Original Article

Septic Arthritis of the Hip in Nigerian Children

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Abstract

Background: Septic arthritis of the hip is an important osteoarticular infection in children. There is insufficient data on its pattern of presentation and sequelae in our environment. The aim of this study was to identify the aetiologic factors, patterns of presentation and sequelae of septic arthritis of the hip in Nigerian children.

Methods: A retrospective analysis of the clinical, roentgenographic and laboratory records of children with septic arthritis of the hip admitted over a 7-year period (1998-2004) to Obafemi Awolowo University Teaching Hospitals Complex Ile-Ife, Nigeria was undertaken.

Results: There were 51 patients with septic arthritis involving 54 hip joints constituting 48.1% of all cases of septic arthritis. The mean age of the patients was 3.6 years SD (range 2 months to 15years). There were 36 males and 15 females. The left hip was more affected than the right (left = 60.8% and right 33.3%). Both hips were affected in 3 patients and 3 patients with HbSS had associated septic arthritis of the knee. Trauma (fall and intramuscular injection) was associated in 27.4% of the patients. The mean duration of symptoms before presentation was 28 days. *Staphylococcus aureus* was the predominant aetiologic bacterial agent (48.9%). All the patients had raised ESR (mean = 78 mm/hr) and 54.9% had anaemia.

The overall result of treatment was unsatisfactory as only 29.4% had complete resolution, while 47.1% had varying degrees of hip joint destruction.

Conclusion: Septic arthritis of the hip in Nigerian children is associated with significant morbidity as a result of late presentation. Early diagnosis, prompt and adequate treatments are essential for the restoration of normal function of the infected hip.

Keywords: Septic hip arthritis, management, children.

Introduction

Septic arthritis refers to joint infections caused by pyogenic bacteria excluding tuberculosis[1]. It may be secondary to bacteraemia or septicaemia. It may also be caused by extension from a contiguous infection like osteomyelitis or cellulitis and by direct implantation of organisms into the joint[1]. Acute septic arthritis of the hip is an important osteoarticular infection and is a medical emergency. Delay in recognition and initiation of therapy increase morbidity and cause permanent disability. The hip is the commonest site of acute septic arthritis in childhood[1-3]. Septic arthritis of the hip is usually diagnosed late in our environment with tragic consequences. This is especially so in neonates and young infants in whom the clinical signs are much less specific[1,2,4]. Awareness of the possibility of septic arthritis of the hip being the cause of pyrexia of unknown origin in a child and diligence in detection are essential if unnecessary

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delay is to be avoided. The present study examined the characteristics of septic arthritis in children at the OAUTHC in an attempt to highlight the features that will make for early diagnosis and prompt treatment.

Patients and Methods

The clinical, laboratory and radiologic records of patients with septic arthritis of the hip seen in Children's Emergency Ward and Children's Orthopaedic Ward of Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC) Ile-Ife, Nigeria, over a 7-year period (1998 to 2004) were retrospectively analysed. The data extracted included age, sex, presenting symptoms and signs and their duration, antecedent history, side(s) affected, aetiologic bacteria agents, radiologic features, full blood count, haemoglobin genotype, erythrocyte sedimentation rate (ESR), treatment received and duration and outcome. Diagnosis was made from clinical features, culture of blood and joint aspirate, x-ray of the hip and ultrasonography of the hip where necessary.

Results

A total of 106 children with septic arthritis of the major joints were seen during this period. Fifty-one patients (48.1%) had septic arthritis involving 54 hip joints. The mean age was 3.6 years (range 2 months to 15 years). The peak incidence was 1 to 5 years. There were 36 males and 15 females (M:F ratio of 2.4 to 1) (Table 1). The left hip was affected in 31 patients (60.8%) while the right hip was affected in 17 (33.3%). Both hips were affected in 3 patients (5.9%). Three patients had associated septic arthritis of the knee (all had HbSS genotype).



Fig. 1: X-rays of the pelvis showing septic arthritis of right hip with narrowing of the right hip joint space.



Fig. 2: X-rays showing septic arthritis of right hip with pelvic obliquity and destruction of the right femoral head.

