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Research article

Toxicity study of a Siddha drug Nannari ver Ooral kudineer

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Abstract

Background:

The root decoction of Nannari ver, *Hemidesmus indicus* (Linn) from Asclepiadaceae family has been using in traditional medicine for a long period. In Tamilnadu and even in Kerala people are more using *Hemidesmus indicus,* (Linn) Commonly in siddha this medicine used as diuretic and to reduce body heat.

Objective:

To evaluate the acute and sub-acute toxicity of Nannari ver Ooral kudineer (NVK) on experimental in Wister albino rat models.

Materials and Methods:

Acute toxicity study was carried out in female Wister albino rat. Administration of a single dose of 4000mg/kg of Nannari ver Ooral kudineer by gavages to five rat were found no mortality. In 1/20th dose was used as the highest therapeutic dose. In sub acute toxicity analysis male and female Wister albino rats has received daily 50 to 200mg/kg /bwt for 28 days.

Results:

No significant changes in WBC, RBC were observed between control and test groups following repeated administration of Nannari ver Ooral kudineer. The animals treated with NVK showed normal growth pattern and body weight compared with control rats . There was a slight decrease in plasma glucose level and increased in Hb levels,after administration of NVK (400 mg.kg-1).

Conclusion:

At the end of study there was no an undesirable effect of all organs and safe for consumption by human health.

Keywords

Siddha medicine, Nannari ver Kudineer, acute & sub acute studies.

Introduction

Plant based medicine is a traditional medicine, from time immemorial has been the main stay of health care need for the treatment of various types of diseases. Despite improvement in science and technology in medicine, greater numbers of the population are still following herbal medicine to resolve their primary health problems (Shetty Akhila et al . 2007). According to World Health Organization, more than 80% of the world's population have been used in traditional medicine for their primary healthcare needs .

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(Shah Ayub et al .1997).It is generally presumed that herbal medicines are more effective and because of their natural source are free from undesirable side effect(Bürger et al. 2005). Plants or herbal products used in the treatment of different ailments usually contain wide range of chemical compositions. Some of the chemical constituents could be of beneficial effects to the body system while others may possess toxic properties (Mythilypriya et al .2007). *Nannari (Hemidesmus indicus) is* Synonymed as *Angarimooli, Pathalamooli, Kopagu, Saripam, Parrkodi, Neerundi, Kanannusari, Krishnavalli, Saariyam.* Root of *Nannari is* therapeutically used in Diabetes mellitus, *Pitha* disease, Arthritis, Indigestion and also used in urinary tract infection (Murugesa Mudaliyar K.S. 2016)

Methods and materials

The study was performed in Nannari ver Ooral kudineer(NVK) has a reference from *Gunapadam Mooligai* Part -1 indicated for VALI AZHAL KEEL VAYU (RHEUMATOID ARTHRITIS. The study was done after the approval in IAEC Committee (321611004/KMCP/26/2018) of KM College of Pharmacy.

The raw drugs were collected from Tirunelveli district, Tamilnadu. The purified plant was authenticated by faculties, Department of Medicinal Botanist and Siddha Gunapadam experts at Government Siddha Medical College, Palayamkottai-627002.

Experimental animals

Acute toxicity

Female Wister albino rat weighing 180 ± 20 g are used in acute toxicity study. The animals are divided into three groups of six animals, totally 18 animals were used in this study. The Group I animals are administered a single daily dose of 0.5 ml of Tween 80 orally for 15 days. In Group II are administered with (300 mg.kg^{-1}b.w.NVK) once a day for 15 days. The Group III are fed 2000 mg.kg^{-1}b.w. once daily for 15 days for acute toxicity studies. On HPE revealed no acute toxic symptoms were observed after 15 th day All test animals were subjected to gross necropsy.

Sub acute test for Nannari ver Ooral kudineer(NVK)

The sub acute toxicity were performed in Male and female Wistar rats weighing 180 ± 10 g. The animals are divided into five groups of six animals each. The administration of dose is calculated based on the body weight of the animal. The animals in Group I were administered with a single daily dose of 0.5 ml of Tween 80 orally for 20 days. The animals in Group II were administered with 50 mg.kg^{-1} b.w. of the NVK once in daily for 20 days.

