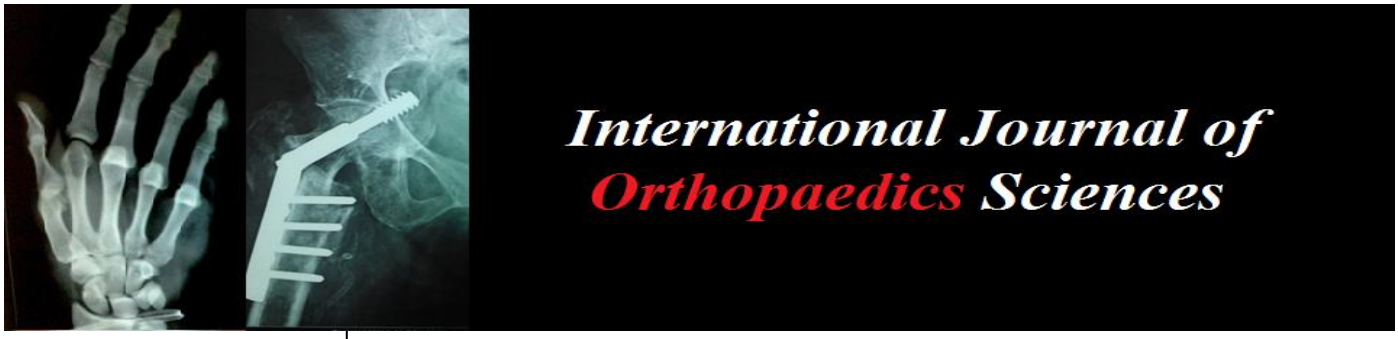

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Fungal septic arthritis in neonates: Is there an etiological shift?

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Abstract
Introduction: Neonatal septic arthritis has a potential for disastrous sequels with long term disability, especially with joint destruction, instability and growth disturbances. But recent trend shows an increase in fungal septic arthritis. Fungal infections are not readily recognised, do not advertise their presence in a characteristic fashion, and the causative organism is generally not easy to demonstrate in tissue. The purpose of this study was to assess the incidence, identify the risk factors predisposing to fungal infection, its management and outcome.
Method: The study was conducted at paediatric hospital in Karnataka. All neonates diagnosed with septic arthritis were included. The neonates were assessed and managed as per our institutional protocol. All cases meeting the criteria underwent arthrocentesis followed by mini-approach arthrotomy of affected joint. The pus was sent for culture and sensitivity, fungal culture and gram staining. Data was collected with regards to organism grown, sensitivity pattern, antenatal, birth history and post-natal period to identify risk factor for infection.
Results: 26 of 132 children with septic arthritis had fungal septic arthritis. Candida species was noted to be the most common fungal infection followed by Malassezia furfur. The mean age of patients was 18 days and the mean age of presentation 18 days, 80% of them needed NICU care during first week of life. 65% of them had low birth weight. Hip joint was most commonly affected. 72% had no growth on initial culture and Six had concomitant infection with Klebsiella. 64% had delayed ossification of femur epiphysis and 5 had frank septic sequalae.
Conclusion: There is an increasing incidence of fungal septic arthritis and it should be kept in mind while treating a neonatal septic arthritis. Early diagnosis and aggressive line of treatment with a prolonged follow up is needed to reduce the morbidity of the disease.

Keywords: Fungal, septic arthritis, etiological

Introduction
Neonatal septic arthritis has a potential for disastrous sequels with long term disability, especially with joint destruction, instability and growth disturbances. Global incidence is approximately 0.3 per 1000 live births and Indian incidence is as 0.6 per 1000 live births [1, 2]. It is caused by a variety of microorganisms most common being gram-positive. But recent trend shows an increase in fungal septic arthritis. Fungal infections are not readily recognised, do not advertise their presence in a characteristic fashion, and the causative organism is generally not easy to demonstrate in tissue [3]. The purpose of this study was to assess the incidence, identify the risk factors predisposing to fungal infection, its management and outcome.