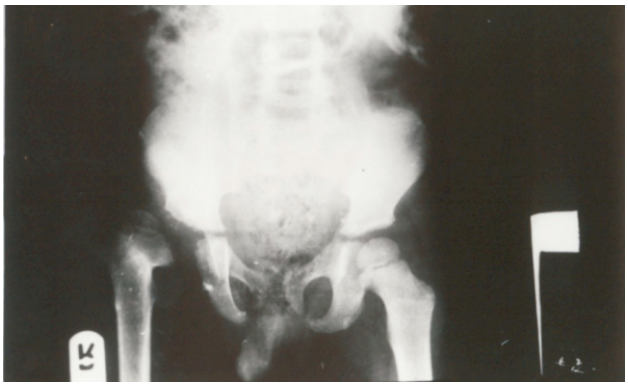


Fig. 3: X-rays showing destruction of right femoral head and pathologic dislocation of the right hip.

The common presenting symptoms were joint pain (49.0%), joint swelling (15.7%), limping (43.1%) and fever (41.2%). A history of fall was given in 5 patients (9.8%) while 9 patients (17.6%) had intramuscular injections into the ipsilateral buttocks of the affected hip before the onset of symptoms. Eleven patients (21.6%) presented with septicaemia, most of them in infancy (0-1 year). The diagnosis in three of them was confirmed by ultrasonography. Duration of symptoms before presentation ranged from 3 days to 1 year (mean 28 days). The younger

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Table 1:
Age and Gender Distribution of Septic Arthritis of the Hip managed at OAUTHC

Age (Yrs)	Gender		Total (%)
	Male	Female	
0 -1	7	4	11(21.5)
> 1 - 5	13	6	19(37.3)
> 5 - 10	7	2	9(17.6)
> 10 - 15	9	3	12(23.5)
Total	36 (70.6)	15 (29.4)	51(100)

Table 2:
Presenting features in children with septic Arthritis of the Hip at OAUTHC

Presenting Features	Number of Children	%
Joint Pain	25	49.0
Joint Swelling	8	15.7
Limping	22	43.1
Fever	21	41.2
Falls	5	9.8
Injection into buttocks	9	17.6
Septicaemia	11	21.6
Discharging sinuses	3	5.9
Dislocated hip	2	3.9
Tetralogy of Fallot	1	2.0

patients tended to present earlier than the older patients.

The microscopy, culture and sensitivity results of joint aspirate and blood culture were available in 45 patients. Staphylococcus aureus was isolated in 22 patients (48.9%), Pseudomonas aeruginosa in 6 patients (13.3%), Salmonella typhi in 2 patients (both with HbSS) and Klebsiella spp was isolated in one patient. There were mixed growth in 5 patients but no growth in 9 patients (20.0%). The

Table 3:
Isolated bacteria agents from pus and blood culture in septic arthritis of the hip managed at OAUTHC (N=45)

Micro-Organism	Number of Children
Staphylococcus aureus	22 (48.9)
Pseudomonas aeruginosa	6 (13.3)
Salmonella typhi	2 (4.4)
Klebsiella spp	1 (2.2)
Mixed growth	5 (11.1)
No growth	9 (20.0)

erythrocyte sedimentation rate (ESR) ranged from 10 to 150mm/Hr (mean = 78mm/Hr). Genotype result was available in 33 patients. Twenty three patients had HbAA, 4 patients had HbAS, 3 patients had HbAC while another 3 patients had HbSS. Twenty eight patients (54.9%) had anaemia with PCV of 10 to 29% (table 4). All the patients with septicaemia had anaemia.

The white cell count ranged from 3,600 to 25,300/cmm (mean 9,300/cmm). The patients with

Table 4:
Packed cell volume (PCV) in children with septic arthritis at OAUTHC

PCV	Frequency	(%)
10 - 19	7	13.7
20 - 25	18	35.3
26 - 29	3	5.9
≥ 30	23	45.1
Total	51	100

Table 5:
Treatment modalities in children with septic arthritis at OAUTHC

Procedure	No. of Children
Open arthrotomy, antibiotics and traction	36 (70.6%)
Traction and antibiotics only	12 (23.5%)
Girdlestone arthroplasty/Joint debridement	3 (5.9%)
Physiotherapy	23 (45.1%)

a longer history tended to have normal white cell count. Those in whom tuberculosis of the hip joint was suspected were screened for HIV but were all negative for the HIV test.

Thirty six patients (70.6%) had a combination of open arthrotomy, antibiotics and skin traction; 12 (23.5%) had antibiotics and traction only while 3 patients with completely destroyed hip joint had Girdlestone arthroplasty. Twenty-three patients (45.1%) had various forms of physiotherapy, including range of motion exercises and shoe raise.

