Abstracts :

HYPOGLYGEMIG PLANTS-ABSTRACTS ON CLINICAL TRIALS

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Source materials for the abstracts are :

1. Handa SS, Chawla AS, Maninder : Hypoglycemic plants—a review. Fitoterapia. IX (3): 195-224, 1989.
2. Bailey CJ, Dey C, Leatherdale BA : Traditional treatments for diseases from Asia and the West Indies. Practical Diabetes 3(4): 190-193, 1986.
3. Ahuja MMS : Research in Diabetic Care. J. Ind. Med. Assoc. 75 (11-12) : 229-233, 1980.
4. Citations provided by INDIAN MEDLARS CENTRE. (December 1989).
5. Diabetes in the Tropics. Proceedings of the world congress on diabetes in the tropics. Bombay. Jan. 20-22, 1966.

Introduction

Diabetes has been well known as a wasting disease due to insulin deficiency in the ancient Indian literature of pre-Christian era, Sushruta Samhita and Charaka Samhita served as the ancient medical compendia for early detection and treatment of diabetes. "Prameha" is a group of urinary disorders characterized by the passing of turbid urine in excessive quantity. 'Madhumeha' (Diabetes) has been described as one of the 20 pramehas in Ayurveda, where patient passes sweet urine like honey and his sugar level of blood rises considerably above normal limits. Svarasa (Juice) of leaf of Bilva, Svarasa of stem of Guduci, powder of Madhunasani, powdered seed of Jambu, and various others have been described in the treatment of Madhumeha, way back from the days of Charaka and Sushruta. Even today, many medicinal plants and mineral preparations, individually or in combination with different formulations have been recommended in the treatment of diabetes.

Following are abstracts of indigenous medicines which have been clinically evaluated.

Allium cepa

Title : Antihyperglycemic effect of onion : effect on fasting blood sugar and induced—hyperglycemia in man.

Authors : Sharma KK, Gupta RK, Gupta S, Samuel KC. Ind J Med Res 65 : 422-429, 1977.

The effect of aquous extract of onion was studied on fasting blood sugar and experimentally induced hyperglycemia in man. Study was carried out in 20 healthy volunteers (18 males and 2 females), in age group of 20-30 years. Various experiments were performed in groups of 5 volunteers; The experiments which were performed after an overnight fast of 14 hrs, included—administration of graded doses of aquous extracts of onion (25, 50, 100, 200 G) orally; oral GTT with 50 G glucose and graded doses of onion extract which was administered with, before and after glucose; IVGTT with glucose and onion extract; adrenaline—induced hyperglycemia (AIH) with onion extract. It was demonstrated that onion extract when administered in various doses along with glucose during OGTT reduced

hyperglycemia in a dose-dependent manner-Graded doses of aquous extract had no effect on fasting sugar levels. Thus onion is said to have 'antihyperglycemic' rather than hypoglycemic effect. Active principle in onion bulb (allyl-propyl disulfide) is heat stable. The onion extract was also found to cause reduction in blood sugar level during IVGTT and AIH.

Cannabis indica

Title : Effect of cannabis smoking in blood lactic acid and glucose in humans.

Authors : Papadakis D P, Michael C M, Kephalas TA, Miras LJ : Experimentia30: 1183-84, 1974.

Effect of cannabis smoking in blood lactic acid and glucose in humans have been studied (since chances in cannabis-induced catecholamine concentrations are reflected in blood sugar level). The test was performed in 2 groups (i) 5 chronic smokers and (ii) 5 who had not smoked Hashish for last 3 years and had tasted it 5-6 times in lifetime ("naives")-All these healthy volunteer tobacco smokers fasted for 20 hrs before experiment which included administration of Hashish 2G + tobacco by smoking for a duration of 10 min. This did not exhibit lowering of blood glucose levels; however the blood lactic acid level was decreased immediately after Hashish smoking, the rate of decline being more rapid in naives .than chronic smokers.

Title : Effect of marijuana on the glucose tolerance test.

Authors : Podolsky S, Pattavina CG, Amarlal MA. Ann N.Y. Acad Sci 191 : 54-60, 1971.