Method and Material
The study was conducted at a tertiary government paediatric hospital in Bengaluru, Karnataka. All neonates diagnosed with septic arthritis between 2015 -2018 were included in the study. The neonates were assessed and managed as per our institutional protocol for septic arthritis. Patients were diagnosed using Modified Kocher's criteria (Instead of non-weight bearing, Painful joint movements were considered), radiography and ultrasonography. They were admitted in neonatal intensive care unit and baseline blood investigation [total counts, ESR, CRP], blood for culture and sensitivity were sent at admission.

Empirical broad-spectrum antibiotics covering gram-positive and gram-negative organisms were started immediately.

The neonate was assessed by neonatologist for other systemic infections. All cases meeting the criteria underwent arthrocentesis followed by mini-approach arthrotomy of affected joint in case of a positive tap. The pus was sent for culture-sensitivity and gram staining, in case of No growth the samples were sub-cultured and fungal culture was done with longer period of incubation [Figure 1]. In sick neonates or neonates with co-morbid infection, fungal culture was sent primarily. Post-surgery patients were monitored in intensive care unit and antibiotics were changed according to sensitivity pattern. Parenteral antibiotics were instituted for average of 7 days. Patients were discharged on oral antibiotics once there was clinical improvement and CRP was less than 6. But in cases with other systemic involvement and fungal infection, parenteral antibiotics was continued for 21 days.

Data and assessed was collected and assessed with regards to organism grown, sensitivity pattern, antenatal, birth history and post-natal period to identify the cause/ risk factor for infection.

Fig 1: Aspiration of joint done and collection is sent for culture. sub-culture or extended culture shows fungal growth

Results

We had 132 children with neonatal septic arthritis between 2015- 2018. Of these 26 children had fungal septic arthritis, Candida species being the most common. The mean age of patients was 18 days (7 days to 28 days). Male female ratio was 1.3:1. Five children were born prematurely and 6 where by LSCS. The mean age of presentation was 18 days and 80% of them needed NICU care during first week of life. The average birth weight was 2.1kg, with 65% of them having low birth weight. Joint swelling with paucity of movements and increased warmth were the common presenting signs. Vague constitutional symptoms preceded the definitive signs of septic arthritis in all cases.

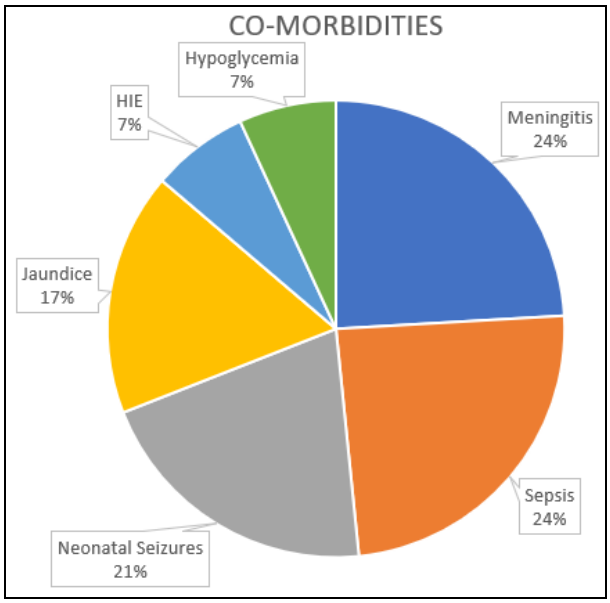

Fig 2: Co-morbidities in neonates with septic arthritis

Most of the neonates presented with painful restriction of joint movement, constitutional symptoms and other pre-existing comorbidity like Meningitis, sepsis, neonatal seizures and hypoxic ischaemic encephalitis [Figure 2]. All the neonates had an increased CRP and Leucocytosis. It was observed that neonates with fungal infections had an elevated lymphocyte count. Hip joint [46.2%] was most commonly affected. Four neonates [15.4%] had multiple joint involvement [Figure 3].

