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Evaluation of Antilithiatic activity of *Adonis aestivalis* Linn. In male Wister rats

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ABSTRUCT

Adonis aestivalis Linn is a plant traditionally used for the cure and treatment of many ailments. The present study was aimed to investigate the Antilithiatic activity of extracts of dried leaves and roots powder of Adonis aestivalis Linn. The present study was concentrated on estimation of calcium, oxalate, phosphate, magnesium excretion in the urine; this elevated urinary calcium with high urinary oxalate might lead to calcium oxalate stone formation, following administration of extracts significantly lower urinary calcium and oxalate were observed, this enabled us to conclude that the extract is anti lithiatic activity.

Key words: *Adonis aestivalis Linn,* Antilithiatic activity, calcium oxalate stone.

INTRODUCTION

Nearly all cultures, from ancient times, have used plants as a source of medicine. In many developing countries traditional medicine is still the mainstay of healthcare, and most of the drugs and cures used from plants. In developed countries too people are turning to herbal remedies.Beside modern scientific medicine still depends on plants, and the knowledge gained from them, for some essential drugs. People in India china are known to have used plants for healthcare for over 5,000 years. India is one of the world's 12 regions having the largest biodiversity. Present study is significant investigations on traditional medicinal plants for the activity. One of the major causes for acute and chronic renal failure is the tone formation or lithiasis that includes nephrolithiasis and urolithiasis. Lithiasis is a clinical problem occurring in bout 1 to 5 percent of the world population with reference rate of 50 to 80 percent the stone formation is multi factorial in origin and the variables that may induce stone formation includes dehydration, infection, alkyline pH, concentrated urine, calcium resorption, NH_3 concentration

But the exact cause for lithiasis is still not clear it may be explained as a Physiologic problem. It was fond out that clinical stone formation includes initially formation of nidus, retention of the nidus in the urinary tract and growth of the nidus to sufficient size so that it obstructs the urinary tract. The theories which explain the nidus formation state that either super saturation of ions in urine or deficiency of inhibiter ions in urine lead to stone formations. The ionic disturbances in urine were brought about by feeding the rats with ethylene glycolated water for 28 days, thus leading to stone formation. Ethylene glycol is oxidized to oxalate, an anion that create ionic disturbances which are conducive to oxalate stone formation using such antilithiatic animals.

MATERIALS AND METHODS

The main aim of this study was to screen Adonis aestivalis Linn, belonging to the family (Ranunculaceae) which used as folk medicine for its diuretic (edema) activity in pregnancy and it is a Arnamenal plant. The shade dried and coarsely pulverized leaves and roots of Adonis aestivalis Linn, was extracted by continues hot percolation method using ethanol as a solvent for 72 hours using soxhlet apparatus.

Experimental model

Male wistar rats weighing 100 to 150g were acclimatized to our laboratory condition. They were fed with a standard pelleted diet obtained from (medipally, Hyderabad), animal breeders and suppliers and had access to water ad libitum. Lithiasis was induced by feeding the rats with 0.75% ethylene glycolated water for 28 days.

Treatment protocol

The animals were divided into four groups of 6 animals each and designed as G_1.G_2, G_3 and G_4. G_1 was the normal control, G_2 was extract control, and lithiasis was induced only in the $G_3$and G_4 by 0.75% ethylene glycolated water for 28 days. G_3 was reserved as lithiatic control and G_4 was further treated orally with divided doses of extract of 60 mg/kg of body weight daily by gavages. Urine samples were collected once in every 7days by keeping the animals' separately in metabolic cages for 24 hours and analyzed for calcium, phosphate, oxalate, protein and magnesium. Proteins and oxalate were estimated colorimetrically.

The stone formation induced by ethylene glycol was further favored in G_3 by low level of urinary magnesium as it is reported to be an inhibitor of crystallization. This I further supported by the observation of urinary magnesium in stone former.Treatment in G3 results in high urinary magnesium adding support to its antilithiatic effect.