Hunger or increased appetite is not uncommonly reported during marijuana smoking. To classify the possible role of hypoglycemia or alteration in blood glucose levels in the genesis of this symptom oral GTT's were performed on four—healthy, chronic marijuana users (21-24 years). They abstained from use of all drugs for 7 days, after which time control 5 hr tests were done with a single venepuncture for each GTT. The subjects then resumed using marijuana(l-l cigarette daily) containing ca. 1% A^9 tetrahydrocannabinol (THC, active principle). Seven days later. GTT's were repeated under identical conditions. Chronic marijuana users showed no hypoglycemia, but deterioration glucose tolerance test occured and there was no impairment of insulin release.

Casearia esculent a

Title : Clinical evaluation of Saptarangi as a hypoglycemic agent in treatment of diabetes mellitus.

Authors : Kashyap SK, Ahuja MMS, J Res Ind Med 2 : 155-159, 1968.

A series of observations were made in 10 human volunteers and 8 diabetics who were found suitable for oral antidiabetic drug and were devoid of complications. Volunteers received 25, 50 and 100 G of crude extract of saptar-angi (C-esculenta) orally and blood glucose levels were estimated in fasting state and after 1 hr and 4 hrs; and it was noted that optimum single dose of saptarangi was 25 G as hypoglycemic effects were equal to those of 50 G. Drug was not tolerated at 100 G dose. Hypoglycemic action of saptarangi (25 G) was compared with placebo (calcium lactate) in 8 diabetics during 4 hr fasting; the average fall in blood sugar was 15% with saptarangi and 12% with placebo. When hypoglycemic action

of the drug (25 G) was compared tolbutamide (1 G dose) in 14 diabetics on 2 different occasions, the average fall in blood glucose with saptarangi was 20% while it was 28% after 4 hrs with tolbutamide. It was concluded that saptarangi has only mild hypoglycemic activity, and its value in the treatment of diabetes mellitus is limited. Activity fraction is not known.

Cephalandra indica

Title : Observations on antidiabetic properties of Cindica (telakucha).

Authors : Chopra R.N., and Bose JP : Ind Med Gaz. 60 : 201, 1925.

This drug is considered in many part of India to have marked efficiency in reducing glycosuria. Chemical analysis of fresh plant revealed an enzyme with amylolytic properties, a hormone and traces of an alkaloid. 1-2 ounces of freshly extracted juice from stem and leaves was administered every morning on empty stomach to a series of diabetic patients under standard diet control. There was no reduction of sugar levels both in urine and blood in diabetic patients treated.

Clerodendron phlomidis

Title : Hypoglycemic effect of clerodendron phlomidis (Arani).

Authors : Bhattacharya SK, Bajpai HS- J Res Ind Med 10 (4) : 6, 1975.

Hypoglycemic effect of C. phlomidis (Arani) was studied in 10 normal and 33 maturity onset diabetic patients, Alcoholic extract of the drug was prepared and administered only as pills. Eight pills each weighing 0.5 g were given. The effect was compared with that of a known hypoglycemic drug tolbutamide (Rastinon).

The conclusions drawn were :

i) Arani is effective in lowering blood sugar level in normal individuals and its effect is comparable to tolbutamide.

ii) Arani showed hypoglycemic effect in diabetic individual.

iii) In diabetics, fall in blood sugar level with Arani became apparent at 2 hrs and persisted for 6 hrs. Chaturvedi GN, Subramaniyam PR, Tiwari SK, Singh KP. Ancient Sci Life 3 : 216, 1984.

In the clinical trials with 13 diabetic patients, oral administration of the decoction (1 : 4 in doses of 15-30 G of crude drug per day in divided doses for five weeks) produced a marked symptomatic improvement. A fall in urine sugar and marked reduction in blood sugar was also observed in 64% of cases and glucose tolerance was also increased in the drug treated group.

Coccinia indica

Title : Treatment of diabetes mellitus with coccinia indica

Authors : Azad Khan AK, Aktar S, Mahtab H. Br Med J280: 1044, 1980.

A double-blind controlled trial using leaves of the plant C. indica was carried out to treat patients with untreated but uncomplicated maturity onset diabetes. The patients received at random either tablets made from the homogenized and freeze-dried leaves of C-indica or placebo tablets prepared with chlorophyll and were told to take 3 tablets twice daily for 6 weeks. An oral GTT was done at the beginn-

ing and end of trial and FBS concentrations were estimated during the trial for all patients.

