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Original Research Article

Elevated First Trimester C-Reactive Protein as Predictor of Gestational Diabetes in Telangana Population

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Conflict of interest: Nil

Abstract

Background: C-REACTIVE PROTEIN levels are a significant biomarker of post-inflammatory conditions associated with various clinical conditions, including type II TYPE-II DIABETICS. Hence, C-REACTIVE PROTEIN elevation in gestational TYPE-II DIABETICS patients also predicts CVD and other vascular conditions.

Method: 85 pregnant women with gestational diabetes in the first trimester and the same number of normal pregnant women in the controlled group were compared. Blood sugar (fasting and postprandial) and C-reactive protein, BODY MASS INDEX, age, and period of gestation (weeks) were compared in both groups.

Results: BODY MASS INDEX of the gestational TYPE-II DIABETICS group was 26.03 (±3.38), 22.82 (±2.16) in the controlled group, t test was 7.37 and $p<0.001$. Apart from blood glucose parameters, C-REACTIVE PROTEIN levels were elevated in gestational TYPE-II DIABETICS patients, and $p<0.01$ (p values were highly significant).

Conclusion: In the present, C-REACTIVE PROTEIN values were higher in gestational diabetes due to inflammation and oxidative stress. These findings are important for obstetricians and gynaecologists to predict the risk factors of pregnancy and the foetus and treat efficiently to avoid morbidity, and mortality in such patients.

Keywords: C-reactive protein, Gestational, Immune turbimetric Method, type-II DIABETICS Blood glucose.

Introduction

It has been proposed that, high sensitivity C-REACTIVE PROTEIN be added as a clinical criteria for type-II DIABETICS as a biomarker of inflammation [1], because evidence supporting the hypothesis that elevated C-REACTIVE PROTEIN levels contribute to increased cardiovascular risk is now observed in women's health studies, especially in the gestational period [2].

It is reported that, leptin (positively) and adiponectin (negatively) are associated with C-REACTIVE PROTEIN; therefore, in the gestational period in type-II DIABETICS patients, C-REACTIVE PROTEIN indicates a post-inflammatory state and predicts the risk factors in gestational TYPE-II DIABETICS patients. In the genetic study, it was also confirmed that common variation in several genes involved in metabolic and inflammatory regulation has significant effects on C-REACTIVE PROTEIN levels, consistent with C-REACTIVE PROTEIN's identification as a useful biomarker of risk

for incident vascular disease and diabetes [3,4]. All these findings have sparked increased discussion about the elevation of C-REACTIVE PROTEIN levels in TYPE-II DIABETICS patients, including gestational periods too. Hence, attempts are made to study the C-REACTIVE PROTEIN levels in gestational TYPE-II DIABETICS patients to predict the cardio-vascular risk factors in pregnancy and the fetus.

Material and Method

85 (eighty five patients) regularly visiting the obstetrics and gynaecology department of Maheshwara Medical College and hospital Chitkul (v), near Isnapur X Roads, Patancheru, Sangareddy (dist), Telangana-502307, were studied.

Inclusive Criteria: Pregnant patients with more than 20 weeks of gestation and diabetics with more than 20 weeks of gestation, multipara, were selected. Normal pregnant women above 20 weeks of gestation were studied as control groups.

Exclusion Criteria: Known diabetics, having a history of GTYPE-II DIABETICS in past pregnancy, patients associated with endocrine diseases like thyroid, adrenal, or immune compromised diseases.

Method: 85 pregnant women with gestational diabetes and the same number of normal pregnant women were selected as the control group. Diagnosis of GTYPE-II DIABETICS is based on the 4th International Work Shop Conference on Gestational Diabetes, which adapts the Carpenter- Custan criteria [5]. About 8 ml of blood from each patient was collected after an overnight fast (after 12 hours) by venipuncture. 4 ml is collected in a clean plain bulb, remaining in the EDTA and fluoride bulbs. Blood was allowed to clot, and serum was then separated by centrifugation. Blood sugar was studied by glucose oxidation, peroxidation, and point (enzymatic method), and C-reactive protein by the immune-turbimetric method.

The duration of the study was from January 2021 to March 2023.

Statistical analysis: The studied parameters in gestational diabetic women and the control group were compared by t test. The statistical analysis was carried out in Statistical Package for the Social Sciences software.

