Increasing Trends of Methicillin Resistant Coagulase Negative Staphylococcus in Neonatal Septicaemia - A Study in a Tertiary Care Hospital, Mysore, South India

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Materials and Methods:
This study was carried out in the department of Microbiology, Mysore Medical College & Research Institute, Mysore. Samples were received from Cheluvamba hospital NICU over a period of 3 years from December 2007 to December 2010. Cases included in our study were neonates less than 28 days with clinical diagnosis of septicaemia. Infections within 7 days of birth were considered early onset septicaemia (EOS) and infections between 7 to 28 days were late onset septicaemia (LOS).

Materials and Methods:
The antibiotic susceptibility of the isolates was determined by disk diffusion method on Muller Hinton agar using antibiotics of sensitivity pattern was studied. All the samples were processed for blood culture and isolates were initially identified by colony morphology, Gram stain, catalase, oxidase, slide coagulase, tube coagulase test (read after 4-24 hours). Gram negative isolates were further identified by standard biochemical reactions and antibiotic susceptibility pattern was studied. In babies whom CoNS was isolated in blood culture, a repeat sample was taken and reconfirmed for the isolate. Biotyping of CoNS was done by the following panel of tests – fermentation of mannose, xylose, sucrose, maltose, lactose, novobiocin sensitivity, urease, nitrate reduction test, ornithine decarboxylase test.

The antibiotic susceptibility of the isolates was determined by disk diffusion method on Muller Hinton agar using antibiotics at the specific absolute concentration using HiMedia disks. Methicillin resistance was determined using cefoxitin 30µg disk.
Results:
A total of 2256 blood samples received from NICU to the department of Microbiology were processed for aerobic culture. 1587 samples were positive for blood culture. Among 1587 isolates, 1425 were from EOS and 162 from LOS. CoNS 587(36.98%) was the most common pathogen isolated in both EOS 523(36.70%) and LOS 64(39.50%) cases. Staphylococcus epidermidis 234(39.86%) was the commonest CoNS species.

CoNS are further gaining importance due to increase in resistance to betalactam antibiotics and multiresistance. MR-CoNS have become the predominant pathogen in hospitalised patients with the number of infections increasing dramatically. CoNS are in increasing being implicated as a significant nosocomial pathogen, so many reviewers have emphasised the need for species identification. Species identification is important in monitoring the reservoir and distribution of CoNS involved in nosocomial infections.

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Discussion:
The infections in neonates are most frequent and habitually more seriously associated with high mortality. CoNS is increasing being implicated as a significant nosocomial pathogen, so many reviewers have emphasised the need for species identification. Species identification is important in monitoring the reservoir and distribution of CoNS involved in nosocomial infections.

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MRCNS are the source of resistance gene to other Gram-positive cocci including Staphylococcus aureus in hospital settings. In our study an attempt was made to retrospectively analyse the trends of occurrence of MRCoNS in neonatal septicaemia cases. In our study CoNS was the commonest isolate, 36.98% followed by Klebsiella species, 22.45% and Escherichia coli, 19.45%. This is in concordance with the reports of Shahnazam Gheibi et al., reported causes of neonatal sepsis as CoNS from EOS – 48.8%, LOS – 69.8% followed by Klebsiella, Escherichia coli & Staphylococcus aureus. However, Nalin et al. have reported predominance of Gram negative sepsis, 58.5% over Gram positive cocci, 41.5%. Gupta B et al. in their study over a period of 4 yrs reported an increase in incidence of neonatal sepsis caused by CoNS from 20% to 35%.

Shubra Singh et al. have reported common CoNS species as Staphylococcus epidermidis 40%, Staphylococcus haemolyticus 12% which is similar to that seen in our study of Staphylococcus epidermidis 39.86% and Staphylococcus haemolyticus 14.31%.

Of the 587 CoNS isolates 286 (43.72%) were methicillin resistant. Amit Jain et al. reported 66% MR-CoNS from neonatal sepsis.

In our study an increase was noticed in CoNS isolates prevalence over a period of 3 yrs from 41.57% to 57.36%. Many other authors also have reported increasing trend of CoNS in neonatal sepsis. MR-CoNS also showed increased resistance even to non beta lactam antibiotics thereby narrowing the therapeutic options. Periodic surveillance of the causative agents and their antibiotic profile is essential for effective management of neonatal sepsis. Appropriate antibiotic therapy would minimise the risk of severe morbidity and mortality besides decreasing the emergence of multidrug resistant organisms by rational antibiotic use.

Conclusions:
In view of the above facts that in our study we have noticed an increase in prevalence of MR-CoNS in neonatal septicaemia and increase in their resistance pattern, it is necessary to periodically review the strategy of antibiotic usage.

References:


