Candidemia in neonatal Intensive care unit and its response to fluconazole therapy

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Candidemia is one of the leading causes of health care associated infections world wide, especially affecting neonates and persons with decreased immunity. Around 10-20% or more blood stream infections are caused by *Candida*^[1]. The source is often endogenous. Neonates with interventions in the form of intravenous catheters and tubes are specially vulnerable to Candidemia^[2]. There was lack of scientific data in our hospital regarding Candidemia. Therefore we carried out a study to determine the prevalence of Candidemia and its response to anti-fungal therapy.

Methodology: Blood samples from Neonatal ICU sent routinely to Microbiology laboratory for culture were processed in BACTEC-3D automated blood culture system. The bottles flagging positive in the automated blood culture machine were subcultured on Blood agar, Sabourad’s dextrose agar plate and MacConkey’s medium and incubated at 35-37⁰c for 48 hours. A preliminary gram’s stain was also done on the bottles flagging positive for growth. Colonies resembling yeast were subjected to identification and speciation by Germ tube test, Slide culture by Delmau’s method and Sugar assimilation test by modified Wickerham and Burton method^[3]. Antifungal susceptibility to fluconazole and voriconazole was determined by modified disk diffusion test using Muller Hinton agar supplemented with 5% glucose and methylene blue. Response to treatment was monitored by observation.

Results: A total of 258 blood samples were received at microbiology laboratory from different neonates admitted in NICU for culture in the study period spanning 6 months. Average time of stay in NICU at the time of positive blood culture was 7.5 days.

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A total of 55 (21.3%) were positive for *Candida spp*. The species distribution is shown in figure 1. Susceptibility to anti fungals (Fluconazole and Voriconazole) is depicted in table 1. All the 55 culture positive neonates received intravenous fluconazole empirically and was continued for an average period of one week following the initial blood culture report. The treatment outcome is depicted in table 2.

Discussion: In our study the prevalence of Candida was 21.3%. There is wide variation in the prevalence of Candidemia in different regions of India^[4,5,6]. *Candida krusei* was the most common *Candida spp* isolated. . Overall, prevalence of non-albicans *Candida spp* was overwhelmingly higher than *C. albicans*, which is in consonant with the global trend^[7]. In fact only one sample was positive for *C. albicans* in the study. Further *C. krusei* showed 83% resistance to. It is known to be intrinsically resistant to fluconazole. Six fatalities out of 55 Candidemia cases in neonates is certainly high. The draw back of the study was that the method used for speciation of *Candida* takes 7 days for reporting therefore a switching over to voriconazole could not be implemented soon. Also we could not determine the exact cause of death in six cases because of presence of multiple co morbidities.

Conclusion: *Candida krusei* was the most common *Candida spp* causing neonatal Candidemia. Voriconazole showed uniform sensitivity across all *Candida spp*. in the study. Therefore voriconazole can be used for empirical treatment of neonatal candidemia in centers where quick speciation is not done.

TABLE1: Sensitivity pattern of Candida isolates

Species	Fluconazole		Voriconazole	
	S	R	S	R
C. krusei	07	36	43	00
C. tropicalis	10	00	10	00
C. guilliermondii	01	00	01	00
C. albicans	01	00	01	00

TABLE 2: Outcome of Candidemia cases

Total	Improved	Unimproved	Death
43	42	07	06