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A Single-blind Randomized Clinical Study of *Varunadi Ghanvati* in the Management of Urinary Calculus & Modulation of S. Calcium Level

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ABSTRACT

Introduction

Urinary calculus is the most common afflict on the urinary system. It's a chronic disease with acute symptomatology i.e., severe pain incidence. It's treatable with conservative management in the early stage with a good prognosis. In the chronic phase, surgical intervention is essential in most cases though it comes with many complications. High S. Calcium level is a pathological stage, which can result in the formation and deposition of calcium-containing crystals in the urinary tract. Managing S. Calcium level can prevent further calculus formation.

Materials & Methods

Total 32 patients, between the age group of 18 to 70 years with classical symptomatology of urinary calculus and evidence of the stone presence in the urinary tract were registered & before treatment data were taken. Patients were given *Varunadighanvati* (500mg) each, 2 tablets 3 times a day with lukewarm water for 8 weeks. After treatment data was taken (Subjective & Objective) and assessed with proper statistical tests.

Results

In the subjective criteria, 85.30% improvement was observed. In the USG investigation, 73.81% improvement was observed. In S. calcium level, most of the subjects had slightly elevated S. Calcium levels, therefore no significant improvement was observed in it. In the overall assessment, 12 (37.50%) patients had marked improvement, 20 (62.50%) patients had moderate improvement.

Conclusion

Varunadighanvati have a highly significant effect in the management of urinary calculus and have modulating effects for the S. Calcium level.

Key Words *Varunadi Kwath, Urinary calculus, S. Calcium, Clinical study*

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INTRODUCTION

Urinary calculus is the most common afflict in the urinary system disorders after UTI & BPH. In the context of India, urinary calculus is prevalent, with an expectancy of 12% in a total population reported being prone to urinary stones. Out of

this 12%, 50% of the population is severely affected by renal damage, which even leads to loss of kidney function¹. It's a chronic disease with acute symptomatology i.e., severe pain incidence. Calcium is the major element of about 80–90% of all urinary stones². They are usually

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made of calcium oxalate or calcium phosphate or mixtures of them detected in the chemical or infrared spectrometric analysis³. Uric acid stones constitute nearly 5–10% of urinary stones⁴. Cystine stones are very rare, constituting only 1–2% of urinary calculi⁵. Hypercalcemia with hypercalciuria causes the occurrence of calcium nephrolithiasis, by increasing the urinary saturation of calcium salts and by binding negatively charged inhibitors of stone formation⁶. Around 70% of subjects with hypercalciuria have relatives with nephrolithiasis⁷. In Ayurveda 4 types of *Ashmarī* have been mentioned i.e., *shleshmaj*, *Vataj*, *Pittaj* & *Shukraj*⁸. In the early stage, *Ashmarī* can be treated with medicines, but in the later stage when the disease progresses, surgical removal of *Ashmarī* is essential⁹. *Varuna*¹⁰ & *Pashanbheda*¹¹ are indicated in different *Samhitas* of Ayurveda for the management of urinary calculus of any type with the effects i.e., lithotriptic, diuretic. *Ghanvati* form of *Varunadi Kwatha*¹² has been used for this study.

AIMS & OBJECTIVES

A. AIMS:

1. To study and observe the efficacy and effectiveness of *Varunadighanvati* in the modulation of serum calcium levels.
2. To study and observe the efficacy and effectiveness of *Varunadighanvati* in the management of urinary calculus.

B. OBJECTIVES:

1. To provide simple & effective measures to the patients with urinary calculus for the prevention and effective management of it.

MATERIALS & METHODS

SELECTION OF PATIENTS:

Patients who attended the out-patient department (OPD) of *Kayachikitsa* department and referred for research study from other departments of the academic hospital attached with the Institute of Post-Graduate Teaching & Research in Ayurveda, Jamnagar during the period from June 2018 to August 2019 complained of pain in flanks, loin, lumber, hypogastric, and associated regions which were mentioned in classics, burning micturition, hematuria, dysuria, and frequency of micturition were screened. Out of these, patients suffering from *Mootrashmari* (urinary calculus) fulfilling the below-mentioned inclusion criteria were randomly selected by a computer-generated randomization chart.

