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The use of Capparis decidua (KAIR) in metabolic syndrome

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Abstract

The metabolic syndrome (syndrome X, insulin resistance syndrome) consists of a constellation of metabolic abnormalities that confer increased risk of cardiovascular disease (CVD) and diabetes mellitus (DM). Therefore in the proposed research it is envisaged to evaluate the possible pharmaceutical efficacy of Capparis decidua fruits utility as hypolipidaemic agent. The present study shows the effect of Capparis decidua in metabolic syndrome.

Keywords: Capparis decidua, Diabetes, Lipid Profile, obesity

Introduction

The metabolic syndrome affects 44% of the U.S. population older than age 50. A greater percentage of women over age 50 have the syndrome than men. The age dependency of the syndrome's prevalence is seen in most populations around the world. The oxidative stress hypothesis provides a unifying theory for aging and the predisposition to the metabolic syndrome. The proinflammatory state is superimposed and contributory to the insulin resistance produced by excessive FFAs. The enhanced secretion of interleukin 6 (IL-6) and tumor necrosis factor (TNF) produced by adipocytes and monocyte-derived macrophages results in more insulin resistance and lipolysis of adipose tissue triglyceride stores to circulating FFAs. IL-6 and other cytokines also enhance hepatic glucose production, VLDL production by the liver, and insulin resistance in muscle. Cytokines and FFAs also increase the hepatic production of fibrinogen and adipocyte production of plasminogen activator inhibitor 1 (PAI-1), resulting in a prothrombotic state. Higher levels of circulating cytokines also stimulate the hepatic production of C-reactive protein (CRP). Reduced production of the anti-inflammatory and insulin-sensitizing cytokine adiponectin is also associated with the metabolic syndrome[1].

The data indicate that Capparis deciduas may have potential use as an antidiabetic agent especially in chronic cases as it helps in lowering the oxidative stress in diabetes. Oral feeding of diet containing (30%) *Capparis decidua* fruit powder for 3 weeks to alloxanized (80mg/kg IP) diabetic rat (blood sugar 450mg %) showed significant hypoglycemia (blood sugar 120-130mg %). In additional anti-oxidant (Yadav et al 1997)[2] and hypolipedimic

activity (Agarwal and Chauhan 1998)[3] has been described in literature.

Capparis decidua is found throughout India especially in dry area of Punjab, Sind, Kutch, Rajasthan, Gujarat and Madhya Pradesh. The use of medicinal plants in the management of various illnesses is due to their phytochemical constituents and dates back to antiquity[4]. However during the last decade an increase in the use of medicinal plant has been world-wide[5].

In the fruit of *Capparis decidua* main active component are spermidine alkaloid[6] and Isocodonocarpine[7] has anti diabetic potential. The present study shows the effect of *Capparis deciduas* in metabolic syndrome.

Materials and methods

This is randomized controlled trial study was conducted One hundred patients of metabolic syndrome were randomly selected for this study attending the Diabetes Care & Research Center of P.B.M. Hospital, Bikaner. Base line investigations were completed. A detailed history of each patient was obtained as per the attached proforma.

Exclusion criteria:

Patient suffering from liver disease, arthritis, renal disease, malabsorption, asthma, pulmonary tuberculosis, myocardial infarction, heart block disease and any other disease in addition to metabolic syndrome

Method:

Group I: These patients were given conventional treatment only and serve as the control group.

Group II: These patients besides conventional treatment were given capparis deciduas (KAIR) in the study group.

Procedure:

They will be presented themselves voluntarily for the present study on the basis of personal request, relationship and their eternal eagerness to know about the effect of '*C. decidua*'. Base line parameters were taken for every patient i.e. Waist hip ratio, body mass index, blood pressure, fasting blood sugar, lipid profile and glycosylated hemoglobin.

Patients were evaluated weekly for body mass index, waist hip ratio, blood pressure and fasting blood sugar. After 3 months besides above test glycosylated hemoglobin and lipid profile will also be estimated. Those under control group were evaluated base line and after three month for these above mentioned parameters.

1. **Body mass index: (Quetelet's index)**

$$BMI = \frac{\text{Weight (kg)}}{\text{Height (m}^2\text{)}}$$

2. **Waist Hip Ratio**
   It is of body circumference measured midway between the iliac creast and lowest rib to that at the level of the greater trochanters.
3. **Blood pressure measurement:**
   Measurement of blood pressure by sphygmomanometer in sitting position, mean of two reading will be recorded.
4. **Fasting Blood sugar:**
   FBS measured by glucose oxidase method, using enzymatic kits (GOD-POD method).
5. **Glycosylated Hemoglobin:**
   Measured by ion-exchange resin method/Boronate affinity assay using HBA_1C Kit.
6. **Serum lipid profile:**
   a. Estimation of serum Triglyceride: was done colorimetrically using enzymatic kit (GPO-POD method).
   b. Estimation of total Cholesterol: was done colorimetrically using enzymatic kit (CHOD-POD method).
   c. Estimation of HDL Cholesterol: was done colorimetrically using enzymatic kit (Precipitating reagent).

d. Estimation of VLDL Cholesterol and LDL Cholesterol: was calculated by using Friedwald (1972) formula.

i. VLDL-Cholesterol (mg/dl) = Triglyceride/5

ii. LDL-Cholesterol (mg/dl) = Total Cholesterol - (HDL Cholesterol + VLDL Cholesterol).

