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Reliability of serum procalcitonin concentrations for the diagnosis of sepsis in neonates

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The evaluation of tests for neonatal sepsis is important because the infection may present a very serious threat to the baby. Extensive literature exists on single laboratory test or combinations of tests, as well as tests used together with risk factors and/or clinical signs, to diagnose neonatal sepsis. In many instances, the results of the evaluations have been conflicting. It has recently been suggested that serum procalcitonin (PCT) is of value: in the diagnosis of neonatal sepsis, with varying results. This study was designed to determine the reliability of PCT concentrations as a new marker for the diagnosis of early neonatal sepsis of vertical transmission comparing to the traditional inflammatory mediators, such as interleukin-6 (IL-6) and C-reactive protein (CRP) values. The current study included 69 newborn babies. After full history and clinical examination, they were classified into 2 groups: Group 1, included 27 of asymptomatic newborn infants admitted during the first 24 h of life to the neonatal unit because of prematurity, low birth weight. They had no clinical signs of sepsis during their first week of life and had a negative blood culture, and they did not receive antibiotic treatment. The second group: Group 2, included 42 symptomatic neonates who were admitted to the neonatal care unit and were evaluated for sepsis during the first 48 h of life, they were subclassified into twosubgroups: group 2A; included 22 neonates of confirmed vertical neonatal sepsis, defined as they had at least three clinical signs of infection with culture proven sepsis, and group 2B included 20 neonates of vertical clinical sepsis (they had at least three clinical signs of infection) with negative blood culture. Blood sampling for blood culture, complete blood count, blood gases and blood chemistry, additionally, CRP, serum IL-6 and PCT were measured. The microbial organisms isolated from the blood culture of group 2A; Escherichia coli was isolated from 9 cases, staphylococcus aureus from 6 cases, staphylococcus epidermidis from 2 cases, group B streptococci (GBS) from 2 cases, ureaplasma from 2 cases and one case was GBS positive mother. The comparison between the studied groups revealed that, white blood cell counts (WBCs) and CRP levels were significantly increased in group 2A more than in group 1 and group 2B. While in group 2B the WBCs not differed from group 1 but CRP differed from group 1. IL-6 and PCT values were significantly increased in group 2A more than in group 1 and group 2B. Furthermore in group 2B both were significantly increased as compared to group 1. For the diagnosis of neonatal infection, at cutoff >1.5 ng/ml, PCT give a sensitivity of 92.9%, specificity of 85.2%, positive predictive value (PPV) of 84.8%, and negative predictive value (NPV) of 76.7%. At a cutoff >140 ng/ml, IL-6 gives a sensitivity of 76.2%, speCificity of 70.4%, PPV of 64%, NPV of 63.3%. However, at a cutoff >12 mg/L, CRP gives a sensitivity of 88%, specificity of 77.8%, PPV of 77.1%, NPV of 70%. We conclude that the serum PCT concentration showed a good diagnostic value for the early detection of neonatal sepsis of vertical transmission comparing with the other traditional markers of inflammations, thus may facilitate early therapeutic intervention in those high risk group.