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Research Paper

A Study Of Insulin Resistance in Diabetics Doing Yoga and Those Not Doing Yoga with Comparable BMI and Glycemic Status

Yoga

KEYWORDS : yoga, type 2 DM, FSI, HOMA-IR.

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ABSTRACT

Aim: To study and understand the role of yogic exercises in improving and possibly correcting the errors of metabolism in diabetes and the effects of yogic exercises on insulin sensitivity in type 2 DM.

Material & Methods: Study sample consists of 100 patients with type 2 DM and they were randomly divided into two groups i.e. those performing yoga and those who do not. Their complete medical history was noted and fasting blood sugar, fasting insulin, lipid profile, blood urea, serum creatinine and blood pressure were obtained and HOMA-IR calculated.

Results: Patients who were doing yoga for >2 months had significantly lower FSI and HOMA-IR than those who had just started or had been doing yoga from 2 months.

Conclusion: Yoga significantly reduces insulin resistance and in future is likely to play a greater ride in the prevention and treatment of diabetes mellitus and other disorders associated with it.

INTRODUCTION

Insulin resistance associated with hyperinsulinemia has emerged in recent years as an important health risk that is present in approximately 3-16% of the population in western industrialized societies. Insulin resistance as assessed for the whole body arises from reduced glucose utilization by skeletal muscles, adipose tissue and liver. The dietary factors and physical exercise can have a modulatory action on insulin sensitivity1

Weight loss in these situations result in a decrease in insulin concentration and an increase in insulin sensitivity towards normalcy. Based on current knowledge, it is reasonable to suggest that weight control and lifestyle modification could alter the incidence of the syndrome of insulin resistance, and improve the risk profile for cardiovascular diseases2

The pancreas controls the blood sugar level by secreting glucagons and insulin. Stress keeps the blood sugar high, overworking the pancreas. If it cannot produce enough insulin to regulate blood sugar, diabetes can result3

Type 2 diabetes mellitus is characterized by three pathophysiologic abnormalities: impaired insulin secretion, peripheral insulin resistance, and excessive hepatic glucose production. Obesity, particularly visceral or central, is very common in type 2 DM. Insulin resistance associated with obesity augments the genetically determined insulin resistance of type 2 DM. Adipocytes secrete a number of biologic products (leptin, tumor necrosis factor alpha and free fatty acids) that modulate processes such as insulin secretion, insulin action, and bodyweight regulation and may contribute to the insulin resistance.

The slow, calm controlled nature of movements in yoga stimulates the correct functioning of the body's intricate rhythm pattern. Some of the benefits of yoga effects on body are a follows4

- Reduced stress, sound sleep
- Improvement of many medical conditions
- Lower blood pressure& heart rate
- Spiritual growth& sense of well being
- Slowed ageing process.

AIMS AND OBJECTIVES

1. Our aim was to understand the role of yogic exercises in improving and possibly correcting the errors of metabolism in type 2 DM.
2. To observe the effects of yogic exercises on insulin sensitivity in type 2 DM.

MATERIAL AND METHODS

The study was conducted on diabetic patients attending the MBGH RNT Medical College, Udaipur and other diabetics performing yoga elsewhere.100 subjects were taken & divided randomly into 2 groups:-

1. Diabetic patients performing yoga
2. Diabetic patients not performing yoga

A complete medical history, family history, duration of illness, therapy for hypertension, ischaemic heart disease, peripheral arterial disease and cerebrovascular disease and history of smoking, alcohol, dietary pattern, occupation and physical activity were obtained and complete clinical examination was done:

1. Blood pressure was measured in right upper limb in supine position noting both systolic and diastolic pressures after a rest of 10 minutes with random zoro sphygmomanometer.
2. Fasting blood sugar, serum creatnine, blood urea were obtained.
3. Fasting serum insulin level was measured.
4. HOMA-IR, an index of insulin resistance is calculated using fasting insulin(mg/dl) * fasting insulin(μU/ml)/405

Exclusion Criteria:

1. Patients who are grossly obese & pregnant ladies.
2. Patients having chronic renal failure with serum creatinine of 3mg%
3. Patients with decompensated heart disease and other complicated cases.
4. Patients receiving immunosuppressive drugs, corticosteroids, alcohol etc.

Sample Collection and Preparation:

Serum or plasma was used and the usual precautions for venipuncture were observed. Specimens were stored at 2 to 80C for up to 24 hours or frozen at -200C or lower for longer period.

RESULT AND DISCUSSION

Our study population consisted of subjects in the age range of 35 to 75 years with a mean age of 48.34 ± 12.60 years among

yoga group and 52.56 ± 12.19 years among non yoga groups. The percentages of male and female subjects were 55% and 45% respectively.

