# SEPTIC ARTHRITIS IN THE NEWBORN – A 17 YEARS' CLINICAL EXPERIENCE

N K Ho, Y P Low, H F See

## ABSTRACT

**Septic arthritis is an uncommon, yet serious disorder in the newborn. Most patients survive with permanent handicaps. We encountered 11 cases of neonatal septic arthritis in the Hospital over the past 17 years (1971-87), an incidence of 0.12 per 1000 livebirths or 0.67 per 1000 admissions to the neonatal nursery. The clinical experience is presented.**

**The diagnosis of septic arthritis in the newborn is more difficult than in the older children. Joint swelling (10/11), tenderness (9/11) and limitations of joint movement (8/11) were the common presenting clinical signs. Constitutional symptoms (fever, leucocytosis, gastrointestinal disturbances) were unremarkable. More than half of the babies (6/11) were prematurely born. The knees and the hips were frequently infected, many had multiple joint involvement (6/11). Septic arthritis commonly manifested between 20-40 days of life. The causative agents viz. *Staphylococcus aureus* (4/11), *Candida* (2/11), *Citrobacter* (1/11) and *Methicillin Resistant Staphylococcus aureus MRSA* (4/11) showed that septic arthritis was a nosocomial infection. Many babies (9/11) had insertion of intravascular catheter for 1-3 weeks and 9/11 babies had concomitant positive blood culture, 2/11 coexisting osteomyelitis and 1, meningitis. Though there was no death, majority of the babies had joint destruction and severe handicap. Early diagnosis including frequent examinations of joints, prompt treatment and control of nosocomial infection are important in management.**

**Key Words:** Septic Arthritis, Neonatal Arthritis, Candidial Arthritis, Methicillin Resistant Staphylococcus Aureus (MRSA)

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## INTRODUCTION

Bones and joints infections are seldom talked about at paediatric conferences or written about in paediatric journals. Although the mortality and morbidity of bone and joint sepsis have decreased markedly, there is still a significant number of children who suffer damage due to these diseases. (1, 2) Most reports on septic arthritis include children of all age groups (3-7) and the number of neonates with septic arthritis was small. We could find only one report on septic arthritis in the neonates (1), the age of diagnosis of these 9 cases ranged from 3 – 54 days. For this reason we present the clinical features of our 11 cases of neonatal septic arthritis.

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## METHODS & MATERIALS

All neonatal infections, from 1971 – 1987, in the Department of Neonatology, Toa Payoh Hospital were traced from the infection register of the Department's Record Book and records of babies with a diagnosis of septic arthritis were retrieved and studied. The diagnosis of septic arthritis was made by the attending paediatricians.

## RESULTS

From 1971 – 1987, 89435 babies were born in the Hospital. We examined all the records of babies with infections and we were able to trace 11 cases of septic arthritis over the past 17 years. This gave an incidence of 0.12 per 1000 livebirths or 0.67 per 1000 admissions to our nursery. We also observed that the first case of septic arthritis appeared in 1978, nine years after the opening of the neonatal nursery. The 11 cases of septic arthritis were seen over the past 10 years. The yearly distribution of cases of septic arthritis from 1978-87 is shown. (Table 1)

The majority of the cases were diagnosed between 20-40 days of life. Only one case was diagnosed on the 65th day. (Table 2) More than half (7/11) of the patients were low birthweight infants of less than 2270 grams (5 lbs). Most of them were prematurely born (6/7), and their gestational age ranged from 28-35 weeks (mean 31.1 ± 2.3 weeks). One was assessed as intrauterine growth retardation. (IUGR) There were 6 males and 5 females. All babies except 2 had complicated deliveries including diabetic pregnancy, pre-eclamptic toxaemia, Caesarean sections, multiple births and cytomegalovirus infection. A total of 21 joints were infected in these newborns. In order of frequency, the knees (10/21), hips (6/21), shoulder (3/21), ankle (1/21) and elbow (1/21) were

