



EFFICACY OF SHRINGAVERADI CHOORNA IN THE MANAGEMENT OF RENAL CALCULI: A CLINICAL STUDY WITH PRE-POST STUDY DESIGN

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ABSTRACT:

Background: Renal stones are a common health problem, affecting approximately 8-10% of the global population. If left untreated or not treated properly, renal calculi can significantly impair kidney function, and recurrence is also common. Many formulations with *asmari bhedaka* property have been mentioned in *Ayurveda* classics which are cost effective, devoid of complications and provide wide scope for the successful treatment of *mootrasmari*. **Aim** - To evaluate the effect of *Shringaveradi choorna* in reducing the size, signs and symptoms of renal calculi. **Settings and design:** the study was a Pre-Post study design with 23 participants in a single group selected on the basis of inclusion and exclusion criteria. **Materials and methods:** Participants were given 2g *Shringaveradi choorna* twice daily, before food with *dadhimanda*(scum of curd) as *anupana* for a period of 30 days. Assessment was done on Baseline, 15th and 31st day for subjective parameters (pain and tenderness over renal angle, burning micturition ,dysuria) and objective parameters(hematuria, puscells in urine). Renal calculi size and number were assessed before and after the treatment by taking USG(Abd&pelvis). **Results:** Both subjective and objective parameters were statistically significant with P <0.0001. Size and number of calculi showed significance with p<0.001. **Conclusion:** On analysing the results it can be concluded that *Sringaveradi choorna* is effective in reducing the size, number as well as signs and symptoms of renal calculi.

Keywords: Renal calculi, *mootrasmari*, *Sringaveradi choorna*

INTRODUCTION

Renal calculi is the third most common urological disorder, exceeded by urinary tract infections and pathological conditions of the prostate[1]. Its incidence and prevalence is increasing day by day globally[2]. Estimated lifetime prevalence of kidney stone disease ranges from 1% to 15%. Males are affected more as compared to females with a male to female ratio of 3:1. According to the National Health And Nutrition Examination Survey (NHANES) data from 2007-2010, approximately 19% of men and 9% of women will develop at least one stone at some point in their lifetime[3]. Urinary calculi are hard mineral deposits formed in the kidney or urinary tract, made up of urinary salts and colloid matrix of organic materials[4].

Ayurveda provides a comprehensive understanding of *mootrasmari*, including its pathogenesis, clinical features, classification, prognosis, complications and treatment options. *Mootrasmari* is considered as one among *ashtamahagadas* and is a *kapha pradhana tridoshaja vyadhi*. According to *Susrutha*, those persons who do not undergo *sodhana* therapy regularly and those who indulge in unwholesome food and activities regularly become the victims of *asmari*. There are mainly 4 types of *asmari* : *Shleshmaja asmari*, *Pittaja asmari*, *Vataja asmari* and *Sukraja asmari*. Various ayurvedic formulations have shown effectiveness in expelling renal stones and preventing recurrence. *Asmari* of recent onset can be cured with medicines while chronic calculi should be treated surgically [5]. The *asmarihara yogas* when used in the initial stage of renal stone reduces the chance of surgery. In

Ayurveda although various medications have been available to treat renal calculi, these medicines contain many drugs, some of which are unavailable in the present day. The present study with *Shringaveradi choorna* is proposed with an easily available, conservative and economically feasible treatment for renal calculi of less than 10mm size. *Shringaveradi choorna*, which contains *Sringavera*, *Yavakshara*, *Pathya* and *Kaleetaka (Darvi)*, is one of the formulation mentioned in *Bhavaprakasha-Asmaryadhikara*. This *choorna* is praised for its *asmaribhedana* (splitting) and *pathana* (eliminating) property[6].

AIM

The aim of this study was to evaluate the effect of *Shringaveradi choorna* in reducing the size, signs and symptoms of renal calculi.

