Original Article

Evaluation of Uric Acid Level in Albino Rabbits Treated with Ivy Leaves Extract

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ABSTRACT

Objective: Evaluate the effect of dried Ivy leaves extract on blood uric acid in Albino Rabbits.

Study Design: Experimental study

Place and Duration of Study: This study was conducted at the Pharmacology Research Department of University of Karachi, duration of study was 2 months from 20 June 2019 to 19 Aug 2019.

Methods: Dried Ivy leaves extract was given to Rabbits and they were consigned in 2 groups, group A was given normal saline and it was control group while group B, treatment group, was given Ivy leaves extract. Blood samples were drawn from control and treated groups and Uric acids levels were tested on day 7, 15 and 30 respectively.

Results: As it is evident from results that animals treated with Ivy leaves extract showed significant reduction in normal serum uric acid level compared to control group. Mean level of Uric Acid Level mg/dl at Day 7 in groups 1 and 2 was 5.10±0.51 and 4.78±0.27, at day 30 in group 1 and 2 was 4.98±0.34 and 3.76±0.32 and at day 60 in groups 1 and 2 was 5.06±0.48 and 3.46±0.48 it shows significant difference among the groups ($p<0.001$).

Conclusion: Current study showed that some acidic compounds and amino acids present in Ivy leaves extract can impair reabsorption of uric acid which ultimately increases its elimination so uric acid concentration decreased significantly in treated groups given Ivy leaves extract.

Key Words: Albino Rabbits, Ivy leaves, Uric Acid

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INTRODUCTION

It has proved from different research tasks both epidemiologically and medically that increased intake of naturally obtained fruits and leafy green vegetables might reduce the risk of highly fatal chronic diseases like tumors of different body organs and cardiovascular events such as angina, myocardial infarcts and stroke[1,2]. It is also understood that role of different ingredients derived from plant origin in nanotechnology is not sufficiently known also their consequences in the field of health and health industries is unidentified, in spite of advances in pharmacological discipline of herbal extracts, recent developments worldwide have specified active naturally extracted components from plant sources that not just exhibit decreased side effects but also yield numerous health advantages. It has unlocked modern road maps in the discipline of bio medics, some published studies have partly or entirely replaced nano capsulated drugs synthesized from photochemical compounds (plant derived drugs) which may enhance pharmacological effects and provide additional biological features[3,4].

Hedera helix l is associated with family Araliaceae, it is frequently called as English Ivy or simply Ivy, in conventional treatment of respiratory diseases extract of newly emerged leaves of plant has been recommended for many years[5]. There are various pharmacological formulations, preprations and dosage forms of Ivy leaf extract are found including liquid, semisolid, solid and these forms are conveniently made accessible for patients to cure diseases [6,7].

Habitat of plant conforms is often found along roadside, abandoned fields, railroads areas, gardens, and different waste areas. I. hederacea frequently grows in warm climatic areas, Ivy plant originates in different parts of Asia like Pakistan, India and Kashmir[8,9]. Various phenols such as sinapic acid-hexoside, erulic acid, coumaric acid-hexoside and ferulic acid-hexoside were found in hederacea helix leaves, according to the mass spectral characteristics, following amino acids are also present in hedera leaves Leucine= 6.59, Isoleucine=5.03, Glycine =5. 36, Glutamic acid=22.71 and Tyrosine =2.58.

It is studied by most of the investigators believe that high intake of proteins cause increases the excretion of uric acid but exact mechanism of its excretion is not clear. Mares has mentioned that increased level of uric

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acid in urine due to high dietary feeding of amino acids results from deterioration of many nuclei of digestive cells which are involved in assimilation of ingested proteins. Taylor and Rose proved in their study that uric acid level increases in urine after ingestion of high protein diet but urinary creatinine level does not alter. Mosier and Christman specifically mentioned that amino acid glycine significantly increases urinary uric acid concentration but it does not affect creatinine level. Hedera helix plant is widely consumed for cure of different joint diseases like rheumatoid arthritis, osteoporosis and other degenerative arthritis for treatment of these disorders higher share is from Ivy leaves. Fleck is a skin disease usually expressed on face it can be best treated with this plant, Ivy plant is also commonly used for different skin whitening creams mixed with some other medicinal plants [10,11].

