JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

EFFECT OF PASHANABHEDA (*Bryophyllum pinnatam*) GHANA KASHAYA CAPSULE IN MOOTRASHMARI W.S.R. TO NEPHROLITHIASIS - A CASE STUDY

Dr. Shailesh Y.[*], Dr. Shrilatha Kamath[**]

[*]Assistant Professor, Dept. of P.G. studies in Kayachikitsa and Manasaroga.

[**] Professor, HOD, Dept. of P.G. studies in Kayachikitsa and Manasaroga.

Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Kuthpady, Udupi-574118.

ABSTRACT

Back ground: Nephrolithiasis or calculi formation occurs in kidneys. Features of Nephrolithiasis are closely similar to the disease Mootrashmari in Ayurveda. The condition Mootrashmari presents with features like vedana (pain), mootradharasangha (obstruction in flow of urine), sarudhiramootrata (Haematuria), avila mootrata (turbid urine) and Sasikata mootrata (gravels in urine). **Case presentation:** A 28 year young male, who is a field worker in a building construction company, presented with the complaint of on and off gradual development of burning micturition and pain abdomen since 4months. **Diagnosis and Management:** After proper physical examination and CT abdomen (KUB) confirmed as Nephrolithiasis. Pashanabheda (Bryophyllum pinnatum) Kashaya Ghana capsule with the dose of 4 capsules thrice in a day after food along with anupana as luke warm water for 45days. **Results:** After 15 days of treatment, during follow up patient came with an expelled stone of 3.8mm size. After completion of treatment at 45th day assessment was done. After treatment assessment of primary outcome measures by C.T. Abdomen (KUB) findings are (S.T.O.N.E. score) size of the stone, topography changed, obstruction, total numbers of stone and evaluation of stone density got good score of 9. Secondary outcome measures got 0 score with completely relief from all symptoms. After treatment quality of life assessed by WISQOL Questioners also got good score of 135. **Discussion:** Because of its tikta, kashaya rasa, katu vipaka, bastishodhana, bhedana, mootravirechaniya, vrunashodhaka, vrunaropaka, raktasthambhaka properties and antimicrobial activity, antilithogenic activity, anti-inflammatory activity helped to tackle Mootrashmari Roga. Even antiurolithiatic activity of this drug has evidence by folklore clinical practices and also by anti urolithiatic activity of In vitro dissolution study model. **Conclusion:** *Bryophyllum pinnatam* one of the source plant of pashanabheda is proved as best drug in the case of Mootrashmari / Nephrolithiasis.

KEY WORDS: Nephrolithiasis, Mootrashmari, Pashanabheda, Bryophyllum pinnatum

INTRODUCTION

Nephrolithiasis or calculi formation in kidneys, is a common problem worldwide with a prevalence of 7% in the adults, and ≥30% recurrence rate within 10years. In Indian population, about 12% are expected to have urinary stones and out of which 50% may end up in loss of kidney functions[1]. Nephrolithiasis starts by the aggregation of crystals on nidus. The nidus can be glycoprotein matrix, injured epithelium, foreign body or another crystal. Once such a nidus is formed and the urine saturation remains in supersaturation state, aggregation of crystals occurs over the nidus and crystals grows in the size to form stone[2]. These features are closely similar to the disease Mootrashmari in Ayurveda and most of the pathology in both the conditions are similar[3].

The condition Mootrashmari presents with features like vedana (pain), mootradharasangha (obstruction in flow of urine), sarudhiramootrata (haematuria), avila mootrata (turbid urine) and sasikata mootrata (gravels in urine)[4]. The diagnosis is often made on the basis of the history, physical examination, urine analysis and radiographic confirmation. Halical CT is highly

sensitive and is able to detect stone as small as 1mm that may be missed by other imaging modalities, or evidence of recent passage. It is considered as gold standard diagnostic test for Nephrolithiasis[5]. So in the present study clinical diagnosis is confirmed by Halical CT abdomen (KUB). Kshara, kashaya and churna yogas are frequently used forms of medicines in the management of Mootrashmari. In such instances administration of medicines and its palatability is a major challenge. Pashanabheda (Bryophyllum pinnatum) is the drug of choice in Bastigata[6] (urinary system) diseases and which was evidenced in anti urolithiatic activity in the In vitro dissolution model. Considering all the above, the drug Pashanabheda was selected for the present study, and the kashaya (decoction) was modified into Ghana kashaya form (solid form of concentrated decoction of the drug) and filled in the capsules.

MATERIALS AND METHODS

CASE REPORT

A 28 year young male, who is a field worker in a building construction company since 3years, presented with the complaint of on and off gradual development of burning micturition and pain abdomen since 4 months.