Out of 16 patients who received the C. indica tablet, glucose tolerance considerably improved in 10, while none of those on placebo showed such an improvement the difference being highly significant. There were no adverse effect during 6 weeks' use. The data shows that the active principle is slow acting since maximal effect was obtained only after 3 weeks of treatment. Isolation of active principle would open up many possibilities, as the plant is not toxic.

Cyamopsis tetragonolobus (Guar gum)

Title : Study of glycosylated hemoglobin in diabetic patients : clinical usefulness of plant fiber.

Authors : Gabriel F. Labios M Balagner JV et al J Med Esp 83 : 371-376 (1984) Biol Abstr 80 Abstr, 80 88663 (1985).

Guar gum, a purified form of dietary fiber extracted from the seeds of Indian cluster bean C. tetragonolobus, contains not less than 66% of high mol. wt. hydrocolloidal polysaccharide galactomannan. Clinical blind study was done for 90 days on the effect of 5 G of guar gum at breakfast, lunch and dinner, added to normal diet in four groups of 16 patients, each one of the first two diabetic groups depending upon insulin and other 2 non-insulin dependent diabetic patients. These clinical studies revealed that that the dietary supplement with guar gum can decrease the need of insulin and oral antidiabetics, improving the glycemia profile and the control of the metabolic state showing progressive decrease in HbAic levels.

5 G guar granules thrice a day is shown to reduce fasting and postprandial plasma glucose levels. The possible mechanisms of action are slowing of gastric emptying and reduction of intestinal glucose absorption by inhibition of mixing action of intestinal contractions.

Gymnema sylvestris

Title : Hypoglycemic activity of an indigenous drug (Gymnema sylvestris, 'Gurmar') in normal and diabetic persons.

Authors : Khare AK, Tandon RN, Tewari JP. Ind J Phys Pharmacol. 27 : 257-58, 1983.

Effect of drug was studied on 10 normal adults (6 male, 4 female) and 6 diabetic persons (4 male, 2 female). All were administered with an agueous decoction of the shade-dried powdered leaves of Gurmar (concentration adjusted to 10g/100ml) in a dose of 2g thrice daily for a period of 10 days; Fasting blood sugars were decreased in normal individual significantly ($p<0.05$); whereas in diabetic individuals, there was fall not only in FBS, but also in sugar levels at 30 min and 120 min after oral glucose load.

Jasad Bhasma

Title (i) : Role of Ayurvedic medicines in the treatment of diabetes mellitus.

Author : Ajgaonkar SS : Ind J Med Sci 6 : 117-136, 1952.

Title (ii) : Treatment of diabetes with an oral Ayurvedic preparation 'Jasad Bhasma'.

Authors : Sathe RV *et al.,* J Assoc Phys Ind 8: 331-335,1960.

A preparation of zinc was tried on 34 patients of diabetes at J.J. Hospital, Bombay

for a period of 3 months to 3 years. The patient's ages varied from 25 to 65 years and the duration of diabetes was from 6 months to 30 years. The patients were kept on a diet of 207 gm carbohydrate and 1760 calories. These patients were stabilized on diet for 4 days, and then Jasad bhasma was administered. Out of 34 cases only 4 required the help of insulin and the rest were controlled on Jasad bhasma alone. The urine sugar before treatment varied from 10 gms to over 120 gms. The fasting blood sugar was between 120 mg to 160 mg in three patients, 161 mg to 200 mg in 11 and over 200 mg in 20 patients before treatment. With Jasad bhasma treatment, 17 diabetics had fasting blood sugar within normal limits, while only 2 had fasting blood sugar above 200 mg. The rest (14) had fasting levels between 121 mg to 200 mg%.

Momordica charantia

Khanna P, Nag TN, Jain SC, Mohan S. Paper presented at the third internation congress. Plant Tissue and Cell Culture, University Leicester, 1974.