INCLUSION CRITERIA:

1. Referring or stable type of pain in both loin regions up to external urethral orifice.
2. Burning micturition with or without pain.
3. Intermittent mild to moderate haematuria.
4. Crystalluria. (Evident in Urine routine and microscopic investigation)
5. Patients (research subject) with ages between 18 to 80 years irrespective of gender, caste, religion, and region.
6. Stone size up to 15 mm evident in USG.

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EXCLUSION CRITERIA:

Patients of urolithiasis having a disease or/and under any medication that affects study, study drug, and its result or prognosis were excluded.

- 1) Case of medical emergency or need of immediate surgical intervention.
- 2) Case with severe hydronephrosis.
- 3) Severe haematuria.
- 4) Acute or chronic renal disease.
- 5) Acute retention of urine for more than 12 to 24 hours.
- 6) Hyperparathyroidism.

TREATMENT PROTOCOLS:

Table 1 Ingredient of *Varunadighanvati: Chakradatt ashmaryadhikar-29* (AFI – 4:22) (AYUSH Department, Govt. of India)

No.	Classical Name & Latin name	Part use	Proportion
1.	<i>Varuna</i> (Crataevanurvala Buch. -Ham.)	Stem bark	1 part
2.	<i>Shila</i> (<i>Pashanbheda</i>) (<i>Saxifraga ligulata</i> Wall.)	Root	1 part
3.	<i>Shunthi</i> (<i>Zingiber officinale</i> Roscoe)	Rhizome	1 part
4.	<i>Gokshura</i> (<i>Tribulus terrestris</i> Linn.)	Fruit	1 part
5.	<i>Yavakshar</i>	<i>Kshara</i>	125 mg

POSOLOGY:

METHOD OF PREPARATION:

The decoction was made from all the herbal raw ingredients except, *Kshara* for the *ghanvati* preparation as per table no. 1. A solid-state (*Rasakriya*) was achieved by continuously boiling the decoction, after that the *Prakshepadravya(s)* were added to the formulation. *Ghanvati* was made from the mixture weighing 500 mg each.

Table 2 Posology

<i>VarunadiGhanvati:</i>	
Dose	2 Tab. (Each 500 mg)
Frequency	TDS
<i>Anupana</i>	Warm water
Route of administration	Oral
Duration	For 8 Weeks
Follow up	2 Weeks

STUDY DESIGN:

- 7) Developmental defects or structural abnormalities of the kidney(s).
- 8) Neoplastic conditions.
- 9) Endocrinal diseases.
- 10) Staghorn stone or stone larger than 15 mm in size.

WASHOUT PERIOD:

Minimum 3 days of washout period were given if the patient (research subject) was taking any herbal or conventional medicine which can interact with or interrupt the research study.

1. Study type: Interventional
2. Purpose: Treatment
3. Masking: Single-blind
4. Grouping: 1 Group
5. Timing: Prospective
6. Endpoint: Efficacy and safety
7. Sample size: 32 patients in a group

CRITERIA FOR ASSESSMENT:

Patients were assessed based on relief in signs-symptoms (subjective criteria), other imaging investigation, and findings of the laboratory (objective criteria) based on specially designed research proforma through the scoring pattern.