Based on above information that high dietary protein intake can increase uric acid excretion through urine, our study also rely on these facts as Ivy leaves extract contain many amino acids specially glycine and this amino acid increases excretion of uric acid markedly. So it can be studied that food substances rich in protein amino acid content and different acidic substances can decrease blood uric acid level like acetyl salicylic acid and can be beneficial in gout diseases.

METHODS

For the perseverance of study healthy rabbits were used, them prolong biochemical effect like blood concentration of uric acid studied. The weight of animals ranges between 1200 to 1800 grams, they were from different gender and alienated uniformly in two groups.

Group A is control group (Normal saline 6ml/kg).

Group B is test group given Ivy extract at the dose of 0.0125 ml/kg [12].

Dried Ivy leaves extract was given on daily basis for sixty days. One-week time period was permitted to all animals to acclimatize under normal favorable laboratory condition, they were also under strict observation for any ulceration on skin, lack of activity, edema, diarrhea and hair loss.

Extract preparation: Extract of Ivy leaves can be prepared with following steps, first fresh leaves of plant were filtered with the aid of mesh #60 then it was crushed and powder form was obtained. Extractor was employed to formulate the extract and water has to be used as solvent in the ratio of 1:10 with herb and finally infusion was acquired and sieved.

Test Collection: Test collection method was done with obtaining blood from rabbits on regular intervals like 7th, 30th, and 60thday of study for measuring variations in blood uric acid levels. Total amount of blood collected from each animal is 5 ml and it was injected in jell tubes for the assessment of uric acid level.

Rate of mortality was checked for 60 days' time period in animals getting extract of dried Ivy leaves and it was zero percent.

Statistical analysis: TUKES POST HOC TEST has been used to evaluate significance of mean.

P <0.05 considered as significant.

P<0.01 considered as very significant.

P<0.001 considered as highly significant.

RESULTS

Uric acid level: Uric Acid conc. in mg/dl as Mean and comparison on day 7 in both groups

Uric Acid Level as mean in mg/dl on Day 7 in group 1 and 2 was 5.10±0.51 and 4.78±0.27 it shows notable difference among groups (p<0.001). Correlation of Group 1 and Group 2 exhibited insignificant difference (p=0.326) as shown in Table 1 and Figure 1.

Uric Acid conc in mg/dl as Mean and comparison on day 30 in both groups

Uric Acid Level as mean in mg/dl on Day 30 in group 1 and 2 was 4.98±0.34 and3.76±0.32 with marked difference among groups (p<0.001). Correlation of Group 1 and Group 2 presented significant difference (p<0.001) as shown in Table 1 and Figure 2.

Uric Acid conc in mg/dl as Mean and comparison on day 60 in both groups

Table No. 1: Showing mean and comparison between the groups

	Day7	Day 30	Day 60
Mean group1 Mean group 2	5.10±0.51 4.78±0.27	4.98±0.34 3.76±0.32	5.06±0.48 3.46±0.48
Comparison between group1 and group2	Insignificant difference TUKES POST HOC TEST used	Significant	Significant

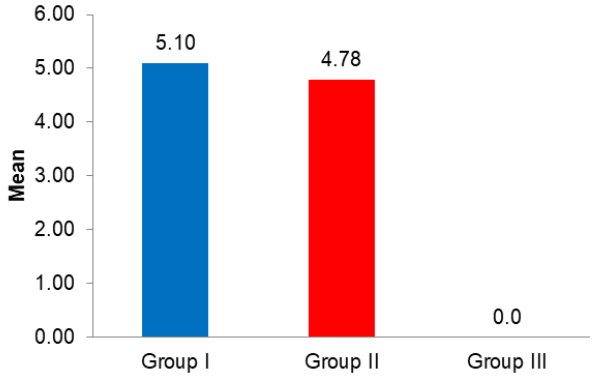

Figure No. 1: Uric Acid level as mean concentration in mg/dl at day 7 in different groups

Uric Acid Level as mean in mg/dl on Day 60 in group 1 and 2 was 5.06±0.48 and 3.46±0.48. difference is marked among the groups (p<0.001). Correlation of

Group 1 and Group 2 presented marked difference ($p<0.001$) as shown in Table 1 and Figure 3.

