ABSTRACT

Introduction: Neurological problems are the major complications faced in the early onset of Type I diabetes mellitus, which causes potential physio-morphological changes in the central nervous system. Its early adverse impact cannot be ignored during the early childhood cognitive behavior. The brain is prone to adverse effects of Hyperglycemia leading to “Diabetic Encephalopathy” which is characterized by structural, functional and biochemical changes associated with deteriorating cognitive functions. The early recognition and initiation of treatment can prevent the complications in young children. The ancient alternative medical science Ayurveda has laid foundation for the discovery of many drugs which are synthetically manufactured and used since many decades. They have mentioned the use of many herbs and herbal formulations among them Clitoria ternatea Linn. and Salacia chinensis Wight. were selected for experimental purpose on young diabetic animal model based on their neuro-supportive and antidiabetic activity.

Objective: To study the number of viable neurons in the Frontal Cortical and Hippocampal CA3 region, arborization pattern of frontal cortical neurons, and histopathology of pancreas and adrenal gland.

Methodology: The diabetes was induced in 22 days old overnight fasted rats by giving intraperitoneal streptozotocin injection at a dose of 60mg/kg body weight. The diabetes was confirmed on 5th day and the rats showing fasting blood sugar between 200-400mg/100 ml were included in the present study. There were six groups each in each category of preventive and curative treatment groups, and each group consists of 6 rats. The experimental groups include Normal Control, Diabetic Control, Insulin Control; treatment administered with the extract of Clitoria ternatea Linn. and
Salacia chinensis Wight. Individually and in combination of both. The preventive treatment was started immediately after the confirmation of diabetes induction and it was continued for 30 days. After the reconfirmation of diabetes with a gap of 30 days, the curative treatment was initiated, and continued for 30 days. At the end of 30 days treatment the brain of the animal were collected, processed, sectioned and stained with cresyl violet, and was subjected to quantitative microscopic analysis. For the quantitative arborization study Rapid Golgi stain was used and analysis was made under Camera Lucida. The pancreas and adrenal glands were collected, processed, sectioned and stained with hematoxylin & eosin stains, and later they were subjected to qualitative analysis.

Results: The results were expressed as mean +/- standard error and the differences were considered significant at p value ≤ 0.05. Among different drug treatment groups in the present study, the preventive treatment with individual administration of root extract of Clitoria ternatea L. And Salacia chinensis W. has shown significant impact on the arborization and survival of Frontal Cortical neurons, and have also shown an effect on the survival of Hippocampal CA3 region neurons. The individual administrations of drug Clitoria ternatea Linn. and Salacia chinensis Wight. have shown good recovery changes in the endocrine part of pancreas. The adrenal medulla has revealed stress induced changes like multiple hemorrhagic spots with cell hypertrophy.
**Conclusion:** Among different drug treatment groups in the present study, the preventive treatment with individual administration of root extract of *Clitoria ternatea* L. and *Salacia chinensis* w. can influence the arborization of cortical neurons. These drugs also can support the survival of a number of Cortical and Hippocampal neurons in the early diagnosed and treated young diabetic condition. The early administration of these drugs soon after recognizing diabetic condition can interfere in a better way to prevent the adverse effects of juvenile diabetes on the brain tissue, which is an essential prerequisite to achieve complete and competitive personality through effective memory and cognitive functions.