Rapid Detection of Early and Late Neonatal Sepsis Utilizing an Automated Blood Culture System


BACKGROUND: Implementation of rapid detection automated blood culture systems has led to shorter incubation times and decreased length of stay in the NICU. It is recommended that cultures are accessioned in the laboratory within 1 hour of being drawn. Bellevue Hospital switched to a 48 hour antibiotic protocol with the use of a multidisciplinary automated detection system in 2005. Previous data demonstrated that all early sepsis positive culture results returned within 48 hours.

OBJECTIVE: To review infants with any blood cultures; number of patients with positive cultures, identity of bacteria in positive cultures, rapidity in reporting positive cultures. To analyze NICU LOS of patients with negative cultures in early sepsis evaluation. To determine the potential for shortening antibiotic exposure in infants undergoing early sepsis evaluations for maternal indications.

DESIGN/METHODS: Retrospective chart review: June 1, 2004 through May 31, 2008, neonates who underwent sepsis evaluations at Bellevue Hospital RPC. Statistical analysis: Student t-test.

RESULTS: 857 patients had blood culture analyses and 50 patients had positive cultures. 39/50 were inborn infants, 11 of whom had early sepsis, and 28 with late sepsis. In all cases of early sepsis, the positive blood culture result was reported by 30 hours (with an average time of 17 hours 57 minutes). The organisms identified were Staphylococcus (36%), Streptococcus (27%), E. Coli (19%), Citrobacter (9%), and Listeria (9%). The late sepsis evaluation differed in that time to positivity reached an average of 24 hours 59 minutes with the longest time to positivity of 60 hours. The organisms identified in the late sepsis group were Staphylococcus (58%), Enterococcus (25%), Streptococcus (5%), Klebsiella (5%), E. Coli (5%), and Enterobacter (2%) with increasing variation at >30 days of life. There was a disparity in incubation time to reach positivity among organisms between the early and late sepsis cohorts.

CONCLUSIONS: All blood cultures in early sepsis were reported positive by 36 hours from time of accession. Late sepsis cultures, on average, had longer incubation times than early cultures to reach positivity. The incubation time for positive blood cultures differed by organism type. The average time between drawing a culture and its accession exceeds recommendations for the rapid detection system. There is potential to further decrease antibiotic coverage in early sepsis workups.

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