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Research Article

Use of *Kulattha (Dolichos biflorus* Linn.) in the Management of *Mutrashmari* (Urinary Calculus): A Clinical Study

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I N F O

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A B S T R A C T

Introduction: In Ayurveda, *Ashmari* is mainly considered as '*Mutrashmari*' (urolithiasis), which is emerging as a sequel to deranged *mutra pravritti* and leads to deterioration in urine secretion and micturition. *Mutrashmari* is a disease of *Mutravaha srotas*. It is considered to be one of the various deadly diseases described as '*Asta mahagadas'*. These show symptoms that are quite similar to the symptoms of urolithiasis of modern science. The trial medicine "*Kulattha Churna*" is mentioned to have lithotriptic (ashmarighna) properties and also relieves burning micturition (*mutrakrichra).*

Aims and Objectives: This work aims to analyse the medical management of *mutrashmari*. Its objectives are: (i) To assess the efficacy of *Kulattha (Dolichos biflorus* Linn.) in the management of *mutrashmari*. (ii) To assess the efficacy of *Kulattha (Dolichos biflorus* Linn.) on stones present in the calyx and pelvis.

Methodology: A clinical study on 100 patients suffering from *mutrashmari* was conducted at Government Ayurvedic College & Hospital, Guwahati-14, Assam. Three patients were not able to complete the study, hence the effective sample size was 97. A special proforma was prepared and designed which was used for diagnosis. Routine blood examination and biochemical investigations along with microscopic examination of urine were carried out.

Results: After the completion of treatment, the effects on the clinical features according to Ayurveda and modern science were observed thoroughly which showed that *kulattha churna* cured symptoms like *Mutradhara Sanga*, *Basti Vedana, Mehana Vedana*, and *Sevani Vedana* effectively. There was marked improvement in *AtiAvilamutrata, Nabhivedana, Dysuria*, burning micturition, haematuria and pain.

Conclusion: From the result of the effect of therapy on stones, it can be summarised that kulattha churna has a good effect on stones of size less than 5 mm.

Keywords: *Urolithiasis, Mutrashmari, Kulattha Churna, Asmarighna*

Introduction

In Ayurveda, *Ashmari* is mainly considered as '*Mutrasmari*' (urolithiasis), which is emerging as a sequel to deranged mutra pravritti and leads to deterioration in urine secretion and micturition. *Mutrashmari* is a disease of *Mutravaha srotas*. It is considered one of the various deadly diseases which are described as '*Asta mahagadas*'. Sushruta, the father of surgery, explained urinary calculus in detail under the heading of *Mutrashmari*, including aetiological factors, pathology, symptomatology, classification and also complications and management with medicines and surgical procedures.[1] In the 26th chapter of Chikitsa Sthana, there is a detailed description of *Nidana, Samprapti, purva rupa, rupa*, and the type and treatment of *Ashmari.*[2]

Excruciating pain over *nabhi, vasti*, or at *sevani*, or *medra* during micturition, blood-stained urine, sudden stoppage of urine flow, slitting and twisting of urine, and jolting aggravation of pain etc. during running are the main symptoms of *mutrashmari*. These are quite similar to the symptoms of urolithiasis in modern science. Hence *mutrashmari* mentioned in Ayurveda can be co-related with urolithiasis.

In modern science, the presence of calculi in the urinary system is known as urolithiasis. It is estimated that urolithiasis is particularly common in some geographic locales such as in parts of South Africa, India, the United States, and South East Asia and afflicts 2% of the total world's population.[3]

Based on its prevalence, urolithiasis was chosen as the disease for the trial. An attempt to manage mutrashmari in the calyx and pelvis by medical management using Kulattha Churna is made in this work. Efforts are made to find a safe and effective cure for this terrifying illness. The proposed drug has references in various Ayurvedic classics for the treatment of *Ashmari.* The trial medicine, "*Kulattha Churna*", is mentioned to have lithotriptic (*ashmarighna*) properties and also relieves burning micturition (*mutrakrichra*).[4,5]

