

Incidence and bacteriologic causes of septic arthritis in a general hospital in Saudi Arabia

Jaffar A. Al-Tawfiq, Mohammed Babiker

From the Internal Medicine, Saudi Aramco Medical Services Organization, Dhahran, Saudi Arabia

Correspondence: Dr. Jaffar A. Al-Tawfiq · Internal Medicine, Saudi Aramco Medical Services Organization, Dhahran, Saudi Arabia · T:+966-3-877-3524.F:+966-3-877-3790. jaffar.tawfiq@aramco.com

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BACKGROUND AND OBJECTIVES: Since data on the incidence and etiology of septic arthritis in Saudi Arabia is sparse, we analyzed the incidence and bacterial etiology of septic arthritis in a general hospital in Saudi Arabia.

DESIGN AND SETTINGS: Observational study of all hospitalized patients with native joint septic arthritis from 2005 to 2010.

PATIENTS AND METHODS: We specifically collected data on demography, joint(s) affected, synovial fluid gram stain and culture, and blood culture. We also included the initial antimicrobial agents, length of stay (LOS) and any surgical interventions. Data were analyzed using simple descriptive statistics.

RESULTS: There were 58 cases of native joint septic arthritis with an annual incidence rate of 0.2-0.8 per 1000 discharges. There were 31 (53.4%) males and 27 (46.6%) females with a mean (SD) age of 44.2 (29.3) years. There were 18 (25.8%) children <18 years of age. The most frequently affected joints were the knee (28, 48.3%), ankle (7, 12.1%), elbow (6, 10.3%), and shoulder (4, 6.9%). Of the synovial cultures, 17 (29.3%) were negative and the most commonly isolated organism was methicillin-susceptible *Staphylococcus aureus* (16, 27.6%). Blood cultures were negative in 38 cases (67.8%) and positive in the remaining 32%. The most common organism from blood cultures was *S aureus* (12.5%). There was no difference in the rate of positive synovial fluid cultures between children and adults (65% vs 82.4%, $P=.22$), but children were more likely to grow *S aureus* (53%) than adults (20%) ($P=.024$).

CONCLUSIONS: Septic arthritis is an uncommon disease in the study population and the most common organism is *S aureus*.

Septic arthritis can be classified into native joint and prosthetic joint infections. Native joint septic arthritis typically is the consequence of hematogenous seeding of joints.¹ About 0.5% of patients with bacteremia due to *Streptococcus pneumoniae* develop septic arthritis.² The incidence of septic arthritis varies based on the inclusion and exclusion criteria of the included patient population and/or the inclusion of prosthetic joint infections. There are few studies from Saudi Arabia³⁻⁸ addressing septic arthritis and those studies included children only,^{3,4} patients with rheumatoid arthritis or sickle cell disease,^{5,6} and a small study of 25 patients.⁸ We studied the rate and etiology of septic arthritis involving native joints in a hospital in Saudi Arabia.

PATIENTS AND METHODS

This study included patients with septic arthritis admitted to Saudi Aramco Medical Services Organization (SAMSO) from 2005 to 2010. We included patients with native joint infection and excluded patients with prosthetic joint infections. Septic arthritis was defined as any patient with single joint involvement with effusion and fever and had synovial fluid gram stain and culture. We specifically collected data on demography, joint(s) affected, synovial fluid gram stain and cultures, and blood cultures. We also included the initial antimicrobial therapy, length of hospital stay (LOS) and any surgical interventions. Data were analyzed using simple descriptive statistics using the Statistical Package for Social Sciences Version 11 (SPSS 11).