Observation and Results:

Table 1: Comparison of clinical manifestation (baseline) in both groups

Clinical manifestations	Gestation TYPE-II DIABETICS 82	Control group 82	t test	p value
Age (year)	23.58 (±2.52)	23.28 (±2.50)	0.77	P>0.43
Gestational Age (weeks)	31.84 (±2.82)	31.84 (±2.60)	0.1	p>0.45
BODY MASS INDEX	26.03 (±3.38)	22.82 (±2.16)	7.37	P<0.001

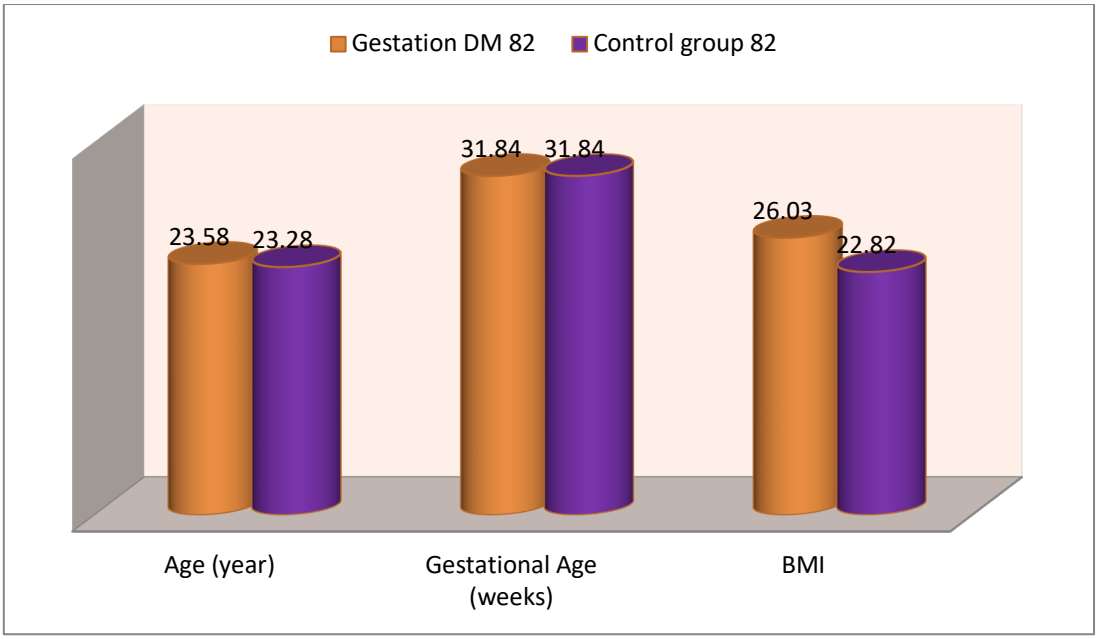

Figure 1: Comparison of clinical manifestation (base-line) in both groups

Table 2: Comparison of laboratory findings in both groups

Laboratory Findings	Gestation TYPE-II DIABETICS 85	Control group 85	t test	p value
Blood glucose (fasting)	124.226 (±17.40)	83.58 (±4.85)	20.7	P<0.001
Blood glucose (post meal)	226.48 (±14)	110.68 (SD±6.66)	68.8	P<0.001
C-REACTIVE PROTEIN (mg/l) level	3.38 (±0.36)	2.78 (±0.10)	14.8	P<0.001

