Aspects on early diagnosis of neonatal sepsis

av

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Akademisk avhandling

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ABSTRACT

This thesis presents four studies, all designed to improve the problematic diagnostic situation concerning infants with suspected sepsis.

Study I included 401 neonates with suspected sepsis. Nine signs of sepsis and C-reactive protein were prospectively recorded and logistic regression was used to assess associations between these signs and a subsequently confirmed diagnosis of sepsis. C-reactive protein and five of the clinical signs were statistically significantly associated with a positive blood culture. When the material was stratified by gestational age, differences between premature and full term infants were detected.

Studies II and III were prospective studies that used samples collected from neonates with suspected sepsis to evaluate a novel real-time polymerase chain reaction (PCR) method. The results where compared with simultaneously collected blood cultures. Study II used plasma samples and resulted in a sensitivity of 42% and specificity of 95%. In study III, the protocol was improved and adapted to whole blood samples which resulted in a sensitivity of 79% and specificity of 90%. Both protocols included species-specific probes and study III indicated that PCR has the potential to detect bacteria in culture-negative sepsis.

Staphylococcus epidermidis is the most common pathogen in neonatal sepsis, but there is still a lack of typing methods suitable for large materials of S. epidermidis. In Study IV we therefore evaluated a new S. epidermidis genotyping method based on PCR for the repeat regions of four genes that encode for cell wall anchoring proteins. The method was applied to 49 well-defined neonatal blood isolates of S. epidermidis. The combination of sdrF and aap seemed to be optimal, resulting in a diversity index of 0.92.

Conclusions

- Bradycardia, apnoea, low blood pressure, feeding intolerance and distended abdomen are obvious early signs of neonatal sepsis. Premature and full-term infants differ in terms of the signs they display in neonatal sepsis.

- Blood is superior to plasma for developing PCR methods for bacterial DNA detection. The PCR method described in study III can detect neonatal bacteraemia, but it can be further improved before it is used in routine care.

- There has been a lack of useful typing methods for S. epidermidis. We can now present PCR of the genes for the cell wall anchoring proteins sdrF and aap as a novel and feasible approach when there is a need to type a large number of S. epidermidis isolates.