Objective Criteria:

1. Improvement in the s. calcium level, CBC and urine routine, and microscopic investigation

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2. Size of stone (with the help of USG)
3. Number of stones (with the help of USG)
4. Hydronephrosis (with the help of USG)
5. Concretion of crystals (with the help of USG)

Criteria for total improvement for overall assessment:

No.	Total improvement	Criteria
1	Cured	100 % relief in signs& symptoms and change in size and number of stone(s).
2	Marked improvement	75 to 99% relief in signs& symptoms and change in size and number of stone(s).
3	Moderate improvement	50 to 74% relief in signs& symptoms and change in size and number of stone(s).
4	Mild improvement	25 to 49% relief in signs& symptoms and change in size and number of stone(s).
5	Impaired improvement	<25% relief in signs& symptoms and change in size and number of stone(s).
5	No improvement	No relief in signs& symptoms and no change in size and number of stone(s).

DISCUSSION

In this study, a total of 32 subjects was enrolled according to inclusion criteria and given *varunadighanvat* for 8 weeks and with 2 weeks of follow-up as per table no.2. Before treatment and after treatment subjective data and objective data as per table no. (3.1, 3.2, 3.3, 3.4) (investigations) were carried out and assessed statistically with (p<0.05) significance table no. (3.1, 3.2, 3.3, 3.4).

Table. 3.1 Pain:

No.	Symptom	Score
1	No pain	1
2	Bearable pain (1 or 2 times in 1 month)	2
3	Bearable pain occasionally (average 2 to 3 times /week)	3

4	Bearable pain every day	4
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Table. 3.2 Burning micturition

No.	Symptom	Score
1	No burning micturition	0
2	Burning micturition (1 or 2 times in 1 month)	1
3	Regular burning micturition (average 2 to 3 times /week)	2
4	Regular burning micturition everyday	3

Table. 3.3 Haematuria

No.	Symptom	Score
1	No Hematuria	0
2	Smoky black coloured urine	1
3	Bright red coloured urine	2

Table. 3.4 Frequency micturition

No.	Frequency	Score
1	Up to 6 times	0
2	7-9 times	1
3	10-12 times	2
4	>12 times	3

Varunadighanvat has 5 ingredients as per table no. 1, all ingredients have *vata-kaphanashaka* properties, *varunahas* pitta-*janaka* properties. This formulation has pharmacological actions, i.e., *Ashmarighna*, *bastishodhana*, *mootrala*, *bhedana*, *mootravirechaniya*, *deepana*, *paachana*, *aamdoshahara*, *vrushya*, *brumhana*, and *sukshmasrotogami*. These all ingredients are individually indicated for the *ashmarichikitsa*. In the statistical analysis of subjective criteria (chief complaints), significant improvement was observed in hematuria (97.44%), pain (94.17%), burning micturition (87.50%), frequency of micturition (78.79%), and dysuria (75.27%) as per table no. 4.1. In the objective criteria, for haematological investigations, no significant improvement was observed in Hb% (0.31%), and S. Calcium level (0.31%), for

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biochemical investigation significant observed in a number of stones (46.91%), size of improvement observed in U. Albumin level stones (48.34%), a concretion of crystals (100.00%), for ultra-sound sonography (100.00%), and hydronephrosis (100.00%) as per investigations, the significant improvement table no. 4.2.

Table 4.1 Subjective parameters assessed by Wilcoxon matched-pairs sign rank test

Chief Complaints (Subjective parameters)	n	BT (Mean± S.D.)	AT (Mean± S.D.)	%	Sum of All Ranks (W)	P	Result
Pain (<i>Ruk</i>)	32	3.75 ± 0.43	0.21 ± 0.49	94.17	528	.0000 (<0.0001)	Extremely Significant
Burning micturition (<i>Mutradaha</i>)	32	3.0 ± 0.25	0.37 ± 0.49	87.50	528	.0000 (<0.0001)	Extremely Significant
Hematuria (<i>Saraktamootrapravrutti</i>)	32	1.21 ± 1.15	0.03 ± 0.17	97.44	190	.000070 (<0.0001)	Extremely Significant
Dysuria (<i>Mootrakruhra</i>)	32	2.90 ± 0.39	0.71 ± 0.45	75.27	528	0.0000 (<0.0001)	Extremely Significant
Frequency micturition (<i>Atimootrapravrutti</i>)	32	1.03 ± 1.40	0.21 ± 0.42	78.79	78	0.002 (<0.01)	Highly Significant

