

The Magnitude of Septic Arthritis in Neonates: In a Tertiary Care Hospital in Bangladesh

Nishat Jahan¹, Md Mahbulul Hoque²

Author Affiliation: ¹Registrar, ²Professor, Department of Neonatal Medicine and Neonatal ICU, Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh 1207.

Corresponding Author: Nishat Jahan, Registrar, Department of Neonatal Medicine and Neonatal ICU, Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh 1207.

E-mail: shimee.nishat@gmail.com

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Abstract

Background: Septic arthritis is not a common manifestation of neonatal infection but devastating if not detected or treated early. Its initial sign symptoms are nonspecific. Bacteria responsible for septic arthritis are changing from time to time as most of the cases of neonatal septic arthritis arise as a consequence of bacteremia.

Aim: To highlight the magnitude of septic arthritis in neonate.

Materials and Methods: A retrospective observational study was done in neonatal unit of Dhaka Shishu (Children) Hospital from October 2019 to March 2020. The medical records of those neonates were looked for prenatal, natal and postnatal history and examination findings. The onset of joint involvement, type of joints and number of joint affected was recorded as well as general and local symptoms were also recorded. All investigations were done including X ray and USG of joint.

Results: Total 1903 neonates were admitted over 6 months. Among them 18 neonates were diagnosed as septic arthritis. In our study 58.8 % neonates were preterm, mean age of admission was 21.5 ± 5 days and most common risk factor was nosocomial infection. They commonly (17 patients) presented with tenderness and limitation of movements. Among the involved joints 15 were knee, 3 hip and 1 shoulder joint. Twelve patients had positive blood culture, 10 patients had joint effusion evident by USG.

Conclusion: All septic neonates should be looked for arthritis as its prevalence is not rare.

Keywords: Neonate; Septic arthritis.

Key Message: All neonates with sepsis have to search for any joint manifestation present or not because neonatal septic arthritis is not very uncommon in our setup and need early diagnosis and treatment to avoid any devastating condition.

Introduction

Septic arthritis is one of the most serious disabling conditions in all age groups. The incidence of septic arthritis is more in infancy and childhood because of their innate deficiencies and inabilities in defense mechanisms. Bone and joint infections, though uncommon in neonatal sepsis, contribute to a significant number of cases in developing

countries.¹ It is regarded as one of the deep-seated infections in neonates. Global incidence of the disease is approximately 0.3 per 1000 live births, In India, it has been reported as 0.6 per 1000 live births.² Diagnosis may be difficult and delayed because of the paucity of signs and symptoms. Poor outcome is related to its potential to cause permanent sequelae.³ Timely diagnosis is the most important prognostic factor in septic

arthritis (SA). Delay in diagnosis leads to a poorer outcome mainly in infants.⁴ Risk factors in this age group include umbilical catheterization, breech presentation, prematurity, bacteremia, sepsis, perinatal asphyxia, total parenteral nutrition, femoral venipuncture, and trauma during the birth process.⁵ The microbiological spectrum of neonatal septic arthritis has been typically dominated by Gram-positive cocci.⁶ But gram negative bacilli is also reported. Clinical signs are misleading with those of septicemia, but later a painful leg, pseudo paralysis, lack of movement, uneasiness and refusal to be fed may be encountered.⁷ Osteomyelitis and septic arthritis may occur simultaneously in the same patient, or osteomyelitis may decompress into its adjacent joint, resulting in septic arthritis. Osteoarticular infections in infant usually occurs via the haematogenous route, frequently affecting the long bones and the outcome tends to be better. Moreover, the newborn is more vulnerable to infection due to immunologic deficiencies involving the reticulo endothelial system, complement, cytokines, polymorpho nuclear leukocytes, antibody or cell-mediated immunity. Premature and sick neonates are a high -risk population in which potential sites of bacterial access are frequently present.⁸ In Bangladesh article related to neonatal arthritis is very seldom. This paper is written with the view to highlight the importance of septic arthritis in neonates.

