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ASSESSMENT OF NEPHROPROTECTIVE ACTIVITY OF TRAIKANTAKA GHRITA ON WISTAR ALBINO RATS

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ABSTRACT

The present study was aimed to evaluate nephroprotective activity of *Traikantaka Ghrita(TG)* , A Polyherbal Formulation against gentamicin induced experimental animal models.*TG* is a combination of herbs and *shilajatu* which possess *mutrakrichra hara, ashmari hara* and *mutrala* properties. Nephrotoxicity was induced in wistar albino rats by intraperitoneal administration of gentamicin(80mg/kg).Effect of simultaneous administration of TG in different doses by oral was estimated. Serum creatinine, serum urea and blood urea level as renal markers,body weight % and Lipid peroxidation, Glutathioneperoxidase, Catalase activity as antioxidant parameters. .Histopathological study of the rats was carried out. From the study, it was revealed that *Traikantaka Ghrita Moderately* prevent renal damage by normalizing increased levels of renal markers. From the present study, it was concluded that *Traikantaka Ghrita*. possess nephroprotective activity in experimental animals.

Keywords: *Traikantaka Ghrita , Nephrotoxicity, Gentamicin.*

INTRODUCTION: In the field of ayurvedic practice several types of *Kalpanas* are being used. Few of such *Kalpanas* are- *Sneha Kalpana*, *Sandhana kalpana*, etc, which have great popularity in the present era.

The kidney disease is a leading cause of morbidity and mortality. Now a days, there are several reasons for getting into the renal failure but one of the most important reasons is chronic blood pressure and chronic uncontrolled diabetes. Synthetic drugs for uric acid and other diseases are also one of the reasons and in some cases the nephritic syndrome, nephritis and auto-immune diseases are the cause.

No matter whatever the cause is, once the Creatinine level goes beyond the limits, it becomes very difficult to bring it back in the range. The herbs so used together help to improve the overall health and improve kidney functions.

Traikantaka Ghrita is a unique formulation included under *sneha kalpana*. It is indicated in *Mutrakrichra*, *Mutrasharkara, Ashmari* and *Mutradosha*. These can be symptomatically co- related to disorders of urinary system in modern science. To understand its role in different disorders as mentioned above its need of the hour to screen out the effect of *TG* in the disorders of urinary system.

MATERIALS AND METHODS:

Preparation of Traikantaka Ghrita[1,2]:

Table. No.1 Description of the raw herbs:

Sl.No.	Name of Drug	Botanical Name	Part Used

1.	*Gokshura*	*Tribulus terrestris Linn.*	Fruit
2.	*Ela*	*Elletaria cardamomum*	Seeds
3.	*Pashanabheda*	*Bergenia lingulata*	Plant
4.	*Yasti madhu*	*Glycyrrhiza glabra Linn*	Root
5.	*Satavari*	*Asparagus racemoses Willd*	Root
6.	*Darba*	*Imperata cylindrica Beauv*	*Mula*
7.	*Draksha*	*Vitis vinifera Linn.*	Fruit
8.	*Musta*	*Cyprus rotundus Linn*	Tubers
9.	*Pippali*	*Piper longum.Linn*	Fruit
10.	*Vasuka*	*Achyranthes aspera Linn.*	Plant
11.	*Vasira*	*Calotropis procera (Linn)*	Plant
12.	*Kasa*	*Saccharum spontaneum Linn*	Root
13.	*Ikshu mula*	*Saccharum officinarum.*	Root
14.	*Matsyakshi*	*Alternanthera sessilis Linn.*	Plant

Table. No.2. Ingredients:

Sl.No	Name of the drug	Quantity
1	*Kashaya* was prepared out of *Gokshura, Ela ,Pashanabheda, Yasti madhu, Satavari, Shilajatu*	3000ml
2	*Kalka* was prepared out of *Darbha, Draksha, Musta ,Pippali, Vasuka, Vasira, Kasa, Ikshu moola, Matsyakshi*	187.5g
3	*Murchita ghrita*	750ml
4	*Go dugdha*	750ml

Animals[3]: Wistar albino rats of either sex weighing between 150–300g were selected from Animal house of SDM Centre for Research in Ayurveda & Allied Sciences, Udupi considering the inclusive and exclusive criteria. They were housed under controlled conditions of temperature (23±2 °c), humidity (55±5%) and 12h light and 12h dark cycles. The animals were fed with standard pellet diet and water *ad libitum*. The research protocol was approved by Institutional Animal Ethics Committee (IAEC).

