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Research Article

NEPHROPROTECTIVE ACTIVITY OF *BRIHATHYADI KASHAYAM* IN ALBINO RATS

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ABSTRACT

Brihathyadi kashayam mentioned in *Yogarathnakara* in the treatment of *Mootrkrichra* consists of combination of five simple drugs which are *Brihathi, Prishnaparni, Kutaja, Paata,* and *Yasthimadhu.* That is found to be more effective and safe in the treatment of *Mutravahasrotovikaras.* **Aim and Objectives:** Evaluation of Analytical study and the nephroprotective effect of *Brihathyadi kashayam.* **Objectives:** To prepare *Brihathyadi kashayam* according to classical reference, Experimental evaluation of *Brihathyadi kashayam* for its nephroprotective activity. **Materials and Methods:** *Brihathyadi kashayam* lower dose and higher dose were used in the study of nephroprotective activity in albino rats. The nephroprotective activity of *Brihathyadi kashayam* were evaluated against Rifampicin induced renal damage in albino rats. The results were analyzed by statistical methods. **Results:** In the experimental study the result was showed as the *Brihathyadi Kashayam* double dose was found effective in nephroprotective action, i.e., in reversing the degenerative changes caused in the nephrons by Rifampicin and lowering the serum creatinine, uric acid and urea levels comparing with the *Brihathyadi Kashayam* single dose and disease controlled group. **Conclusion:** This experimental study of *Brihathyadi kashayam* double dose showed the nephroprotective activity against the Rifampicin induced renal damage.

KEYWORDS: *Brihathyadi kashayam, Mutravaha sroto vikaras,* Nephroprotective activity.

INTRODUCTION

Ayurveda, the science of life is traced back to *Vedic* time about 5000 B.C and is widely practiced throughout India. The Ayurvedic methods of holistic health care emphasizes balancing the body, mind and spirit to treat and prevent disease[1]. The main objectives of Ayurveda is "*Swasthasya swasthya rakshanam aturasya vikara prashamanam"* that means to protect and maintain the health of a healthy person and to treat the disease and giving relief to sick person [2].

Srotas are the channels that convey the body elements, which are undergoing metabolic processes, sub serve the purpose of circulation. The vitiation, depletion and maintenance of existed bodily structures are never possible without *Srothas*[3]. All the *Brihatrayees* were explained about *Srotas* in the respective *Samhitas.*

Mootravaha srotas is one among the thirteen *Srotases* and is having its predominant action in *Kledavahana*[4]. Being a system responsible for homeostasis of fluids in the body it also detoxifies by eliminating the waste products through urine[5]. *Mootravahasrotovikaras* and its treatment are mentioned in *Samhithas.* As *Basthi* is one among the *Trimarms*[6] prime importance should be given in the treatment of *Mutravaha sroto vikaras*.

Renal dysfunction is one of the common conditions in population. Recent statistical study shows that the 17% of Indians having the Kidney related disease and the majority of the patients are belongs to the younger and predominantly in working population [7]. Current line of treatments for impaired renal function in modern medicine are Antihypertensive, Diuretics, and Erythropoietin etc. Dialysis and organ transplantations are the late stage managements[8]. It is costly and also has its own known potential adverse effects[9].

Brihathyadi kashayam mentioned in *Yogarathnakara* in the treatment of *Mootrkrichra* consists of combination of five simple drays which are *Brihathi, Prishnaparni, Kutaja, Paata,* and *Yasthimadhu*[10]. That is found to be more effective and safe in the treatment of *Mutravaha srotovikaras.*

However clinically *Brihathyadi kashayam* is widely used in the treatment of *Mootravaha srotovikaras* without any adverse effects, but in present era, experimental and clinical study with statistical analysis is necessary to scientifically prove

the same. Here an attempt is made to study the efficacy of this safe and economic combination in albino rats for its nephron– protective action.