Results

The present study showed (Table no. 1) the mean age of the subjects in group I was 51.7±10.03 years and in group II was 53.48±10.91 years. There was statistically insignificant difference between the groups. The study observed the waist hip ratio, blood pressure, glycemic control & lipid profile are statistical significant in study group as compare to control group after pre and post treatment (table no. 2 & 3).

Discussion

The present study show statistically insignificant in waist hip ratio, systolic & diastolic blood pressure after using *Capparis Decidua*. The data indicate that Capparis deciduas may have potential use as an antioxidative agent especially in chronic cases as it helps in lowering the oxidative stress in diabetes (Yadav et al 1997)[4]. Fruits possess antidiabetic activity. *C. decidua* powder has hypoglycaemic activity, decreases lipid peroxidation and alters free radical scavenging enzymes such as superoxide dismutase and catalase in erythrocytes, liver, kidney and heart in aged alloxan induced diabetic rats. *C. decidua* powder is used against alloxan induced oxidative stress and diabetes in rats.

Table 1: Mean age of subjects under study.

	Male		Female		Total	
	Control Group	Study Group	Control Group	Study Group	Control Group	Study Group
Mean	50.24	55.52	53.71	51.09	51.7	53.48
Standard Deviation	9.7	10.38	10.37	11.25	10.03	10.91
SE	5.34	5.58	4.58	4.79	7.07	7.07
t value	2.06		1.18		0.23	
p value	< 0.05		< 0.1		< 0.9	

Table 2: Anthropometric and biochemical parameters in control group.

Parameters		Base line		Post treatment		p value
		Mean	SD	Mean	SD	
BMI		29.17	4.98	29.11	4.96	<0.9
W/H ratio		0.96	0.05	0.94	0.05	<0.2
B.P. (mmHg)	SBP	155.8	8.76	150.84	8.06	< 0.01
	DBP	95.52	6.2	93.52	6.3	< 0.1
Glycaemic control	FBS	206.84	62.82	184.12	53.43	< 0.001
	HbA_1C	9.09	1.78	8.8	1.68	<0.1
Lipid profile	TC	243.6	29.6	235.07	28.54	< 0.001
	TG	194.54	60.92	189.84	61.19	< 0.001
	HDL	36.74	3.13	37.32	2.5	< 0.8
	LDL	167.83	28.43	159.78	26.94	< 0.001
	VLDL	38.91	12.18	37.97	12.24	< 0.1

Table 3: Effect of Capparis deciduas (KAIR) therapy on anthropometric and biochemical parameters in study group.

`		Base line		Post treatment		p value
		Mean	**SD**	**Mean**	**SD**	
BMI		28.4	3.6	27.45	3.46	< 0.9
W/H ratio		0.95	0.056	0.93	0.059	< 0.8
B.P. (mmHg)	SBP	151.16	8.9	139.88	8.09	< 0.001
	DBP	96.16	6.67	87.96	5.85	< 0.001
Glycaemic control	FBS	222.84	69.41	172.34	45.77	< 0.001
	HbA_1C	9.25	1.62	7.82	1.46	< 0.02
Lipid profile	TC	236.93	32.27	213.31	25.87	< 0.001
	TG	195.96	48.78	172.71	47.95	< 0.001
	HDL	36.76	4.06	39.32	3.21	< 0.02
	LDL	160.97	29.11	139.46	23.03	< 0.001
	VLDL	39.19	9.75	34.53	9.6	< 0.02

The present study shows the effect of *Capparis decidua* in glycemic control & found that significant reduction after three month. Similar results found by Goyal R.[7] and show Significant reductions in plasma triglycerides, total lipids and phospholipids concentration were noticed. This study also show the effect of *Capparis decidua* in lipid profile and found that serum HDL-cholesterol are significant increase but serum LDL-cholesterol and serum VLDL-cholesterol are significant decrease. Similar resuts found by purohit[14] who studied on administration of C. decidua fruit extract (50% ethanolic) at the dose of 500 mg/kg body weight significantly reduced serum total cholesterol (61%), LDL cholesterol (71%), triglycerides (32%) and phospholipids (25%). Similarly C. decidua shoot extract lowered serum total cholesterol (48%), LDL cholesterol (57%), triglycerides (38%) and phospholipids (36%) because of ethanolic extract of fruit was found to have antiatherosclerotic activity in cholesterol fed rabbits.

Conclusion

The present study show the Capparis Decidua use in metabolic syndrome and found that significant reduction in blood sugar level and improved lipid profile. This herb can be used as an adjunct with diet and medicines in management of metabolic syndrome. Such studies should be further encouraged as medicinal herbs constitute the cornerstone of traditional medicinal practice worldwide.

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