Nephroprotective activity: The selected animals were weighed and allotted to different groups. Simple tap water was administered in normal control group. The drugs were administered into respective groups. Gentamycin (80 mg./kg. I.P.) was administered to gentamycin control group and in the drug treated group for 14 days. On 14th day the animal were weighed and sacrificed by cervical dislocation and blood samples were collected for the estimation of serum parameters. The kidney and heart were dissected out and weighed and preserved for histopathological studies.for TED group TG + gentamycin are administered for 14 days and on 14th day animals were sacrificed and all the test and parameters repeated as for gentamycin control group. For TED X2 group double the dose of TG is administered and gentamycin 80mg/kg are administered for same 14 days and all the procedures are repeated as for previous groups.

Statistical analysis: All the values were expressed as MEAN± SEM (standard error of mean). The data were analysed by one way ANNOVA followed by Dunnet'smultiple't' test. A level of $P<0.05$

was considered as statistically significant. Level of significance was noted and interpreted accordingly.

RESULTS and DISSCUSSION:

Aminoglycoside antibiotics are well known to cause serious nephrotoxicity; therefore their clinical uses are limited. However, it is important to be aware of risk factors associated with incidence of their renal damages. The onset of deterioration of renal function induced by aminoglycosides for example gentamicin occurs after 5–7 days' of treatments between 80 and 150 mg/kg. In this study, gentamicin was injected intraperitonially at the dose of 80 mg/kg, for 14 successive days. The exact mechanism by which gentamicin-induced nephrotoxicity is unknown, however, several investigators reported that aminoglycoside antibiotics are a class of drug capable of causing the formation of ROS which can be directly involved in gentamicin-induced damage, end product of lipid peroxidation in tissues, results in a decrease in polyunsaturated fatty acid content, which serves as substrate for free radicals. The interaction between cationic drugs such as aminoglycosides, with the anionic phospholipid is considered the first step for the development of gentamicin toxicity [4,5].In the present study, it would be interesting to discuss the RFT changes occurring in the gentamicin control group compared normal control and test drug groups compared to gentamicin group. Among the 3 parameters significant increase was seen in serum creatinine and serum uric acid of gentamicin control group and significant increase in serum uric acid in TED group, the other parameters were either not significantly increased or decreased. It was noted that there were statistically non significant positive changes observed in the test drug groups compared to gentamicin group.(table. No.3)

Statistically there is no significant decrease in gentamicin group and TED group and statistically non significant increase was observed in TEDx2 group. There is moderate increase in body weight after the study in TEDx2 group which might be due to rasayana and balya properties of the test drug.(table no. 4)

The results may be indicative of presence of moderate anti-oxidant effect in the test formulation. Over all analysis indicates that the test drug has no significant influence over free radical generation or their scavenging.(table no.5)

Histopathology: The results of the histopathological examination showed mild decrease in the gentamicin induced degenerative changes in the kidney indicating that the nephroprotective effect is only mild to moderate in this test formulation. Based on the analysis of the results obtained during the study it can be inferred that the test drug Traikantaka ghrita has moderate nephroprotective activity.

Table. No. 3 Renal Function Test:

Groups	Serum Urea	Serum Creatinine	Serum Uric acid
Normal control	34.66±1.30	0.36±0.02	1.35±0.10
Gentamicin control	82.40±11.64	0.90±0.07**	2.40±0.19**
TG(TED+Gentamicin)	71.40±9.16	0.76±0.04	1.68±0.10*
TG(TEDx2+Gentamicin)	76.0±25.03	0.82±1.09	1.16±0.27**

*Values are expressed as Mean ± SEM, *p<0.05 **p <0.01*

Table. No. 4 body weight % of rats:

Groups	%Body weight gain (g)
Normal control	11.59±2.38
Gentamicin control	7.50±0.79
TG(TED+Gentamicin)	6.62±0.73
TG(TEDx2+Gentamicin)	8.94±0.81

*Values are expressed as Mean ± SEM, *p<0.05 **p <0.01*

Table. No. 5 Antioxidant Parameters:

Groups	Catalase activity	Glutathione Peroxidase	Lipid perioxidation
Normal control	0.13±0.01	6.66±1.95	1.13±0.05
Gentamicin control	1.47±0.17	7.73±3.42	0.74±0.18
TG(TED+Gentamicin)	1.45±0.04	12.40±1.32	1.47±0.37
TG(TEDx2+Gentamicin)	1.63±0.01	8.57±2.45	1.20±0.03

*Values are expressed as Mean ± SEM, *p<0.05 **p <0.01*

Photomicrograph of kidney: Plate 1.