OBJECTIVE

1. To evaluate the effect of *Shringaveradi choorna* in reducing the size of the renal calculi
2. To evaluate the effect of *Shringaveradi choorna* in reducing the signs and symptoms of renal calculi

MATERIALS AND METHODS

Diagnosis was made on the basis of clinical examination and USG (abdomen & pelvis). Patients were monitored regularly and observations were recorded before, during and after the drug schedule.

Study Setting

OPD and IPD, Dept. of Shalyatantra, Govt. Ayurveda College hospital, Trivandrum

The Study was conducted for a duration of 1 1/2 year; from 01/04/23 to 31/08/24.

Study Design :

Interventional pre-post study design. The consort flow diagram of the study is provided in Fig. 1.

Study Population

Participants, between the age group of 30-60 years irrespective of gender, having renal calculi attending the OPD and IPD, Department of Shalyatantra, Government ayurveda college, Trivandrum

Sampling method: Consecutive sampling

Sample Size : 23

Trial Drug Details:

Table 1: Ingredients of *Shringaveradi choorna*

Drug	Botanical Name	Family	Useful Part
<i>Shringavera</i>	<i>Zingiber officinale</i>	Zingiberaceae	Rhizome
<i>Pathya</i>	<i>Terminalia chebula</i>	Combretaceae	Fruit
<i>Kaliyaka/Darvi</i>	<i>Berberis aristata</i>	Berberidaceae	Stem
<i>Yava</i>	<i>Hordeum vulgare</i>	Poaceae	Whole plant

Selection Criteria:

Inclusion criteria:-

- Patients with signs and symptoms of renal calculi and diagnosis confirmed by USG
- Size of the calculi less than 10mm
- Patients of both sex
- Age group 30-60years

Exclusion criteria:-

Name of the trial drug: Shringaveradi choorna

Ingredients of the *yoga* (*Shringavera*, *yavakshara*, *pathya*, *darvi*) were collected from a GMP certified shop and the authenticity of drugs was ensured. Preparation and storage of drug was done in a clean and safe condition.

Preparation Of *Shringaveradi Choorna*

Ingredients mentioned in Table 1 (1-3) were thoroughly cleaned, dried, finely powdered and sieved. Equal quantities of each drug and *yavakshara* were well mixed together and stored in airtight container.

- Patients having impaired renal functions
- Diagnosed cases of malignancy
- Tuberculosis of urinary tract
- Subjects with uncontrolled DM and HPTN
- Pregnant and lactating mothers
- Patients who are contraindicated for the intake of *kshara* as mentioned in classics.

