

CLINICAL PREDICTIVE MODEL FOR NEONATAL CANDIDEMIA

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Neonatal candidemia is diagnosed in 2-4% of Very Low Birth Weight (<1500 gm; VLBW) infants. Although there are strong, evidenced-based guidelines for empirical antifungal treatment for patients with fever and neutropenia, no such guidelines exist in neonates. We sought to examine clinical risk factors for in a cohort of neonates in order to develop a predictive model for empirical antifungal therapy guidelines.

Methods: We conducted a single-center retrospective cohort study of 34 consecutive candidemic neonates at the Duke University NICU over three years. We compared these candidemic infants to 17 infants with serious ($\Delta 3$ consecutive positive blood cultures) coagulase negative staphylococcus bacteremia (CoNS-B). We used CoNS-B patients because candidemia and CoNS-B often present with similar clinical findings, and are most common, in the VLBW infant. We conducted bivariable and multivariable logistic regression analysis of the data; for both analyses, the outcome was candidemia.

Results: In the bivariable analysis (table 1) we saw that birth weight, gestational age, central catheter access, and age at diagnosis, did not predict candidemia vs. bacteremia; but that need for mechanical ventilation, NPO status at the day of diagnosis predicted candidemia. Broad-spectrum antibiotic use, 3rd generation cephalosporin use specifically, and negative blood cultures in the previous 14 days predicted candidemia (table 1). Following multivariable analysis, we selected the 3 strongest predictors for candidemia-intubated at diagnosis (OR=13.2), negative blood cultures (OR=9.7), and 3rd generation cephalosporin use (OR=27.4) in the 7 days prior to diagnosis-these predictors (table 2) were all dichotomous. We used the Beta coefficients (Table 2) as the basis for a risk score-intubated=2 points, negative blood cultures in prior 14 days=2 points; 3rd generation cephalosporin use in prior 14 days=3 points. After generating the risk score, we selected a cut-point (candidemia risk score greater than or equal to 3 is "test positive") and used the cut-point to determine sensitivity and specificity of the simplified candidemia score as a "test" for candidemia. The model had a sensitivity of 97% and specificity >71%. Although these results need to be tested prospectively, these results indicate that a clinical model may be very useful clinically in predicting candidemia.

	Candidemic(n=34)	CoNS Bacteremic(n=17)	p-value
Birth Weight (gm) 117	1094	0.66	
Gestational Age (wk)	27	28.2	0.15
Age at diagnosis (days)	24	31	0.19
Intubated (n)	32	11	0.01
NPO (n)	2	7	0.03
Central Access (n)	29	16	0.65
Ceph abx days in 2wk prior to dx	4.3	0.8	<0.001
Neg blood cx in 2wk prior to dx	25	3	<0.001

Predictor variable	OR	95%CI	p-value	B
Intubated	13	(0.4, 136)	0.18	2.3
Negative blood cultures	9.6	(1.7, 55)	0.012	2.3
3rd Generation cephalosporin	22.7	(2.8, 183)	0.003	3.3
_Intercept	-4.3			

Table 3: Sensitivity and specificity of clinical predictive model

CLASSIFIED	TRUE	
	Candidemic	Bacteremic
+	33	5
-	1	12
Sensitivity	0.97	
Specificity	0.71	