Table 1
**YEARLY DISTRIBUTION AND CAUSATIVE ORGANISMS OF SEPTIC ARTHRITIS**

| Year | No of Cases | Causative Organisms |
|---|---|---|
| 1978 | 1 | Staphylococcus aureus |
| 1979 | 1 | Staphylococcus aureus |
| 1980 | 1 | Staphylococcus aureus |
| 1981 | 1 | Candida |
| 1982 | 1 | Citrobacter |
| 1983 | 1 | Staphylococcus aureus |
| 1984 | 0 | |
| 1985 | 2 | Candida & MRSA |
| 1986 | 1 | MRSA |
| 1987 | 2 | MRSA |

MRSA = Methicillin resistant Staphylococcus aureus.

Table 2
**DAY OF ONSET OF SEPTIC ARTHRITIS**

| Day of Onset | No. of Cases |
|---|---|
| <10 days old | 0 |
| 11 – 20 days | 2 |
| 21 – 30 days | 5 |
| 31 – 40 days | 3 |
| 41 – 50 days | 0 |
| 51 – 60 days | 0 |
| >61 days old | 1 |

frequently infected. It is also noted that 6 babies had multiple joint involvement.

The organisms causing septic arthritis is shown (Table 1). 4 cases of *Staphylococcus aureus* septic arthritis were diagnosed, 3 of which occurred before 1980. 2 cases of *Candida* septic arthritis were seen during the period when cases of systemic candidiasis were reported. (8,9) We had 4 cases of *MRSA* (*Methicillin Resistant Staphylococcus aureus*) septic arthritis since 1985.

Nine babies had intravascular catheter insertion from 7-22 days,(Mean 11.8 ± S.D. 4.8 days). Eight had umbilical arterial catheterisation and only 1 had umbilical venous catheterisation. Nine babies (82%) had concomitant positive blood cultures and 1 had meningitis (9%). However, only 2 babies (18%) had coexisting osteomyelitis.

As noted in other reports, the clinical signs and symptoms of bone and joint infections of the neonates, especially the premature neonates, were unremarkable or minimal. (10/11) The common presenting signs were joint swelling with pus aspirated from the involved joints (10/11), tenderness over the joints (9/11) and limitations of movement (8/11) (Table 3). Other physical signs eg. fever (5/11), redness over the infected joint (2/11), leucocytosis and gastrointestinal disturbances were unreliable. Only 2 babies had total white counts of greater than 25000/mm$^3$ and none had gastrointestinal symptoms.

These babies were treated with antibiotics or antifungal drugs, to which the isolated organisms were sensitive, for a period of – 6 weeks. Most babies had aspirations of the involved joints in addition to antibiotic therapy.

We have not encountered any deaths due to septic arthritis in all our cases. However the sequelae are

Table 3
**PRESENTING SIGNS OF SEPTIC ARTHRITIS**

| Clinical Signs | No. of Patients |
|---|---|
| Joint Swelling (with pus aspirated) | 10 |
| Joint Tenderness | 9 |
| Decreased Mobility of involved joint | 8 |
| Fever | 5 |
| Warm Joint | 4 |
| Erythema over involved joint | 2 |

serious. 9 patients had shortening of limbs or growth arrest of bones. (1 baby was too young to assess the extent of bone and joint damage). Only 1 patient recovered without sequelae; here the diagnosis was made when the child was 14 days old.

## DISCUSSIONS

Before the discovery of antibiotics, the mortality of septic arthritis or osteomyelitis was about 50%. To prevent death, measures like limb amputation had to be instituted. Hence the life of the patient was saved by paying the high price of losing the function of the limb.

