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Perspective

Serial C-Reactive Protein in Guiding Antibiotic Duration in Neonatal Sepsis

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DESCRIPTION

One of the most researched and often used laboratory tests for neonatal sepsis is C-Reactive Protein (CRP). It is a crucial component of the humoral response to bacterial invasion as part of the acute-phase response to infection. Its limited sensitivity in the early stages of the disease is due to the delayed synthesis during the inflammatory response. Serial testing and the addition of earlier indicators like interleukins or procalcitonin both obviously increase the diagnostic accuracy. Although there is no substitute for the clinical impression and the gold standard, CRP is also very helpful for evaluating the response to treatment and directing antibiotic medication (i.e. culture results). The effects of noninfectious variables on CRP levels in healthy and symptomatic neonates, as well as the impact of gestational age and birth weight on CRP kinetics, are some issues that have not yet been fully resolved despite the extensive study on CRP in neonates.

Several scientific procedures, including Western blot, immunohistochemistry, ELISA, immunocytochemistry, and immunoprecipitation, can use antibodies that detect CRP. These antibodies specifically target CRP in samples from humans, mice, rats, and pigs. We use Mouse, Rabbit, Goat, Chicken, and Sheep to develop our CRP monoclonal, polyclonal, recombinant monoclonal, and recombinant polyclonal antibodies. The specificity to CRP of these antibodies has been confirmed by cell therapy. Choose the CRP antibody that is right for you.

Since very little CRP crosses the placenta, any increase in serum CRP in the newborn always indicates endogenous production. After a single stimulation, *de novo* hepatic synthesis begins relatively quickly, with serum concentrations exceeding 5 mg/l by about 6 hours and peaking at about 48 hours. Sensitivity is more crucial than specificity for the identification of early-onset sepsis in clinical practice since treating an infant who isn't sick will have less negative effects than neglecting to treat one who is. Previous investigations revealed that the sensitivities and specificities of CRP ranged from 29 to 100% and from 6 to 100%, respectively, in the diagnosis of early-onset sepsis. Different reference values, a posteriori-selected cut-off points, test procedures, patient characteristics, inclusion criteria, definitions of sepsis, sample sizes, and sampling times all contribute to these dramatic differences.

The early phases of infection are thought to have the lowest CRP sensitivity. The CRP diagnosis accuracy varies significantly within an intolerable range of sensitivity for a single CRP determination at the time of initial examination as well as for determinations from cord blood. This may be due to the arbitrary selection of appropriate cut-off points as well as the imprecise analytical techniques with different quantification limitations previously employed to detect the CRP pattern in the very early newborn period and other early stages of infection.

A high CRP is not always indicative of sepsis because it can also be brought on by factors unrelated to infection, such as physiologic increases upon birth. As a result, questions were raised about the validity of CRP in the early stages of the disease because it was unable to definitively confirm or rule out an infection. CRP serial analysis was performed, and results greater than 6 mg/L were deemed abnormal. At admission, 48 hours, four days, and six days after starting therapy, serum CRP was calculated once more. The antibiotics were withdrawn, the patient was monitored for 48 hours in the hospital, and if the blood culture came back negative, the patient was discharged if the CRP after 48 hours was 6 mg/L (group 1) and the patient was clinically stable. Group 2 refers to newborns having CRP levels more than 6 mg/L at 48 hours. Estimates of CRP were performed on the neonates in this cohort at 4 and 6 days old. Group 2a was those who had negative CRP at day 4 and group 2b were those who had positive CRP at day 6 respectively. Once CRP was back to normal, antibiotics were discontinued. When possible, by appointment or telephone, all newborns were monitored for 48 hours in the hospital and then followed for 4 weeks. After six days, CRP estimation was not performed.

The latex agglutination test, which is straightforward to carry out and simple to interpret but non-specific and must be linked with other laboratory results and clinical findings, was used in this investigation to assess CRP qualitatively. Comparatively less non-specific but time-consuming are quantitative procedures. A range

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of non-infectious illnesses can also provide beneficial effects. These elements most likely account for the observed results. Since serial serum CRP values alone cannot be used as a parameter for guiding the duration of antibiotic treatment in a group of newborns with suspected neonatal septicaemia, it can be deduced from the findings of this study that serum CRP values had modest sensitivity and negative predictive value in neonatal sepsis. This emphasizes the significance of linking clinical and laboratory data with straightforward assays with strong predictive values that can detect all infants who are affected (high sensitivity). The gold standard for identifying and treating newborn septicaemia is still blood culture.