ABSTRACT

Objective

To investigate the Nephroprotective effect of polyherbal formulation against diabetes induced nephropathy in rats

Method

Diabetes was induced to rats by intraperitoneal injection of streptozotocin at a dose of 60mg/kg. Past 48 hours of STZ administration, blood samples were collected and the induction of diabetes mellitus was confirmed by plasma glucose level determination. The rats with plasma glucose level ≥250 mg/dl are randomly divided into five groups and each group consists of 6 animals.

Polyherbal formulation was administered to streptozotocin induced diabetic nephropathy rats orally with variable dose of 250mg/kg p.o and 500 mg/kg p.o continuously for a phase of 16 weeks. Another group of diabetic rats were treated with aminoguanidine hydrogen carbonate (AMG) in drinking water at the dose of 1mg/ml continuously for a period of 16 weeks. Whereas, diabetic nephropathy control rats treated with vehicle.

At the end of 16 weeks of protocol, animals were sacrificed; blood was collected, processed for collection of serum and stored at −70°C until further use. The serum is utilized for estimation of various diagnostic
markers like plasma glucose, HbA1C, Insulin, total cholesterol, HDL-cholesterol, LDL-cholesterol, triglycerides, total plasma lipids, blood urea nitrogen and plasma creatinine etc. by utilizing standard kits to confirm the chronic glycemia, hyperlipidaemia and to assess the kidney function.

In another part of the study serum also utilized for estimation of inflammatory markers like TNF-α, IL-6, TGF-β to confirm the role of inflammation in nephropathy.

Kidneys are collected immediately after sacrifice, kept in formalin solution and processed for histopathological observation for favourable effect of polyherbal formulation.

**Results**

Animals treated with different concentrations of polyherbal formulation for a period of 16 weeks exhibited the significant decrease in diabetic evaluation parameters like blood glucose, glycosylated hemoglobin and raise in insulin when compared to diabetic nephropathy rats.

Daily treatment with two dose levels of polyherbal formulation upto 16 weeks, exhibited the significant dose dependant decrease in different lipid profiles like total cholesterol, LDL-cholesterol, VLDL, triglycerides and significant increase in HDL-cholesterol compared to diabetic nephropathy control rats. Daily treatment with two dose levels of polyherbal formulation upto 16 weeks, exhibited the significant dose dependant decrease in renal function parameters like urinary albumin
excretion rate, type IV collagen Excretion, total proteins in urine, blood urea nitrogen, plasma creatinine, advanced glycation end products, excretion of glycosaminoglycans and significant increase in glycosaminoglycans, urine volume, urinary creatinine, GFR when compared to diabetic nephropathy rats.

Histological observation of the kidney of diabetic nephropathy rats exhibited the alteration of normal morphological changes. Kidneys isolated from animals treated with variable concentrations of polyherbal formulation shows recoverable morphological changes.

**Conclusion**

The results of our study reveal that polyherbal formulation reduces the renal impairment in diabetic nephropathy rats through anti-diabetic, antioxidant and anti-inflammatory effect, protective morphological changes.

**Key words**