Update Article

INDIGENOUS DRUGS IN DIABETES MELLITUS : PROSPECTAND RETROSPECT

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Drug therapy for diabetes mellitus in Western system of medicine is relatively modern and had started with a bang with the epoch making discovery of insulin by Banting and Best in 1922 A.D. However healing properties of plants in different diseases had been mentioned in Rigveda and subsequently in Atharva Veda (1200 B.C.)- Since the time of Charaka and Susruta (400 B.C.) the medicinal plants were regrouped and Nagarjuna while editing Susruta Samhita described the presence of active pharmacological materials in bark, leaf, flower, fruit, rhizome etc.

Apart from the above leads, the effects of herbal medicines in diseases were obtained from (H Ayurved (2) Unani (3) Sidha texts (4) Ethno medicine (5) Folklore or hearsay.

However as no scientific literature properly recording the tangible effects of herbal medicine was available further scientific investigations of herbal medicine became necessary in different diseases including diabetes rnellitus. Thus, a large volume of work carried out, was published or reviewed from time to time, yet a genuine herbal drug for diabetes rnellitus remained out of sight (2 to 10).

Insulin and synthetic oral drugs can at least control blood sugar level of patients when judiciously used in selected cases, though cure is out of question. However these failed to control the sequaleae and complications of diabetes rnellitus.

Therefore, such endeavours, as to obtain drugs from herbal sources are pertinent. This area though exciting often leaves the efforts unrewarded due to involvement of a number of variables. It is necessary to enumerate and take proper cognisance of these variables so that correct data generation is possible.

It is absolutely necessary that the material should be collected at a definite season and correctly identified. It may be preferable to administer the material by the same procedure as identified in lead papers or when no such data is available after suitable chemical extraction with solvents. These extracts or fractions may be partially standardised based on the yield or of the extract/unit dry plant or concentration of some salts. The extracts or fractions should be tested on several sensitive 'in vitro' and 'in vivo' experimental models as well as in Type I and Type II clinical diabetes for clinical efficacy. Earlier screening of the extracts or fractions had been carried out in different experimental models of normal or diabetes animal by different workers (6, 7, 8,9) leading sometimes to generation of conflicting results with the same plant.

It is, therefore, felt that newer and standardised experimental models normal and diabetic conditions should be evolved for a screening procedure. Such models in albino rats will be preferable at the initial stage of screening due to the limiting factor of the extract/fraction.

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The following experimental models developed in CF strain male albino rats of the body wt. of 140-165 gms and used in this laboratory had yielded satisfactory results in the process of primary and secondary screening for blood sugar lowering effect and may be followed : (11 to 13).

(1) *Fasted model '•* The rats are fasted over night (18 hrs) and after collection of blood at 0 hr drug is administered. Subsequently at 1, 3, 4, hrs of beyond blood is collected for glucose estimation by a standard method, preferably by glucose oxidase method.

(2) *Fed model :* Excess amount of pellets (Hind lever or any standard pellets) is left over in the morning in the cages. The rest of the procedure is the same in (1).

(3) *Glucose loaded model :* Fasted rats (18 hrs) were fed the drug per oral 1/2 hr after 10% glucose (1.5 g/kg oral) was administered. Blood samples were collected as in other models at 0.5, 1 and 3 hrs after.

(4) *Tolbutamide sensitisation enhancement:* Tolbutamide (50 mg/kg body wt. oral) was fed to albino rats which were divided into two batches of equal number of rats. One batch received xanthone per oral and the other half equal volume of gum acacia suspension. Blood was collected as in (a) at 1, 3 and 4 hrs from both the groups.

(5) *Chronic drug administered model:* The extract or the active principle is administered in doses from 21-28 days. Then procedure followed in (2) is repeated after administration of the final dose.

(6) *Diabetic model:* It is desirable to use both insulin deficient diabetic rats and diabetic rats with adequate insulin level in the blood to simulate Type I and Type II diabetes respectively.

a) The insulin deficiency can be readily produced through alloxan or streptozotocin induced beta-cell necrosis of the islets of langerhans used in full doses.

b) It is rather difficult to create a model of diabetic albino rats with adequate insulin level in blood. Attempts made to create mild diabetes by using lesser and repeated doses of alloxan and streptozotocin do not appear logical as blood insulin levels of such animals have not been adequately studied. Genetic models of BB rats or ob ob mice could be used if a SPF colony can be maintained. The effect of the drug has to be tested as in (2).

These blood sugar studies will be inadequate unless a proper dose response study is conducted with herbal drugs.

It is also necessary to develop a scoring procedure for predicting the probability of herbal drugs. A scoring procedure generated and followed in this laboratory had usually given a good lead (14).

A very large number of potential blood sugar lowering plants had been mentioned from time to time (2 to 10). It is unnecessary to recapitulate these.

On the other hand it will be certainly rewarding if some of the more beneficial plants are properly screened as indicated and data generated. This will give a lead to further trials and clinical efficacy testing In

this way a real blood sugar lowering agent from a herbal source will be a real service to the human society as it will be relatively safe, economical and readily acceptable.

Editorial Comments

With scientific advancements, other methods that may now be included :

a) Perfusion studies on in vitro islet cells preparations and seeking effectiveness of the agents on beta cells[15].

b) In vivo studies, employing clamp techni ques and calculating hepatic glucose pro duction and tissue glucose utilization[16].

c) Studies on receptor function, e.g. number, affinity or indirectly tissue changes as to indicate changes in insulin sensitivity[17,18].

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