PREDICTORS OF CANDIDA BLOOD STREAM INJECTION IN NEWBORNS ADMITTED IN LEVEL III NEONATAL UNIT NEW DELHI

A.Kumar*, S. Namdev*, A. Mahor**, V.S.Randhawa**, S. Nangia*, A.Saili* 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 blood stream infections (BSI) in neonatal intensive care units (NICUs) and is associated with high morbidity and mortality

The gross mortality of fungal infections in NICUs ranges from 25% to 50^{1, 2} While in an Indian study, *Candida* attributed deaths occurred in 17% cases³

The clinical presentation of invasive fungal and bacterial infection is similar, which may cause diagnostic and treatment delay

Given the high mortality and difficulty in establishing an early diagnosis, it is important to determine risk factors/predictors for *Candida* BSI

Objective

To find the risk factors/predictors for *Candida* BSI in newborns by comparing them with newborns with *Klebsiella* BSI

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* in 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 who grew *Klebsiella* on blood culture was included

Data analysis was performed using SPSS Version 20.0. Risk factors were assessed using Univariate analysis All p values were two tailed and values<.05 were taken as significant

Results

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

Examination of a standard battery of conditions associated with morbidity in both groups e.g. birth-weight, gestation, asphyxia, ventilation,

Table 1. Univariate analysis

Variable	Candida (N=30)	Klebsiella (n=30)	O.R	Confidence interval	P Value
Male Sex	18	17	1.15	0.41 3.20	0.79
Gestation (weeks) Mean (SD)	31.7 (3.1)	32.5 (4.3)	0.94	0.82 1.08	0.41
Birth Weight (grams) Mean (SD)	1446 (507)	1572 (805)	1.00	0.99 1.00	0.47
Duration of stay (Days) Mean (SD)	39.5 (28.7)	27.3 (21.1)	1.02	0.99 1.04	0.07
Ventilation	22	16	2.41	0.82 7.09	0.11
Vasopressors	16	20	0.57	0.20 1.62	0.29
APGAR <7 at 1 Min	17	11	2.26	0.80 6.36	0.12
Surfactant	9	8	1.18	0.38 3.63	0.76
Steroids	12	16	0.58	0.21 1.62	0.30
TPN	7	11	0.53	0.17 1.62	0.26
CPAP	23	18	2.19	0.72 6.69	0.17
Died	10	13	0.65	0.23 1.86	0.43

vasopressors use, surfactant, steroid, parenteral nutrition etc did not reveal any notable differences

Candida BSI and *Klebsiella* BSI were associated with similar mortality (33% vs. 43% P>0.05)

Discussion

Several factors have been identified as contributing to an increased incidence of neonatal candidemia, including prolonged endotracheal intubation, indwelling catheterization, parenteral nutrition, broad-spectrum antibiotics, & prolonged antibiotic therapy duration^{4, 5}

Similarly antenatal steroid use, cesarean section, male gender, low birth weight, parenteral nutrition, percutaneous and umbilical catheter insertion, mechanical ventilation and low Apgar scores were found to be risk factors for bacterial blood stream infections⁶. We found no statistical difference between risk factors predisposing to *Candida* BSI or *Klebsiella* BSI

In a study from Kuwait, the case-fatality rate for *Candida* species in LOS was 22%, significantly higher than the case-fatality rate of Gram-negative bacillary infections, or any other type of infection⁷

In contrast in our study we found comparable mortality (33% vs. 43% P>0.05) among newborns with *Candida* BSI and *Klebsiella* BSI

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 Results could be NICU specific

Conclusions

Newborns admitted with *Candida* or *Klebsiella* BSI in level III neonatal units have similar epidemiological characteristics, morbidity and mortality

References

1. Weese-Mayer DE, Fondriest DW, Brouillette RT, Shulman ST. *Pediatr Infect Dis J* 1987;6:190-6.
2. Wadile RG, Bhate VM. *Indian J Pathol Microbiol* 2015;58:472-74.
3. Narang A, Agrawal PB, Chakrabarti A, Kumar P. *J Trop Pediatr* 1998;44:104-8.
4. Singhi S, Rao DS, Chakrabarti A. *Pediatr Crit Care Med* 2008;9:91-5.
5. Chen J, Jiang Y, Wei B, et al. *BMC Infectious Diseases* 2016;16: 700.
6. Bolat F, Uslu S, Bolat G, et al. *Indian Pediatr* 2012;49:951-7.
7. Hammoud MS, Al-Taiar A, Thalib L, et al. *J Paediatr Child Health* 2012;48:604-9.