Short history of present illness: On history taking, 28 year young male, who is a non-smoker, non-alcoholic and not a K/C/O Type II DM/HTN/IHD with Euthyroid status, presented with the complaint of gradual development of burning micturition and pain abdomen since 4 months. Associated with occasional pain in right flank area radiating to right groin area. Severity of the pain was aggravated during travelling, heavy physical work and summer season and relieved by taking rest and intake of water. By the history patient is a habituated non-vegetarian fast food lover. No h/o trauma, herpes zoster, recent abdominal surgery, muscular strain and high grade fever was found. For the above complaints the patient opted for ayurveda management. After screening the patient (Table1 to 4) medical management with the patient's consent started Pashanabheda kashaya Ghana capsule (Table no. 5) in OPD basis.

Table 1: Urinary System Examination

INSPECTION: Loins: Supra pubic area: Groins:	Swelling: Absent Redness: Absent Oedema: Absent Skin lesions : Absent Intertrigo: Absent	
PERCUSSION:	Tympanic: Absent Dull note at loins: Absent Dull note at suprapubic region: Absent Colonic resonance: Absent	
PALPATION: 1) KIDNEYS:	Right	Left
	Tenderness grade:- 2 Swelling: Present Size: Normal Shape: Normal Surface:-Regular Induration:- Ab Surrounding area:- Consistency:- soft	Non tender Swelling: Absent Size: Normal Shape: Normal Surface:-Regular Induration:-Ab Surrounding area:- Consistency:-soft
2) Lesions: 3) Groins :	Tenderness: present Tenderness grade- 2 Swelling : Absent Local Rise in temperature: Absent	Tenderness: Absent Tenderness grade- 0 Swelling : Absent Local Rise in temperature: Absent
Genitalia examination:	No any defects found	

Investigations:

1. Hematological investigations: Table 2:

Test	Value	Normal value
Hb%	13 gm/dl	M-11.5-15gm/dl F-13-17gm/dl
T.L.C	7000	4000-11000
E.S.R	20 mm/hr	Less than 15mm/hr
RBS	96mg/dl	60-140mg/dl
Blood urea	40	10-50mg/dl
Serum Creatinine	0.8	0.6-1.4mg/dl
Serum Uric acid	3.7	3.5-7.2mg/dl

2. Urine routine:Table 3:

ROUTINE	**VALUES**	**NORMAL VALUE**
Albumin	Nil	
Sugar	Nil	
MICRO		**Value**
Pus Cells	3-4/hpf	1-2/hpf
RBCs	2-3/hpf	0-1/hpf
Epithelial Cells	3-5/hpf	3-5/hpf
Crystals	Nil	Nil
Casts	Nil	Nil
Bacteria	Nil	Nil

3. Radiological findings:Table 4:

C.T. Abdomen (KUB) findings	**BT** Date:15/12/2023			**AT** Date:31/01/2024		
	R	**L**	**Total**	**R**	**L**	**Total**
1. Size of the stone	3mm 4.5mm	7x5mm	42.5mm	No stone found	5x3mm	5x3mm
2. Topography of the stone	-Right upper pole -Just proximal to the rt vesicoureteric junction.	Left mid pole	-	-	Left mid pole	-
3. Obstruction	Mild hydronephrosis and hydro ureter	No evidence of hydronephrosis	-	No evidence of hydronephrosis and hydro ureter	No evidence of hydronephrosis	-
4.Number of stones present	2	1	3	0	1	1
5.Evaluation of stone density	500 HU 780HU	1080HU	2360HU	-	1080HU	1080HU

TREATMENT

Management was done by Pashanabheda kashaya Ghana capsules.

Table 5: Treatment details

Arm	Intervention / treatment
Pashanabheda Kashaya Ghana capsule	**Medicine** : Pashanabheda Kashaya Ghana capsule Oral intake of Pashanabheda Kashaya Ghana capsule in the dose of 4 capsule[7] (each capsule containing –4gm aqueous extraction of *Bryophyllum pinnatam*) thrice a day before food with the anupana of 150ml[8] of luke warm water every day for 45 days

OBSERVATIONS:

Post treatment changes were assessed based on primary outcome measures by objective parameters like S.T.O.N.E. Score (table no 6) and secondary outcome measures by subjective parameters (table no. 7) and WISQOL Questionnaire (table no. 8) at the base line and 45th day after the treatment.