Ethylene glycol administration increased urinary excretion of proteins, a feature encountered in hyperoxaluric rats. The extract reduced this protein level suggesting that it prevents the nidus formation that may lead to crystallization. The urinary phosphate level was also elevated in lithiatic control rats suggesting that phosphate stone had also been formed. However, treatment with the extract reduces the phosphate level. All the observations suggest the calcium oxalate and phosphate stones are formed in this model and the extract significantly inhibits lithiasis by potential resetting the ionic disturbance by ethylene glycol.

Statistical Analysis

The results were expressed as Mean+-SEM. Data was evaluated using ANOVA. Followed by newmen –keuls test. Probability values less than 0.05 were considered significant.

RESULTS

Ethylene glycol treatment raised the urinary calcium, phosphate, oxalate and protein levels significantly ($p<0.05$) in the lithiatic group G_3, whereas magnesium level showed a significant decrease. However, after the treatment with plant in G_4, these values were found to be reduced.

Table.1. Effect of *Adonis aestivalis Linn*. on calcium excretion in experimental urolithiasis

Days	Group-1	Group-2	Group-3	Group-4
1	1.70±0.06	0.72±0.10	0.76±0.50	0.72±0.22
7	0.62±0.06	1.00±0.10	2.60±0.50	4.52±0.23
14	0.72±0.05	0.89±0.16	5.98±0.21	3.25±020
21	0.82±0.03	0.95±0.11	5.82±0.12	2.81±0.03
28	0.80±0.01	0.90±0.13	5.21±0.10	2.4±0.05

Table. 2. Effect of *Adonis aestivalis Linn*. on oxalate excretion in experimental urolithiasis

Days	Group-1	Group-2	Group-3	Group-4
1	0.32±0.52	0.38±0.25	0.43±0.23	0.39±0.09
7	0.36±0.12	0.43±0.12	7.32±0.15	7.21±0.11
14	0.36±0.11	0.39±0.11	10.20±0.06	5.46±0.22
21	0.38±0.09	0.72±0.26	13.15±0.22	4.06±0.22
28	0.38±0.11	0.52±0.11	14.50±0.12	2.20±0.42

Table.3. Effect of *Adonis aestivalis Linn*. on Phosphate excretion in experimental urolithiasis

Days	Group-1	Group-2	Group-3	Group-4
1	7.00±0.57	7.58±0.300	7.86±0.96	7.05±0.30
7	7.86±0.60	8.89±0.20	10.2±0.12	9.23±0.21
14	7.10±0.60	8.2±0.30	12.89±0.13	10.89±0.25
21	7.10±0.01	8.56±0.22	13.49±0.10	10.26±0.20
28	7.26±0.01	8.59±024	14.36±0.10	10.98±0.40

Table.4. Effect of *Adonis aestivalis Linn.* on Magnesium excretion in experimental urolithiasis

Days	Group-1	Group-2	Group-3	Group-4
1	1.10±0.01	1.02±0.03	1.32±0.20	1.32±0.22
7	0.90±0.02	0.69±0.02	1.25±0.21	1.12±0.09
14	1.1±0.10	0.80±0.01	0.81±0.56	1.0±0.09
21	1.38±0.05	0.50±0.02	0.42±.012	0.90±0.012
28	1.20±0.23	0.83±0.02	0.3±0.23	1.20±0.21

Values are expressed as mg/24hr urine smple; Values are expressed as Mean± SEM for six animals in each group.; Values are significantly different from normal control. ; Values are significantly different from lithiatic control values. ; Newman- keuls multiple range test ($p<0.05$)

DISCUSSION

In experimental animal lithiasis cn be induced by chemicals or by foreign body insertion. In this study ethylene glycol administration induces lithiasis. As mentioned earlier ethylene glycol getsoxidized to oxali acid leading hyperoxaluria this is substantiated by ion concentration noted in G3. It has been reported that hyperoxaluria results in an increase in urinary super saturation of calcium.

It is evident from the results of antilithiatic study that the main cation contribution to stone formation is calcium. Hyperoxaluria is the most common risk factor identified in 40-75% of calcium stone forms. This elevated urinary calcium with high urinary oxalate might lead to calcium oxalate stone formation. Following administration a significantly lower urinary calcium and oxalate were observed, this enabled us to conclude that the extract is anti lithiatic

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