ORIGINAL ARTICLE

Frequency of Elevated Levels of Serum CRP in Patients with Preterm Labor in a Tertiary Care Hospital, Karachi

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ABSTRACT

Background: Preterm birth is a significant public health problem, occurring in over 10 percent of births world wise, and contributing largely to neonatal mortality and various morbidities in childhood and later in life. Increase level of C-reactive protein (CRP) is associated with increased risk of preterm delivery. This study is designed to determine the elevated level of CRP in patients with preterm labor to establish a local data. Results of my study can be grate help for other care health provider to provide effective antenatal care.

Objective: To determine frequency of elevated levels of serum CRP (by blood serum test) in patients with preterm labor in a tertiary care hospital, Karachi.

Setting: This Cross Sectional Study was conducted in the Department of Obstetrics and gynecology, Civil hospital Karachi for the duration of six months from January, 2018 to July, 2018.

Subject and Methods: A total of 88 pregnant women with pre term delivery were included in this study. Preterm labor was confirmed by uterine contraction (3 contraction in 10 minutes each lasting for 30 second) and cervical dilatation of preterm labor. Blood sample was taken for CRP level whole of this information was documented on predesigned proforma.

Results: The average age of the women was 28.26±4.02 years. Frequency of elevated level of serum CRP in patients with preterm labor was 89.77% (79/88).

Conclusion: In present study frequency of elevated level of serum CRP in patients with preterm labor was 89.77%. Measurement of the C-reactive protein during pregnancy can be used as a predictive screening biomarker for detection of subclinical infections that cause preterm uterine contraction and hence early intervention and intensive antenatal care to reduce the perinatal morbidity and mortality.

Keywords: Preterm labor, Elevated levels of serum CRP, Cervical Dilatation.

INTRODUCTION

Preterm birth is a significant public health problem, occurring in over 10 percent of births world wise, and contributing largely to neonatal mortality and various morbidities in childhood and later in life. [1] Preterm labour is define as the onset of labor prior to complication of 37 weeks of gestation and a pregnancy beyond 20 weeks of gestation. [2] This happens when uterine contraction causes dilatation of cervix earlier than normal so the detus can be at risk for health problem. Accurate diagnosis is, therefore crucial for identifying those women undergoing preterm labor who ate at greater risk of preterm delivery; this may allow transport to regional obstetrical center and permits time for corticosteroid therapy. Infection makes 25-40% causes preterm delivery. In pregnant women with infection: increase cytokine level in blood which leads to production of prostaglandins and ultimately causes to induce uterine contraction and dilatation of cervix and preterm delivery. To find a predictive model for a progression of preterm delivery, may studies focused on the analysis of biochemical marker in blood such as CRP. [3]. C-reactive protein (CRP) is a ring shaped protine food in blood plasma, this is an acute phase protein that synthesized in liver. Increase level of CRP is associated with increased risk of preterm delivery from 14.5-255 times. CRP is a deicate inflammatory index. CRP measurement is naïve noninvasive and safe that can be helpful test for assessment and classify the risk levels and also predict the morbidity of mother and fetus. [3]

Preterm uterine contraction defined by American Academy of pediatrics and the American college of obstetrics and gynecology which included the following:

Regular utrine contraction occur at a frequency of four in 20 minutes or 8 in 60 minutes (or at interval of less than 8 minutes) plus progressive changes in the cervix: cervical dilation more than 1cm and cervical effacement of 80% or greater.[5]

Women who were CRP positive in early pregnancy had more risk of developing adverse complication of pregnancy like fetal growth restriction, oligohydramnios, PPROM, Neonates born to CRP positive mother and complication like preterm, low birth weight, septicemia and other. [6]

It is observed that 91% of pregnant women with premature uterine contraction have elevated level of CRP. [4]. As regards anticipated and early diagnosis preterm labor is necessary and important to investigate, deciding to using these markers and upgrade accurately predict preterm delivery. [3]

MATERIAL AND METHODS

This Cross Sectional Study was conducted in the Department of Obstetrics and gynecology, Civil hospital Karachi for the duration of six months from January, 2018 to July, 2018. A total of 88 pregnant women with pre term delivery were included in this study by using open EPI. Sample size calculator taking prevalence of elevated CRP level in patients presenting with preterm labour is 91% with margins of error 6% and confidence interval was 95%.

Inclusion Criteria:

- Maternal age between 18 to 40 years, regardless of parity
- Singleton pregnancy
- Breech cephalic presentation
- Gestational age between 26 to 37

Exclusion Criteria:

- Medical and surgical illness
- Medically induced premature uterine contraction
- Uterine anomaly such as uterine incompetence and Malformations of uterus.