Aims and Objectives

- To assess the efficacy of Kulattha (*Dolichos biflorus* Linn.) in the management of *Mutrashmari*
- To assess the efficacy of Kulattha (*Dolichos biflorus* Linn.) in stones present in the calyx and pelvis

Material & Methods

This randomised open clinical trial was conducted for a period of 60 days among patients selected from the Outpatient Department (OPD) and Inpatient Department (IPD) of the Hospital of Government Ayurvedic College & Hospital, Jalukbari, Assam. All the patients in the present study were selected between the age group of 18 and 75 years. Patients having *mutrashmari* were selected to observe the overall relief in signs and symptoms, but special observations were done regarding relief in urolithiasis present in the calyx and pelvis. All the patients were chosen irrespective of their sex, religion, occupation etc.

In the current clinical investigation, 100 *Mutrashmari* patients were selected, of which 97 patients completed the trial and received *kullatha churna* treatment for 60 days. The impact of the medication on signs and symptoms was examined at several time points, including after 20 days, after 40 days, and after 60 days, when the treatment was complete.

On the basis of signs and symptoms of *Mutrashmari* that are described in Ayurvedic and modern text, a special proforma was prepared. The diagnosis was made using this proforma. Routine blood examination and biochemical investigations such as serum creatinine, blood urea and random blood sugar were carried out. Routine and microscopic examination of urine was carried out to investigate the presence of epithelial cells, pus cells, red blood cells, renal casts and crystals. Follow-up was advised after 20 days, 40 days, and 60 days. Statistical analysis was done using GraphPad.

Ethical clearance was received from the Institutional Ethics Committee, Govt. Ayurvedic College, Guwahati for the study. Consent was taken from patients after informing them about the purpose of the clinical trial, nature of the drug of treatment, and follow-up including laboratory investigations to monitor and safeguard their health.

Diagnostic Tests

Special investigations such as X-ray (KUB region) were advised for the confirmation of the diagnosis. To know the size and site of the stone, ultrasonography of the KUB region was done in cases of radiolucent stone.

Subjective Criteria: Pain, burning micturition, and dysuria

Objective Criteria: Haematuria, size of stone, site of stone, and number of stones

Inclusion Criteria

- Age between 18 and 75 years
- Stone size ≤ 10 mm

Exclusion Criteria

- Patients below 18 years and above 75 years of age
- Patients having the size of calculus more than 10 mm
- Patients with chronic renal failure with high blood urea and serum creatinine, who needed immediate surgical procedures and had complications
- Patients with obstructive uropathy, moderate to severe hydronephrosis and other major systemic illnesses

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Criteria for Withdrawal

- Aggravation of the disease condition like hydronephrosis, ureteric colic, haematuria etc. during the course of the trial period
- Discontinuation of the prescribed treatment during the trial
- Any complication or side effect during the treatment for which the treatment needed to be changed

Trial Medicine: All patients were given *Kulattha beeja* churna (Figures 1 and 2).

Dose: 12 gm per day in three divided doses (the dose is as mentioned in Sharangadhar Samhita)[6]

Duration: 60 days

Figure 1.*Kulattha Beej*

Figure 2.Prepared Medicine (*Kulattha Beej Churna*)

Assessment Criteria

The signs and symptoms of *Mutrashmari* as described in Ayurvedic classics as well as in modern medicine along with various investigations helped in making a diagnosis and assessing the extent of relief. Scoring was done according to relief in signs, symptoms and investigations and statistical analysis was done to know the efficacy of therapy.

Subjective Parameter

The symptoms were noted before and after treatment. Assessment of the therapy was done according to the relief observed in the symptoms with the help of a scoring pattern.

