Medical Service, Chulalongkorn Hospital, Bangkok.

Patients and Method

We reviewed all patients with a diagnosis of bacterial arthritis (non-gonococcal) who had been admitted to the Medical Service of Chulalongkorn Hospital between January 1976 and December 1985. Patients were included in the study if they satisfied the diagnotic criteria for bacterial arthritis, particularly either by positive Gram-staining study or positive culture for micro-organisms in the synovial fluid or in the blood. Cases of gonococcal arthritis and tuberculous arthritis were not included in this study. These criteria for the diagnosis of bacterial arthritis were met in 94 patients. The study included sex and age distribution, onset of disease, pattern of articular manifestation, associated symptoms, underlying diseases and outcome of therapy.

Result

The 94 patients can be divided into two groups by diagnostic criteria. The first group comprise those with a positive Gram-staining study and / or positive synovial fluid culture; 78 cases (83 per cent of the total) belonged to the first group. The second group, comprising patients with a positive blood culture only, accounted for 16 cases (17 per cent of the total). Of the total, 61.7 per cent were males as shown in table 1. Table 2 shows relatively even age distribution of the patients.

Table 1. 94 cases of bacterial arthritis.

Patient	Males		Females		Total	
	No. of patients	%*	No. of patients	%*	No. of patients	%
Group 1: Either positive for Gram stain and/or positive synovial fluid culture	50	64.1	28	35.9	78	83.0
Group 2: Positive blood culture only	8	50	8	50	16	17.0
Total	58	61.7	36	38.3	94	100

Note: * Percentage from the total number of patients

Table 2. Age distribution in 94 cases of bacterial arthritis.

Age (years)	Group 1		Group 2		Total	
	No. of patients	%	No. of patients	%	No. of patients	%
15-19	11	14.1	1	6.2	12	12.8
20-29	18	23.1	3	18.7	21	22.3
30-39	14	17.9	5	31.3	19	20.2
40-49	13	16.7	3	18.8	16	17.0
50-59	14	17.9	2	12.5	16	17.0
60^{+}	8	10.2	2	10.5	10	10.6
Total	78	100	16	100	94	100

Acute onset of disease (defined by symptoms of less than one week in duration) characterized 95.7 per cent of all cases. Monoarticular arthritis was observed in 69.1 per cent of the patients, whereas tenosynovitis was found in only 6.3 per cent of the total (table 3).

Table 3. Onset and pattern of articular manifestation.

Manifestation	Group 1 (78 patients)		Group 2 (16 patients)		Total (94 patients)	
	No. of patients	%	No. of patients	%	No. of patients	%
Onset:						
Acute	74	94.9	16	100	90	95.7
Chronic	4	5.1	-	-	4	4.3
Articular:						
Monoarticular	54	69.2	11	68.7	65	69.1
Oligoarticular	24	30.8	5	31.3	29	30.9
Spondylitis	(1)		(1)		(2)	(2.1)
Sacroiliitis			(1)		(1)	(1.1)
Tenosynovitis and arthritis	4	5.2	2	12.5	6	6.3

Fever was the main feature and was evident in 96.8 per cent of the cases. About one-third (35.1% of the total) had evidence of a chill. Skin lesions, particularly cellulitis, abscess, pustule and ulcer, were evident in 13.8 per cent of the total, as shown in table 4.

Table 4. Associated symptoms and findings.

Symptom	Group 1 (78 patients)		Group 2 (16 patients)		Total (94 patients)	
	No. of patients	%	No. of patients	%	No. of patients	%
Fever	75	96.2	16	100	91	96.8
Chill	29	37.2	4	25.0	33	35.1
Skin lesion	9	11.5	4	25.0	13	13.8
cellulitis	5		2		7	
abscess	2		1		3	
pustule	1		-		1	
ulcer	1		1		2	
Meningitis	1		-		1	

Table 5 shows the type of joint involvement. The knee joint was the most commonly affected joint (69.1%) followed in frequency by the ankle (14.9%), shoulder (12.8%), wrist (10.6%) and hip (9.6%). Spondylitis and sacroiliac joint involvement were found in 2.1 and 1.1 per cent of the patient, respectively.

Table 5. Joint involvement in 94 cases of bacterial arthritis.

Joint	Group 1 (78 patients)		Group 2 (16 patients)		Total (94 patients)	
	No. of patients	%	No. of patients	%	No. of patients	%
Knee	59	75.6	6	37.5	65	69.1
Ankle	11	14.1	3	18.8	14	14.9
Shoulder	10	12.8	2	12.5	12	12.8
Wrist	8	10.3	2	12.5	10	10.6
Elbow	7	9.0	1	6.3	8	8.5
Hip	7	9.0	2	12.5	9	9.6
MTP	3	3.9	1	6.3	4	4.2
MCP	1	1.3	-	-	1	1.1
PIP	2	2.6	1	6.3	3	3.2
DIP	1	1.3	-	-	1	1.1
Sternoclavicular	-	-	1	6.3	1	1.1
Spondylitis	1	1.3	1	6.3	2	2.1
Sacroiliac	-	-	1	6.3	1	1.1

The potential foci (primary source) of infection was evident in 45.7 per cent of all cases, with the skin being the major part of the body involved (table 6).

