

C-Reactive Protein in Pregnancy, Labor, in the Post Partum Period and in Premature Rupture of Membranes

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Abstract

The changes in the serum level of the C-reactive protein (CRP) over the course of normal pregnancy, labor, in premature rupture of membranes (PROM) and also in the post partum period were evaluated in 80 cases using turbidimetric system. Also, the efficiency of CRP determination versus ESR, total leucocytic count and differential blood count in detecting PROM was evaluated. The study revealed that CRP levels did not show a significant difference in pregnancy compared to the control group. However, CRP level was more sensitive and specific than the other parameters in detecting subclinical chorioamnionitis. It has added the advantage of being an easy, accurate, rapid diagnostic method.

Introduction

THE introduction of a new, sensitive method [1], the turbidimetric immunoassay for the determination of CRP has spurred new interest in this active phase protein.

CRP, produced in the liver, rises sig-

nificantly following injury and inflammation [2]. Because of this latter association, it was thought that it could aid in the management of patients with preterm premature rupture of the membranes [2]. There are conflicting reports as to the changes in the CRP levels during pregnancy and in the post partum period. The literature has con-

tradictory opinions as to the predictive value of CRP in chorioamnionitis, with confirmatory reports as well as contradictory reports.

Material and Methods

The present study was performed on 80 cases divided into 5 groups as follows:

1. Thirty normal pregnant females in different gestational periods, not in labor calculated from the last menstrual period and confirmed either by physical examination and/or follow up by ultrasound examination.
 - Ten cases in the first gestational period with range 1-12 weeks.
 - Ten cases in the second gestational period with range 13-28 weeks.
 - Ten cases in the third gestational period with range 29-40 weeks.
2. Ten cases during normal labor with normal delivery and giving single normal living infant between 37-40 weeks gestation.
3. Ten cases with premature rupture of membranes between 30-36 weeks.
4. Twenty cases after delivery in the postpartum period.
5. Ten normal cases, non pregnant females with child bearing period as a control period.

All the cases under the study were at-

tending the gynecology and obstetric outpatient clinic and inpatient sections in Kasr El Aini Hospital. Their ages ranged from 17-40 years. The patients of PROM admitted to the hospital were confirmed by routine means, pooling of fluid in the posterior vaginal fornix and examined by a sterile speculum. The pH of the fluid is alkaline on nitrazine paper.

All cases were subjected to thorough clinical examination and laboratory investigation including total leucocytic count, ESR and differential blood film.

Patients were subjected to the following:

1. Full clinical examination and measuring blood pressure.
2. total leucocytic count, ESR, and differential blood count.
3. Estimation of CRP in the serum of patients using turbidimetry system for the quantitative determination of CRP in the serum of patients by using turbidimetric reagent code No. OUSN 36, also we used quantitative control serum of CRP code No. OUKU [3].

C-reactive protein samples were collected and stored and measurements were performed by turbidimetry immunoassay with the Behring turbidimeter system, with use of antisera of human serum patient prepared by immunizing rabbits with the relevant human serum proteins. In an immunochemical reaction, the proteins contained in the human serum sample for immune com-

plexes with the specific antibodies of the reagent. The turbidity generated in the reaction is measured photometrically.

The data were plotted and statistical

differences were calculated by means of a Student's t-test and analysis of variances.

Results

The results are summarized in table 1.

Table (1): Comparison of CRP, ESR, WBCs Counts and Bands between Females in Pregnancy, Labor, with PROM and after Labor with Control Group.

