INFLUENCE OF D-Nil plus (A POLYHERBAL DRUG) ON HAEMATOLOGICAL AND BIOCHEMICAL CHANGES IN DIABETIC INDUCED RATS

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Received : 25-10-2005           Accepted : 12-12-2005

ABSTRACT

Diabetes mellitus, a metabolic disorder, is characterized by hyperglycemia and altered metabolism. The administration of D-Nil plus (a poly herbal drug) showed effective treatment for alloxan induced diabetes in rats. In diabetic rats, hematological profiles namely RBC, WBC, platelet count and hemoglobin were decreased whereas ESR was increased. Similarly biochemical parameters creatinine, urea and protein were decreased but cholesterol level was increased. After the treatment with D-Nil plus, hematological parameters and biochemical parameters were reversed. The results suggest that the D-Nil plus can be used for the treatment of diabetes.

KEYWORDS:
D-Nil plus, diabetes, hematological, biochemical parameters.

INTRODUCTION

Diabetes mellitus, which is a syndrome characterized by abnormal insulin secretion, altering carbohydrate, protein and fat metabolism in addition to damaging β cells of pancreas, and liver and kidney. Hyperglycemia, impaired glucose metabolism and base membrane alterations were mainly associated with diabetes mellitus. It is multifaceted and dynamic expressions of pathological disequilibria, which are closely related and even intermingled by common factors such as obesity, hyperinsulinemia, micro and macro vascular disease and cardiac risk factor.

Medicinal plants are the source of great economic value in the Indian sub continent. Herbal medicine is still the mainstay of about 75-80% of the whole population, mainly in developing countries for primary health care system because of better cultural acceptability, better compatibility with the human body and fewer side effects. Now a day, multiple drug resistance has developed due to indiscriminate use of commercial synthetic drugs. A number of plants have been found to be useful in diabetes mellitus and compounds have also been purified from some plants. The purpose of this study, therefore, is to examine the antidiabetic effect of D-Nil plus using a diabetic animal model.

MATERIALS AND METHODS

PLANT MATERIAL

The ingredients of the poly herbal drug, leaves of Gymnema sylvestre, leaves of Coccinia indica, roots of Salacia reticulata,
shilajith (gummy ma trix), fruit s of Momordica charantia, see ds of Trigonella foenum a nd rhizome of Curcuma longum were obtained and auth enticated in th e Taxonomy Division, D epartment of Botany, Kongunadu Arts and S cience College, Bharathiar University, Coimbatore where voucher specimen was deposited.

PREPARATION OF THE HERBAL POWDER

The dried p arts of th e selected medicinal plants and shila jith (75 mg each) were powdered and b lended in a dehumidified chamber using mechanical blenders to form a uniform blend.

ANIMALS

Wistar strains of male albino rats, weighing 200-250g obtain ed fro m Thrisur G overnment Vet erinary Coll ege, Thrissur were used for the study. The animals were maintained at 25°±3°C in well vent ilated animal hou se under nat ural photoperio d conditions in large polypropylene ca ges. They were fed with standard pe llet diet obtained fro m Hindustan Le v er Lt d., Bangalore and water ad libitum.

The animals were div ided into four groups of six animals e ach. Group I, served as control rats, were fed w ith normal diet. In Group II, the diabetes was induced in rats by the ad ministration of freshly prep ared alloxan (60mg / kg body weight). Group III, alloxan induced animals received D-Nil plus powder at a dose of 150mg / kg body weight in dist ill ed water oral ly administered twice per day for 15 days. In Group IV, t he normal rats were administered with herbal pow der for 15 days.

HAEMATOLOGICAL AND BIOCHEMICAL PARAMETERS

Haematological p arameters namely haemoglobin, RBC, WBC, platlet count and ESR were carried out b y routine laboratory m ethods. Biochemical parameters namely p rotein, urea and creatinine were assay ed a ccording to the methods described by Lowry et al (1951)\(^8\), Varley et al (1976)\(^9\) and Roswe et al (1953)\(^10\) respectively.

STASTICAL ANALYSIS

Data are reported as mean ± SD and statistical analysis for significance was by the one way A NOVA usi ng DMRT (Duncan’s Multiple Range Test) with level of significance as P< 0.05.