Pain

No pain	-	0
Occasional pain	-	1
Constant dull pain	-	2
Constant severe pain	-	3

Burning micturition

No burning micturition	-	0
Occasional burning micturition	-	1
Constant burning micturition	-	2
Constant severe burning micturition	-	3

Dysuria

No dysuria	-	0
Occasional dysuria	-	1
Constant dysuria	-	2
Constant severe dysuria	-	3

Objective Parameter

Various signs were noted and investigations were done before and after treatment. The details of the scores adopted for the signs and investigations of the disease were as follows –

Haematuria

• No RBC/ HPF in urine	-	0
• 0–5 RBC/ HPF in urine	-	1
• 6–10 RBC/ HPF in urine	-	2
• > 10 RBC/ HPF in urine	-	3

Size of Stone

• No stone size	-	0
• Stone size < 5 mm	-	1
• Stone size ≥ 5–8 mm	-	2
• Stone size > 8 mm	-	3

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Site of Stone

- No stone anywhere - 0
- Ureter, UV junction, bladder - 1
- Pelvis - 2
- Calyx - 3

Number of stones

- No stone - 0
- 1 stone - 1
- 2 stones - 2
- ≥ 3 stones - 3

Follow Up

All the patients were instructed to have regular check-ups at 20 days, 40 days and 60 days. During this period, patients were examined thoroughly for the signs and symptoms. They were also informed clearly about the *Pathya* and *Apathya*.

Results

After the completion of the treatment, the effects on the clinical features according to Ayurveda and modern science were observed thoroughly which showed that the *kulattha churna* cured symptoms like *Mutradhara Sanga* (79.60%), *Basti Vedana* (79.24%), *Mehana Vedana* (78.12%), and *Sevani Vedana* (76.92%). There was a marked improvement in *AtiAvilamutrata* (66.66%) and *Nabhivedana* (65.70%). It was observed that *kulattha churna* cured symptoms like dysuria (83.33%), burning micturition (82.41%), haematuria 87.5%, and pain (76.30%). Statistical analysis of the improvement of different signs and symptoms is shown in Tables 1–3.

Note: t(18) = 10.3215, p ≤ 0.001, hence the result was highly significant. It signifies that the trial drug was highly effective in reducing dysuria caused by the stone.

Table 1.Paired t Test Value for Pain (*Vedana*) Before and After Treatment (N = 91)

X̄BT ± SD	X̄AT ± SD	SED	t(90)	p Value	Remarks
1.90 ± 0.76	0.67 ± 0.76	0.066	18.5243	< 0.001	Highly significant

X̄BT: Mean Before Treatment, X̄AT: Mean After Treatment, SED: Standard Error Deviation

Note: t(90) = 18.5243, p ≤ 0.001, hence the result was highly significant. It signifies that the trial drug was highly effective in reducing the pain caused by the stone.

Table 2.Paired t Test Value for Burning Micturition Before and After Treatment (N = 70)

X̄BT ± SD	X̄AT ± SD	SED	t(69)	p Value	Remarks
1.61 ± 0.71	0.54 ± 0.85	0.074	14.4260	< 0.001	Highly significant

X̄BT: Mean Before Treatment, X̄AT: Mean After Treatment, SED: Standard Error Deviation

Note: t(69) = 14.4260, p ≤ 0.001, hence the result was highly significant. It signifies that the trial drug was highly effective in reducing burning micturition caused by the stone.

Table 3.Paired t Test Value for Relief of Dysuria Before and After Treatment (N = 19)

X̄BT ± SD	X̄AT ± SD	SED	t(18)	p Value	Remarks
1.74 ± 0.73	0.00 ± 0.00	0.168	10.3215	< 0.001	Highly significant

X̄BT: Mean Before Treatment, X̄AT: Mean After Treatment, SED: Standard Error Deviation

The ultrasound reports showed that a total of 39 kidney stones were present in the calyx, out of which, 24 stones were less than 5 mm in size, 13 stones were between 5 and 8 mm, and 2 stones were more than 8 mm in size. Six stones of size less than 5 mm and 4 stones of sizes between 5 and 8 mm were expelled from the body. Fourteen stones of size less than 5 mm and 10 stones between 5 and 8 mm were reduced in size. In 2 stones of size less than 5 mm, downward movement was observed. 4 stones of size less than 5 mm and 1 stone of size between 5 and 8 mm remained unchanged. In the pelvis, out of 32 stones, 22 were less than 5 mm, 9 were between 5 and 8 mm, and 1 stone was more than 8 mm in size. Out of these, 8 stones of size less than 5 mm and 3 stones of size between 5 and 8 mm were expelled from the body (Figure 3); 3 stones of size less than 5 mm remain unchanged and 1 stone between 5 and 8 mm reduced in size. In 5 stones of size less than 5 mm, downward movement was observed. Table 4 shows

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the effect of therapy on the stones at the calyx and pelvis of patients.