Table 6. Potential foci of infection in bacterial arthritis.

	Group 1 (78 patients)		Group 2 (16 patients)		Total (94 patients)	
	No. of patients	%	No. of patients	%	No. of patients	%
Present	33	42.3	10	62.5	43	45.7
.Cellulitis	5		2		7	
.Skin ulcer	1		1		2	
.Exploliative dermatitis	2		-		2	
.Abscess	2		1		3	
.Perianal abscess	1		-		1	
.Perinephric abscess	1		-		1	
.UTI	6		2		8	
.Endocarditis	2		3		5	
.Root abscess	1		2		3	
.Otis media	1		-		1	
.Chronic osteomyelitis	4		-		5	

Table 7 shows the prevalence of underlying diseases found in 41.9 per cent of the total; diabetes melletus was the predominant disease.

Leucocytosis (white cells > 10,000) was found in the majority of cases (85.1%); however, neutrophils accounted for more than 90 per cent of the white blood cells in 31.9 per cent of the cases.

Table 7. Prevalence of underlying diseases.

	Group 1 (78 patients)		Group 2 (16 patients)		Total (94 patients)	
	No. of patients	%	No. of patients	%	No. of patients	%
Present	29	37.2	10	62.5	39	41.9
Diabetes mellitus	20		3		23	
Chronic liver disease (cirrhosis)	6		-		6	
Blood disease	3		-		3	
Thalassemia	1		-		1	
AML	2		-		2	
Exfloliative dermatitis	2		-		2	
RA.	-		1		1	
SLE	1		1		2	
Renal failure	1		1		2	
Drug addiction	1		-		1	
TB-LN	1		-		1	
Psoriasis	1		-		1	
Leprosy	1		-		1	
CA Cx.	1		-		1	

Notes: AML = Acute myeloblastic leukemia, RA = Rheumatoid arthritis
SLE = Systemic lupus erythematosus, TB-LN = Tuberculous lymphadinitis
CA Cx. = Carcinoma of the cervix

Gram - positive cocci were found in 88.3 per cent of the patients, followed in frequency by Gram-staining studies were positive in 74.5 per cent of the cases. Synovial cultures were positive in 54.2 per cent of the cases and there were evidence of bacteremia in 39.4 per cent of the cases (table 8).

Table 8. Findings of Gram staining, culture and hemoculture in 94 cases of bacterial arthritis.

Organism	Organism		Positive for Gram stain		Positive culture of synovial fluid		Positive haemoculture	
	No.	%	No.	%	No.	%	No.	%
Gram + cocci	83	88.3	63	75.9	43	51.8	32	38.5
Gram − cocci	1	1.1	1					
Gram − bacilli	10	10.6	6	60	8	80	5	50
Total	94	100	70	74.5	51	54.2	37	39.4

Of the bacterial findings in 70 cases with positive synovial fluid culture or hemoculture, Gram-positive cocci were found in 85.7 per cent of the total and Gram-negative bacilli were found in 14.3 per cent. Staphylococus aureus and enterobacter were the main Gram-positive cocci and Gram-negative bacilli, respectively (table 9).

Table 9. Bacterial findings in 70 cases with positive synovial culture or hemoculture.

	Total 70 cases	
	No.	%
Gram + cocci	60	85.7
.Stap. aureus	35	50
.Streptococcus	25	35.7
- B.haemolytic strep.	20	
.not grouped	6	
.non-A	5	
. A	5	
. F	2	
. G	2	
- non-haemolytic strep.	2	
- Strep. pneumoniae	1	
- Anaerobic strep. (pepto strep.)	2	
Gram - cocci	-	
Gram - bacilli	10	14.3
Enterobacter	5	7.1
E.Coli	1	1.4
Klebsiella	1	1.4
Pseudomonas auroginosa	1	1.4
Pseudomonas pseudomalei	2	2.9

Table 10 shows the outcome of therapy. The majority of the cases were treated with appropriate antibiotics and closed needle drainage, which gave a good outcome. Death occurred in 6.4 per cent of the total.

Table 10. Result of treatment.