RESULTS AND DISCUSSIONS

The result of the haematological parameters and biochemical parameters are reported in table 1 and figure 1. Diabetic animals (group II) exhibited significant decrease in WBC, platlet count and RBC and significant increase in the level of ESR. The haematological changes produced during diabetic condition were found to be reverted significantly to near normal upon administration of the herbal extract (D-Nil plus) in alloxan induced rats (group III).

No significant change in WBC and ESR was observed in group IV rats whereas a significant decrease in RBC, platlet count and ESR 1 hr was noticed.

The levels of urea and creatinine were found to be elevated in alloxan induced diabetic rats (group II). Administration of D-Nil plus to alloxan induced rats (group III) was found to be significantly reduced the levels of urea and creatinine to near normal which might be due to its hepatoprotective acti vity. No significant changes in urea and creatinine levels were observed in group IV rats when compared to group I control animals. There was a marked decrease in the protein contents of diabetic group (group II) when compared with control group. Treatment with herbal preparation was found to control this metabolic disturbance and was able to bring
these levels to near normal (group III). In group IV, protein levels were found to be significantly decreased when compared to the control group.

ACKNOWLEDGEMENT

The authors thank Dr. M. Aruchami, Secretary, Kongunadu Arts and Science College, Coimbatore, for providing laboratory facilities and Dr. B.G. Krishnaswamy, General Manager - Product Development, The Arya Vaidya Pharmacy, Perumal Koil Street, Ramanathapuram, Coimbatore-641 045, Tamil Nadu, India for his valuable suggestions.

TABLE 1
UREA AND CREATININE LEVELS IN SERUM OF CONTROL AND EXPERIMENTAL RATS

| Parameters   | Group I (Control) | Group II (Alloxan) | Group III (Alloxan + D-Nil plus) | Group IV (D-Nil Plus) |
|--------------|-------------------|--------------------|-----------------------------------|-----------------------|
| Urea (mg/dl) | 35.67 ± 1.36      | 68.17 ± 4.60*      | 42.00 ± 4.32b*                    | 36.88 ± 1.24cns       |
| Creatinine (mg/dl) | 0.83 ± 0.03 | 2.12 ± 0.18a*      | 0.95 ± 0.11b*                     | 0.73 ± 0.04cns        |
| Protein (mg/dl)  | 6.28 ± 0.44      | 3.67 ± 0.39a*      | 5.90 ± 0.21b*                     | 5.07 ± 0.34c*         |

Values are mean ± SD from 6 rats in each group
* - p<0.05   ns - Not significant

Statistical comparisons:
1. a - Group II is compared with Group I
2. b - Group III is compared with Group II
3. c - Group IV is compared with Group I

TABLE 2
HEMATOLOGICAL PARAMETERS IN CONTROL AND EXPERIMENTAL RATS

| Parameters      | Group I (Control) | Group II (Alloxan) | Group III (Alloxan + D-Nil plus) | Group IV (D-Nil Plus) |
|-----------------|-------------------|--------------------|-----------------------------------|-----------------------|
| WBC (Thousand / mm³) | 9.13 ± 0.42      | 6.73 ± 0.33a*      | 8.88 ± 0.60b*                     | 8.40 ± 0.80cns       |
| RBC (million/mm³) | 5.50 ± 0.31      | 3.98 ± 0.28a*      | 4.95 ± 0.46b*                     | 4.77 ± 0.34c*        |
| Platlet count (Lakhs / ml) | 3.20 ± 0.33 | 1.95 ± 0.10a*      | 2.98 ± 0.15b*                     | 2.75 ± 0.17c*        |
| ESR ½ hr        | 6.70 ± 0.35      | 9.87 ± 0.23a*      | 6.15 ± 0.33b*                     | 6.57 ± 0.23cns       |
| ESR 1 hr        | 12.54 ± 0.30     | 15.27 ± 0.21a*     | 12.95 ± 0.17b*                    | 12.03 ± 0.21c*       |

Values are mean ± SD from 6 rats in each group
* - p<0.05   ns - Not significant

Statistical comparisons:
1. a - Group II is compared with Group I
2. b - Group III is compared with Group II
3. c - Group IV is compared with Group I
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