Table 4.2 Objective parameters assessed by paired 't'-test & Wilcoxon matched-pairs sign rank test:

Haematological, Bio-Chemical and USG Investigations	n	BT (Mean ± S.D.)	AT (Mean ± S.D.)	Mean Change	%	t value (**Sum of ranks)	P-value (or of)	Result
S. Calcium	32	10.05 ± .74	10.02 ± .59	.031 ± .95	0.31	.184	.855 (>0.01)	Not Significant
Hb%	32	13.97 ± 1.48	13.93 ± 1.65	.043 ± .69	0.31	.358	.72 (>0.01)	Not Significant
Urine Albumin	32	.21 ± .42	0 ± 0	.21 ± .42	100.0	2.96	.006 (<0.01)	Highly Significant
Number of Stones	32	2.53 ± 2.68	1.34 ± 1.23	1.18 ± 2.66	46.91	2.51	.017 (>0.05)	Significant
Size of stones	32	10.43 ± 6.90	5.39 ± 4.58	5.04 ± 4.96	48.34	5.75	.000002 (>0.01)	Extremely Significant
Concretion of Crystals*	32	1.00 ± 0.00	0.00 ± 0.00	1.00 ± 0.00	100.0	**528	0.00000 (<0.0001)	Extremely Significant
Hydronephrosis*	32	1.00 ± 0.00	0.00 ± 0.00	1.00 ± 0.00	100.0	**528	0.00000 (<0.0001)	Extremely Significant

*Wilcoxon matched-pairs sign rank test applied (Data is not Normally Distributed & Grading pattern applied for the assessment)

On the assessment of overall effects of the treatment, 62.50 % (20) patients had moderate improvement as per table no. 5, which was in between 50 to 74% relief in sign & symptoms and change in size and number of stone(s) as per table no. 4. 37.50 % (12) patients had marked improvement as per table no. 5, which was in between 75 to 99% relief in sign & symptoms

and change in size and number of stone(s) as per table no. 4.

CONCLUSION

These results suggest that the application of *Varunadighanvat* for 8 weeks has a significant effect (p<0.05) on the management of urinary

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calculus and its expulsion, along with the modulation of S. Calcium level.