Data Collection Procedure: After approval of synopsis from college of physician and surgeon of Pakistan, permission was taken form ethical review board committee of civil hospital Karachi. All women fulfilling inclusion criteria was assigned in study after taking informed consent, these include, those attending OPD, emergency and labor ward of Gynae unit 2 civil hospital Karachi. GPR, OBS examination and vaginal speculum examination was

done. Preterm labor was confirmed by uterine contraction (3 contraction in 10 minutes each lasting for 30 second) and cervical dilatation of preterm labor. Blood sample was taken for CRP level whole of this information was documented on predesigned proforma. All the assessment was done under supervision having greater than 5 years' experience.

Data Analysis Procedure: Data was entered and analyzed through SPPS version 22. Mean and standard deviation was calculated for all quantitative variables like maternal age, gestational age, parity and CRP level. Frequency and percentage were calculated for socio economic status educational status, elevated CRP level. Effect modifiers like age, gestational age, soicoecnomic status, educational status, residence status were controlled through stratification post stratification chi-square test was applied keeping p value < 0.05 significant.

RESULTS

A total of 88 pregnant women with pre term delivery were included in this study. Most of the women were 26 to 30 years of age as shown in figure 1.
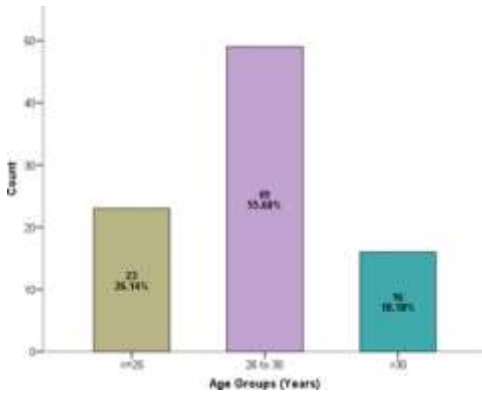

Figure 1: Age Distribution Of The Women; n= 88

The average age of the women was 28.26±4.02 years similarly parity, gestational age and CRP level of the women is also reported in table 1.

Table 1: Descriptive Statistics of Characteristics of Patients

Variables	Mean	SD
Age (Years)	28.26	4.02
Parity	1.82	0.89
Gestational Age (Weeks)	35.15	1.53
CRP	6.89	1.22

67.05% of the women were urban and 32.95% were rural as shown in figure 2.
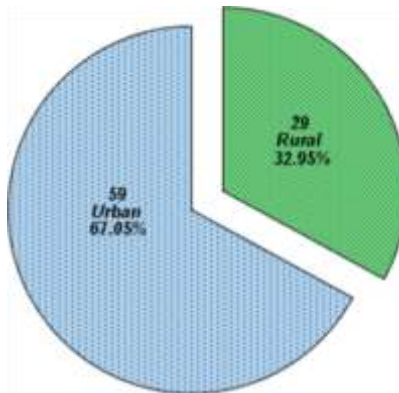

Figure 2: Residence Status Of The Women; n= 88

Frequency of elevated level of serum CRP in patients with preterm labor was 89.77% (79/88) as presented in figure 3.
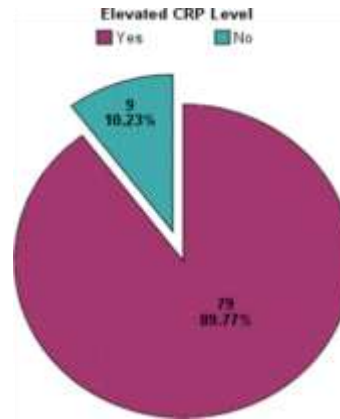

Figure 3: n= 88

Rate of elevated CRP was insignificant among different age group as shown in table 2.

Table 2

Age groups (years)	Elevated level of serum crp		Total	Chi-square	P-Value
	Yes	No			
≤ 25 years	19(82.6%)	4(17.4%)	23	2.27	0.321
26 to 30 years	46(93.9%)	3(6.1%)	49		
>30 years	14(87.5%)	2(12.5%)	16		

Frequency of elevated level of serum CRP in patients with preterm labor with respect to Gestational Age was shown in table 3;

Table 3:

Gestational age	Elevated level of serum crp		Total	Chi-square	P-Value
	Yes	No			
< 35 weeks	25(100%)	0(0%)	25	3.97	0.06
35-36	54(85.7%)	9(14.3%)	63		

Frequency of elevated level of serum CRP in patients with preterm labor with respect to education status was shown in table 4;