Materials and Methods

A retrospective observational study was done in neonatal unit of Dhaka Shishu (Children) Hospital over 6 months period from October 2019 to March 2020. Total admitted neonates at that time were 1903. The medical records of those neonates were looked for prenatal, natal and postnatal history and examination findings. These included the demographic data, any risk factor, diagnosis of infection, type of infection, early infection, late and nosocomial infection. The onset of joint involvement, type of joints and number of joint affected was recorded as well as general and local symptoms were also recorded.

Laboratory results of blood picture, C-reactive protein, blood glucose, blood gases, electrolytes, hepatic function tests, bleeding time, coagulation time, prothrombin time, partial thromboplastin time, VDRL, bacteriological study for blood were documented. X ray and Ultrasound of bones and joints were also recorded.

Data were compiled and analyzed with the help of SPSS version 21.0 and Microsoft word 2013. Means were used to describe continuous variables and range was used as a measure of variability.

Results

Total 1903 neonates were admitted from October 2019 to March 2020. Among them 17 neonates were diagnosed as septic arthritis. Out of these 17 (0.89%) neonates, 14 were new admission and three were readmission.

Ten (58.8%) babies were preterm. mean age of admission was 21.5 ± 2.1 days. Fourteen patients had nosocomial infection. (Table 1)

Table 1: General Characteristics of neonates with septic arthritis

Variables	No of patients (n=17)	Percentage (%)
Gestational age		
Term	7	41.17
Preterm	10	58.8
Male	8	47
Female	9	52.9
Age of onset of symptoms	-	-
≥15 days	7	-
≥21 days	10	-
Mean	21.5 ± 2.1	-
H/O previous admission	3	-
Risk factors	-	-
Prematurity	10	-
Wt. <1500 gms	7	-
Perinatal Asphyxia	7	-
Nosocomial infection	14	-

Ten (58.8%) babies were preterm. mean age of admission was 21.5 ± 2.1 days. Fourteen patients had nosocomial infection.

Table 2: Signs symptoms of arthritis.

Sign symptoms	No of patients
Limitation of movement or pain with motion	17
Irritability	14
Swelling	15
Tenderness	17
General features of sepsis	14

Regarding signs symptoms seventeen neonates had limitation of movement, 14 had irritability and tenderness, swelling of joints present 15 patients.

Table 3: Joint involvement.

Joint	No of patients	%
Knee joint	15	78.9
Hip joint	3	15.78
Shoulder joint	1	5.26

Single joint involvement was commonest. Knee joint was most commonly involved. Total joint involvement were 19 among 17 patients as one patient had both knee joints and another had both knee and hip joint involvement.

Table 4: Cases with investigations finding.

Case	CRP (mg/L)	Leukocytosis	Blood C/S	USG of joint	X ray
Case 1	114.3	+	-	-	+
Case 2	149.6	+	-	+	+
Case 3	101	+	+	+	+
Case 4	200	+	+	+	+
Case 5	118	+	+	+	+
Case 6	242	-	+	-	+
Case 7	150.5	+	+	-	+
Case 8	100.2	-	+	+	+
Case 9	78.4	+	-	+	-
Case 10	98	-	+	-	+
Case 11	134	+	+	-	+
Case 12	78.8	+	-	-	+
Case 13	111.4	-	+	+	-
Case 14	86.3	+	+	+	+
Case 15	132.4	+	-	-	+
Case 16	69.7	+	+	+	+
Case 17	100.2	-	+	+	+

All the patients had increased CRP, 12 patients had leukocytosis, 12 patients had positive blood culture, 10 patients had found joint effusion evident by USG, soft tissue swelling was found in x ray in 15 patients.

Table 5: Organism in blood c/s

Organism	No of patients (n=12)
Klebsiella	5
Acinetobactor	4
Staphylococcus aureus	3

Out of 17 neonates 12 had positive blood culture. Out of them 5 were klebsiella, 4 were acinetobactor and 3 were staphylococcus positive.

