SUMMARY AND CONCLUSION
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Present work was carried out to evaluate the levels of C-reactive protein in both superficial and deep infections of the newborns and to assess its reliability, if any, in the diagnosis of various neonatal infections. The present study was also directed to derive a correlation between the gestational age and birth weight of the newborn babies to the respective concentration of C-reactive protein in the serum.

A total of 50 newborn babies were selected, of which 10 normal non-infected babies served as control, while the remaining 40 cases were of various neonatal infections. The study group of neonatal infections comprised of 22 cases of superficial infections, 14 cases of deep infections and 4 cases of combined infections. A special emphasis was also given to assess the gestational age and birth weight of all the babies.

Besides evaluating C-reactive protein, other parameters of diagnosing infection, viz. total leucocyte count, bacteriological profile, blood culture and sensitivity and/or X-ray chest was done in all the cases.

We found that amongst the study group cases, the majority of cases (75%) were term babies, while the control
group of cases had equitable distribution according to
gestational age. 87.5% of the infected cases and 70% of
the control group of cases had birth weight above 2.5 kg.
There was male dominance in both control as well as in
study group of cases. Majority of the cases presented
with umbilical discharge, refusal of feeds, fever, poor
activity, discharge from eyes and jaundice. The cases of
meningitis had evidence of altered sensorium and convulsions.

All the neonatal infections were broadly classified
in three groups, i.e. superficial infections, deep infections
and combined infections. Amongst the superficial infections,
there were 17 cases of umbilical sepsis, 3 of conjunctivitis
and 2 of furunculosis, while in deep infections, there
were 6 cases of septicemia, 2 cases of septic meningitis,
4 cases of bronchopneumonia and 2 cases of septic arthritis.
We observed that in superficial infections, the main
organism, which was isolated, was staph-aureus, while in
deep infections especially in sepsicaemia, E. coli was
grown in majority of cases followed by staph-epidermidis,
streptococcus and klebsiella. However, in cases of septic
meningitis and bronchopneumonia, no organism was cultured.
We also observed leucocytosis in 50% of cases in our study,
the mean leucocyte count was 11,300 in superficial
infections, while it was 13,200 in deep infections.
Values between the two being statistically significant
(P value < 0.01).
Detection of C-reactive protein and its concentration in individual infections:

C-reactive protein was estimated in all of the 40 cases of neonatal infections and 10 normal non-infected babies. It was observed that though CRP was not detectable in any of the control group of cases, it was detectable in 50% of cases of superficial infections, and all cases of deep as well as combined infections. The mean concentration of CRP (μg/ml) in superficial and deep infections in our study was 34.8 ± 19.5 and 68.6 ± 17.1 μg/ml respectively. The values were statistically significant between both the groups (P value < 0.01).

Amongst the deep infections, septic meningitis had the highest mean value of CRP (79.6 μg/ml) followed by septicemia (70.0 μg/ml), septic arthritis (64.0 μg/ml) and bronchopneumonia (63.5 μg/ml). An interesting observation was that low birth weight and pre-term babies had higher percentage of detection (100% and 90%) than term and normal weight babies (67% and 68%). We also observed a correlation of the concentration of CRP to the gestational age and birth weight of all the cases. It was seen that the mean value of CRP in deep infections, irrespective of the period of gestation was highly significant than the values observed in the pre-term (33.6 ± 25.8) and term cases (35.8 ± 15.9) of superficial infections and combined infections (P value < 0.001).
We also observed that there was a significant difference ($p$ value $< 0.01$) of the CRP concentration between superficial and deep infections as well as deep and combined infections in both low birth weight (superficial infection 54.7 ± 32.9 and deep infection 62.7 ± 2.3) and normal weight babies (superficial infection 28.6 ± 14.5 and deep infection 70.3 ± 19.2). However, no significant difference of the CRP concentration was observed amongst both superficial and deep infections ($p$ value $> 0.05$). As already reported, the mean concentration of CRP in superficial infections was found to be 34.8 ± 19.5 ug/mL. On a break up of the various superficial infections, it was observed that the mean concentration of CRP in umbilical sepsis, furunculosis, and conjunctivitis was found to be 41.6 ug/mL, 33.3 ug/mL, and 15.8 ug/mL respectively.

Another significant observation was that low birth weight and pre-term had higher percentage of detection than term and normal weight babies of CRP. The higher detection rate observed in low birth weight and pre-term babies can be attributed to the fact that both these groups of babies are immunocompromised and therefore are more prone to deeper infections. Further, it was seen that irrespective of the period of gestation and birth weight, the values of CRP were highly significant in deep infections as compared to the superficial infections.

In nutshell, our study demonstrates that the detection and the height of CRP concentration is directly
correlated to the severity of infection, rate of detection and mean percentage being significantly higher in deeper infections as compared to superficial infections. The reason may be explained by the fact that because CRP production is a non-specific response to tissue damage, the greater destruction induced by bacteria than by viral infections causes higher CRP values in deeper infections. The greater CRP response may be related to extracellular life cycle of bacteria compared with the intracellular life cycle of viruses, so explaining a low detection of CRP values in cases of viral infections. We can also explain the low percentage of detection of CRP in superficial infections by the fact that being a local infection, all the superficial infections did not induce production of CRP, so causing low percentage of detection of CRP and also low level of mean CRP concentration in cases of superficial infections.

We therefore conclude that CRP test is an important parameter to diagnose both superficial and deep infections and is more reliable indicator than total leucocytes count and bacterial culture specially in deeper infections.