

Impact of iron indices, mitochondrial oxidative capacity, oxidative stress and inflammatory markers on insulin resistance and secretion - A pathophysiologic perspective

Jayanthy Ramesh^{1,2}, Mohammad Ibrahim.Shaik¹ and Jayanthy Srivalli²

¹Department of Endocrinology, Osmania Medical College, India

²Sai's Institute of Endocrinology, India

Objective: We designed our study to elucidate how iron deficiency anemia influences the natural history of diabetes mellitus and to study the effect of iron indices, mitochondrial oxidative capacity and oxidative stress on insulin resistance and secretion in established cases of type 2 diabetes.

Research Design and Methods: A comparative crosssectional study was conducted in 40 healthy controls, 40 iron deficiency anemia (IDA), 40 type 2 diabetes without iron deficiency anemia and 40 type 2 diabetes with iron deficiency patients. All the Patients were BMI, age and sex matched. Glycemic indices, fasting serum insulin levels, Iron indices, inflammatory markers, Total Antioxidation capacity (TAOC), mitochondrial oxidative capacity (MOC) were analyzed.

Results: In iron deficiency anemia there was decrease in MOC, TAOC and HOMA B ($p < 0.001$). Iron is positively correlated with MOC which inturn is positively correlated with HOMA B. In type 2 diabetes there was increase in free iron, ferritin, transferrin, TNF-alpha and HOMA IR ($p < 0.001$) and decrease in TAOC, MOC and HOMA B. In type 2 diabetes with IDA there was decrease in iron, ferritin HOMA-IR ($p < 0.001$), TNF- α ($p < 0.05$) and increase in IL-6 ($p < 0.05$) as compared to type 2 diabetes without IDA.

Conclusion: Iron deficiency anemia is associated with decreased mitochondrial oxidative capacity and insulin secretion with no change in insulin sensitivity. This prompts us to question whether chronic IDA predisposes to early development of diabetes especially where both diabetes and IDA are highly prevalent. Both diabetes and iron deficiency anemia can together worsen the oxidative stress and pathophysiology of Diabetes mellitus despite improvement in insulin resistance.

Biography

Jayanthy Ramesh has done MBBS, MD Paediatrics from BHU, DM Endocrinology from PGIMER Chandigarh, DNB (Endocrinology) and Member National Academy of Medical Sciences. Currently Professor and Head, Department of Endocrinology, Osmania Medical College/Osmania General Hospital, Hyderabad and Consultant Endocrinologist at Sai's Institute of Endocrinology, Hyderabad. He has presented and published many papers at various national and international conferences and journals.

saiendocrine@yahoo.com