However, antibiotics alone is not the sole answer to the problem otherwise septic arthritis should have been deleted from the list of neonatal infections. That permanent sequelae are seen in patients indicates that more has to be done for patients with septic arthritis. Delay in diagnosis and inadequacy of treatment are usually responsible for serious handicaps seen in the patients. (2)

The first case of septic arthritis in our Hospital was diagnosed in 1978, 9 years after the nursery was opened and an average of 1 case a year has been diagnosed since then. We can only surmise that, before 1978, at the time when there was no neonatal intensive care services in the Hospital, many ill babies died before they could develop septic arthritis.

The increased use of umbilical arterial catheters for prolonged periods may be one of the predisposing causes of bone and joint infections. In the pre-neonatal intensive care days, only umbilical venous catheters were used, usually for no longer than 96 hours. Cases of osteomyelitis as a complication of umbilical arterial catheterisation have been reported. (12)

Septic arthritis in the neonate gives rise to more serious handicaps. This can be explained by the fact that in the premature infants the ossific nucleus of the end of the bone has not yet appeared and in addition there is no epiphyseal plate. In these neonates infection begins in the vulnerable cartilage precursor of the end of the bone itself, causing rapid destruction with consequent joint destruction and growth arrest and subsequent leg-length discrepancy.

The diagnosis of septic arthritis in the newborn is more difficult than in older chidren. Multiple joint infection is a serious problem in the neonate, especially in the prematurely born and frequent examinations of all joints is therefore necessary so that earliest possible treatment can be given.

The neonate is subject to attack from a variety of organisms not seen in other age groups. Though *Group B*

*streptococcus* and *Haemophilus influenzae* have become a significant cause of septic arthritis (4, 11) this was not our experience. Before 1980, *Staphylococcus aureus* was the most prevalent organism seen in the nursery and between 1981 and 1984 *Candida* appeared in our nursery and many cases of systemic Candidiasis were reported.(8, 9) Since 1985 we have been troubled by *MRSA (methicillin resistant Staphylococcus aureus).* From the pattern of neonatal septic arthritis we diagnosed, we postulate that the condition is nosocomially acquired and control of nursery infection is imperative if the disease is to be eradicated.

There is still no consensus of opinion as regards management of septic arthritis, let alone neonatal arthritis. Some advocate arthrotomy (5, 13, 2) while others prefer aspiration of the infected joints.

In fact, surgical treatment of neonatal septic arthritis in most instances should be expectant rather than obligatory. Early diagnosis and the judicious use of antibiotics when the infection is limited to the synovium, prevent pus formation and its destructive enzymic action on the cartilage and bone.

When pus is detected in the joint, decompression should be advocated. When the affected joint is superficial and the swelling is easily seen and monitored, repeated careful aspirations is the preferred method of decompression. However, when the joint is deep-seated as in the case of the hip, arthrotomy is the only sure method of draining the pus.

We concur with Wilson and Di Paola (14) that except for the hip joint, arthrotomy of the joints has no advantage over repeated joint aspirations. Moreover, most of our neonates are premature, physically small, and have intercurrent medical problems. Hence any surgical procedure no matter how small represents an assault to their tenuous existence.

Additionally, we would like to stress that the joints of neonates are small; the knee of one, for instance, is only about the size of the interphalangeal joint of an adult thumb. Therefore the incision for arthrotomy of the knee must necessarily be small. Access to the joint is therefore technically difficult and limited. It is also difficult to introduce and maintain a suction drain in such small joints.

We believe, therefore, that repeated aspirations of an accessible joint is the best treatment for septic arthritis in neonates.

We note that in all published reports, the outcome of management of septic arthritis in infants and children is always considered together and all age groups are included for assessment. In our opinion, neonates present a different problem; the poorer prognosis in neonatal septic arthritis is not related to a particular type of treatment. The vulnerability of a young joint which has not been fully developed may be an important deciding factor. The neonate's infected joints are therefore easily damaged. We propose that neonatal septic arthritis should be considered as a separate entity and looked into more seriously. It should be excluded in the discussions of septic arthritis of infancy and childhood. We feel that prevention of nursery infections may also help to reduce the incidence of neonatal septic arthritis.

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