P<0.001 = highly significant

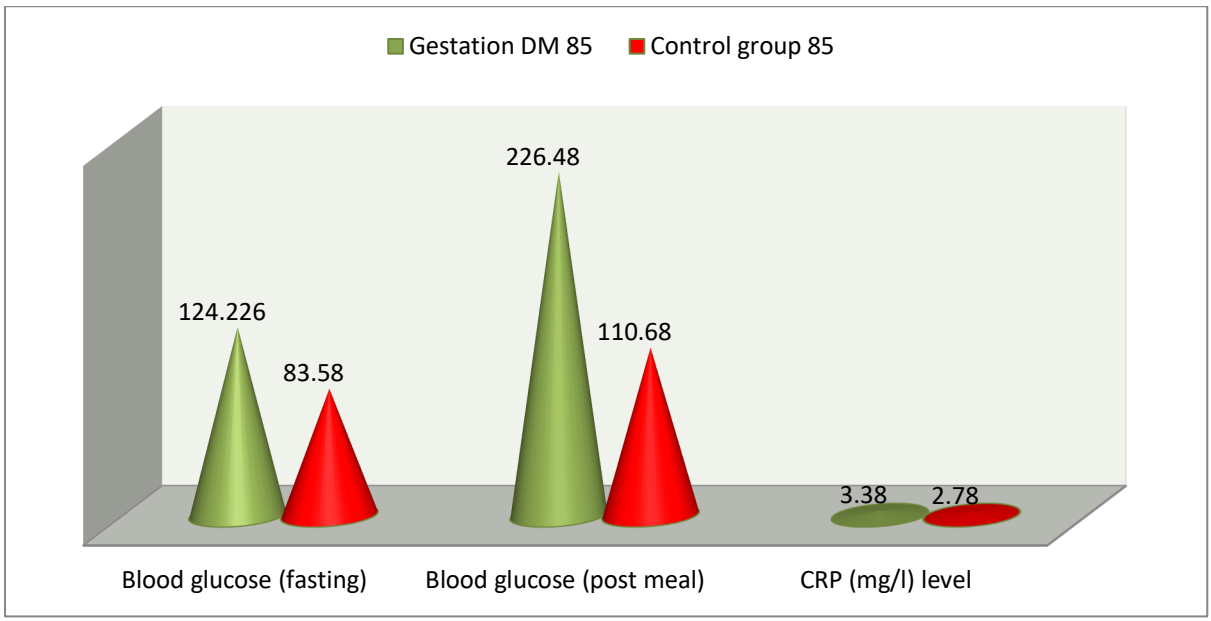

Figure 2: Comparison of laboratory findings in both groups

Table 3: C - reactive protein parameter in Fasting and post meal blood glucose

C-REACTIVE PROTEIN parameters	Blood glucose Fasting	Blood glucose post meal	t test	p value
C-REACTIVE PROTEIN level	0.6342 (±0.42)	0.6240 (±0.38)	0.16	p>0.86

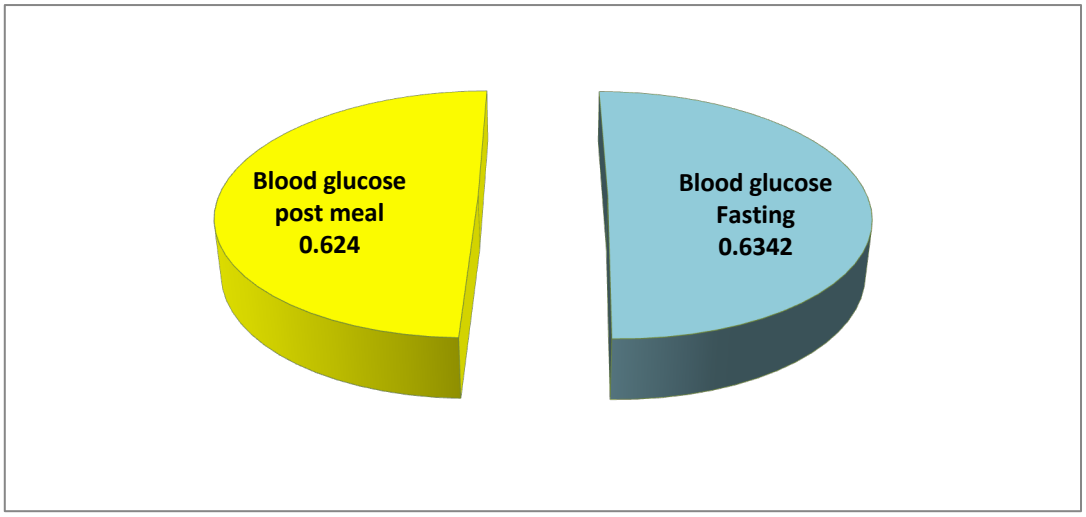

Figure 3: C - reactive protein parameter in Fasting and post meal blood glucose

Table 1: Comparison clinical manifestation (Base line) in both groups

1) Age (years) 23.58 (±2.52) in gestational TYPE-II DIABETICS, 23.28 (±2.50) in controlled groups, t test was 0.77 p>0.43
2) Gestation age (weeks) 31.84 (±2.82) in gestational DN, 31.84 (±2.60) in controlled group, t test was 0.01 and p>0.45
3) BODY MASS INDEX 26.03 (±3.38) in gestational TYPE-II DIABETICS, 22.82 (±2.16) in controlled group, t test was 7.37 and p>0.001

Table 2: Comparison of laboratory findings in both groups

1) Blood glucose (fasting) – 124.26 (±17.40) in gestational TYPE-II DIABETICS, 83.58 (±4.83) in controlled group, t test was 20.7 and p<0.001
2) Blood glucose (post meal) – 226.48 (±14) in gestational TYPE-II DIABETICS, 110.68 (±6.66) in controlled group, t test was 68.8 and p<0.001.
3) C-REACTIVE PROTEIN (mg/dl) – 3.38 (±0.36) in gestational TYPE-II DIABETICS, 2.78 (SD±0.10) in controlled group, t test was 14.8 and p p<0.001

Table 3: C-reactive protein parameter in fasting and post meal blood glucose –

C-REACTIVE PROTEIN level 0.6342 (±0.42) in Fasting, 0.6240 (±0.38) in post meal, t test 0.16 and p>0.86.

