Original Research Article

Study of serum ferritin in type 2 DM patients in north Gujarat

Jigar A Parmar1, Gaurav D Modi1,*, Margit G Gajjar1

1 Dept. of Biochemistry, GMERS Medical College, Vadnagar, Gujarat, India

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ABSTRACT

Introduction: Diabetes mellitus is a metabolic disorder in which metabolism of various trace elements is being altered. Present study has been carried out to determine association between serum ferritin and type 2 diabetes mellitus.

Aim: To analyze level of serum ferritin in type 2 diabetes mellitus patients in comparison with healthy controls.

Materials and Methods: The present cross-sectional study was carried at Clinical Chemistry Laboratory, department of Biochemistry, GMERS Medical College and Hospital, Vadnagar, Gujarat. There were 100 cases having minimum 5 years history of type 2 diabetes mellitus residing at North Gujarat. There were 100 healthy controls in this study. GOD-POD (Glucose Oxidase- Peroxidase) method was used for estimation of Glucose. Nephelometry method was used for estimation of Ferritin and HbA1c.

Results: In comparison to healthy controls; Serum ferritin level was found high in Type 2 DM patients.

Conclusion: High level of serum ferritin was found in patients of type 2 diabetes mellitus patients who have poor glycemic control.

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1. Introduction

Prevalence of Type 2 diabetes mellitus (DM2) has continue to increase in recent decades.1–5 It is an important health problem worldwide affecting about 8 percent of population.6 Serum ferritin is storage form of Iron. It is globular protein. Ferrous form of Iron enters into cells in condition of oxidative stress and changes into Ferric form which is linked to ferritin and protect the cells from free radicals.7 Oxidative stress is linked with impairment in glucose tolerance and insulin resistance.8–10 Higher levels of Ferritin and Iron inside cells can produce Insulin resistance and malfunction of Beta cells of Pancreas. Hyperinsulinemia because of Insulin resistance may be responsible for high level of Ferritin. Derangement in metabolism of Iron may produce resistance to insulin, hyperinsulinemia, dyslipidemia and obesity.11,12

*Corresponding author.
E-mail address: dr_gauravmodi2004@yahoo.co.in (G. D. Modi).

2. Materials and Methods

The present cross sectional study was carried at Clinical Chemistry Laboratory, Laboratory Services, Department of Biochemistry, GMERS Medical College and Hospital, Vadnagar, Gujarat.

2.1. Inclusion criteria

All cases and controls included in study have age more than 40 years.

2.2. Study duration

The duration of study was four months.

There were 100 cases having minimum 5 years history of type 2 diabetes mellitus residing at North Gujarat. Patients having acute infections, chronic systemic diseases, cancer, thyroid disorders, history of smoking and alcohol were excluded from study.

Pregnant ladies and lactating mothers were not included.
Patients on Insulin were excluded.
There were 100 healthy controls in this study.
All participants were instructed to continue their usual physical activities and routine diet.
All cases were instructed to take their oral hypoglycemic drugs as per advice of physician.
Criteria for the diagnosis of diabetes mellitus
1. Fasting Blood Sugar >126 mg/dL. Fasting is defined as no caloric intake for at least 8h.
2. 2 hour Post Prandial Blood Sugar > 200 mg/dL.

2.3. Laboratory samples
1. Two ml of venous blood was collected in fluoride vacutainer for estimation of glucose.
2. Four ml of venous blood was collected in plain vacutainer for estimation of Ferritin.
3. Four ml of venous blood was collected in EDTA vacutainer for estimation of HbA1c.
4. Collection of Blood was done in morning in fasting condition.
5. Samples were analyzed within two hours of collection.
6. GOD-POD (Glucose Oxidase- Peroxidase) method was used for estimation of glucose.
7. Nephelometry method was used for estimation of Ferritin and HbA1c.

2.4. Statistical analysis
Statistical analysis was done by using SPSS software version for performing student ‘t’ test. Probability <0.05 considered as significant.

3. Result
In the present study, 64 patients were males and 36 were females as illustrated in the Table 1. FBS(158.67±20.78), PPBS (176.19±19.84) and ferritin (202.31±17.27 in male and 105.09 ±10.66 in female) levels were significantly increased in type 2 diabetes mellitus patients compared with controls.

Table 1: Age of patients of diabetes mellitus
<table>
<thead>
<tr>
<th>Age</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>41-50 yrs</td>
<td>13</td>
<td>8</td>
</tr>
<tr>
<td>51-60 yrs</td>
<td>32</td>
<td>19</td>
</tr>
<tr>
<td>61-70 yrs</td>
<td>19</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>64</td>
<td>36</td>
</tr>
</tbody>
</table>

4. Discussion
Chronic disorders like diabetes mellitus and hypertension leads to mortality in present era. Conclusive evidences are available which clearly indicates derangement in trace elements metabolism in diabetes mellitus. Correlation exists between serum ferritin, FBS, HbA1c and Serum Insulin. Serum ferritin, a reflector of body iron stores was significantly higher in diabetic patients increased as duration of diabetes increased. This possibly reflects the subclinical hemochromatosis developing in a long standing diabetic patient. Increased body iron stores are possibly associated with occurrence of glucose intolerance, type-2 diabetes and gestational diabetes.

Table 2: Serum ferritin and HbA1c level in Healthy controls and patients of diabetes mellitus
<table>
<thead>
<tr>
<th>Name of Parameter</th>
<th>Controls (Mean±SD) (N=100)</th>
<th>Diabetes Mellitus Patients (Mean±SD) (N=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FBS (mg/dl)</td>
<td>89.32 ± 9.21</td>
<td>158.67 ± 20.78*</td>
</tr>
<tr>
<td>PPBS (mg/dl)</td>
<td>108.96 ±10.54</td>
<td>176.19 ± 19.84*</td>
</tr>
<tr>
<td>Ferritin (ng/ml)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In Male: 141.57 ±14.65</td>
<td>202.31 ± 17.27*</td>
<td></td>
</tr>
<tr>
<td>In Female: 79.13 ± 7.42</td>
<td>105.09 ± 10.66*</td>
<td></td>
</tr>
<tr>
<td>HbA1c (%)</td>
<td>4.89+0.78</td>
<td>7.86 + 2.03*</td>
</tr>
</tbody>
</table>

*p<0.05

5. Conclusion
From the present study it may concluded that high level of serum ferritin is found in patients of type 2 diabetes mellitus who have poor glycemic control which may have role in prognosis and pathogenesis of diabetes mellitus. For better understanding effect of serum ferritin in diabetes mellitus, further clinical studies are needed which should enroll large number of patients and should use higher advanced methods.

6. Conflict of Interest
None.

7. Source of funding
Self-funding was done for the study.

References


**Author biography**

**Jigar A Parmar**, Assistant Professor

**Gaurav D Modi**, Associate Professor

**Margit G Gajjar**, Assistant Professor

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