RESULTS

The annual incidence rate was 0.2 to 0.8 per 1000 discharges among the 58 cases of native joint septic arthritis. There were 31 (53.4%) male and 27 (46.6%) female with a mean (SD) age of 44.2 (29.3) years. Children <18 years of age constituted 25.8% of the cases. The most frequently affected joints were the knee (28, 48.3%), ankle (7, 12.1%), elbow (6, 10.3%), and shoulder (4, 6.9%). Synovial fluid cultures were negative in 17 (29.3%) patients and positive in the remaining 69.7%. The most commonly isolated organism from synovial fluid was *Staphylococcus aureus* (16, 27.6%), followed by gram-negative bacilli (7.6%) (Table 1). One of the synovial cultures (1.8%) showed methicillin-resistant *S aureus* (MRSA). Blood cultures were negative in 38 (67.8%) and positive in 32% of cultures. In relation to blood cultures, the most common organism was *S aureus* (12.5%) followed by gram-negative bacilli (5.4%). There was no difference in the rate of positive synovial fluid cultures between children and adults (65% vs. 82.4%, $P=.22$). Synovial fluid cultures were more likely to grow *S aureus* in children (53%) than in adults (20%) ($P=.024$). There was no difference in the rate of positive blood cultures between adults (37.5%) and children (27.8%) ($P=.5$). Of the total patients, 62% had incision and drainage and 32% had joint aspiration only. The most frequently administered initial antibiotic therapy was nafcillin ($n=16$, 27.6%), vancomycin ($n=8$, 13.8%), cefazolin ($n=6$, 10.3%) and ciprofloxacin ($n=5$, 8.6%). The antibiotic was adjusted to the specific isolated organism and was continued for 4 to 8 weeks. None of the patients had long-term complications.

DISCUSSION

Septic arthritis is one of the diagnoses of acute monoarthritis and a definitive diagnosis depends on the isolation and identification of bacteria in synovial fluid. There are different criteria used for diagnosis of septic arthritis. In one study, using Grade A Newman criterion, the annual incidence was 1.63 per 100 000 compared to a rate of 3.91 per 100 000 when using Grade C criteria.⁹ Including patients with Newman Grade C criterion, those with clinical and laboratory findings of septic arthritis and no identifiable organism resulted in an incidence of septic arthritis of 0.2 to 0.8 per 1000 discharges, in this study. Including all cases of suspected septic arthritis gives a better estimation of the true positivity of synovial fluid and blood cultures. The most common bacterial pathogen in septic arthritis is *S au-*

Table 1. Most frequent bacterial pathogens isolated from synovial fluid and blood cultures.

	Synovial fluid culture; n (%)	Blood culture; n (%)
<i>Brucella</i>	1 (1.8)	1 (1.8)
Gram-negative bacilli	4 (7.6)	3 (5.4)
Methicillin-susceptible <i>Staphylococcus aureus</i>	16 (27.6)	7 (12.5)
Methicillin-resistant <i>Staphylococcus aureus</i>	1 (1.9)	0 (0)
<i>Salmonella</i>	2 (3.8)	1 (1.8)
<i>Streptococcus</i>	2 (3.8)	1 (1.8)
<i>Listeria</i>	1 (1.9)	0 (0)
<i>Staphylococcus</i> and <i>Streptococcus</i>	3 (5.7)	0 (0)
Negative culture	17 (29.3)	38 (67.8)

reus,^{10,11} which accounted for 39% of the total bacterial isolates in childhood septic arthritis in a study in Saudi Arabia.³ Similarly, *S aureus* was the most common organism in this study. Children were more likely to have *S aureus* than adults as noted in a study from Saudi Arabia.⁷ Although, pediatric septic arthritis used to be due to *Haemophilus influenzae*, this organism is not seen in patients with septic arthritis in developed countries nor in Saudi Arabia due to the introduction of mandatory *H influenzae* vaccinations. Although, MRSA was reported to be the most common organism causing septic arthritis in a study from northern California,¹² only one patient in the current study had MRSA septic arthritis. The difference in the rate of MRSA infection depends on the overall prevalence of MRSA in these two populations. There are no randomized controlled trials evaluating the best drainage technique of adults with bacterial arthritis. Peripheral joints are easily accessible by needle aspiration,¹³ whereas arthroscopy is needed for septic arthritis involving the knees, shoulders and wrists.¹⁴ In the current study, 62% had incision and drainage and 32% had joint aspiration only.

In conclusion, septic arthritis was uncommon in this population in Saudi Arabia and the most frequently isolated organism was *S aureus*. The most frequently involved joints were the knee, ankle and elbow. Although, this study included only hospitalized patients, it is the practice in our hospital to admit all patients with confirmed or suspected septic arthritis. Thus, it is likely that the study truly estimated the actual incidence of the disease.

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