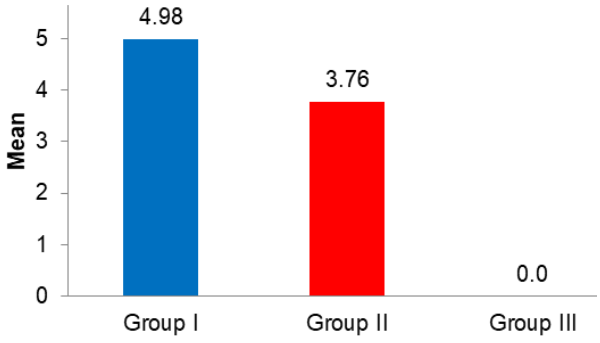

Figure No. 2: Uric Acid level as mean concentration in mg/dl at day 30 in different groups

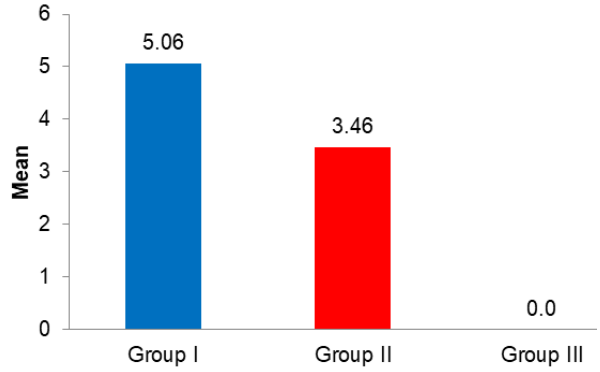

Figure No. 3: Uric Acid level as mean concentration in mg/dl at day 60 in different groups

DISCUSSION

Biochemical Formula of uric acid is C5-H4-N4-O3. It consist of oxygen, carbon, hydrogen and nitrogen and it is a heterocyclic ring compound. Uric acid is the metabolic product of purines. Purines naturally produced in the body and can be taken from diet also. Higher levels of uric acid start to deposit in joints as sodium urate crystals and can be the result of pathological condition gout. Uric acid can form different salts and ionic compounds called as acidic urates and urates, ammonium acid urate is one of the compound of uric acid which can deposit in spaces of joints and starts inflammatory process known as arthritis. Formation of uric acid begins with breakdown of nucleotide purine in the body and it is one of the components of urine. Higher values of blood uric acid may lead to gout, and it can cause some other medical disorders, like formation of ammonium acid urate crystals in joints and diabetes. Reference range of uric acid in blood lies between 3.4 and 7.2. Raised or decreased levels of uric acid are known as hypouricemia and hyperuricemia respectively. There are certain factors which can increase level of uric acid in body like diet rich in purine, sucrose, fructose corn soup, dieting or weight loss (rapidly) may temporarily elevate uric acid levels.

It was already proved by Taylor that high intake of protein in diet can increase uric acid excretion in urine our study is also in accordance with Taylor and it might occur due to interaction of amino acids at proximal convulated tubules of kidney. Christman and Moiser have also proved in their study that glycine amino acid inhibits reabsorption of uric acid at proximal convulated tubules it also causes secretion of uric acid thus can increase uric acid level in urine current study is also in favor of Christman and Moiser study because Ivy leaves extract also contain many amino acids and acidic compounds that might increase urinary excretion of uric acid.

Certain acidic substances may increase blood uric acid level like acetylsalicylic acid interfere with uric acid excretion at proximal convulated tubule as shown by terkeltaub in his study which is in favor of this study that acidic substances and amino acids can also interfere with excretion of uric acid [13].

Gout is the diseased condition which is characterized as higher levels of uric acid in blood and it get deposited in spaces of joints usually small joints of foot. The usual symptoms of gout include arthritis with severe pain in joints, redness swelling and inflammation begins where crystals of uric acid has been deposited. Reduction of uric acid level might occur due to amino acids found in Ivy leaves extract as these amino acids along with some acidic molecules might affect uric acid reabsorption at proximal convoluted tubules. It is apparent from this research that uric acid level is markedly less in rabbits given Ivy leaves (extract) which manifest that its extract cause fruitful effects in gout.

CONCLUSION

Different acidic substances are present in Ivy leaves extract which interacts with uric acid at proximal convulated tubules of kidney. These substances absorb back and cause secretion of uric acid in tubular lumen. Serum uric acid concentration is significantly less in treated groups given Ivy leaves extract as compared to control group.

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Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Shahid Ali, Nuzhat Sultana

Drafting or Revising Critically:	Uzma Ali, Mehveen Iqbal, Rahimullah Rahi
Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

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