ORIGINAL RESEARCH

A cross sectional Study to find out incidence of fungal sepsis in very low birth weight neonates from a tertiary care hospital

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ABSTRACT
The importance of fungal sepsis as a cause of increased morbidity and mortality among newborn has been stated by many research across the globe. Incidence of sepsis among neonate is around 0.1% compared to incidence among very low birth weight neonate of approximately 20%.This study was aimed to find out incidence of fungal blood stream infection (BSI) among very low birth weight neonate. We have found fungal BSI incidence of 22.9% (n=131).We found growth of only Candida in our study .Out of total Candida grown 6.6% were pure and16% were grown with Bacterial growth .
Key word: Fungal sepsis, low birth weight, Neonates

INTRODUCTION

Invasive fungal infections (IFIs) are an important cause of nosocomial infection in the neonates, especially the extremely premature infants given the immaturity of the immune system. Infection from various fungi including Candida, Aspergillus, Malassezia, and Blastomyces sp have been reported in these patients.Candida bloodstream infections (BSIs) remain the most common infection among all IFIs and is associated with significant mortality and adverse neurodevelopmental outcome (1).

Invasive fungal infection is an important cause of morbidity and mortality in very low birthweight (VLBW: ,1500 g) infants.(2,3) The previously reported estimates of incidence of invasive fungal infection in VLBW infants are between 3% and 6%.(4-9). The clinical presentation of invasive fungal and bacterial infection is similar, and this may cause diagnostic delay.(7) Diagnosis and treatment may be further delayed because of difficulty in culturing the organisms from blood, cerebrospinal fluid, or urine. (10-11) A high index of suspicion and the use of additional laboratory and clinical tests may be needed to confirm the suspected diagnosis.

Fungal infections are 3rdmost common cause of late onset sepsis in very low birth weight neonates.Incidence of systemic fungal infection in VLBW newborn has been observed to range from 2.2% to 12.9%.Fungal sepsis in neonatesis associated with end organ dissemination and high mortality .

Advances in neonatal intensive care have resulted in improved survival of preterm infants,mortality is still higher among VLBW neonates who develop sepsis than for those without sepsis.(12-13)

Most fungal infections in preterm babies are cause by Candida spp a much smaller number may be due molds like Malasazia, Zygomycetres, Aspergillus etc. Candida spp are commensal organisms that causes colonization of skin surfaces and can contaminate catheter surfaces .Candida can invade the blood stream and disseminate in these infants due to their immature immune system.Due to these reason fungal infection among VLBW babies are very difficult to eradicate.Laboratory diagnosis of fungal infection is confirmative but it takes time,intermittently positive culture findings and absence of reliable serological test are challenges.Therefore, this study was aimed to evaluate incidence of fungal infection among VLBW neonates form our tertiary care neonatal unit.

AIM

Aim of our study was to find out fungal blood stream infection among very low birth weight neonates from our neonatal care unit.

MATERIAL METHODS

It was a hospital based prospective observational study conducted at Special neonatal care unit of tertiary care hospital and Department of Microbiology of our Institute. Study was conducted over a period of one and half year from March 2015 to September 2016.

Study population: Neonates weight <1.5 kg admitted in SNCU .

Inclusion criteria: Very low birth weight neonate with clinically suspected late onset sepsis .

Ethical Consideration: Study was approved from institutional ethics committee.

Methodology: A total of 131 blood sample for aerobic culture were collected from all suspected cases of late onset neonatal sepsis during study period. Sample was collected under all aseptic precaution in BACT/alert blood culture bottle before start of antibiotics . Culture bottles were incubated at 37ºC and observed for growth up to 28 days .When growth was detected by BACT/alert system, sub culture was made on SabouraudDextrose agar(SDA) (two tubes), Blood agar and MacCockey agar. SDA tube was incubatedat 25ºC and 37ºC and observed daily for any growth. Blood agar and MacCockey agar plates were incubated at 37ºC and observed for any bacteria lgrowth after 24hrs.

RESULT &DISCUSSION

Fungal infections are emerging threat to the neonate in the tertiary care centers. *Candida* has been found to be the most common fungal pathogen specially in immune compromised host such as neonates.We have included 131 blood samples from eligible neonates for fungal culture. Out of 131 samples, 70 (53.4%) culture found positive for growth by Bact Alert system . We didn't find growth of any molds in our study . Only growth of Candida were detected. Candida growth was reported as early as 2 days and latest by 5 days of sending blood cultures in all infants with fungal infection.

Pure growth of *Candida spp* was found in 9 (6.9%) samples, mixed bacterial and fungal growth was detected in 21(16%) samples and 49(37.4%) culture showed pure bacterial growth. A total of 30 Candida isolates were grown from our culture(Similar result were reported by Juyal et al who studied cases of neonatal septicemia and reported 69.5% growth from blood culture . Pure growth of Candida, Bacteria and Mixed bacterial &*Candida* was reported from 34.6% , 11% and 54.3% of cases . Another study by Sardana et al reported 69.3% growth from blood culture.Pure bacterial and Mixed Bacterial & Yeast growth was reported from 53.7% and 16.2% cases respectively(14-15).(Table-1-2)

In our study Candida septicemia accounted for 22.9% of sepsis, similar to study by Juyal et al, Sardana et al, Sharma et al and Rani et al who reported 34.5%, 30.1%, 21.4% and 34.7% of Candida septicemia of all neonatal septicemia cases respectively .(14-17)Various studies have reported a recent increase in the incidence of fungal sepsis among newborn in recent years specially among the VLBW. Out of 30 Candida 19 were from Male neonate and 11 from female neonateSimilarfindings were reported by G Prakash et al 82 who reported 64% male and 36% female neonate.(18)

We have also found growth of 70 bacterial isolates which were not the part of our study therefore didn't included in analysis .

Among the cases with *Candida spp* 24(88%) were delivered Vaginally and 4(12%) were Caesarean sectionborn .*Candida spp* found was more in neonates born vaginally and this was statistically significant . The reason behind this may be due to, baby get exposed to birth canal of the mother during vaginal delivery and Candida may be a normal vaginal flora of mother.This normal flora of mother may turn to pathogenic in immuno- compromised host .

Table-1 Distribution of Blood culture result

Culture Growth		**Number**	**%**
Pure Bacterial Growth		49	37.4
Pure Fungal Growth		9	6.9
Mixed Bacterial & Fungal Growth		21	16.0
Sterile		52	39.7
	Total	**131**	**100.0**

Table-2 Distribution of Organism from Blood culture (N=131)

Organism	**Number**	**%**
Fungal Growth		
Candida spp	30	100
Molds	00	00
Bacterial Growth		
Staphylococcus aureus	34	48.6
Klebsiella spp	24	34.3

E.coli	8	11.4
Pseudomonas spp	2	2.9
Acenetobacter spp	1	1.4
Enterococcus spp	1	1.4
Total	**70**	100.0

CONCLUSION

Candida BSI is an important morbidity in NICU with a high mortality rates. Every NICU should have a written antifungal policy to prevent the morbidity and mortality associated with Candida BSI.An incidence of 22.6% alert the need to develop specific strategies to prevent and treat fungal infection. Further all laboratories should be able to do culture &identify the fungal species and also perform anti fungal sensitivity tests to help clinician. Antibiotic/Antifungal written policy should be develop and followed by every NICU to prevent the morbidity and mortality associated with Candida BSI.

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