Discussion

Present study of elevated first trimester C-reactive protein as a predictor of gestational diabetes in the Telangana population. In the comparison of clinical manifestation (base line) in both groups, age (year) was 23.58 (±2.52) in gestational TYPE-II DIABETICS, 23.28 (±2.50) in the controlled group, and the t test was 0.77 and p>0.43. Gestational week study – 31.84 (±2.82) in gestational TYPE-II DIABETICS, 31.84 (± 2.60) in the controlled group, t test was 0.01 and p>0.45, The BODY MASS INDEX of gestational TYPE-II DIABETICS was 26.03 (± 3.38) in gestational TYPE-II

DIABETICS, 22.82 (±2.16) in controlled group, t test was 7.37 and p<0.001 (p value was highly significant) (Table-1). In the comparative of laboratory findings, blood glucose (fasting) was 124.26 (±17.40) in gestational TYPE-II DIABETICS, 83.58 (±4.85) in the controlled group, and the t test was 20.7 and p<0.001. Blood glucose (post meal) 226.48 (±14) in gestation TYPE-II DIABETICS, 110.68 (±6.66) in controlled group, t test was 68.8 and p<0.001. C-REACTIVE PROTEIN level 3.38 (±0.36) in gestation TYPE-II DIABETICS, 2.78 (± 0.10) in control; the t test was 14.8 and p<0.001 (Table-2). The C-RP parameters in fasting and post-meal blood glucose were C-REACTIVE PROTEIN levels of 0.6342 (±0.42) in fasting blood glucose and 0.6240 (±0.38) in post-meal blood glucose), t test was 0.16 and p>0.86 (Table-3). These findings are more or less in agreement with previous studies [5,6,7].

TYPE-II DIABETICS is the most common medical complication during pregnancy; the prevalence of such cases varies between 12 to 18 % globally [8]. The increase in BODY MASS INDEX seems to play a role in the significant increase in C-REACTIVE PROTEIN serum levels. Gain during pregnancy and nutrition factors such as intake of saturated fatty acids are among other risk factors associated with TYPE-II DIABETICS [9]. The cornerstone of management is glycemic control, and poor control during pregnancy has been associated with miscarriage, preterm-birth, stillbirth, macrosomia, urinary tract infection, polyhydroaminos shoulder dystocia, operative delivery, neonatal hyperbilirubinemia, and hypocalcaemia [10]. In normal pregnancy, there is an increase in lipid peroxidation products in serum with advancing gestation, which is balanced by an adequate anti-oxidative response. In TYPE-II DIABETICS, increased blood glucose levels cause the auto oxidation of unsaturated lipids in plasma and membrane proteins, which is responsible for the generation of free radicals. So this cycle of tissue damage and cell death, leading to increased free radical production and compromised free radical scavengers, exaggerates the oxidative stress.

The first-trimester markers may help to predict this complication and improve the management of such cases. Hence, the first trimester of pregnancy is known as the "insulin sensitive period. Insulin resistance increases during the second trimester of pregnancy [11,12]. In the management of TYPE-II DIABETICS, treatment modalities aimed at improving insulin sensitivity may be useful It is hypothesised that high sensitivity C-REACTIVE PROTEIN may cause insulin resistance by increasing IRS-1 (insulin receptor substrate-1) phosphorylation at ser 307 and ser 612 via Jun N-terminal kinases and extracellular signal regulated kinases I and II respectively, leading to impaired insulin, stimulated glucose transporter translocation, and glycogen synthesis [13]. Controlling weight gain during pregnancy reduces the incidence of TYPE-II DIABETICS.

Summary and Conclusion

The present study of elevated first trimester C-REACTIVE PROTEIN as a predictor of gestational diabetes will be helpful for obstetricians and gynecologist, radiologists, and neonatal physicians to predict complications for the fetus and mother as well. This study demands further hormonal, patho-physiological, genetic, and nutritional studies because the exact pathogenesis of gestational diabetes is still unclear.

Limitation of study: Owing to the tertiary location of the research centre, the small number of patients, and the lack of the latest techniques, we have limited findings and research.

Ethical Approval: This research paper was approved by Ethical committee of

Maheshwara Medical College and hospital Chitkul (v), Near Isnapur X Roads, Patancheru, Sangareddy (dist), Telangana-502307.

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