A detailed study of polypeptide yielded from fruits and seeds of M. charantia, was undertaken. The crystalline product isolated was named P-insulin; it has 17 amino acids, 16 of which are found to be same as those in crystalline bovine insulin, methionine being the extra aminoacid-

Title : A clinical trial of insulin obtained from vegetable source (plant insulin) in patients with diabetetes mellitus.

Authors : Balwa US, Goyal RK, Bhandari CM, Pangariya A. Rajasthan Med J. 16 : 54-60, 1976.

A clinical trial of insulin obtained from vegetable source (p-insulin) was carried out in 9 patients of primary diabetes mellitus (Six with juvenile diabetes, one with maturity onset diabetes and 2 with chemical diabetes), for its efficacy as a hypoglycemic agent; when p-insulin was administered subcutaneously (dose: 10-30 units depending upon severity of DM), a consistent hypoglycemic effect was noted, as shown by a reduction in blood sugar level in patients with DM. The average fall (±S.E.) in blood sugar level at the peak effect of p-insulin was found to be 45.86± 13.67%. The onset of action was within 30 to 60 minutes, and peak effect was observed after 6 hrs- No hypersensivitity reaction to this extract was noted in any of the patients.

Title : Improvement in glucose-tolerance due to Momordica charantia (Karela).

Authors : Leatherdale GA, Panesar RK, Singh G *et al.*, Br Med J 282 : 1823-4,1981.

The effect of karela (M, charantia) a fruit indigenous to South America and Asia, on glucose and insulin concentrations was studied in 9 NIDDM patients and 6 non-diabetic laboratory rats. A water-soluble extract of the fruits significantly reduced blood glucose concentrations during a 50 G oral GTT in diabetics and after force-feeding in rats. Fried Karela fruits consumed as a daily supplement to the diet produced a small but significant improvement in glucose tolerance. Improvement in glucose tolerance was not associated with an increase in serum insulin responses. These results show that Karela improves glucose-tolerance in diabetics.

Pterocarpus marsupium

Extracts of P. marsupium popularly known as 'Vijaysar' have been used in the treatment of diabetes mellitus by Ayurvedic physicians in different parts of India, The alcoholic and aquous extracts of the heartwood of this plant exhibited hypoglycemic activity.

Title : Blood sugar, blood urea and serum lipids as influenced by Gurmar preparation, Pterocarpus marsupium and Tamarindus indica in diabetes mellitus.

Authors: Kedar P. and Chakrabarti C.H. Maharashtra Med J 28 : 165-169, 1981.

Water stored overnight in a tumbler made of P. marsupium is known as 'Beejawood water'. It showed hypoglycemic activity from the second week of treatment and maintained blood sugar at normal levels till the drug was withdrawn.

Title : Clinical observations of the anti-diabetic properties of Pterocarpus marsupium and Eugenia jambolana.

Authors : Sepaha GC, Bose SN. J Ind Med Assoc27: 388-391, 1956.

21 cases of diabetes treated with 2 indigenous drugs are reported, 14 with Pterocarpus marsupium, and 7 cases with Eugenia jambolana. In 6 cases Basant Kusumaker Rasa was used for some time simultaneously with these drugs without any appreciable antidiabetic effect. P. marsupium was given initially in 1 oz dose; either 24 hrs' or 7 days' infusion was given; later dose was increased to 2 oz bid. E. Jambolana was tried in a dose of 1 dr tds. P. marsupium appeared to be effective in 7% of cases. No untoward effect was noted except in 2 cases who developed albuminuria. E. jambolana seed seemed to have definitely more antidiabetic property than P. marsupium, the effect was noted in 42% cases. The mode of action of the drugs is not known. P. marsupium probably raises the renal threshold for sugar.

Title : Hypoglycemic effect of bark of Pterocarpus marsupium Roxb.

Authors: Pandey M C, Sharma P V. Med Surg XV (11): 21-23, 1975.

Blood sugar level dropped to a great extent and increased tolerance to glucose was also observed when 72 G of dry back per day of Vijayasar was given in the decoction form to 22 diabetic patients in different doses. There was an improvement in glucose tolerance in 12 patients after 7-day treatment- Slight reduction in body weight was observed in 10 cases (45.5%). Maximum symptomatic relief was noticed on dryness of mouth, polyuria and polydipsia from 3rd day of treatment onwards. No untoward effect was noted during the study.