

Trends in hospital-acquired bloodstream infection at a tertiary South African neonatal unit

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Background: Infection is the third leading contributor to neonatal mortality globally. Hospital-acquired (HA) infection is a common complication in sick and preterm neonates, with bloodstream infection (BSI) being the most frequent infection type encountered. Analysis of long-term epidemiological trends in neonatal HA-BSI is important for benchmarking, detecting emerging threats and resistance patterns, and informing quality improvement interventions.

Materials and methods: A retrospective folder review was performed for all neonates admitted to Tygerberg Hospital's neonatal unit for more than 3 days between 1 January 2014 and 31 December 2018 (Period 2). Data was extracted from the laboratory information systems, hospital administrative system and patient folders. Data was compared to previously published data (2009-2013, Period 1) reporting trends in HA-BSI rate, blood culture yield, pathogen profile, antimicrobial susceptibility, and BSI-attributable mortality.

Results: Despite substantially higher admissions in Period 2, HA-BSI rate was significantly reduced compared to Period 1 (3.3 versus 3.9 per 1000 inpatient-days; $p=0.002$);

pathogen yield (11.0% to 10.4%, $p=0.233$) and blood culture contamination rate (5.1% to 5.3%, $p=0.636$) were unchanged. For both periods, Gram-negative pathogens predominated (62.5%) with *Klebsiella* species, *Staphylococcus aureus*, *Serratia marcescens* and *Acinetobacter baumannii* being the most frequent pathogens, and exhibiting substantial antimicrobial resistance in Period 2 (72.6%, 72.4%, 19.0% and 77.9% were multidrug-resistant respectively). Although the crude mortality rate of neonates with HA-BSI increased significantly in Period 2 to 24.9% ($p=0.014$), BSI-attributable mortality was unchanged between the study periods (71.2% vs 65.9%; $p=0.376$).

Conclusion: Despite larger number of infants at risk for HA infections through improved survival of preterm neonates, HA-BSI rates have declined in this neonatal unit over the last decade. Timely and continuous BSI surveillance, together with integrated microbiology, paediatric infectious disease and infection prevention feedback and interventions, can successfully reduce preventable infectious morbidity and mortality in hospitalised neonates in resource-constrained settings.