The animals in Group III were administered with 100 mg.kg^{-1} b.w. of the NVK orally once daily for 20 days. The animals in Group IV and V were administered 200 and 400 mg.kg^{-1} b.w. once in daily for 20 days.The animals are weighed every five days, from commencement of the treatment, to record the weight variations. At the end of the treatment, blood samples were taken for biochemical analysis. The serum plasma was analyzed for total cholesterol, total triglyceride, HDL-cholesterol levels, LDL-cholesterol, plasma glucose, Alanine aminotransferase (ALT), Aspartate aminotransferase (AST), creatinine and urea level.

RESULTS

Acute toxicity study

The acute toxicity of Nannari ver Ooral kudineer was showed no mortality or morbidity in animals through the 15-days period following single oral administration at all selected dose levels of the NVK (Table-1). The morphological characteristics and physical appearance of all animals seems to normal. The physical appearance and motor nervous system was normal. The compared Group I , II and III showed no toxic effects ,in the dose of upto 2000/kg/bw.

Sub acute Toxicity in NVK

The effect of NVK was observed for their effect on the body weight changes was observed ,significant increased ($p<0.05$) in body weight. The results are described in **Table.2.** The values are expressed as Mean ± S.E.M. n=6. The results of group I were compared with other group II, III, IV, and V (**P<0.01 *P<0.05).

Effect of Nannari ver Ooral kudineer(NVK) on internal organs

According to Table no 3. No toxic effects found in kidney, heart, liver and brain of the rats were observed. From the study it was clear that, significant ($p<0.01$) changes in the weights of various organs of the animals with higher doses of NVK (400 mg.kg^{-1} bwt). The group I was compared with other group II, III, IV, and V. The statistical analysis was carried out using one way ANOVA method, where **P<0.01.

Effect of biochemical profiles of rats

Table no 4. Showed the effect of Nannari ver Ooral kudineer was significant decrease ($p<0.05$) in the plasma glucose level in treated rats especially at higher dose (400 mg.kg^{-1}) compared with control groups. **P<0.01 *P<0.05. Significant decrease ($p<0.05$) in the plasma total cholesterol (TC), triglyceride (TG) and LDL-cholesterol levels. There is no evidence of severe toxicity associated with the administration of higher concentration of NVK.

Changes in hepatic enzymes.

Table.5.The AST, ALT, ALP, TP and Albumin values was compared in Group I and other groups II, III, IV, and V. The statistical analysis was carried out using one way ANOVA method, where determined **P<0.01 *P<0.05.

Effect of Nannari ver Ooral kudineer on haematological parameters in rats

From the study it was evident that, a significant increase ($p<0.01$) were observed in the hemoglobin contents and RBC count in the group treated with 200 mg.kg^{-1} / body weight. There was no significant change in the calcium level in all the treated animals compared to the control.

Table.1. Acute toxicity study of Nannari ver Ooral kudineer(NVK)

	Dose (mg.kg^{-1})	Sign of Toxicity (ST.NB^{-1})	Mortality (D.S^{-1})
Group I	0	0/3	0/3
Group II	300	0/3	0/3
Group III	2000	0/3	0/3

Table.2.The effects of Nannari ver ooral kudineer on body weight changes in rats

Treatment	Day 1	Day 5	Day 10	Day 20
Control	187.15±6.8	189.45 ±6.20	198.15 ±6.35	196.75±6.60
NVK **50 mg.kg^{-1}**	196.30 ±6.4	195.30 ±6.30	200.25 ±6.70	198.35±6.76*
NVK**100 mg.kg^{-1}**	188.35 ±5.7	191.30 ±6.40	198.55 ±7.10	197.40±6.36*
NVK**200 mg.kg^{-1}**	197.30 ±7.2	200.15±6.50	200.90 ±7.20**	206.50±7.30**
NVK**400 mg.kg^{-1}**	187.65 ±6.05	194.15 ±5.60	197.60 ±6.35**	207.63±7.42**

Table: 3 The effects of NVK on kidney, heart, liver and brain of the rats

Treatment	Heart (gms)	Kidney (gms)	Liver (gms)	Brain (gms)
Control	0.35 ± 0.05	0.65± 0.03	3.33± 0.05	0.68± 0.06
NVK 50 mg.kg^{-1}	0.36± 0.02	0.81± 0.03	3.45± 0.03	0.71± 0.4
NVK 100 mg.kg^{-1}	0.37± 0.06	0.79± 0.04	3.76±0.02	0.69± 0.3
NVK 200 mg.kg^{-1}	0.36± 0.04	0.74± 0.02	3.65± 0.02	0.76± 0.06
NVK400 mg.kg^{-1}	0.35± 0.03	0.75± 0.03	3.87± 0.03	0.78± 0.06

The values are expressed as mean ± S.E.M. n=6. The results of group I were compared with other groups such as II, III, IV, and V. The statistical analysis was carried out using one way ANOVA method, where **P<0.01.