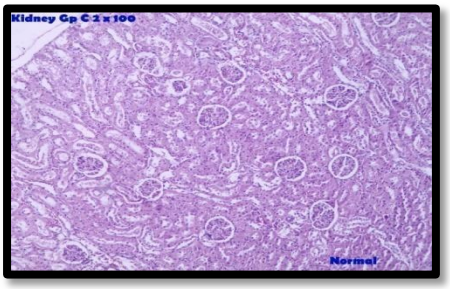

Fig . 1.a

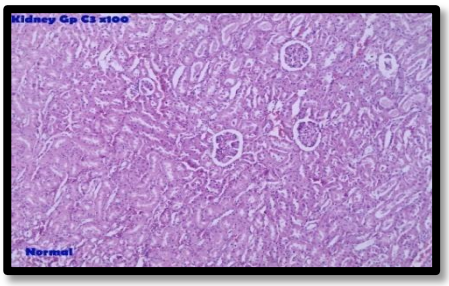

Fig .1.b

Plate 2.

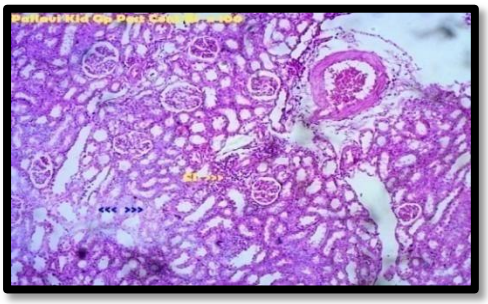

Fig.2.a

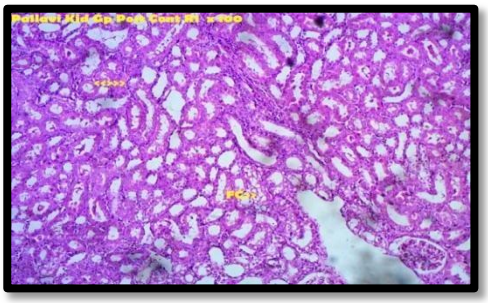

Fig.2.b

Plate. 3

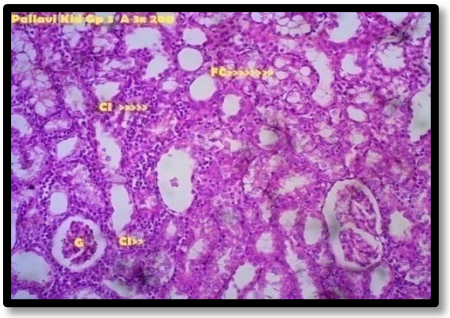

Fig.3.a

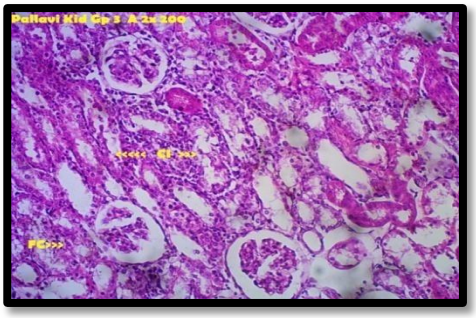

Fig3.b

Plate 4.

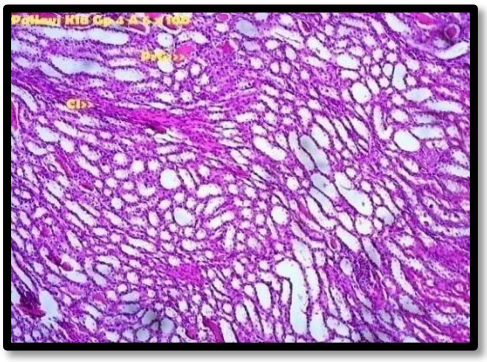

Fig.4.a

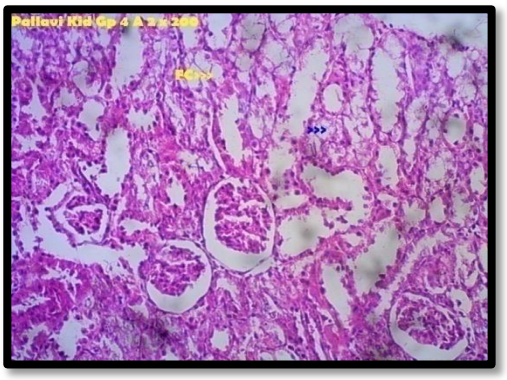

Fig.4.b

CONCLUSION: *Sneha kalpana* is one the special preparations in Bhaishajya Kalpana where the therapeutic effect of the drug is achieved in fat/oil media. The stability of the drug can also be enhanced by preparing *ghrita*. To conclude by considering the bio-chemical, ponderal and Histopathological changes, it can be suggested that the trial drug TG is having nephroprotective activity as revealed by experimental study conducted on Albino rats. However, the observed effect can be considered to indicate moderate Nephro-protection in the test formulation.

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