EVALUATION OF C-REACTIVE PROTEINS (CRP) IN THE DIAGNOSIS OF PREMATURE RUPTURE OF MEMBRANE IN PATIENTS ATTENDING IN TERTIARY CARE HOSPITAL AT MUZAFFARPUR, BIHAR

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Abstract
Objective: C-Reactive Proteins (CRP) is an important marker of Sub-clinical infection in cases of Premature Rupture of Membrane (PROM). The aim of present study was the evaluation of CRP from the patients attending in our hospital with premature rupture of membrane.

Materials and Method: A total of 32 patients of Preterm, Premature rupture of membranes and 32 patients preterm with intact membranes as a control, between 28-36 weeks of gestation were included in the study.

Results: The Sensitivity and specificity of CRP determination was found to be 78.12% each as an early predictor of subclinical chorioamnionitis. TLC had a low sensitivity of 22% and specificity of 65% in detecting histological chorioamnionitis (HCA).

Conclusion: CRP estimation is a simple, reliable, quite affordable and reasonably marker for the detection of early chorioamnionitis.

Keywords: PROM, CRP, Chorioamnionitis, Sensitivity, Specificity

Introduction
C- reactive protein is an acute phase protein, produced by hepatocytes and secreted in the blood after inflammation, infection, trauma, necrosis, malignancy, and allergic reactions. It is a indicator of inflammation.

CRP level can increase 10,000-fold from less than 50 μg/l to more than 500 mg/L after stimulus and production and concentration of CRP increase to 5 mg/L by 6 hours and peak at 48 hours, which increases with inflammation. It can double every 8 hours and reaches its peak at 36 to 50 hours. CRP level between 100 and 500 mg/L is considered highly predictive of inflammation due to bacterial infection [10]. CRP level decrease rapidly after infection has subsided due to the half life of CRP.

Acute inflammation of the membranes and chorion of placenta is known as Chorioamnionitis or Intra-amniotic infection and it is typically due to ascending polymicrobial bacterial infection due to premature rupture of membranes. Most common Microorganism causing chorioamnionitis is Genital Mycoplasma, Ureaplasma Urealyticum, and Mycoplasma hominis, Gardenerella Vaginalis, Group-B Streptococcus, E.coli, Enterroccoccus and Listeria monocytogenous are also responsible for that[11].

Premature rupture of membrane (PROM) is one of the most common underlying causes of preterm delivery, stillbirth and neonatal sepsis, chronic lung disease, Brain injury leading to cerebral palsy, other neurodevelopment disability and perinatal death [1,5,6].

It has been reported that histopathological changes of chorioamnionitis appear before the clinical evidence of chorioamnionitis has manifested. A significant association was found between elevated CRP and histological chorioamnionitis in preterm PROM [4]. CRP values were significantly higher in infected pregnancies.

The present study was designed to know the significance of C-reactive proteins in the prediction of chorioamnionitis.

Materials and Methods
The present study was conducted in the Department of Biochemistry, Sri Krishna Medical College, Muzaffarpur, Bihar, with the help of Department of Microbiology, Pathology, Obstetrics and Gynaecology Department, during the period between November 2017 to December 2018. A total of 32 patients were admitted in the maternity ward, with presenting complain of Premature rupture of membrane (PROM) between 28-36 weeks were included in the study. Patients having any acute or chronic infections...
were excluded from the study. From all the patients and
control group informed consent were taken.
Simultaneously 32 patients matched for age, parity, period
of gestation with normal pregnancy and without any
history of ruptured or leaking membranes were studied as
control groups. Following admission routine investigations
like CBC (By Sysmax five parts fully automated), blood
sugar, viral marker, LFT, KFT, BT, CT, PT INR and ESR were
done in each cases.
Estimation of C - reactive protein was done by Quantitative
Immunoturbidimetric method (supplied by Roche Integra
fully automated method), was done in the both study
group and control groups. Estimation of C-reactive protein
was done on admission, after 24 hrs, 48 hrs, 3rd day, 5th
day and following delivery in the study group and at the time
of admission and following delivery in the control group.
Placenta and membranes were sent for histopathological
examination to detect any evidence of chorioamnionitis in
each case.