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The duration of treatment and follow up was from 1 week to 24 weeks (mean 8 weeks). Fifteen patients (29.4%) had complete resolution without sequelae while 24 patients (47.1%) had varying degrees of complications. Twelve patients (23.5%) were lost to follow up after discharge from the ward (Tables 5 and 6).

Discussion

Septic arthritis of the hip remains a serious osteoarticular disease in children because of potential permanent damage to the hip joint and systemic morbidity. About 48.1% of all cases of septic arthritis in children seen at our center involved the hip joint. This is the experience of most workers[1,2,5,9]. The peak incidence in our series was in the under 5 age group. About 58.9% of the patients were 5 years or younger (mean = 3.6 years). This is similar to the findings by Nade et al[5] in Australia and Wang et al[6] in Southern Taiwan.

The left side was more affected than the right. The reason for this left side dominance is not clear. It is worthy of note that the 9 patients who had intramuscular injection into the buttocks before the onset of septic arthritis had it on the left side. This is in contrast to equal involvement of both hips in studies by Chen et al[7]. The three patients with associated septic arthritis of the knee joint had sickle cell anaemia (HbSS). Multiple joint involvements in sickle cell disease is not unusual because of their immuno-compromised state. The common presenting features (pain, fever and limping) are similar to the report of other workers[6].

Trauma is an important associated aetiologic factor in our series. A history of fall was given in 5 patients (9.8%) while 9 patients (17.6%) had intramuscular injections into the buttocks of the affected hips prior to the onset of septic arthritis. Cases of septic arthritis following intramuscular injections could be explained as resulting from spread of infection from contiguous site of gluteal abscess or cellulitis. Trauma is also believed to reduce the local resistance of a joint to spread of infection[1]. This could be as a result of haematoma formation which is readily infected during a bacteraemia.

The mean duration of symptoms was 28 days (range 3 days to 1 year). This is in contrast to the experience of Chen et al[7] who reported a mean duration of 5 days (range 1-14 days). The delay in intervention may be due to delay in making a diagnosis by the referring physicians, activities of quacks in this environment and poverty. The hip is deeply situated, giving rise to difficulties in interpreting early clinical features and therefore possible delay in diagnosis. Many physicians are slow to recognize the early clinical manifestations of septicaemia and suppuration of the hip joint[1]. Septicaemia was the mode of presentation in 11(21.6%) of our patients. Some of them were initially diagnosed as malaria. This is unfortunate considering the fact that 'pus and articular cartilage are incompatible'[8]. The sequelae of delay in diagnosis and initiation of appropriate treatment can be crippling.

Staphylococcus aureus was the most common bacteria isolate (48.9%) followed by Pseudomonas aeruginosa (13.3%). Salmonella typhi was cultured in two patients with HbSS and multiple joint involvement. The predominance of Staph. aureus in this report is similar to the findings of other workers[1,4,6,9-12]. The prevalence of Salmonella species in this study is also similar to the findings of Wang et al[6] who found 3 of 58 isolates and Chiu et al[13] who reported a child with typhoid fever and septic arthritis of the hip in whom Salmonella typhi was isolated from joint aspirate.

There was no growth from culture of blood and joint aspirate in 9(20%) of the patients. The inability to obtain bacteriologic proof of infection may be

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due to prior use of antibiotics (a rampant practice in our environment), non availability of facilities for anaerobic cultures, the changing patterns of the organisms involved and their cultural characterstics[1]. It is interesting to note that Haemophilus influenza was not cultured in any of the children. Anaemia was an important complication in our patients. Twenty-eight (54.9%) of the children had a packed cell volume (PCV) of less than 30%. All the children with septicaemia had this complication. This could be due to haemolysis or toxic depression of bone marrow. The raised erythrocyte sedimentation rate (ESR) in all the patients is consistent with the findings of most workers[6,10].

The principles of treatment of septic arthritis of the hip revolve around three basic steps. First, the joint must be adequately drained of pus to decompress it. Secondly, antibiotics must be given to diminish the systemic effects of sepsis. Thirdly the joint must be rested in a stable position. The method of draining pus from the joint has been a subject of controversy. Ward et all[4] advocated repeated aspiration of the joint in addition to antibiotics and reserved surgical drainage for cases that responded inadequately to antibiotics and aspiration. Schmid and Parker[15] as well as Griffin[16] also advocated needle aspiration of joints as often and as soon as fluid accumulated with instillation of antibiotics. However Paterson[17] in a clinical review of 50 patients with proven suppurative arthritis treated at Adelaide Children's Hospital showed no failures if open arthrotomy was performed within 5 days of the onset of symptoms. With the advent of modern anaesthesia and adequate preoperative preparation early open arthrotomy should not pose any problem. Repeated needle arthrotomy is painful, results are uncertain because the pus may be thick and difficult to aspirate even under tension and the instilled broad spectrum antibiotics are irritants to cartilage[1,17]. "Every hour that an acute suppurative process continues within a joint is of significance to prognosis"[17].

