Sensitivity of Elevated C-Reactive Protein serum levels in Diagnosis of Chorioamnionitis among pregnant women with gestational diabetes

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Abstract

The role of elevated C-Reactive Protein (CRP) serum levels has been questioned in gestational diabetes mellitus (GDM) because of the evidences that metabolic syndrome and GDM are related to increased serum levels of inflammation markers (such as CRP).

The aim of the study was to evaluate the sensitivity of elevated CRP levels for diagnosis of chorioamnionitis and to compare it with sensitivity of other standard laboratory or clinical signs used in the establishing of diagnosis of chorioamnionitis.

Elevated CRP level was present in 93,33% cases. Fetal tachycardia was present in 91,67% cases. Increased white blood cell count was present in 63,33%. A statistically significant difference was found in the level of sensitivity of CRP and of the increased white blood cell count (P<0.01). Elevated C-reactive protein levels were more sensitive than other standard laboratory or clinical signs in predicting chorioamnionitis in women with GDM.

Keywords: Chorioamnionitis, Gestational Diabetes, C-reactive protein, Sensitivity

Senzitivnost povišenog C-reaktivnog proteina u dijagnostici horioamnionitisa kod trudnica sa gestacionim dijabetesom

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Apstrakt

Uloga povišenog serumskog C-Reaktivnog Proteina (CRP) u dijagnostici horioamnionitisa dovodi se u pitanje kod gestacijskog dijabetesa (GDM) zbog povezanosti metaboličkog sindroma i GDM-a sa visokim serumskim nivoima markera inflamacije (kao što je CRP).

Cilj studije je da evaluira senzitivnost povišenog CRP-a u dijagnostici horioamnionitisa u GDM pacijenata i uporedi je sa senzitivnošću ostalih laboratorijskih parametara i kliničkih znakova koji se koriste u dijagnostici ovog entiteta.

Povišen CRP bio je prisutan u 93,33% slučajeva horioamnionitisa, fetalna tahikardija u 91,67%, leukocitoza u 63,33% slučajeva. Pronađena je značajna razlika u nivou senzitivnosti CRP-a i leukocitoze (P<0.01). Povišen CRP je osetljiviji u odnosu na druge parametre u detekciji horioamnionitisa kod trudnica sa GDM-om.

Ključne reči: Horioamnionitis, Gestacioni Dijabetes, C-reaktivni protein, Senzitivnost

Introduction

Chorioamnionitis has an effect on numerous pregnancies complicated by preterm premature rupture of membranes1. Finding a serum factor that could truthfully envisage the presence of chorioamnionitis could potentially direct to more efficient management of preterm premature rupture of membranes. Numerous studies have supported the use of CRP in diagnosing chorioamnionitis[1,2]. However, this role could be questioned in gestational diabetes mellitus (GDM) because an expanding body of evidence has linked the metabolic syndrome and GDM with several emerging non-traditional risk factors, including markers of inflammation, such as CRP[3,4]. However, other authors found disagreeing evidences. They found no correlation between CRP serum levels and GDM and they reported lack of predictive value of CRP in GDM[5].

The aim of this study was to evaluate the sensitivity of elevated C-reactive protein (CRP) levels in detection of chorioamnionitis and to comare it with sensitivity of other laboratory or clinical sings which are in use for establishing the diagnosis of chorioamnionitis.

Materials and Methods

The retrospected study entailed the evaluation of medical records of 60 pregnant woman with GDM, who were in a tertiary health center diagnosed with chorioamnionitis as well. Diagnosis was established by the presence of at least two of the following laboratory or clinical signs in predicting chorioamnionitis[2]: increased white blood cell count, fever, maternal tachycardia, fetal tachycardia, malodorous amniotic fluid, malodorous discharge from uterine cervix, uterine tenderness, elevated CRP serum levels.

Data is expressed as mean values with standard deviation for skewed data. Categorical data is presented in absolute numbers with percentages and analysed using chi-square test and Fisher's exact test. For continuous variables, Student's *t*-test was used. A P value of < 0.05 was considered statistically significant. The diagnostic value of each laboratory or clinical sign used for the diagnosis of chorioamnionitis were evaluated for sensitivity (Sn).

Results

The mean maternal age ± SD was 25.96 ± 6.40 years. Forty-nine women (80%) were nulliparous and 12 (20%) were multiparous women. The mean gestational age at the moment of the diagnosis of chorioamnionitis ± SD was 33.17 ± 1.42 weeks.

Diagnostic characteristics of laboratory or clinical signs of the chorioamnionitis evaluated by sensitivity are summarized in Table 1.

	Number of patients	Sensitivity
Elevated serum CRP level	56	93,33%
Fever	55	91,67%
Fetal tachycardia	55	91,67%
Maternal tachycardia	42	70%
Increased white blood cell count	38	63,33%
Malodorous amniotic fluid	21	35%
Malodorous discharge from uterine cervix	19	31.67%
Uterine tenderness	14	23.33%

Table 1. Diagnostic characteristics of laboratory or clinical signs of the chorioamnionitis evaluated by sensitivity

A highly statistically significant difference was between the levels of sensitivity of CRP, fever and fetal tachycardia comparing with the sensitivity levels of increased white blood cell count, uterine tenderness, malodorous amniotic fluid and discharge from uterine cervix ($P<0.01$). The difference between sensitivity of maternal tachycardia and the sensitivity of the most efficient sings of chorioamnionitis (elevated serum CRP levels, fever and fetal tachycardia) was significant ($P<0.01$).

Conclusion

The present study dealed with diagnostic value of laboratory or clinical signs of chorioamnionitis in GDM evaluated by the sensitivity of each sign. Our study results confirmed that elevated C-reactive protein levels were more sensitive than other standard laboratory or clinical tests in predicting chorioamnionitis in women with GDM. This is in accordance with the finding of other studies regarding general population[3] of pregnant

women or pregnant women with GDM[4]. In addition, in a cross-sectional study which examined the role of CRP in the association between BMI and GDM, CRP has emerged as the most important determinant of chorioamnionitis, independent of GDM[6].

However, the relationship between perinatal inflamation, gestational diabetes, chorioamnionitis are incompletely understood[7]. Our results could be of the importance in the light of the fact that chorioamnionitis is often asymptomatic and clinical signs such as uterine tenderness and malodorous amniotic fluid or cervical discharge lack both sensitivity and specificity. Furtermore, chorioamnionitis occurs without microbiologicaly-proven amniotic fluid infection in over half of cases, due to fastidious organisms, sampling limitations and prior exposure to antibiotics[8]. Also, recent reports indicate that serial CRP levels during this interval may be useful for monitoring of antibiotic treatment[8].

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