Assessment criteria

Primary outcome measure

Change from baseline in objective criteria S.T.O.N.E. Score[9] (Size, Topography, Obstruction, Number of stones present, Evaluation of stone density) assessed by the C.T. Abdomen (KUB) [Time Frame: Baseline and 45 days] (Each item is scored from 0 /best to 3 /worst. The total S.T.O.N.E. score ranges from 0 points / best to 15 points / worst)**Table 6:**

C.T. Abdomen (KUB) findings	**BT** Date:15/12/2023			**AT** Date:31/01/2024		
	R	**L**	**Total**	**R**	**L**	**Total**
1. Size of the stone	1+1	3	5	0	3	3
2. Topography of the stone	2+2	2	6	0	2	2
3. Obstruction	1	0	1	0	0	0
4.Number of stones present	2	1	3	0	1	1
5.Evaluation of stone density	1+2	3	6	0	3	3

Secondary outcome measures:

1. Change from baseline in subjective criteria [Time Frame: Baseline and 45 days] Vedana (pain during micturition, mootradharasangha (obstruction in flow of urine), sarudhiramootrata (haematuria), avila mootrata (turbid urine) and sasikata mootrata (gravels in urine) and krichra mootrata (strangury). Each symptom was scored from 0 /best to 3 /worst. The total score ranges from 0 points / best to 18 points / worst)**Table 7:**

Symptoms	**BT**	**AT**	
		AT_1: 15th day	**AT_2: 45th day**
1.Vedana (Pain during Micturition in naabhi/ basti/sivani/medra)	2	0	0
2.Mootra dhaarasanga (obstruction in flow of urine),	1	0	0
3.Sarudhira mootrata (Haematuria)	0	0	0
4.Avila mootrata (Turbid urine)	0	0	0
5. Sasikata mootrata (Gravels in urine)	0	0	0
6. Krichra mootrata (Strangury)	2	1	0

2. Change from baseline in subjective criteria WISQOL Questionnaire[10] (Wisconsin Stone Quality Of Life Questionnaire) [Time Frame: Baseline and 45 days] (Each item is scored from 5 /best to 1 /worst. The total WISQOL Questionnaire score ranges from 35 points / best to 7 points / worst)**Table 8:**

Questionnaire	**BT**	**AT**
1. In the last 6 weeks, how true for you are the following statements?		
A) My energy level during the day is less than usual	1	5
B) I feel very tired or fatigued	1	5
C) My activity is limited	1	5
2. Because of kidney stones, how true have any of these problems been for you within the last 6 weeks?		
A) Trouble getting to sleep or with waking up while trying to sleep	2	5
B) Needing to get up frequently while sleeping to urinate	2	5
C) Poor quality sleep or not feeling rested after sleeping	2	5
D) Difficulty returning to sleep	2	5
3. Because of kidney stones, how true for you over the last 6 weeks are the following?		
A) I don't feel the usual freedom to travel or to attend or participate in social events	1	5
B) I force myself to go to work or school, to exercise, or to fulfill other responsibilities	1	5
C) I have missed work or family time, or lost leisure or recreation time	2	5
D) I make frequent adjustments or changes to my daily schedule	3	5
E) I have less ability than usual to focus on my work, family, or other commitments or interests	2	5
4. How often have you experienced or felt the following in the last 6 weeks because of kidney stones?		
A) Problems or difficulties sticking to the diet recommendations	1	3
B) Problems tolerating or taking prescription medications as directed	1	3
C) Concern about my general health	2	5
5. Below are some physical symptoms that might be related to kidney stones. In the last 6 weeks, how often have you felt these symptoms?		
A) Nausea, stomach upset or cramps	1	5
B) Physical pain	1	5
C) Urinary frequency (feeling like you have to go more than usual)	1	5
D) Urinary urgency (sudden or unstoppable urge to urinate)	1	5
6. Because of kidney stones, in the last 6 weeks, how true are the following for you?		
A) I have less interest in sex or less sexual contact than usual	2	4
B) I need to make special arrangements when traveling	1	3
C) I have less interest than usual in socializing/ being around others	1	5
7. In the last 6 weeks, because of your kidney stones, how much have you felt the following?		
A) Frustrated with my situation	3	5
B) Worried about what is wrong now	2	5
C) Anxious or nervous about what might go wrong in the future	2	5
D) Annoyed at the nuisances and inconveniences of my situation	2	5
E) Reduced ability, compared to usual, to cope with everyday issues or responsibilities	1	5
F) More irritable than usual	2	5
Total score	46	135

Grading's of Assessment criteria:

A. Primary outcome measure STONE Score: Table 9:

e	OBJECTIVE PARAMETERS	OBJECTIVE PARAMETERS	SCORE
1.	Size of the stone	Stones < 5mm	1
		Stones ≥ 5mm and < 10mm	2
		Stones ≥ 10mm	3
2.	Topography of the stone	Distal and mid ureter stones,	1
		Proximal ureter, mid pole, and upper pole stones	2
		Lower pole stones.	3
3.	Obstruction	Local dilation of the ureter	1
		Ureteral and renal pelvis dilatation	2
		Calix dilatation and parenchymal thinning	3
4.	Number of stones present	Patients with 1 stone	1
		Patients with 2 stones	2
		Patients with ≥ 3 stones	3
5.	Evaluation of stone density	Hounsfield Units < 750	1
		Hounsfield Units between 750 and 1000	2
		Hounsfield Units ≥ 1000	3

