J Neonatal Biol 2016, 5:4(Suppl)
http://dx.doi.org/10.4172/2167-0897.C1.003

Gram negative sepsis in term and preterm infants: Aetiologies and clinical outcomes

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Background: Neonatal septicemia is a source of extensive morbidity and mortality. The aim is to evaluate the outcome and aetiology of every episodes of gram negative sepsis in the neonatal population of Cork University Hospital (CUH) over the past 8 years.

Methods: This is a retrospective descriptive analysis. Neonates with blood cultures with gram negative growth were identified from microbiology database in CUH.

Results: 50 babies with 51 episodes of Gram negative sepsis were included in the study. The majority of sepsis occurred after the first 72 hours of life (41; 80.3%), i.e. late onset sepsis. Mean gestation was 29 weeks, 3 days and mean birth weight was 1357 g. The majority of neonates in this group were <32 weeks i.e. very premature (37; 74%). The incidence of Gram negative sepsis was 5.3% for neonates less than 32 weeks. The most common pathogen was Escherichia coli (34; 66%) followed by Klebsiella spp. (15; 29%). There were 2 instances of extended spectrum beta lactamase (ESBL). Mortality was 10%. There was no difference in gestational age, birth weight or blood parameters (CRP, WCC and Platelets) between those who survived or died. Chorioamnionitis and sepsis occurring in the first 72 hours of life are associated with mortality (p=.018, p=.047). A diagnosis of periventricular leukomalacia was associated with a higher C-reactive protein on day 0 and day 7 of sepsis (p=.028 and p=.043).

Conclusion: E. coli remains the most common Gram negative pathogen in the NICU and early onset disease is associated with significant risk of mortality.

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Clinical characteristics and epidemiology of sepsis in the neonatal intensive care unit in the era of multi-drug resistant organisms: A retrospective review

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Sepsis in the neonatal intensive care unit (NICU) remains one of the most significant causes of morbidity and mortality. Multi-drug resistant organisms (MDRO) are emerging as important pathogens causing neonatal sepsis in the NICU. Episodes of blood culture-proven sepsis for patients (0 to 90 days) in the NICU at our institution from Jan 2012 through Dec 2015 were retrospectively reviewed. 68 episodes of sepsis (ages 0-54 d, median 7 d; 34 female; 81% premature) were caused by gram-negative bacteria (n=42; 62%), gram-positive bacteria (n=21; 31%), or Candida species (n=5; 7%). The most common organisms isolated were Acinetobacter baumannii (27%), Klebsiella pneumoniae (22%), coagulase-negative Staphylococcus (CoNS) (18%), group B Streptococcus (10%) and E. coli (6%). Compared to non-MDRO cases (n=15; 29%, excluding CoNS and Candida), MDRO (n=36; 71%) were associated with higher mortality (58% vs. 13%, p=0.005) and more delay in providing targeted antimicrobial therapy (61% vs. 13%, p=0.004). Sepsis due to the most resistant organisms (A. baumannii and K. pneumoniae Carbapenemase (KPC)-producing bacteria, n=20; 39%) was associated with higher mortality, higher rates of leukopenia and thrombocytopenia (p=0.001, 0.02, 0.04; respectively), and significantly associated with exposure to a carbapenem and vancomycin before onset of sepsis (cases exposed=16/20; 80%, p<0.001, median days of exposure=10 (3-17)). MDRO are the most common causative pathogens of sepsis at our NICU, and are associated with higher mortality compared to non-MDRO. Previous exposure to a carbapenem and vancomycin was associated with sepsis caused by the most resistant organisms.

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