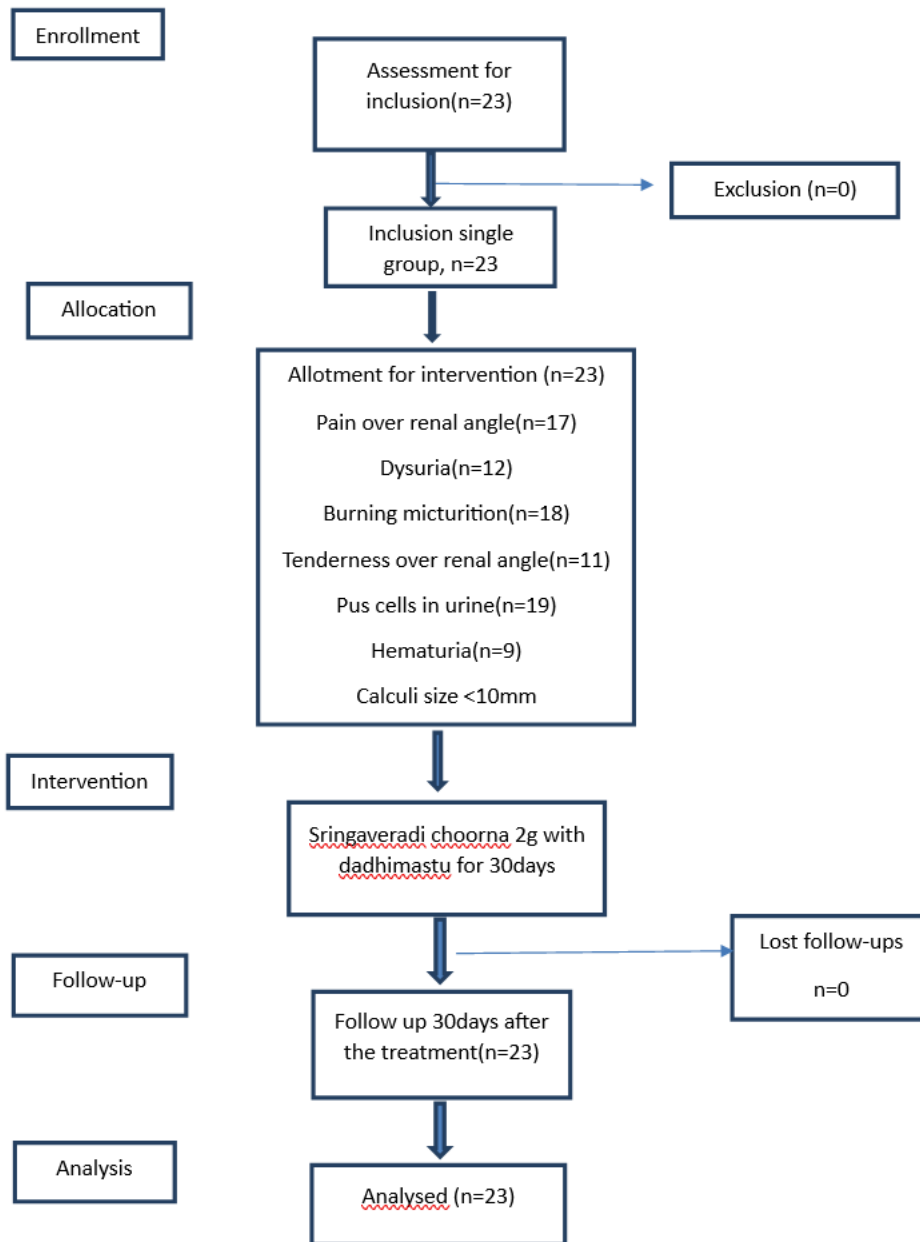


Fig. 1: Flow chart of patient recruitment

Intervention

4g of *Shringaveradi choorna* , was prepared in air tight packets with date of administration labelled on each packet. Mode of preparation of *dadhimastu* as well as the administration of the drug was explained to the patient in written form. 2g *choorna* was administered twice daily, before food, along with 10ml of *dadhimanda*, for a period of 30 days.¹⁵

packets of *choorna* were given for the first visit. Participants were advised to return for a review assessment after 14days, at which point an additional 15 packets of *choorna* were provided.

Treatment Period: 30days.

Follow up was done one month after the intervention period.

Assessment Criteria[7]

Clinical assessments based on subjective and objective parameters were made on 0th day, 15th day, and 31st day. USG (abdomen & pelvis) was taken on 0th and 31st day. Follow up done one month after the intervention period.

The outcome measures assessed were pain and tenderness over renal angle, dysuria, burning micturition, hematuria, puscells in urine and size of the calculi on USG (Abdomen & pelvis).

Subjective parameters

1. Pain over renal angle

Absence of pain	0
Present, in undisturbed level	1
Present disturbs daily routine impossible without medication	2
Pain intolerable	3

2. Burning micturition

No burning micturition	0
Present but easily bearable	1
Unbearable	2

3. Dysuria

No dysuria	0
Occasional dysuria	1
Occasional severe dysuria	2
Constant mild dysuria	3
Constant severe dysuria, no relief after treatment	4

4. Tenderness over renal angle

No tenderness in renal angle	0
Mild tenderness in renal angle	1

Moderate tenderness in renal angle	2
Severe tenderness in renal angle	3

Objective parameters

1. Hematuria (on microscopic examination of urine)

No RBC /HPF	0
0-5RBC/HPF	1
5-10RBC/HPF	2
10-15RBC/HPF	3
> 15 RBC/HPF	4

2. Pus cells

No Pus cells/HPF	0
0-5Puscells/HPF	1
5-10Puscells/HPF	2
10-15Puscells/HPF	3
>15Pus cells/HPF	4