Outcome	Antibiotic alone 15		Antibiotic + closed drainage 70		Antibiotic + surgical drainage 9		Total 94	
	No.	%	No.	%	No.	%	No.	%
Good s damage	13	86.7	62	88.6	3	33.3	78	83.0
Good c damage	-	-	3	4.3	5	55.6	8	8.3
Death	1	6.7	4	5.7	1	11.1	6	6.4
Sign-out	1	6.7	1	0.1	-	-	2	2.1

Note: Good s damage: complete recovery without residual damage
Good c damage: complete recovery with residual damage

Discussion

Although the overall incidence of septic arthritis in Thailand is not known, its prevalence, particularly that of bacterial arthritis, at Chulalongkorn Hospital in 1986 was 19 cases out of 6,491 admissions to the hospital's Medical Service.[11] The clinical pattern of bacterial arthritis has been reported extensively in the literature[4-13, 15-18] but seldom for Thailand.[20,21] Our study was limited to cases diagnosed as bacterial arthritis, postitive only in Gram-staining studies and/or cultures for bacteria arthritis, postitive only in Gram-staining studies and/or cultures for bacteria in joint fluid and/or in blood. Not included were cases of acute monoarthritis with fever. However, for those in whom micro-organisms could not be indentifed by any means although they responded to antibiotic therapy, presumptive diagnosis of bacterial arthritis was made.

As in other reports on non-gonococcal arthritis, incidence were higher among males than females in contrast to gonococcal arthritis in which the incidence is higher among females.[8,10,11,13,18] The reason for male prominence in cases of bacterial arthritis is not known; however, in cases of gonococcal arthritis, the high incidence among females is related to asymptomatic gonococcal infection and environmental factors.[3,22,23,24,25]

In our study, the age at onset of disease was equally distributed among the cases of bacterial arthritis, a finding which is not different from that of other reports,[8,11,18] however, age distribution was different compared with cases of gonococcal arthritis which occurs more frequently among the younger age groups.[3,22,25,26]

Acute onset of monoarticular arthritis with fever was the main feature of bacterial arthritis in our study as is common among other studies; however, tenosynovitis was less frequently observed in contrast with gonococcal arthritis.[1,3,6-8,10-13,22,25,26] Cutaneous manifestation in bacterial arthritis represents a source of infection rather than being a part of a clinical manifestation as in the case of gonococcal arthritis. The presence of cellulitis or abscesses are the main features of cutaneous findings in patients with bacterial arthritis.

The knee joint was the most frequently affected joint, being found in 60-80 per cent of the reported series[3,4,8,10,13,18] as well as in the present study. The hip joint was not commonly affected in adults; it was found in less than 10 per cent of the cases in this study. However in most reports on children, with bacterial arthritis the hip joint was found to be more commonly involved.[4,6,7]

In bacterial arthritis, hematogenous spreading of the infection to the joint is more common than direct extension; however, evidence of bacteremia was found in less than half of the reported cases in this and other studies.[1,3,10,18]

The presence of foci of infection were found in about half of the patients in other studies,[1-3,8,9,10] in this study, evidence of potential foci of infection was found in 45.7 per cent of the cases, with the skin being the main source of infection. The common source of Gram-positive cocci infection was the skin; Gram-negative bacilli, the urinary tract. Thus in cases of bacterial arthritis, the source of infection should be looked for in the aforementioned foci.

With regard to the pathogenesis of bacterial arthritis, more than half of the patients showed evidence of underlying diseases related to the host defence mechanism; by contrast, gonococcal arthritis occurs in heathy patients.[1,2,3,5,9,12,18,22,15,26] Because our study and other studies showed that underlying diseases were found in more than 40 per cent of the cases, underlying diseases should be investigated in patients with bacterial arthritis in order to determine proper management as well as preventive measures.

Staphylococcus aureus is the most common micro-organism causing bacterial arthritis, found in other studies,[1-8,18] it is followed in frequency by the streptococcal group and enterobacter. However, it is interesting to note that E.coli is less common than enterobacter in our patients with arthritis caused by Gram-negative bacilli, which is more common in the reports of other series.[9,12] As in other series, positive for Gram-staining study was more frequently found than positive cultures; however, in the case of negative Gram-staining study, postive cultures were evident.[1,3,4] Leukocytosis of the synovial fluid and blood was the main feature of bacterial arthritis.

The majority of patients responded well to treatment with proper antibiotics and closed needle aspiration; however, a few patients required surgery for open drainage, particularly of the hip joint. Residual damage was found in somes cases, particularly those in which diagnosis and treatment were delayed. Death occurred in casses of severe sepsis 6.4 per cent of the total in this study, which is similar to the findings of previous reports.[1,3,4,6,7,12,14,17] Thus early diagnosis and early institution of proper treatment are the main-stays in the management of bacterial arthritis.

In conclusion, clinical features of bacterial arthritis includes acute monoarthritis with fever, the presence of potential foci of infection and underlying diseases, staphylococcus aureus being the most common micro-organism occuring in any age group. Early diagnosis and early treatment is the main-stay in the management of this type of arthritis.

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