Characteristics and Risk Factors for Candidemia in Newborns Admitted in Level III Neonatal Unit New Delhi

A.Kumar*, A.Saifi*, S.Namdev*, A.Mahor**, V.S.Randhawa**, S.Nangia*, From Departments of Neonatology* and Microbiology** Lady Hardinge Medical College and Associated Kalawati Saran Children Hospital New Delhi

Background

Candida is one of the leading causes of bloodstream infections (BSI) in neonatal intensive care units (NICUs)

It has been estimated that 2.4–9.0% of mortality^{1, 2} and 25.0% of morbidity in the NICU setting may be attributable to *Candida* infections³

Delay in recognition of *Candida* infections and in the initiation of appropriate antifungal therapy often leads to significant morbidity and mortality rates among high-risk infants⁴ Given the high mortality and difficulty in establishing an early diagnosis, it is important to determine risk factors for *Candida* BSI

Objective

To determine the proportion of *Candida* BSI admitted

To compare demographics of infants with invasive *Candida* BSI and matched controls

To find the risk factors for *Candida* BSI in newborns

Methods

Retrospective Case Control Study
Period between January 2014 and December 2017 (48 months)
Level III NICU in New Delhi

Study population included babies who grew *Candida* on blood culture

Data on patient demographics, underlying diseases, medications, central catheters, nutrition, ventilator use etc. was retrieved.

Risk factors were evaluated from the time of admission until the onset of

Candida BSI and then till discharge or death

For each case, one neonate with negative blood culture results was matched for admission age, gender, gestational age, and birth weight

Data analysis was performed using SPSS Version 20.0. Risk factors were assessed using univariate analysis

Variables that were significant in univariate analysis or that have a priori clinical significance were entered into backward step wise regression model in multivariate analysis

All p values were two tailed and values<.05 were taken as significant

Risk Factors for *Candida* BSI

Results

Thirty out of total of 8928 admitted newborns developed *Candida* BSI (3.36 per 1000)

On univariate analysis factors associated with significantly higher risk of *Candida* BSI were Apgar score<7 at 1 min, Ventilation, Vasopressor use, TPN and Prolonged hospital stay
Apgar score <7 at 1 min and Vasopressor use were found to be

Univariate analysis

Variable	Candida (N=30)	Controls (n=30)	O.R	Confidence interval	P Value
Male Sex	18	18	1.00	0.36 2.8	1.00
Gestation (weeks) Mean (SD)	31.7 (3.1)	31.3 (2.6)	1.05	0.88 1.25	0.61
Birth Weight (grams) Mean (SD)	1446 (507)	1400 (467)	1.00	0.99 1.01	0.70
Duration of stay (Days) Mean (SD)	39.5 (28.7)	25.3 (19.1)	1.02	1.00 1.05	0.03
Ventilation	22	7	9.04	2.80 29.13	0.00
Vasopressors	16	4	7.43	2.08 26.55	0.02
APGAR <7 at 1 Min	17	4	8.5	2.37 30.47	0.001
Surfactant	9	13	0.56	0.19 1.62	0.29
Steroids	12	19	0.39	0.14 1.094	0.07
TPN	7	1	8.83	1.01 76.96	0.049
CPAP	23	17	2.51	0.83 7.64	0.11
Died	10	3	4.50	1.09 18.50	0.04

Multivariate Logistic Regression Analysis

Factors	Odds ratio	Confidence Interval	P Value
Apgar Score<7 at 1 min	7.93	2.02 31.18	0.003
Vasopressors	6.89	1.73 27.49	0.006

independent risk factors on multivariate analysis

Candida BSI was associated with significantly higher mortality (33% vs. 10% p<0.05)

Discussion

The overall incidence of candidemia in our study was 3.36 per 1000 admissions. This incidence was lower than 13.6/1000⁴ and 9%¹ in a previous studies

In a study by Chen et al⁵ central venous catheterization and total parenteral nutrition were identified as significant predisposing factors for candidemia. The multivariate logistic regression model results suggested that total parenteral nutrition was the factor most highly associated with increased odds of candidemia. In our study factors associated with significantly higher risk of *Candida* BSI were apgar score<7 at 1 min, Ventilation, Vasopressor use, TPN and Prolonged hospital stay. However on multivariate analysis Apgar score <7

at 1 min and Vasopressor use were found to be independent risk factors

The mortality of 33% reported in our study is comparable to 31% reported in an Indian study⁶ but higher than 5.8% reported from China⁷

Limitations

Retrospective Study

We were not able to assess all variables Limited by the completeness of documentation by the treating neonatologist

Study period and sample size was small We did not look for the colonization of the infants

Examination of environmental flora was not performed

Results could be NICU specific

Conclusions

Our study suggests that Apgar Score <7 at 1 minute and Vasopressor use are independent risk factors for Candidemia in Newborns.

Candida BSI was associated with significantly higher mortality.

References

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