Results

Out of 32 patients in the study group, 25 (78.12%) patients
were positive for CRP in their serum. Whereas in 24 (75%)
patient’s placenta and membranes had changes suggestive
of chorioamnionitis, remaining 7 (21.88%) patients had
histologically normal placenta and membranes (Table -1).
In the control group C-reactive protein and histopathological evidence were present in 2(6.25%) cases and negative in rest of 30 (93.25%) cases (Table -1).
In study group CRP was positive in 24 (75%) out of 32 cases
with histopathological evidence of chorioamnionitis and in
01(3.125%) without chorioamnionitis (Table -1).
In control group CRP was positive in 2 (6.25%) cases with
chorioamnionitis while in rest of 30(93.25%) patients
without chorioamnionitis (Table -1).
CRP had a sensitivity and specificity of 78.12% each for
the diagnosis of histological chorioamnionitis. The positive
predictive value and negative predictive values of CRP
came out to be 75% and 3.125% respectively.

Table 1: shows comparative study of C-reactive protein with histopathological findings of placenta

<table>
<thead>
<tr>
<th>Total no. of patients included in the study</th>
<th>C- Reactive protein</th>
<th>No. of patients</th>
<th>Histopathology of placenta</th>
<th>With chorioamnionitis</th>
<th>Without chorioamnionitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Group N=32</td>
<td>Positive</td>
<td>25 (78.12%)</td>
<td>24 (75%)</td>
<td>1 (3.125%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>7 (21.88%)</td>
<td>5 (15.63%)</td>
<td>2 (6.25%)</td>
<td></td>
</tr>
<tr>
<td>Control Group N=32</td>
<td>Positive</td>
<td>2 (6.25%)</td>
<td>2 (6.25%)</td>
<td>0 (0%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>30 (93.25%)</td>
<td>0 (0%)</td>
<td>30 (93.75%)</td>
<td></td>
</tr>
</tbody>
</table>

Table- 1 shows predictive values of CRP with histopathology of placenta in study and control groups.

Table 2: shows comparative study of histopathological findings with pulse, temperature, TLC and CRP levels in the study groups.

<table>
<thead>
<tr>
<th>Chorioamnionitis</th>
<th>Total no. of patients</th>
<th>Pulse &gt; 100/min</th>
<th>Temp &gt; 37°C</th>
<th>TLC &gt; 10000/mm³</th>
<th>CRP +ve</th>
<th>CRP -ve</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ve</td>
<td>24</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>24</td>
<td>5</td>
</tr>
<tr>
<td>-ve</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Table-2 shows that CRP positivity correlated better with histological chorioamnionitis than other parameters like pulse, temperature and TLC.

Discussion

In our study, CRP was proved to be most reliable early
predictor of histological chorioamnionitis. CRP had a
sensitivity and specificity of 78.12% each and positive
predictive value of 75%. Results are in agreement with
those of other workers but Ismail et al have reported low
specificity value[3].

Raised TLC as a predictor of histological chorioamnionitis
had a low sensitivity of 22% and specificity of 65%. In the
study group, out of 24 patients with chorioamnionitis only
04 had raised TLC. Even in cases of this group with no
chorioamnionitis, 02 had raised TLC. Results are in
agreement with those of previous workers [2].

Maternal temperature, maternal pulse rate and foetal
heart rate did not indicate infectious morbidity in the form
of histological chorioamnionitis. The difference between
study and control groups regarding these parameters were
insignificant.

Conclusion

Therefore, it can be concluded that measurement of CRP
levels to diagnose subclinical infection in the form of
histological chorioamnionitis in cases of PROM has
significant advantages. CRP determination is rapid,
inexpensive and independent of pregnancy and gestational
age. More important, CRP determination is non-invasive,
repeatable and is obtainable in 100% of patients.

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