The fasting serum insulin levels among the group not performing yoga were 37.58 ± 12.57 while among the group performing yoga, the insulin levels were 15.86 ± 9.03 (p<0.05). The corresponding fasting blood sugar among the non yoga group was 129.6 ± 46.25 mg/dl while among yoga group the corresponding fasting blood sugar levels were 113.4±32.67 (P=NS). Insulin resistance was calculated by HOMA-IR technique. Among yoga group, HOMA-IR was 5.11±2.07 while among non yoga groups of diabetics, it was 9±5.76. p value was found to be statistically significant. It was further found that HOMA-IR in those diabetic who were doing yoga for more than 2 months (n=36) was 3.48±1.77µlUmg/dl while in those doing yoga for less than 2 months, HOMA-IR was 5.75±1.95 (p<0.05). That shows yogic exercises has increased the insulin sensitivity while among the non yoga groups, the circulating insulin is ineffective in utilizing glucose although the levels of insulin were higher.

We found that serum cholesterol levels among non yoga group was 185.45±33.49 mg/dl while yoga group, it was 167.42±36.34 mg/dl with significant p value (p<0.001). The levels of HDL among non yoga group was 36.68±2.98 mg/dl while among yoga group, it level were 42.44±4.02 mg/dl with significant p value (p<0.05). the serum triglyceride levels among non yoga group were 89.90±13.14mg/dl while in yoga group, it was 86.38±14.40mg/dl which was non significant. The LDL levels among non yoga group was 87.22 ±13.09mg/dl while in yoga group, it was 83.90±15.66 with insignificant p value.

In our study, the fasting serum insulin levels among yoga group was 15.86 ± 9.05µU/ml while in non-yoga group it was 37.58±12.57 µU/ml(p<0.05) but in our study the fasting blood sugar level among yoga and non-yoga group has insignificant p value as we selected patients with comparable glycemic status.

In our study, we found that there was significant reduction in the SBP and DBP among diabetics performing yoga as compared to those who did not perform yoga. The SBP (mean) among yoga group (n=50) was 123.36 ±10.21 mmHg and mean DBP was 75.16 ± 6.70 (p<0.05). The mean SBP among non-yoga group was 155.04 ± 13.029mmHg and mean DBP and 90.48±6.18 (p<0.05). There was no much effect of duration of yoga on SBP and DBP. In those diabetics who were doing yoga for more than 2 months, the SBP was 124.61 ± 9.77, DBP was 75.22 ± 6.45 mmHg (p>0.05). In those diabetic who were doing yoga for less than 2 months, SBP was 120.14±10.97 mmHg, DBP was 75.00 ± 7.55 mmHg (p>0.05).

SUMMARY AND CONCLUSION

The findings in our study led to the conclusion that type 2 DM is caused not because of insulin deficiency but by an inability of insulin to lower plasma glucose levels effectively, an abnormality termed insulin resistance. A low fasting plasma insulin level does not indicate ß-cell inadequacy, but instead reflects insulin sensitivity. In contrast, a high insulin level indicates the presence of insulin resistance. Doing yoga for >2 months was associated with significantly lower FSI and HOMA-IR than those who had just started or had been doing yoga from 2 months indicating reduced insulin resistance among yoga performers.

Yoga in the future is likely to play a greater ride in the prevention and treatment of diabetes mellitus and other disorders associated with it.

Table showing Comparison of Various Parameters in Relation to Duration of Yoga Group

Variable	Yoga <2 months (n=14)	Yoga >2 months (n=36)	Level of significance (p value)
BMI	24.62±3.81	24.51±3.78	NS
WHR	0.89±0.057	0.90±0.0457	NS
FBS (mg/dl)	104.43±22.17	116.89±35.60	NS
FSI (µU/ML)	23.60±8.54	12.85±7.33	P<0.05
HOMA-IR	5.75 ± 1.95	3.48±1.77	P<0.05
S. cholesterol (mg/dl)	164.64±34.92	168.50±37.31	NS
S.TRIGLYCERIDE (mg/dl)	88.36 ± 15.92	85.61±13.92	NS
LDL (mg/dl)	89.50±14.64	82.50±16.02	NS
HDL (mg/dl)	42.13±3.92	43.06±3.68	NS
SBP (mmHg)	120.14±10.97	124.61±9.77	NS
DBP (mmHg)	75.01±7.55	75.22 ± 6.45	NS

Above table shows that the difference among patients who were doing yoga for >2 months had levels of FSI and HOMA-IR significantly lower statistically (p<0.05) than those who had just started or had been doing yoga from 2 months.

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