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STUDY OF CORRELATION BETWEEN THROMBOCYTOPENIA AND FUNGAL URINARY TRACT INFECTION IN NEONATES

Paediatric Medicine

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ABSTRACT

Background: Thrombocytopenia is thought to be as an early marker of infection in neonate. Fungal infection is associated with greater degree of thrombocytopenia as compared to bacterial infection (either gram positive or gram negative organisms). Urine Culture is less invasive and may be more safer and can help in early diagnosis of fungal infection whenever there is thrombocytopenia and other clinical features of fungal infection, specially preterm neonates admitted in NICU. **Aims and Objectives:** To study the correlation of thrombocytopenia in neonate and fungal Urinary tract infection. **Materials and Methods:** This retrospective study was conducted from 1st July 2022 to 31st December 2022 in the NICU of MGM medical college and M.Y.hospital, Indore, Madhyapradesh. Out of 131 urine samples sent, 49 neonates with UTI were included and grouped into fungal and bacterial urinary tract infection as per the growth of organisms. Urine cultures were done on Automated BacT/Alert 3 D Rapid Bacterial Culture System. Platelet count was measured by automated cell counter and on peripheral smear by Pathologist. Thrombocytopenia was defined as platelet count less than 150000/mm3. The data was analyzed using Chi Square test. **Results:** 33 (67%) and 16 (33%) cultures were positive for bacterial and fungal UTI respectively. Thrombocytopenia seen in 14(87.5%) fungal urinary tract infection as compared to 05(15.15%) bacterial urinary tract infection group which was statistically significant. (P<0.05). **Conclusion:** Thrombocytopenia was significantly associated with fungal urinary tract infection in neonate and can be taken as marker of fungal infection.

KEYWORDS

Fungal UTI, neonate, thrombocytopenia

INTRODUCTION:

Incidence of fungal infection in neonates in varies in studies between 0.3% to 6.7% with mortality of 19% to 36% [1, 2]. Common risk factors for fungal infection include prematurity, very low birth weight, use of broad spectrum antibiotics, drugs like H2 blockers and corticosteroids, and prolonged hospital stay.[3,4] Most cases of fungal infections are health care related. Candida species are the most frequently isolated fungal species. [4] Renal candidiasis is frequently associated with these urinary tract infections andis manifest by "fungus balls" or renal parenchymal infiltration. Candidal urinary tract infections in high-risk newborns are often associated with candidemia hereby warranting systemic antifungal therapy.[5]The diagnosis of fungal infection is difficult clinically still blood culture remains the 'Gold Standard' test to confirm the diagnosis of fungal infection.

Platelet count less than 150000/mm3 in any neonate is defined as thrombocytopenia regardless of gestational age [6]. Thrombocytopenia is used as an early marker of infection in neonate either bacterial or fungal [7]. Fungal infection is associated with greater degree of thrombocytopenia than is seen with either gram positive or gram negative bacterial organisms [8]. There is paucity of literature regarding fungus specific platelet response in neonatal fungal infection. The present study was undertaken to study the correlation of thrombocytopenia with fungal urinary tract infection in neonates.

MATERIALAND METHODS:

This observational retrospective study was conducted for a period of six months from 1st July 2022 to 31st December 2022 in the NICU of MGM medical college and M.Y.hospital, Indore, Madhyapradesh.The study was approved by Institutional Research Committee. Out 131 urine cultures sent, 49 neonates with culture positive were included in this study. The names of neonates with culture positive were collected from NICU register. Case records were obtained from hospital record section. Case records were analysed for gestational age, sex, birth weight, use of broad spectrum antibiotics and indwelling central venous catheter along with clinical features like Hypoglycemia, feed intolerance temperature instability, lethargy, abdominal distention, apnea, and increased need of ventilator support and laboratory markers like hemoglobin, total leukocyte count, differential count, platelet count and CRP.

Thrombocytopenia which is defined as platelet count less than 150000/mm3 [8]. In all neonates urine was collected with all aseptic precautions and sent immediately to Microbiology laboratory for culture. Platelet count was measured by automated cell counter and confirmed on peripheral smear by Pathologist. Culture positive neonates were grouped into fungal infection and bacterial infection groups as per the growth of organisms either after 48 hours or 1 week of inoculation. All the data was recorded in a pre-structured validated proforma and the data was analysed using Chi Square test where p value < 0.05 was significant.

RESULTS:

Out of 131 blood cultures sent during the study period, 49 came positive for either bacterial or fungal infection. 33 (67%) and 16 (33%) blood cultures were positive for bacterial and fungal infection respectively. [Figure 1]

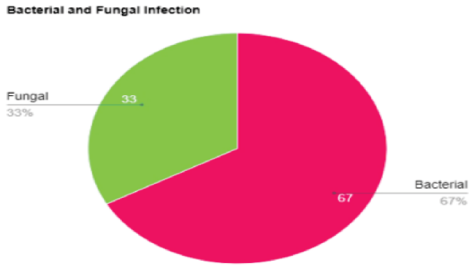

Fig 1: Incidence of bacterial and fungal Culture positivity in neonates

The incidence of thrombocytopenia was present in 19 (38.77%) from both bacterial and fungal culture positive group. Out of which, thrombocytopenia was present in 14(87.5%) fungal as compared to 05 (15.15%) in bacterial infection group. Thrombocytopenia was significantly present in fungal sepsis group (*P*<0.05) [Table 1]

Table 1: Thrombocytopenia in bacterial and fungal sepsis group

Infection group	Thrombocytopenia	Percentage	P value
Bacterial	05	15.15	<0.05
Fungal	14	87.5	
Total	19	100	

DISCUSSION:

The incidence of fungal infection in neonates has increased 11 fold over the past 15 years. Preterm neonates are predisposed to Candida infections because of underdeveloped immune system and increasing use of invasive interventions. Transmission of candida may be vertical from maternal vaginal infection or nosocomial. Colonisation of health workers is as high as 30%. Initial size of colonisation is usually the gastrointestinal tract [9].

Although not much studies on platelet count in sepsis, yet it has well described for more than 40 years that platelet with infections often have thrombocytopenia and the intravenous injection of lipopolysaccharides in mice induce rapid thrombocytopenia. Platelets are believed to be active participants in host defence. [10]

In our study, we demonstrated thrombocytopenia was statistically significantly present in fungal infection (87.5%) as compared to bacterial infection (12.5%). Study by James M *et al* [11]. observed that thrombocytopenia was present in 70% babies with fungal infection. Claveras TS *et al.* [11] concluded that thrombocytopenia is a highly specific marker of neonatal candida sepsis. Guida JD *et al.* [12] found significantly low platelet count at the onset of sepsis in gram negative and fungal sepsis.

Platelets play an important role in linking innate and adaptive immune response. [13] Usually there are many causes of thrombocytopenia in neonates but in septic neonates broadly it can be due to increased platelet destruction, decreased platelet production or mixed etiology. [14] Diffuse endothelial cell trauma, bacterial fungal toxins, increased platelet activation and increased platelet consumption due to DIC are among the factors that play a role in the mechanisms of thrombocytopenia Also platelets interact with invading microorganisms and are critically linked to proinflammatory innate immune response. Platelets express Toll like Receptors (TLR) especially TLR4 and this expression significantly modulates microbial lipopolysaccharide induced thrombocytopenia by stimulating adaptive immunity against invading microorganisms. [15] The major limitations of our study were its retrospective design and small number of cases studied.

CONCLUSION:

Thrombocytopenia was significantly associated with fungal UTI in neonate and can be taken as marker of fungal infection.

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