MATERIALS AND METHODS

The test drug was prepared from Rasa Shastra & Bhaishajya Kalpana department Rasashala of Ramakrishna Ayurvedic Medical College, Yelahanka, Bangalore. All the Chemical reagents and other requirements of experimental study used from stock of Invivo Biosciences, # 23, Katha No 3169, Assessment No 154, Kodigehalli Village, off Magadi road, Yeshwanthapur, Hobli, Bengaluru North Taluk, Bengaluru.

The drug which used as standard drug i.e., Cystone Manufactured by Himalaya Drug Company purchased from Himalaya Health and beauty shop, #739/2, 4th phase Main road, Opp: A.I.R Quarters, Yelahanka New town, Bengaluru. The drug which used to induce nephrotoxicity i.e., Rifampicin purchased from NRR hospital, No 3 & 3A, Hesarghatta Main road, Chikkasandra, Jalahalli West, Bengaluru. Swiss albino rats of either sex weighing between 200-250gm were used for the study. Animals were produced from animal house. Twenty four Albino rats were selected and allotted to four groups of six rats in each group. Six rats were housed in each cage made up of poly-propylene with stainless top grill. The husk was used as bedding material and was changed frequently to protect from infections. Animals were maintained at standard laboratory conditions such as temperature at 23 to 24^0C, humidity of 48-63% and 12 hr light and dark cycles. Animals were fed with standard pellet feed supplied by VRK nutrition solution and aqua guard water in polypropylene bottles. The Animal Ethical committee has approved for experimentation on Animals (Approval number-Invivo-089).

Table 1: Grouping of Experimental Animals

Group1	Disease control	Rifampicin (1g/kg)
Group2	Positive control	Cystone (750mg/k)
Group3	Single dose	*Brihatyadi kashayam* (10ml/kg)
Group4	Double dose	*Brihatyadi kashayam* (20ml/kg)

Animals were grouped into different categories as mentioned above. All the animals will be administered with Rifampicin at the dose of 1g/kg body weight through orally with the help of feeding syringe for a period of 14 days with the interval of 72 hour to induce renal failure i.e., on the 4th, 7th, 10th, 13th days. Standard drug and test drugs administered for 15 consecutive days in their respective doses. After dosing, body weight, feed intake and urine output were measured. On 15th day blood was collected from retro-orbital puncture from the albino rats under anaesthetic condition. Biochemical parameters were Serum analysis (Urea, Creatinine, Nitrogen, Uric acid), Histopathology of kidney, animals were sacrificed and kidney tissue was collected 10% formalin used for histopathological examination.

Average of all the data was compiled and SEM were calculated. The biochemistry of treated groups was compared with negative control groups by one-way anova followed by dunnett's multiple comparison test.

RESULTS

The effect of the drugs in Serum Creatinine is dominated in the table below.

Table 2: Effect of Test Drugs in Serum Creatinine

S.No	Group	Creatinine (mg/dl)
1.	Disease control	2.140 ± 0.082
2.	Positive control	1.105 ± 0.059
3.	*Brihathyadi Kashayam* Single dose	1.508 ± 0.051
4.	*Brihathyadi Kashayam* Double dose	1.340 ± 0.047

DATA: MEAN ± SEM

The data related to the effect of *Brihathyadi Kashayam* Single dose and *Brihathyadi Kashayam* double dose on the Serum Creatinine have been depicted in the table.

The data shows there was reduction in the Serum Creatinine when compared against Disease controlled group which is statistically significant.

The effect of the drugs in Uric acid is dominated in the table below.

Table 3: Effect of Test Drugs in Uric Acid

Group	Uric acid (mg/dl)
Disease control	1.912 ± 0.066
Positive control	0.707 ± 0.047
Brihathyadi Kashayam Single dose	1.110 ± 0.042
Brihathyadi Kashayam Double dose	0.963 ± 0.057

DATA: MEAN ± SEM

The data related to the effect of *Brihathyadi Kashayam* Single dose and *Brihathyadi Kashayam* double dose on the Uric acid have been depicted in the table.