3. Size of the calculi (USG- abdomen & pelvis)

Before treatment :	After treatment :
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Data Analysis

The data related to various assessments of both subjective and objective parameters, before and after treatment of 23 participants were taken for statistical analysis. The result of treatment was analysed through Wilcoxon Signed Rank Test for subjective parameters like pain and tenderness over renal angle, dysuria, and burning micturition, objective parameters like hematuria, puscells in urine and renal calculi size, to interpret the significant changes.

RESULTS

In this study group, based on Wilcoxon Signed Rank test, all the subjective parameters like pain over renal angle, burning micturition, dysuria, tenderness over renal angle and objective parameters like hematuria and pus cells in urine showed a significant improvement after treatment (table 3). The mean pain score reduced from 1.17 to 0.61 on 15th day, 0.17 on 31st day and follow up (figure 1) with p value <0.0001. The mean score for burning micturition was 0.96 on 0th day. By Day 15, the mean dropped to 0.48, and further decreased to 0.04 by Day 31 and at Follow Up with a p value of < 0.0001. Mean dysuria score of 1.09 on 0th day, decreased to 0.43 by Day 15 and further to 0.04 by Day 31 and at Follow-up with a p value of < 0.0001 indicating significant result. The tenderness

over renal angle reduced notably with a mean starting at 0.70 and decreased to 0.09, supported by significant test results. Similarly, RBC count changes over time indicate a complete resolution in the majority of cases by Day 31. Mean pus cells in urine before treatment was 1.39 which reduced to 0.61 on 15th day, came to 0.04 on 31st day.

The mean number of calculi BT was found to be 2.43 and on 31st day, it became 0.78. The Wilcoxon signed rank test for size of the calculi was statistically significant with p value <0.001. The mean size of calculi before and after treatment was 4.85 and 1.74, respectively. The statistical analysis shows a significant result with P value < 0.001. During the treatment period, no participants were withdrawn from the study due to unexpected reactions to the treatment.

Table 2: The incidence of demographic factors

Distribution	Category	Count	%
Gender	Male	15	65.22
	Female	8	34.78
Age	31-40	7	30.43
	41-50	7	30.43
	51-60	9	39.13
Domicile	Rural	8	34.78
	Urban	15	65.22
Diet	Vegetarian	1	5
	Non-vegetarian	19	95
Occupational status	Manual work	12	52.17
	Office work	6	26.09
	House wife	4	17.39
	Professionals	1	4.35

Table 3: Effectiveness on treatment on clinical signs and symptoms

Subjective parameters	Mean				Z score Day 0 vs day 31	p value Day 0 vs day 31	Remark
	0th day	15th day	31st day	Follow up			
Pain over renal angle	1.17	.61	0.17	0.17	3.77	0.0002	Significant
Burning micturition	0.96	0.51	0.21	0.21	4.01	0.0001	Significant
Dysuria	1.09	0.43	0.04	0.04	3.41	0.0007	Significant
Tenderness over renal angle	0.7	0.39	0.09	0.09	3.14	0.0017	Significant
Hematuria	0.57	0.17	0	---	2.98	0.0029	Significant
Puscells in urine	1.39	0.61	0.04	---	4.117	<0.001	Significant
Number of calculi	2.43	---	0.78	---	3.94	<0.001	
Size of the calculi	4.85	----	1.74	---	5.25<0.001		