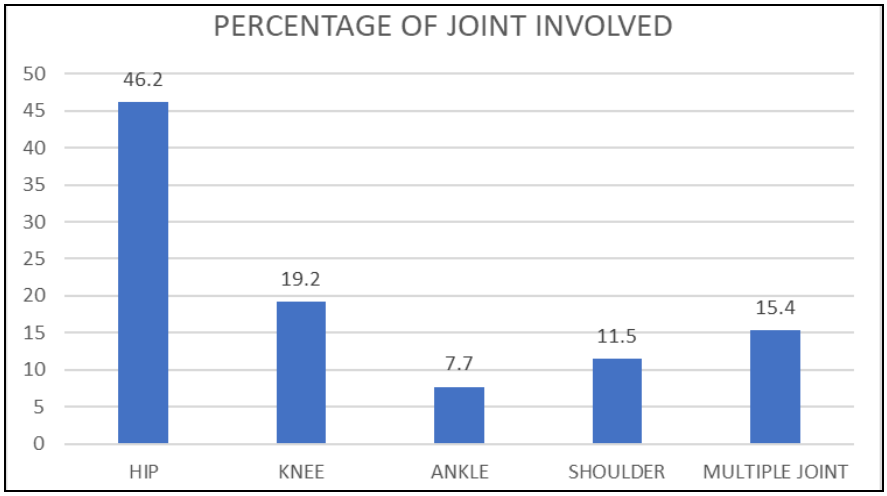

Fig 3: Joint involvement in fungal neonatal septic arthritis

Of the 26 patients 72% had no growth on initial culture and diagnosis was confirmed by microscopic examination of tissue and extended fungal culture [Gram stain / KOH stain] and Six had concomitant infection with Klebsiella. Candida species was noted to be the most common fungal infection and two case has shown Malassezia furfur. There was need for repeat arthrotomy/ debridement of joint in 6 neonates. It was noted that 23% of neonates with fungal septic arthritis needed repeat arthrotomy due to persisted infection. All neonates were successfully managed with appropriate antifungal. On follow-up 64% had delayed ossification of femur epiphysis and 5 had features of septic sequalae which will require further surgical management at later age.

Discussion

Neonatal septic arthritis is not an uncommon clinical entity in a paediatric set up and accounts for 16.5 per 1,000 admissions to a neonatal intensive care unit [4]. Its subtle clinical signs and symptoms make the diagnosis difficult. A high clinical suspicion is necessary for timely diagnosis and effective management. Literature shows *Staphylococcus aureus a*s the commonest culprit for this condition worldwide, while other organisms isolated in culture include *Klebsiella pneumomiae*, Group B streptococci, *Escherichia coli*, *Enterobacter* sp., *Kingella kingae*, and *Candida* sp. [5] Fungal infection in neonates can present as mild mucocutaneous infection or as life threatening and disseminated sepsis with / without septic arthritis. The fungal infection may present at birth as congenital illness or later in life as nosocomial acquired infection [6]. The progression of infection, non-specificity of investigation of culture negative septic arthritis and failure to recognize *Candida* as a potential pathogen may also lead to delay in diagnosis and complications [7, 8].

There have been reports of an important etiologic shift, with gram-negative organisms accounting for 33%, gram-positive 20%, and fungal organisms 7% [9]. In our study we noted that 19.69% of neonatal septic arthritis were due to fungal infection. This was found to be way higher than other studies on septic arthritis and shows a changing trend of etiological organism [9]. Therefore, there is a need to keep a higher suspicion in neonates with joint infections. It is advisable to screen "at-risk" neonates with both bacterial and fungal cultures. The most common risk factors for neonatal fungal infection include low birth weight, pre-term neonates and neonates receiving intensive care [6]. Our study reckoned with the same and noted higher incidence of fungal septic arthritis in neonates under intensive care and having low birth weight / preterm birth.

