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The Galle Medical Journal

Journal of the Galle Medical Association

September 2014 Volume 19 Number 2 ISSN 1391-7072

Poster Presentation – C10

STZ - diabetic rat: An animal model to investigate pancreatic mechanisms of antidiabetic agents

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Introduction

The development of a proper animal model with diabetes mellitus has been considered as a challenge in current ethnopahamacological research. The present study is aimed to establish the streptozotocin (STZ) diabetic model in our laboratory and determine the effect of STZ on some glycaemic parameters, pancreatic β cells in order to study antidaibetic activities of natural products.

Methods

Diabetes mellitus was induced in rats by injecting them with STZ (65 mg/kg, ip). Wistar rats were divided into two groups (n=6/ in each group); healthy rats and STZ - diabetic rats. The healthy and diabetic rats were allowed for free access to water with standard diet for 30 days. Biochemical estimations, assessment of histopathology and immunohistochemistry on the pancreatic tissue were done on the 30th day.

Results

There was a significant increase in the concentrations of fasting blood glucose (141%), fructosamine (83%), a reduction in serum concentrations of insulin (56%) and C-peptide (40%) in diabetic rats compared to the healthy rats ($p<0.05$). Histology of the pancreas showed that there was a significant reduction in the number of islets in STZ- diabetic rats. Immunohistochemical staining with anti-insulin antibody confirmed a marked reduction in insulin secreting cells in small (89%), average (88%) and large (91%) size islets in STZ- diabetic rats ($p=0.03$). However, haemorrhages were not observed and acinar cells were intact in pancreatic tissues with the induction of diabetes mellitus with STZ.

Conclusions

The results revealed that STZ (65 mg/kg) induced hyperglycaemia with a moderate destruction of pancreatic β cells in Wistar rats. Further, this model, can be used as a research tool for investigating active principles of novel antidiabetic agents for the therapy of diabetes mellitus.