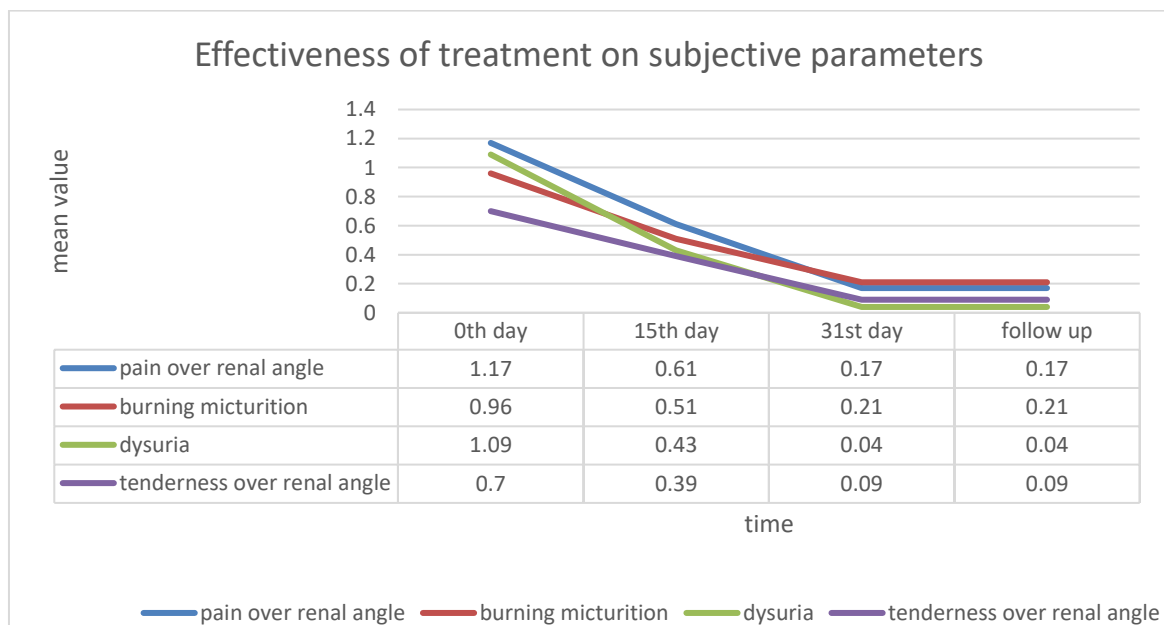


Figure1: Mean reduction on subjective parameters

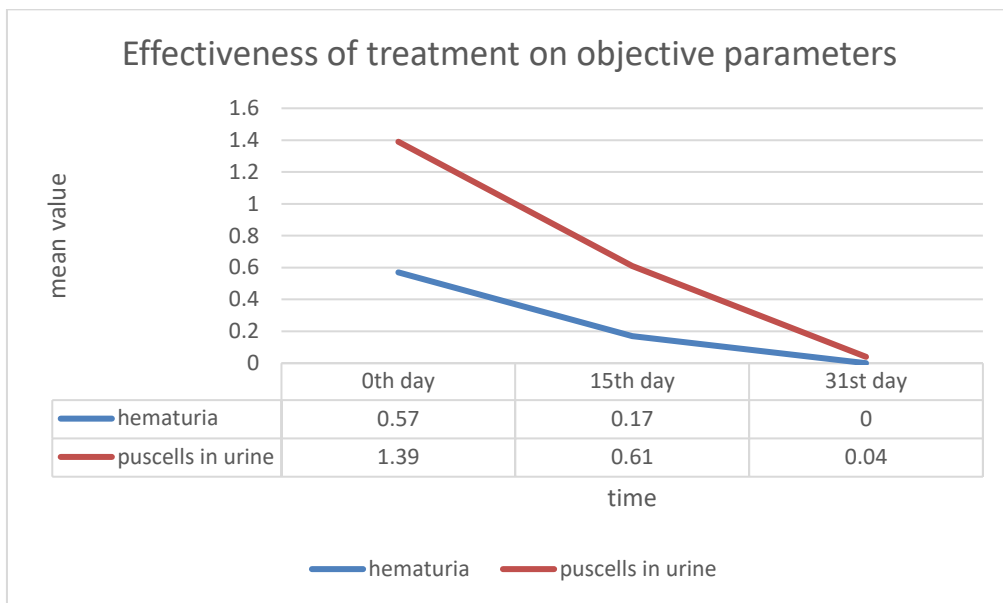


Figure 2: Mean reduction on objective parameters

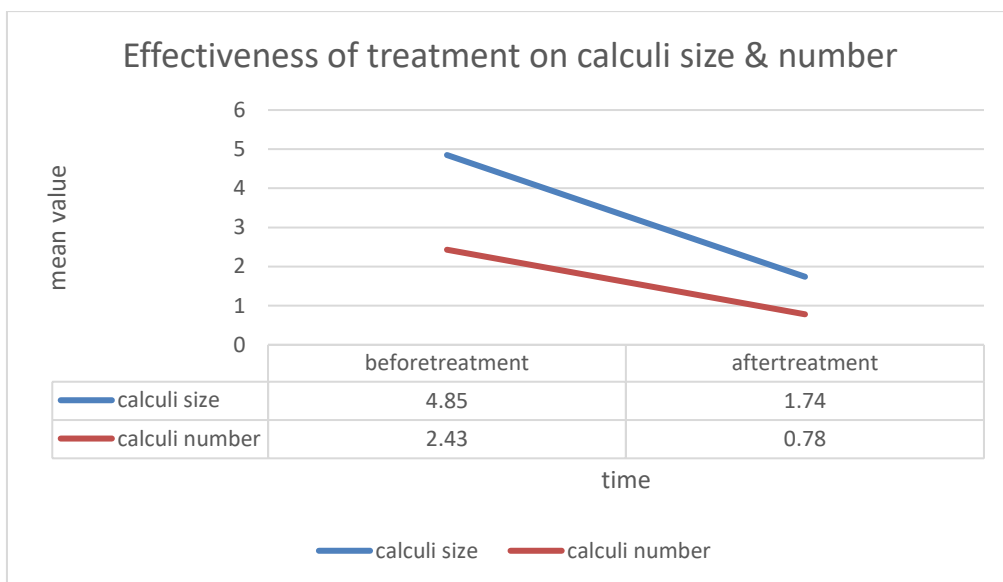


Figure 3: Mean reduction on calculi size and number

DISCUSSION

The study was mainly aimed to evaluate the effect of Shringaveradi Churna in reducing the size, signs and symptoms of renal calculi in 23 participants for a treatment period of 30 days. USG(abd& pelvis) taken on 31st day revealed that out of 56 calculi, 32 got expelled, 24 got reduced in size.

Discussion on the observation of demographic data

In this study, 39% of the participants were in the age group of 51-60 years, 30.4% in 31-40 and 30.4% in 41-50 age groups (table 1). Occupational stress,

unhealthy lifestyle (irregular diet) and changes of the endocrine hormones with the age are the risk factors for the disease. Majority of the participants in this study were males (65%) (table 1). Males are more likely to develop kidney stones compared to

females, with male to female ratio ranging from 1.3 to 5 . 65% of the participants were from urban area(table 1). Cities are more warmer than rural areas because of the urban architecture and infrastructure along with reduced vegetation. As the temperature is positively correlated with the rate of stone prevalence, this may be the reason for development of urolithiasis more in urban areas. 52% were labourers, 26% had office work, 17% were house wives and 4% were students (table 1). Heat exposure and dehydration constitute occupational risk factors for the stone disease. 95% participants of the study were non-vegetarians and 5% were vegetarians (table 1). Higher intake of animal protein may lead to increased excretion of Ca and uric acid as well as to decreased urinary excretion of Citrate.

Discussion based on clinical response

The subjective parameters like the burning micturition, dysuria, pain and tenderness over the renal angle got reduced after treatment. Among the 17 patients presented with pain, 13 got cured, and mild pain remained in four patients. Seventeen out of 18 patients who had the complaint of burning micturition at the time of screening got cured after treatment. Among the 12 participants presented with dysuria, 11 got complete relief from the symptom and grade1 dysuria remained in one participant. Nine out of 11 patients who had the complaint of renal angle tenderness before treatment got cured after treatment. Pain, dysuria, burning micturition , and tenderness over renal angle was statistically significant with $P < 0.0001$. Hematuria showed complete resolution after

treatment and pus cells in urine was also significant with $p \text{ value} < 0.001$. On analysis of the results, it was found that Shringaveradi choorna is effective in reducing the size and clinical symptoms of renal calculi.