Table 4:

Education status	Elevated level of serum crp		Total	Chi-square	P-Value
	Yes	No			
Illiterate	18(90%)	2(10%)	20	1.016	0.797
Primary	16(84.2%)	3(15.8%)	19		
Secondary	29(90.6%)	3(9.4%)	32		
Matric and above	16(94.1%)	1(5.9%)	17		

Frequency of elevated level of serum CRP in patients with preterm labor with respect to residence status was shown in table 5;

Table 5:

Residence status	Elevated level of serum crp		Total	Chi-square	P-Value
	Yes	No			
Rural	24(82.8%)	5(17.2%)	29	2.318	0.128
Urban	55(93.2%)	4(6.8%)	59		

Frequency of elevated level of serum CRP in patients with preterm labor with respect to SES status was shown in table 6;

Table 6:

Ses status	Elevated level of serum crp		Total	Chi-square	P-Value
	Yes	No			
Poor	10(71.4%)	4(28.6%)	14	6.61	0.037
Middle	60(92.3%)	5(7.7%)	65		
Greater	9(100%)	0(0%)	9		

DISCUSSION

Complications of preterm uterine contraction include unattended births, prematurity, hemorrhage, infection, impaired childhood development, and peri-natal death [7]. CRP is a sensitive marker of systemic inflammation [8, 9, 10]. CRP accompanies both acute and chronic inflammatory disorders [11]. Serum concentrations of CRP in pregnancy are elevated above non pregnant values, with the difference being detected as early as 4 weeks gestation[12]. The exact etiology of this increase is unknown, although the direct synthesis of CRP by trophoplast may play a role [89]. Higher concentrations of CRP in the 1st trimester have been associated with preterm delivery [11]. Maternal concentrations of CRP have been studied as an aid in diagnosing subclinical infection in pregnant women who experience preterm labor and premature rupture of membranes. In the past decade elevated levels of CRP measured during gestation have been linked to adverse pregnancy outcomes such as preeclampsia and intrauterine growth restriction and have been associated with the presence of intrauterine infection [13]. Systemic maternal infections can lead to cervical ripening and premature delivery through inflammatory cytokines then prostaglandin production [14].

In this study the average age of the women was 28.26±4.02 years. In Nakishbandy et al study [4] the mean age in women with premature uterine contractions was 27.70±5.86 years, while the mean age in control group was 28.95±6.10 years.

Frequency of elevated level of serum CRP in patients with preterm labor was 89.77%. Among hundred pregnant women included in Nakishbandy et al study [4] presenting with premature uterine contractions; 91% of them delivered preterm within seven days of the contractions and (93%) of them had significant elevated level of CRP (level of CRP were more than 1mg/l P value < 0.001). Such high percentage may be due to elevated levels of CRP that reflect the subclinical infection which lead to production of more pro-inflammatory cytokines that are responsible for induction of labour and subsequent delivery. These results are consistent with the hypothesis that chronic low-grade inflammation may raise CRP levels and cause preterm delivery.

Pitiphat et al. (2005) [10], Lohsoonthporn et al. (2007) [15]and Czajka et al. (2004) [92] found that there is statistically significant association between CRP concentrations and subsequent preterm delivery, with odd ratios of 2.55 and 2.04, respectively in the first two studies. The elevated CRP concentrations were associated with an increased risk of delivery prior to completion of 34 weeks gestation (very preterm delivery). These findings are similar to results of the present study.

Sorokin and colleagues in a large, multicenter, prospective trial revealed that elevated maternal serum concentrations of CRP were associated with preterm birth < 32 weeks of gestation,[17]. Both LR+ and LR- are of clinical interest in at risk populations. CRP, as a marker of preterm labor in symptomatic women [18] with LR + 6.3, and SENS 38% and in asymptomatic women [95] with LR+1.8, and SENS 26%, were noted. Also, CRP (week 34) with LR + 6.8 and LR-0.7, [19] CRP (week 35) with LR+2.8 and LR- 0.6, [20] and CRP (week 37) with LR + 4.5 and LR- 0.3, were reported in preterm labor prediction.

As this study was designed primarily to estimate the utility of CRP alone as indicator of preterm delivery, the relation between cervical length and CRP values was not determined in this study.

CONCLUSION

In present study frequency of elevated level of serum CRP in patients with preterm labor was 89.77%.Measurement of the level of C-reactive protein during pregnancy can be used as a predictive screening biomarker for detection of subclinical infections that cause preterm uterine contraction and hence early intervention and intensive antenatal care to reduce the perinatal morbidity and mortality.

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