

Defining Physiologic Predictors of Peripartum Maternal Bacteremia

Objective: Standard definitions of septic physiology have not been validated in the intrapartum or postpartum period. This study presents a model including 4 vital signs and 5 laboratory values to identify women at risk for peripartum bacteremia.

Study Design: This is a case-control study across two academic centers from 2009 to 2013. Cases were defined as women with fever ($T > 100.4F$) and bacteremia diagnosed by blood cultures drawn between 7 days before and 42 days after delivery. Cases included 115 bacteremic women. Each case was matched to at least two controls ($n=285$), defined as the next two febrile women with negative blood cultures drawn during the defined peripartum period at the same institution. A univariate analysis using Fisher's exact test or t-test was performed when appropriate to identify significant risk factors for peripartum bacteremia between cases and controls. A conditional logistic regression model was used to evaluate the association of temperature, heart rate, systolic blood pressure, respiratory rate, WBC, bandemia, creatinine, ALT, and AST with maternal bacteremia at the time of initial fever and maximum fever.

Results: At the time of initial fever, temperature $> 103F$ (adjusted odds ratio (aOR) 5.58 (95% confidence interval (CI) 2.05-15.19, $p= 0.0008$) and respiratory rate > 20 (aOR 5.27, CI 2.32-11.96, $p= <0.0001$) were associated with bacteremia. At the time of maximum fever, temperature $> 102F$ (aOR 3.37, CI 1.61-7.06, $p= 0.001$), temperature $> 103F$ (aOR 7.96, CI 3.56-17.82, $p= <0.0001$), heart rate > 110 (aOR 2.20, 1.21-3.99,

p=0.01), and respiratory rate >20 (aOR 3.65, CI 1.65-8.08, p= 0.001) were associated with bacteremia. Bandemia > 10% (aOR 2.44, CI 1.07-5.54, p=0.03) during the fever evaluation was associated with bacteremia.

Conclusion: There is a nearly 8-fold increased odds of peripartum bacteremia in febrile women who develop temperature >103F, a 5.5-fold increased odds with RR >20, a 2-fold increased odds with HR >110, and 2.5-fold increased odds with bandemia >10%. Further studies of objective physiologic variables are needed to maximize early detection and treatment of peripartum bacteremia, and thereby reduce subsequent morbidity and mortality.