Probable mode of action of the trial drug

Asmari is a *kapha pradhana tridoshaja vyadhi* in which *kapha* acts as the substratum for stone formation , vitiated *vata* is responsible for the development of *teevra vedana* and *kricchra mootra nissarana* (dysuria) whereas vitiated *pitta* causes *sadaha*(burning micturition) and *saraktha mutrata* (haematuria). So *mootrasmari* must be treated by using drugs with *tridoshaghna* especially *vatasleshmahara, anulomana, srotosodhana, and mootrala* properties.

The drugs included in *Shringaveradi choorna* are *sringavera ,yavakshara, pathya* and *kaleeyaka(darvi)*.These drugs are predominantly with *katu tiktha kashaya rasa, laghu rooksha guna, ushna veerya* and mostly *katu vipaka*, so it can pacify *tridoshas* especially *vata-kapha doshas* in *asmari*.

Due to its *lekhana, pachana, bhedana, sodhana* and *tridoshaghna* properties[8], *yavakshara* can reduce the size, disintegrate and eliminate calculus. According to rajnighantu, *Yavakshara* possesses the properties regarding to disintegration and expulsion of stones (*ashmarihara*) and can produce total relief in sign and symptoms of renal calculi (*mootrakricchrahara*)[9].Research studies show that *yavakshara* is having lithotriptic, anti-inflammatory, antimicrobial and mild diuretic action. As *Yavakshara* is an alkaline substance,it neutralizes

the acidic media thereby helps to change the pH of urine. This prevents the hyper concentration of urine and stone formation. It also helps to disintegrate and eliminate the existing stones from the urinary tract[10].

Harithaki possesses *ashmarihara*, *mootrakrichrahara* and *mootraghata nasana* properties[11]. It also have *Srotomarga vishodhana*, *deepana*, *rasayana* and *anulomana* properties. The ethanolic extract of *Terminalia chebula* seeds demonstrated the highest calcium oxalate crystal dissolution, proving the anti-urolithiatic activity of the plant. The tannins present in the fruits have antibacterial properties [12,13]. It also has strong cytoprotective, anti-inflammatory, antispasmodic, and antioxidant properties.

Shulaprasamana, *vedanasthapana*, *Shothahara* properties of *Shunti* and *darvi* might have helped in relieving the spasm, pain and localized inflammation of urinary tract. Gingerol and other constituents present in the *z. officinale* have antioxidant, antibacterial, anti inflammatory actions[14]. Antispasmodic action of *z. officinale* is also proven. *Berberis aristata* also have all these properties [15]. And additionally it have nephroprotective action also.

Shringaveradi choorna was given along with *dadhimastu*. According to *charaka*, *dadhimastu* is *vata-kaphahara* and *srotomargavisodhana* ie: it helps to eliminate obstructions in the channels[16]. Hence the study demonstrated the lithotriptic, antimicrobial, antioxidant, anti-inflammatory, antispasmodic, and analgesic properties of the drug, proving its role in disintegrating, expelling,

and reducing the size of stones, as well as alleviating the signs and symptoms of the disease.

CONCLUSION

The trial drug was found to be effective in reducing the burning micturition, dysuria, pain and tenderness over the renal angle which are the main signs and symptoms of renal calculi. It plays a therapeutically significant impact on lowering pus cells and RBCs in urine. The medication exhibits a significant efficacy in the stone's dissolution, as evident from the analysis of stone size reduction in USG. No adverse events of the drug were noted during the course of treatment. Hence it can be concluded that *Shringaveradi choorna* is effective in the management of renal calculi smaller than 10mm size.

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