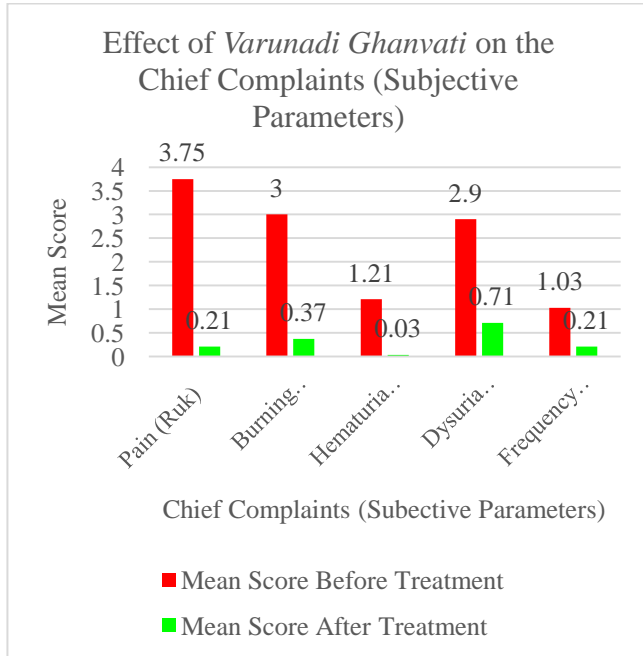


Chart. 4.1 Chart presentation of statistical analysis of subjective parameters

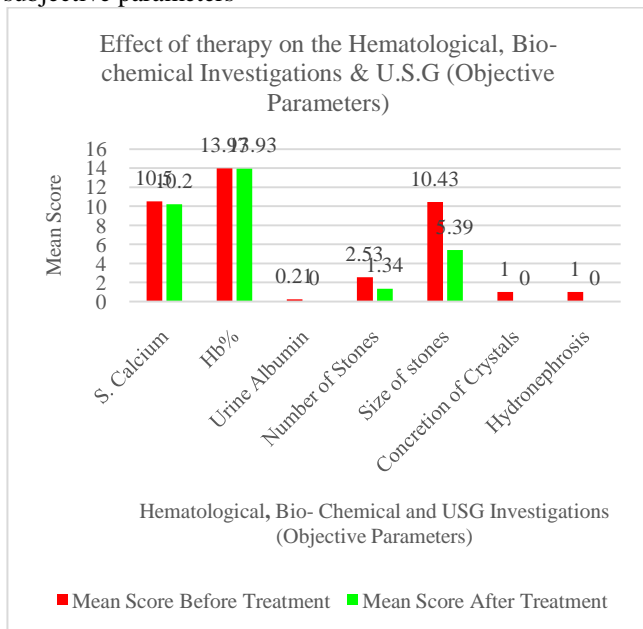


Chart. 4.2 Chart presentation of statistical analysis of Hematological, Bio-Chemical and USG Investigations (Objective parameters)

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REFERENCES

1. https://www.researchgate.net/profile/HnaliniSofia/publication/299543144_PREVALENCE_AND_RISK_FACTORS_OF_KIDNEY_STONE/links/56fe82a108ae650a64f71f53/PREVALENCE-AND-RISK-FACTORS-OF-KIDNEY-STONE.pdf Reviewed on date: 11/01/2022.
2. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6352122/> Reviewed on Date: 11/01/2022.
3. Evan A.P. Physiopathology and etiology of stone formation in the kidney and the urinary tract. *Pediatr. Nephrol.* 2010;25:831–841. doi: 10.1007/s00467-009-1116-y. Reviewed on Date: 11/01/2022.
4. Martillo M.A., Nazzal L., Crittenden D.B. The crystallization of monosodium urate. *Curr. Rheumatol. Rep.* 2014;16:400. doi: 10.1007/s11926-013-0400-9. Reviewed on Date: 11/01/2022.
5. Singh S.K., Agarwal M.M., Sharma S. Medical therapy for calculus disease. *BJU Int.* 2011;107:356–368. doi: 10.1111/j.1464-410X.2010.09802.x. Reviewed on Date: 11/01/2022.
6. <https://pubmed.ncbi.nlm.nih.gov/1272073/> Reviewed on Date: 11/01/2022.
7. Polito C, Manna A, Nappi B, Villiani J, Di Toro R. Idiopathic hypercalciuria and hyperuricosuria: family prevalence of nephrolithiasis. 2000;14:1102–1104. Reviewed on Date: 11/01/2022.
8. <https://niimh.nic.in/ebooks/esushruta/?mod=read>, *Sushrut Samhita, Nidansthan*, Chapter-3/3. Reviewed on Date: 11/01/2022.
9. <https://niimh.nic.in/ebooks/esushruta/?mod=read>, *Sushrut Samhita, Chikitsasthan*, Chapter-7/3. Reviewed on Date: 11/01/2022.
10. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3221072/> Reviewed on Date: 11/01/2022.
11. http://www.ijpr.com/File_Folder/97-105.pdf Reviewed on Date: 11/01/2022.
12. *Chakradattabychakrapanidatta*, translated and made easy by Ayurvedacharya Pandit JagannathasharmaBajpeyee, Third edition, published by Shri Laxmi Venkateshvar steam press, Page no. 167/28. Reviewed on Date: 11/01/2022.