A prompt and early intervention reduces the burden of the disease. Intravenous amphotericin B remains the standard treatment for *Candida* sepsis and fluconazole is an alternative [10, 11, 12]. The dose of Amphotericin B could be increased in a stepwise fashion starting from 0.25 mg/kg/day up to a maximum of 1 mg/kg/day or administered as a constant dose of 0-6 mg/kg/day [6]. There has been fluconazole resistance to 18% to 24%, but no resistance was found against amphotericin B [11, 12]. Intravenous antibiotic is given for a minimum of 7 days and converted to oral antifungal for a total period of 3 weeks. If persisted elevated CRP the antibiotics is continued for 4 weeks. In neonates with other systemic infection it is recommended to continue intravenous antifungal for a total of 3 weeks

It must be noted that adequate timely arthrotomy and thorough joint lavage goes hand in hand with antibiotic treatment. In resistant infections or persisted infection there is need to do a repeat debridement of the joint. Also managing fungal septic arthritis requires support of neonatologist to manage other systemic co-morbidities/ infections. Delayed presentation and uncontrolled infection showed higher rates on bony destruction with 64% of our cases had delayed ossification of femur epiphysis and 5 had features of septic sequalae.

Fungal arthritis should always be considered while treating a neonatal septic arthritis case especially in "at-risk" neonates who are preterm, low birth weight, history of intensive care, having multiple joint involvement and in sick neonates with tests negative for bacterial culture. It is our experience that proper timely diagnosis and aggressive line of treatment with arthrotomy and appropriate antibiotics [Amphotericin B and Fluconazole] give favourable outcomes.

Conclusion

There is an increasing incidence of fungal septic arthritis and it should be kept in mind while treating a neonatal septic arthritis case especially in "at-risk" neonates [Neonates requiring NICU stay, Low birth weight, Co-morbid conditions/sepsis]. It is our experience early diagnosis and aggressive line of treatment with a prolonged follow up is needed to reduce the morbidity of the disease.

Compliance with ethical standards

Conflict of interest: The authors declare that we have no conflict of interests.

Ethical approval: Institutional internal ethical board has approved this study.

Informed consent: Informed consent was obtained from all parents of neonates included in this study and those who underwent surgical intervention.

Reference

1. Narang A, Mukhopadhyay K, Kumar P, Bhakoo ON. Bone and joint infection in neonates. Indian J Pediatr. 1998; 65:461–4. Doi: 10.1007/BF02761144
2. Li Y, Zhou Q, Liu Y, Chen W, Li J, Yuan Z et al. Delayed treatment of septic arthritis in the neonate: A review of 52 cases. Medicine. 2016; 95:e5682. doi: 10.1097/MD.0000000000005682.
3. Rudraprasad MS, Rajappa K, Taosef GS, Bhasme AS, Shetty N, Benkappa N. Short-term outcome of late presenting neonatal septic arthritis. International Journal of Orthopaedics. 2019; 5(4):796-9. DOI: 10.22271/ortho.2019.v5.i4n.1776
4. Thullen JD, Fanaroff AA. Neonatal septic arthritis. The Journal of Pediatrics. 1976; 88(4 Pt 1):621-4.
5. Rai A, Chakladar D, Bhowmik S, Mondal T, Nandy A, Maji B *et al*. Neonatal septic arthritis: Indian perspective. Eur J Rheumatol. 2020; 7(1):S72–7. Doi: 10.5152/eurjrheum.2019.19052. Epub 2019 Sep 5. PMCID: PMC7004267.
6. Ng PC. Systemic fungal infections in neonates. Archives of Disease in Childhood Fetal and Neonatal edition. 1994; 71(2):F130.
7. Lyon RM, Evanich JD. Culture-negative septic arthritis in children. J Pediatr Orthop. 1999; 19:655–9.
8. Ho NK, Low YP, See HF. Septic arthritis in the newborn: A 17 years' clinical experience. Singapore Med J. 1989; 30:356–8.
9. Deshpande SS, Taral N, Modi N, Singrakhia M. Changing epidemiology of neonatal septic arthritis. J Orthop Surg (Hong Kong). 2004; 12:10–3.
10. Stoll BJ, Gordon T, Korones SB, Shankaran S, Tyson JE, Bauer CR et al. Late-onset sepsis in very low birth weight neonates: A report from the National Institute of Child Health and Human Development Neonatal Research Network. J Pediatr. 1996; 129:63–71.
11. Hsieh WB, Leung C. Candidal arthritis after complete treatment of systemic candidiasis. J Chin Med Assoc. 2005; 68:191–4.
12. Narain S. Neonatal systemic candidiasis in a tertiary care centre. Indian J Med Microbiol. 2003; 21:56–8.