Discussion

In the current clinical investigation, 97 *Mutrashmari* patients received *kullatha churna* treatment for 60 days,

Table 4.Effect of Therapy on Stones at Calyx and Pelvis of Patients according to USG Reports

Before Treatment			After Treatment
Size (mm)	Site	No. of Patients*	Effect
< 5	Calyx	24	Exp: 6, DS: 14, DM: 2, NC: 4
	Pelvis	22	Exp: 8, DS: 6, DM: 5, NC: 3
5–8	Calyx	13	Exp: 4, DS: 10, DM: 0, NC: 1
	Pelvis	9	Exp: 3, DS: 1, DM: 0, NC: 0
> 8	Calyx	2	Exp: 0, DS: 0, DM: 0, NC: 0
	Pelvis	1	Exp: 0, DS: 0, DM: 0, NC: 0

Exp: Expelled, DS: Decrease in size, DM: Downward movement, NC: No change in size

*Total number of treated patients excluding patients with incomplete treatment

and the impact of the medication on signs and symptoms was examined at several time points, including after 20 days, 40 days, and 60 days. The majority of patients, i.e. 65 (67.01%) were found to be between the ages of 31 and 40 years, while 20.62% (20 patients) were found to be between the ages of 41 and 75 years. 12.37% of the patients were between the ages of 18 and 30 years. In the present study, out of a total of 97 registered patients, the majority of patients were male (69, 71.13%) while the remaining (28, 28.87%) were female. On observing the nature of occupation, the majority of patients (44.33%) were found to be in paid employment, followed by workers (24.74%), housewives (20.62%), and students (10.31%). In the present study, it was observed that the majority of patients (37.11%) came from the lower-middle class and 31.96% were from the middle class. At least 2.06% of the population came from a higher social level than the remaining 28.87% who belonged to the poor sector of society. Among the patients, 34.02% were found to be addicted to tea or coffee, 16.49% to smoking, 14.43% to tobacco, 3.09% to alcohol, and 31.96% had no addiction. It was observed that the majority of patients (73.2%) took mixed-type diets, while 26.8% were vegetarians.

According to the study, 53.61% of patients consumed *Madhura Rasa*, 19.59% *Katu Rasa*, 10.31% *Amla Rasa*, 7.22% *Lavan Rasa*, 5.15% *Tikta Rasa*, and 4.12% *Kasaya Rasa* daily. The majority of the patients (46.39%) had *Vata-Kapha Sharira Prakriti*, followed by 32.99% of patients with *Vata-pitta* and 20.62% of patients with *Kapha-Pitta Prakriti*. Observing the data of *Nidana* here, it was found that all patients were *Asamshodhanasheela*, followed by 84.54% who had *Madhura Ahara*, 73.33% in *Apathya Sevana*, 67.01% each in *Adhyashana* and *Snigdha Ahara*, 65.98% in *Divaswapna*, 64.95% in *Guru Ahara*, 62.89% had *Tikshnaushna Ahara*, 50.52% had *Ajirṇa Sevana*, 45.36% had *Mamsa Sevana*, 42.27% had *Matsya Sevana*, 39.18% had *Sheeta Ahara*, and 21.65% each in *Samashana* and *Ati Vyayama*.