The data shows there was reduction in the Uric acid when compared against Disease controlled group which is statistically significant. The effect of the drugs in Urea nitrogen is dominated in the table below.

Table 4: Effect of Test Drugs in Urea Nitrogen

Group	Urea nitrogen (mg/dl)
Disease control	38.47 ± 0.510
Positive control	17.62 ± 0.429
Brihathyadi Kashayam Single dose	26.87 ± 0.304
Brihathyadi Kashayam Double dose	24.250 ± 0.580

DATA: MEAN ± SEM

The data related to the effect of *Brihathyadi Kashayam* Single dose and *Brihathyadi Kashayam* double dose on the Urea level have been depicted in the table.

The data shows there was reduction in the Uric acid when compared against Disease controlled group which is statistically significant. The effect of the drugs in body weight is dominated in the table below.

Table 5: Effect of Test Drugs in Body Weight

Group	body weight in gm Day 1	body weight in gm Day 14
Disease control	234.7 ± 1.1	275.0 ± 1.4
Positive control	236.0 ± 0.6	277.0 ± 2.4
Brihathyadi Kashayam Single dose	234.8 ± 0.9	277.0 ± 1.2
Brihathyadi Kashayam Double dose	235.3 ± 0.7	277.7 ± 1.2

DATA: MEAN ± SEM

The data related to the effect of *Brihathyadi Kashayam* Single dose and *Brihathyadi Kashayam* double dose on the Body weight have been depicted in the table. There was no significant change observed in the body weight. The effect of the drugs in weight of Kidney is dominated in the table below.

Table 6: Effect of Test Drugs on Weight of Kidney

Group	Kidney weight in mg
Disease control	414 ± 3.9
Positive control	326 ± 1.1
Brihathyadi Kashayam Single dose	384.5 ± 8.5
Brihathyadi Kashayam Double dose	342.0 ± 8.3

DATA: MEAN ± SEM

The data related to the effect of *Brihathyadi Kashayam* Single dose and *Brihathyadi Kashayam* double dose on the weight of Kidney have been depicted in the table. There was dose dependent reduction in kidney weight when compared against Disease controlled group which is statistically significant.

The effect of the drugs in Urine outputs dominated in the table below.

Table 7: Effect of Test Drugs in Urine Output

Group	Urine output in ml
Disease control	5.7 ± 0.3
Positive control	7.7 ± 0.3
Brihathyadi Kashayam Single dose	6.7 ± 0.3
Brihathyadi Kashayam Double dose	7.5 ± 0.4

DATA: MEAN ± SEM

The data related to the effect of *Brihathyadi Kashayam* Single dose and *Brihathyadi Kashayam* double dose on the Urine output have been depicted in the table. There was marked increase in urine output in High dose of sample drug when compared against Disease controlled, which is statistically significant.

The effect of the drugs in Feed intake is dominated in the table below.

Table 8: Effect of Test Drugs in Feed Intake

Group	Feed intake per animals in gm
Disease control	12.5
Positive control	13.5
Brihathyadi Kashayam Single dose	13.3
Brihathyadi Kashayam Double dose	14.2

The data related to the effect of *Brihathyadi Kashayam* Single dose and *Brihathyadi Kashayam* double dose in the feed intake have been depicted in the table. There was dose dependent increase in feed intake when compared against Disease controlled group.

DISCUSSION

Brihathyadi kashayam mentioned in *Yogarathnakara* in the treatment of *Mootrkrichra* consists of combination of five drugs which are *Brihathi, Prishnaparni, Kutaja, Paata,* and *Yasthimadhu.* With the classical preparation as well as the properties of the drug and the combination shows the *Mutrala* property. The *Kashaya Thiktha rasa* of the *Brihathyadi kashayam,* it can act as *Vatanulomka* and and *Srothoshodhaka* by *Kledhasamana.* As *Brihathyadi kashayam* is indicated in the *Mutravaha srotovikaras* the attempt is done to evaluate its nephroprotective effect.