There is no controversy in the usefulness of antibiotics. All authors recommend parenteral route of administration. Intraarticular instillation of antibiotics is no longer popular for reasons already stated. The choice of antibiotics is initially made on a "best guess" basis[1] and changed according to the culture and sensitivity results. Thirty-six (70.6%) of our patients had open arthrotomy, antibiotics and traction. The initial choice of antibiotics at our center usually covers Staphylococcus aureus. This included Ampicillin and cloxacillin or any of the second or third generation cephalosporins like cefuroxime and ceftriaxone, given parenterally until patients demonstrate clinical improvement. They are then switched over to oral antibiotics, all for a total of about six weeks or more.

Twelve patients (23.5%) in whom no pus was demonstrated had only antibiotics and traction. These were patients who presented very late (Fig 1). Three patients with completely destroyed hip had Girdlestone arthroplasty. Though early mobilization of the joint (about 1 to 3 days after arthrotomy) has been recommended[9] our patients were mobilized when there was marked reduction in hip tenderness. Arthroscopic debridement and drainage is another modality of treatment[11]. None of our patients received this treatment, as this facility is presently not available at our center.

The outcome of septic arthritis in this series is not satisfactory. Only 15 patients (29.4%) had complete resolution while 24 (47.1%) had varying degrees of hip joint destruction (table 6). These complications were as a result of delay in presentation and initiation of appropriate treatment. These disastrous consequences are demonstrated in figures 2 and 3. In the preantibiotic era, Badgley et al[18] reporting the end

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results of 113 cases of septic arthritis of the hip found that only seven had complete resolution of the hip, 43 with destruction of the femoral head and 23 cases with functional hip joint having more than 50 percent of the normal range of motion. Other workers[19-21] had similar experience. One common factor for poor prognosis in most studies is the duration from clinical onset to initiation of appropriate therapy. Where patients present early and appropriate treatment is commenced the results are much better[7,10,12,22].

In conclusion, septic arthritis of the hip is a serious childhood disease. Early diagnosis and prompt treatment is rewarding while delay in diagnosis commonly leads to crippling sequalea.

References

1. Nade S. Acute Septic arthritis in infancy and childhood J. Bone Joint Surg (Br) 1983; 65(3): 234-241.
2. Lloyd-Roberts G.C. Septic arthritis in infancy. International Orthopaedics (SICOT) 1978; 2:97-100.
3. Hallel T, Salvati E.A. Septic arthritis of the hip in infancy. Clinical Orthopeadics and Related Research. 1978; 132:115-128.
4. Shetty A.K, Gedalia A. Management of septic arthritis. Indian J Pediatr. 2004; 71(9): 819-824.
5. Nade S, Robertson FW, Taylor TKF. Antibiotics in the treatment of acute osteomyelitis and acute septic arthritis in children. Med. J Aust 1974; 2:703-705.
6. Wang CL, Wang SM, Yang YJ, Tsai CH, Liu CC. Septic arthritis in children: relationship of Causative Pathogens, complications, and outcome. J Microbiol Immunol Infect 2003; 36(1):41-46.
7. Chen CE, Ko JY, Li CC, Wang CJ. Acute Septic arthritis of the hip in children. Arch Orthp. Trauma Surg. 2001; 121(9):521-526.
8. Lloyd-Roberts G.C Orthopaedics in infancy and childhood. London. Butterworth, 1971.
9. Katz K, Goldberg I, Yosipovitch Z. Early Mobilization in Septic arthritis. Acta Orthop Scand 1990; 61(2):161-162.
10. Gandini D. Acute septic arthritis of the hip in children in northern Australia. ANZJ Surg 2003; 73(3):136-139.
11. Kim SJ, Choi NH, Ko SH, Linton Ja, Park HW. Arthroscopic treatment of septic arthritis of the hip. Clin, Orthop.2003; 407:211-214.
12. Vinod M.B, Matussek J, Curtis N, Graham HK, Carpetis JR. Duration of antibiotics in children

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