Considering the site of stone, it was observed that the maximum (40.21%) patients had stones in the calyx, 32.99% in the pelvis, and 26.8% patients in the ureter, UV junction and bladder (17.53% in the ureter, 7.22% in UV junction, and 2.06% in bladder). It was found that for maximum (73.49%) patients, stones were less than 5 mm in size, while for 23.49%, the size of stones was 5 mm–8 mm, whereas, for 3.01%, the stones were more than 8 mm in size. The total number of patients registered for the study was 100, but 3 patients did not complete the trial. Hence the result after the completion was computed for 97 patients. The effects on the clinical features according to Ayurveda were observed thoroughly which showed that the *kulattha churna* cured symptoms like *Mutradhara Sanga* (79.60%), *Basti Vedana* (79.24%), *Mehana Vedana (*78.12%), and Sevani Vedana (76.92%). There was a marked improvement in *AtiAvilamutrata* (66.66%) and *Nabhivedana* (65.70%). After completion of the treatment with kulattha churna for 2 months, it was clear that it cured symptoms like dysuria (83.33%), burning micturition (82.41%), haematuria (87.5%), and pain (76.30%). The relief in these signs and symptoms was observed due to the *Sula Prashamana*, *Shothahara*, *Vatanulomana* and *Mutrala* properties of the ingredients in *kulattha churna*.

In this study, 39 patients were suffering from stones in the calyx (14 in the upper calyx, 20 in the lower calyx and 5 in mid calyx). In 14 patients with stones in the upper calyx, 3 patients were cured, 1 showed marked improvement and 10 showed improvement. In 20 patients with stones in the lower calyx, 4 were cured, 1 showed marked improvement and 15 showed improvement. In 5 patients with stones in mid calyx, 3 were cured, 1 showed marked improvement and 1 showed improvement.

Probable Mode of Action[4,5]

According to the Ayurveda texts, *kulattha churna* has the following modes of action:

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- **Vata:** *Vataghna, Sara, anulomana, bhedana, Shulaprashamana*
- **Pitta:** *Daha Prashamana, vranaropana*
- **Kapha:** *Kaphahara, Shothahara, Medohara*
- **Dushya (*Rasa, Mutra*):** *Mutrala, Mutra kriccha, mutra vikarahar*
- **Mutravaha Srotodusti:** *Mutra kriccha, mutra vikarahar, ashmarighna*

The *Vatanulomana, Shothahara*, *Shulaprashamana*, *mutrala, Mutra kricchahar* and *mutra vikarahara* properties of *kulattha* help to relieve pain and *Sthanika Sotha*. Stone might be dissolved because of the *Ashmari Bhedana* property of *kulattha*.

Ushna guna of the used drug helps to increase the *Agni,* which further checks the formation of *Ama at Jatharagni* level itself.

Chemical constituents of *kulattha* are genistein, dalbergioidin, phasecollidin, quercetin, and tannins. The tannins and flavonoids (quercetin) that are present in Dolichos biflorus help to relax the smooth muscles of the urinary tract and facilitate the expulsion of stones from both kidneys.[7] Quercetin, another chemical present in *D. biflorus*, shows inhibition of ACE (Angiotensin converting enzymes) activity and results in a significant reduction of renal calcium oxalate crystal deposition as well as interstitial inflammation. Quercetin reduces the lipid peroxidation effectively and restores the antioxidant enzyme activity. In this way, kulattha is used as medicine for treating urolithiasis or renal stones primarily through its antioxidant and anti-inflammatory activity.

Scope for Future Study

The study shows *kulattha churna* has a good effect on stones of sizes less than 5 mm and a mild effect on stones of sizes between 5 and 8 mm. A good cure rate was found in ureteric, uretero vesicular junction, and bladder stones, followed by stones in the calyx. Future studies may be helpful in finding effective treatments for stones larger than 5 mm in size and stones that are present in the pelvis and calyx of the kidney by using *kulattha* along with some specific *anupan* or drugs.

Conclusion

According to the results of effect of therapy on clinical features (according to Ayurveda and modern science), after 60 days of treatment, it can be said that relief in signs and symptoms of *Mutradhara Sanga, Basti Vedana, Mehan Vedana, Sevani Vedana, dysuria*, burning micturition and pain was observed due to S*ula Prashamana, Shothahara, Vatanulomana* and *Mutrala* properties of *kulattha*. From the result of the effect of therapy on stones at different sites and of varying sizes, it can be summarised that *kulattha churna* has an average effect on stones in the calyx. It might be due to the diuretic and analgesic lithotriptic properties of the ingredients in *Kulattha beej*.

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Conflict of Interest: None

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