Variable	Statistical comparison	Control	Pregnancy-	In Labor	PROM	After labor
CRP mg / dl	Mean	0.51	0.5	0.9	1.23	2.4
	SD	0.2	0.25	1.24	1.28	2.95
	T-Value		0	38.44	40.96	25
	P-Value		> 0.1	< 0.001	< 0.001	< 0.001
	Significance		N.S.	H.S.	H.S.	H.S.
ESR mm / hr	Mean	3.16	30.4	36.8	50.7	27.45
	SD	6.5	12.86	15.36	11.66	13.35
	T-Value		6.24	6.03	10.65	5.2
	P-Value		< 0.001	< 0.001	< 0.001	< 0.001
	Significance		S.	H.S.	H.S.	H.S.
WBCS X 10 ³ / cumm	Mean	6.7	6	9.97	11.41	13.5
	SD	2.88	2.14	2.94	2.86	3.2
	T-Value		0.79	2.37	3.47	5.47
	P-Value		-	< 0.05	< 0.001	< 0.001
	Significance		N.S.	S.	S.	S.
Bands X 10 ³ / cumm	Mean	2.6	2.6	3.8	7	4.7
	SD	1.26	1.38	2.53	4.3	3.04
	T-Value		1.1	1.27	2.93	2.02
	P-Value		-	-	< 0.05	< 0.05
	Significance		N.S.	N.S.	S.	S.

CRP = C-reactive protein

ESR = Erythrocyte sedimentation rate

WBCs = White cells

Discussion

The result of this prospective study of patients with PROM and with patients in labor and after labor and with patients in labor and after labor and during pregnancy demonstrated several important findings.

Regarding ESR, there was a highly significant increase in mean ESR level during pregnancy, in patients in labor, in patients with PROM, and in the post partum period when compared to the control group. This is in agreement with Hawrylyshyn et al [4], Romme and Artal [5,6].

In cases of PROM in our study, there was a highly significant increase in ESR when compared to the control group and to groups of pregnant women and patients in labor and in post partum period.

This is in accordance with Hawrylyshyn et al [4], but they found that ESR determinations are unreliable laboratory predictors of chorioamnionitis.

A wide variety of parameters have been proposed as being useful for clinical and diagnostic aids for chorioamnionitis. The most common laboratory parameters include material leucocytosis (elevated white blood cell counts and differential or band neutrophil counts).

In the present study, no significant difference was observed between total white blood cell count during pregnancy and the control group, but a significant increase was found between patients in labor,

PROM and in the postpartum period with the control group. This is in accordance with Kaplan [7].

Mean value of band neutrophils was not significantly different from the control group regarding groups of pregnant females and females in labor, but a significant increase was observed in PROM and in patients after labor. This was in agreement with Romme and Artal [5, 6] and Hawrylyshyn et al [4]. Band neutrophil determinations were found to be less reliable with the lowest sensitivity. This was in agreement with Hawrylyshyn et al [4].

Assay of CRP serum levels by turbidimeter system revealed the following results:

- CRP level did not show any statistically significant differences in pregnant females when compared to control group. The majority of previous reports are based on the semiquantitative latex agglutination and demonstrate an increased presence of CRP with progress of gestation [8, 9].

In disagreement with these reports and in agreement with us, Connell & Connell [10] observed no change during pregnancy and Yeh [9] reported finding declining values throughout pregnancy. Hawrylyshyn et al [4] reported normal values of CRP, during pregnancy, obtained by turbidimetric technique.

- CRP level was significantly increased in group of PROM, females in labor and

after labor when compared to control group.

- The rise of serum CRP level in patients with PROM is in agreement with the finding of Romme & Artal [5]. This rise may be attributed to desintegration of rupture chorioamnionitis membranes that release prostaglandins known to stimulate an increase in CRP production.

It seems clear that histologic changes precede the clinical manifestations of chorioamnionitis and in this case, it is logical to assume that CRP is an early predictor of an inflammatory process.

In our study, CRP level was more sensitive and specific than other parameters like ESR, total leucocytic count and differential blood count and also rises earlier. However, richard [11] found CRP levels to be more sensitive but less specific in identifying clinical chorioamnionitis. CRP had the advantage of being an easy, accurate and rapid diagnostic method. CRP level was significant as an aiding tool in the conservative management in cases of females with PROM and it is an important predictor of infectious morbidity.

From our study, we found that there was no correlation between CRP and ESR, WBC counts and band neutrophils in all groups. In addition, there was no significant difference in demographic characteristics (age, gravity, parity and gestational age) between group of pregnancy,

group in labor and after labor and with PROM as compared to control group. This is in agreement with the study of Ronald & Potkul [12].

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