In the present study significant level of Serum Creatinine, Uric acid, Urea nitrogen, cell structural changes and interstitial oedema was noted in Rifampicin administered group, indicate the renal dysfunction which got apparently reversed by *Brihathyadi Kashayam* double dose which was statistically significant.

In the present study Rifampicin administration caused significant elevation in the Serum Creatinine, Uric acid and Urea level. This indicates the Rifampicin administration caused renal toxicity. The Rifampicin induced nephro toxicity was significantly reversed by the Brihathyadi *Kashayam* double dose hence by the support of analytical and experimental evidence *Brihathyadi Kashayam* double dose was proven for its nephro-protective activity.

CONCLUSION

In the experimental study that was carried out to evaluate the nephro-protective activity of *Brihathyadi Kashayam* in albino rats was found effective in nephro-protective action, i.e, in reversing the degenerative changes caused in the nephrons by Rifampicin. *Brihathyadi Kashayam* sample is effective in reversing the induced degenerative changes in nephrons of albino rats. By the virtue of the *Mutrala* property and *Kashaya– Tiktha rasa* the drug *Brihathyadi Kashayam* is known to act as nephron-protective. On the observation of Experimental study data and Histopathological reports showed the result of the activity ie, *Brihathyadi Kashayam* double dose act as nephro protective.

Pictures of Experimental Study

Image 1: Animal grouping

Image 2: Animals feeding

Image 3: *Brihathyadi Kashayam* Preparation

Image 4: *Brihathyadi Kashayam*

Image 5: Animal dosing

Image 6: urine collection

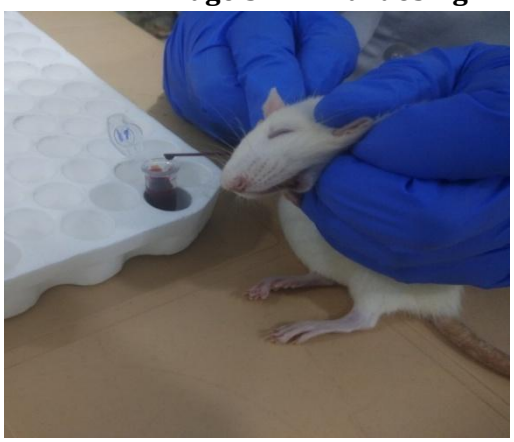

Image 7: Blood sample collection Image

8: Dissected organ

Histopathology

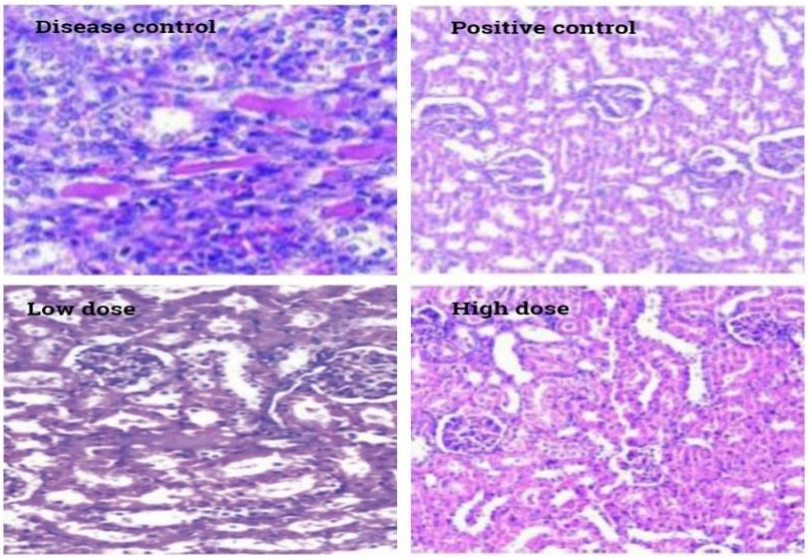

Image 9: Histopathology of Kidney

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