ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 12, Issue, 08, pp.13348-13350, August, 2020

DOI: https://doi.org/10.24941/ijcr.39521.08.2020

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

AESTHETIC MANAGEMENT OF MESIODENS: A CASE REPORT WITH REVIEW OF LITERATURE

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ARTICLE INFO

Article History:
Received 05th May, 2020
Received in revised form
27th June, 2020
Accepted 14th July, 2020
Published online 30th August, 2020

Key Words:
HOMA-IR, Insulin resistance, Type 2 diabetes (T2D)

ABSTRACT

Introduction: Insulin resistance is a feature of a number of clinical disorders, including T2D/glucose intolerance, obesity, dyslipidaemia and hypertension clustering in the so-called metabolic syndrome. Insulin resistance in skeletal muscle manifests itself primarily as a reduction in insulin-stimulated glycogen synthesis due to reduced glucose transport. **Material and Method:** A cross-sectional study was conducted in Muzaffarnagar Medical College, Muzaffarnagar, U.P., India.. A total of 120 subjects of type 2 diabetes having an age group of 40-70 years were participated from urban and rural area of Muzaffarnagar District for determination of HOMA-estimated insulin resistance (HOMA-IR). **Result:** We found urban subjects had significantly higher fasting Glucose, fasting insulin and HOMA-IR values than rural subjects ($p < 0.001$). **Conclusion:** Environmental and lifestyle changes resulting from industrialization and migration to urban environment from rural settings may be responsible to a large extent, for this epidemic of insulin resistance in Indians.

Citation: ***Kapil Dev, Mohsin Ali and Subodh Prakash.*** **2020.** "Aesthetic management of mesiodens: a case report with review of literature", *International Journal of Current Research*, 12, (08), 13348-13350.

INTRODUCTION

Insulin resistance is when cells in your muscles, fat, and liver don't respond well to insulin and can't use glucose from your blood for energy (World Health Organization, 2000). To make up for it, your pancreas makes more insulin. Over time, your blood sugar levels go up. This important article establishes a biological mechanism whereby insulin resistance in muscle is causally linked to genetic influences that are measurable in the general population (Reaven, 2004). It focuses on insulin resistance by comparing extremes of the distribution of this characteristic in the normal population. But does insulin resistance cause mitochondrial dysfunction, or vice versa? The former appears more likely on the basis of current evidence. Exercise can reduce insulin resistance and ameliorate mitochondrial dysfunction, whereas established mitochondrial dysfunction does not necessarily produce insulin resistance in animal models or in humans (Cefalu, 2001). Understanding the nature of common insulin resistance in muscle and its relationship to type 2 diabetes is long overdue. Future work should determine whether specific therapeutic manipulation can offset the effect of identifiable genetic influences and interrupt the long run-in to T2D. The prevalence of T2D is increasing worldwide, especially in low and middle-income countries that are currently facing rapid rates of urbanization (Ebrahim, 2010).

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Rural-to-urban migration has indeed been shown to be associated with increased insulin resistance obesity and other cardiovascular (CV) risk factors, such as dyslipidemia and hypertension, suggesting that living in rural environment might be protective against the development of T2D (Carrillo-Larco, 2016; Hernandez, 2012).

MATERIAL AND METHODS

Material

This study was conducted during the period from the July 2016 until the end of October 2019 in Muzaffarnagar Medical College, Muzaffarnagar, U.P., India. A total of 120 subjects (70 urban subjects + 50 rural subjects) having an age group of 40-65 years were included in this study from urban and rural area of Muzaffarnagar.

Methods

Determination of Fasting Glucose: Fasting glucose concentration was estimated by the enzymatic colorimetric method (GOD– POD) (Trindler, 1969).

Determination of Fasting Insulin: Fasting insulin concentration was estimated by enzyme linked immune sorbent assay (ELISA) method based on the sandwich principle (Yalow, 1960).

Determination of Insulin Resistance: The insulin resistance was calculated by a homeostasis model assessment (HOMA-IR) index = Fasting plasma glucose (mg/dl) X fasting plasma Insulin (uU/ml) / 405, as described by Matthews and colleagues (Matthews, 1985) 1985.

Stastical analysis: Data analysis was performed using Epi info software version 3.5.1. Descriptive statistics, including mean, range, and standard deviations, were calculated for all variables. Proportions were compared using Chi- square tests and chi square for trend at 0.05 level of significance.

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RESULTS

Table. Comparative study of insulin resistance in rural and urban T2D patients of Muzaffarnagar district

Parameters	urban group (no=50) Mean ± S.D.	rural group (no=50) Mean ±S.D.	P value
FPG (mg/dl)	184.16 ± 20.06	178.49 ± 18.12	$p < 0.001$
Fasting Plasma Insulin (uU/ml)	12.67 ±3.67	9.35 ± 2.86	$p < 0.001$
HOMA-IR	5.76.85 ± 0.18	4.12 ±0.13	$p < 0.001$

The results shows that urban subjects had significantly higher Fasting Plasma Glucose, Fasting Plasma Insulin and HOMA-IR level as compared to rural subjects ($p < 0.001$).

DISCUSSION

Epidemiological studies have indicated that rural living might be protective against T2D development. Currently, 54% of the world's population lives in urban areas, a proportion that is expected to increase to 66% by 2050 (American, 2004). Most of the expected urban growth will take place in developing countries in Asia and Africa. Next to China, the world's second largest urban population resides in India with approximately 410 million people and this number is projected to double by 2050 (American, 2011). In India, urban compared to rural populations have significantly higher diabetes prevalence. Studies have shown that urbanization in India is associated with increased consumption of energy-rich foods and a decrease in energy expenditure (through less physical activity) leading to obesity and increased risk of developing T2D and other cardio metabolic conditions (Zakariah Gassasse, 2017; Pasala, 2010). Rapid urbanization in India also often coincides with increased environmental pollution with potential harmful effects to health due to undesirable changes in the physical, chemical or biological characteristics of air, water or land. Emerging epidemiologic data suggests that environmental pollutants could be a risk factor for diabetes (Cheema, 2014; World Health Organization, 2010).

Conclusion

The link between insulin resistance and T2D has been recognized. Insulin resistance is important. Not only is it the most powerful predictor of future development of type 2 diabetes, it is also a therapeutic target once hyperglycemia is present. we investigated the association between residing in an urban environment and insulin resistance, which is an important underlying metabolic condition predisposing the development of diabetes.

After controlling for age, BMI, energy intake, SE score, physical activity, stress and smoking status, there were independent associations between multiple metrics of urban environment and HOMA-IR. Those residing in urban areas as defined by land cover and census category had higher HOMA-IR levels than those in rural or non-urban areas.

Conflict of interest - Author declares No conflict of interest.

Acknowledgment

The authors thanks to, Professor and Head, Department of Medicine for encouragement, support and guidance during the study.

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