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tenderness, swelling of joints present in 15 patients. (Table 2)

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Discussion

Neonatal septic arthritis is not an uncommon clinical entity and is difficult to diagnose as clinical sign symptom is subtle. A high clinical suspicion is necessary for timely diagnosis and effective management. Prevalence of neonatal septic arthritis in our setup is 0.89% (17 out of 1903 neonates). Its global incidence is 0.3 per 1000 live birth and 0.6 per 1000 live birth in India.² It is more common in preterm babies (58.8 %) in our study. In different studies which had done in different institute revealed that premature and late preterm neonates are commonly developed septic arthritis.^{2,9-10} More and more premature neonates are survives with special care and many procedures are required to help them grow. These infants with under developed haemato-lympho- reticular system acquire bacteremia often during hospital stay and from implementation of such procedures, which subsequently lead to septic arthritis.⁹

In our set up the mean age of onset of symptoms was 21.5 ±2 days. R Usha Devi et al, Akash Rai et al and Wadah Khriesata et al had found mean age of onset of symptoms were 15 days onward.^{1,3,9} Baby may presents with symptoms of septicemia & after few days the disease becomes localized to the joints.¹⁰

Most common risk factor in our study was nosocomial infection (82%) then prematurity (58.8%) then low birth weight and perinatal asphyxia (41% each). Ahmad Elgadra et al found prematurity was most common risk factor in his study.¹⁰ A study which had done by Wadah

Khriesata et al in Jordan where 22 neonates had history of previous admission and got antibiotics for different causes, most common cause of their admission was prematurity (13 pt).⁹

In our study most common presentation were limitation of movement, tenderness on motion were also common presenting symptoms. Similar result (limitation and tenderness) were found in a study done by Ahmad Elgadra et al.¹⁰ In a NICU of Egypt most common symptom of septic arthritis were limitation of movement and pain (100%), then swelling of the joints was detected in 8 (88.9%) cases followed by irritability among 7 (77.8 %) cases.⁷

Among the 17 neonates 2 patients had multiple joints involvement. Most common involved joint was knee joint (78.9%) then hip joint (15.78%) then shoulder joint (5.26%) Knee and hip joints involvement are common as described by some authors. 10- 9. Another studies also revealed that hip was most commonly involved joint then shoulder and knee joint.^{1,2,7}

CRP was elevated in all patients and 12 (70%) out of 17 patients had elevated leukocytes count. CRP is time sensitive and is a disease process indicator. Fifteen patients had joint swelling and it was evident by soft tissue swelling in X ray.

Presence of joint effusion was confirmed by USG of joint. Ten patients (58%) had joint effusion in our study. Akash Rai et al had shown Ultrasound individually demonstrated septic arthritis in 32 (59.2%) affected joints which was similar to us.² This procedure is non-invasive, avoiding ionizing radiation, quick and inexpensive. Ultrasound of the hips is the modality of choice in suspected septic arthritis involving the hip joint and may be useful in detecting early.⁹

We have found 12(70.5%) culture positive patients, among them 5(41.6%) klebsiella, (33.33%) acenetobactor and 2(16.66%) positive. In Jordan where microorganisms were grown in blood samples in 59% of the neonates while 41% of the cases were culture negative. K. pneumonia was the most frequent isolated (30%) organism followed by S. aureus and (Enterobacter spp (22% and 7% respectively).⁹ A similar pattern of septic arthritis with gram negative predominance was noticed in India where K.pneumoniae, E coli and Proteus mirabilis were the most common encountered bacteria.^{1,2} The microbiological spectrum was dominated by gram-negative bacteria while previous studies showed the dominance of

gram-positive cocci in causing infection, these include mainly S. aureus (all ages) and Group B Streptococcus (neonates mainly).¹¹ After diagnosis patients were treated with injectable cefotaxim and flucloxacillin then according to culture sensitivity report. All the babies were improved and discharge with proper follow up advice. We could not do joint fluid aspiration and study.

Septic arthritis should be looked for in all septic neonates especially in preterm ones as we have found its high incidence in comparison to other countries.

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