Table.4.The effect of Nannari ver Ooral kudineer on biochemical parameters

Treatment	Glucose (mg.dl^{-1})	Cholesterol (mg.dl^{-1})	Triglyceride (mg.dl^{-1})	HDL (mg.dl^{-1})	LDL (mg.dl^{-1})
Control	94.65± 0.62	39.62± 0.56	28.25± 0.45	135.25± 0.55	83.15±1.72
NVK 50 mg.kg^{-1}	92.50± 0.56	25.85± 0.25*	13.22± 0.23*	175.28± 0.65*	71.59±1.28
NVK 100 mg.kg^{-1}	89.45± 0.47	26.74± 0.26*	15.42± 0.28*	165.18±0.78*	69.84±1.10
NVK 200 mg.kg^{-1}	90.25± 0.55**	33.18± 0.30	17.84± 0.38*	184.30± 0.84*	48.60±1.30
NVK 400 mg.kg^{-1}	86.25± 0.45**	32.78± 0.28	19.28± 0.34*	182.2± 0.85*	46.50±0.84

Table.5.The effects of Nannari ver Ooral kudineeron biochemical parameters such as AST, ALT, ALP, TP and Albumin in rats.

Treatment	AST (IU.l^{-1})	ALT (IU.l^{-1})	ALP (IU.l^{-1})	TP (g.l^{-1})	ALBUMIN (g.l^{-1})
Control	328.5±12.0	70.5± 3.18	253.58± 8.80	69.85± 3.32	37.15±2.35
NVK 50 mg.kg^{-1}	317.0±9.50	68.5± 2.20**	266.10±2.75**	70.30± 2.32	34.30±2.65
NVK 100 mg.kg^{-1}	318.3±7.20	66.1± 3.15**	260.18±6.70**	80.15± 2.82	36.30±3.05
NVK 200 mg.kg^{-1}	313.4±7.95	61.4± 2.90	265.00± 5.20	69.25± 3.32	38.20±2.75
NVK 400 mg.kg^{-1}	323.2±8.20	63.3± 3.52	269.40± 4.40	74.05± 2.58	37.48±2.70

Table.6.The effect of HB, Calcium, RBC and WBC in rats

Treatment	Haemoglobin ($mg.dl^{-1}$)	RBC (10^6 /mm^3)	WBC (10^6 /mm^3)	Calcium ($mg.dl^{-1}$)
Control	11.3± 0.25	9.15± 0.02	11.45± 0.05	9.44 ±0.02
NVK 50 $mg.kg^{-1}$	12.5± 0.26*	9.50± 0.04*	9.55± 0.01*	9.20 ±0.02
NVK 100 $mg.kg^{-1}$	12.3± 0.15*	9.55± 0.02*	8.35± 0.32*	9.26 ±0.20
NVK 200 $mg.kg^{-1}$	10.7± 0.20*	8.30± 0.12*	11.45± 0.03*	9.61 ±0.13
NVK 400 $mg.kg^{-1}$	11.5± 0.35*	8.48± 0.45*	10.55± 0.13*	9.75 ±0.02

DISCUSSION

The acute & sub-acute toxicity was carried out in Wistar albino rats. In acute toxicity, the limit dose of 2000 mg/kg (NVK) did not result in mortality or any clinical sign of acute toxicity in animals in the short-term (48 hours) and long-term (14 days) observatory periods, suggesting that no toxic effects upto 2000 mg/kg in rats.

In the sub acute toxicity study Showed, the extract did not affect the normal growth of the animals as evidenced by comparing the body weight gain in both control and treated animals over the 28-day treatment periods. There were no significant changes in liver enzymes (ALT,AST,ALP and IP) .The significantly increased in the level of RBC,WBC and hemoglobin was found in treatment with Nannari ver Ooral kudineer (400 $mg.kg^{-1)}$.. The extract caused no undesirable effect on the all organ of the animals making it safe for consumption by human health and it was non hemotoxic.

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