B. Secondary outcome measures:

1. Subjective criteria: Table 10:

SL.NO	SUBJECTIVE CRITERIA	SUBJECTIVE PARAMETERS	SCORE
1.	Vedana (Pain during Micturition in naabhi/ basti/sivani/medra)	No pain	0
		VAS* scale 1-4	1
		VAS scale 5	2
		VAS scale 6-10	3
2.	Mootra dhaarasanga (obstruction in flow of urine)	No obstruction in flow of urine	0
		Occasionally once in a day	1
		Often once in two days	2
		Every day	3
3.	Sarudhira mootrata (Haematuria)	No reddish tinge	0
		Dark yellow with reddish tinge	1
		Brownish clots in urine	2
		Red color	3
4.	Avila mootrata (Turbid urine)	Crystal clear fluid	0
		Faintly cloudy or smoky or hazy with slight turbidity	1
		Turbidity clearly present, but newsprint easily read through	2
		Newsprint cannot be seen through tube	3
5.	Sasikata mootrata	Crystal clear fluid	0

	(Gravels in urine)	Well-defined crystals or amorphous material in the urine sediment.	1
		Refrigeration will precipitate out many crystals,	2
		At room temperature that will increase the formation of the crystals.	3
6.	Krichra mootrata (Strangury)	No strangury	0
		VAS scale 1-4	1
		VAS scale 5	2
		VAS scale 6-10	3

*Visual analog scale (VAS) for Pain:

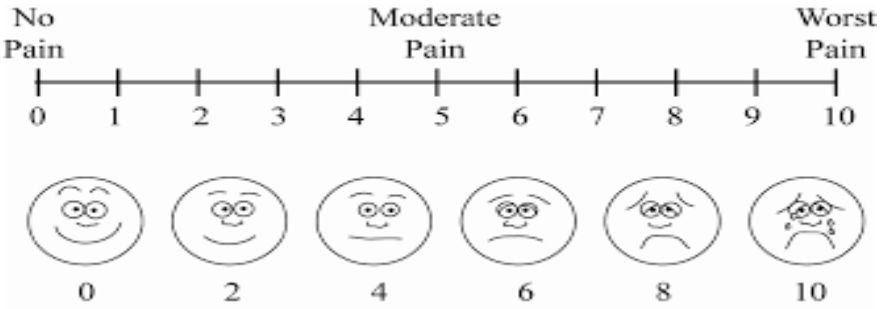


Image1. Before treatment

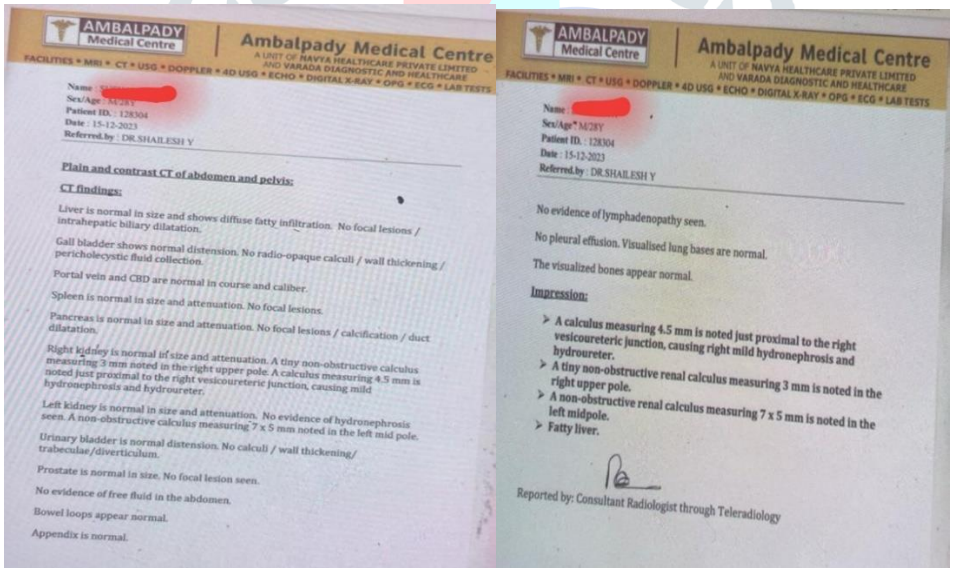
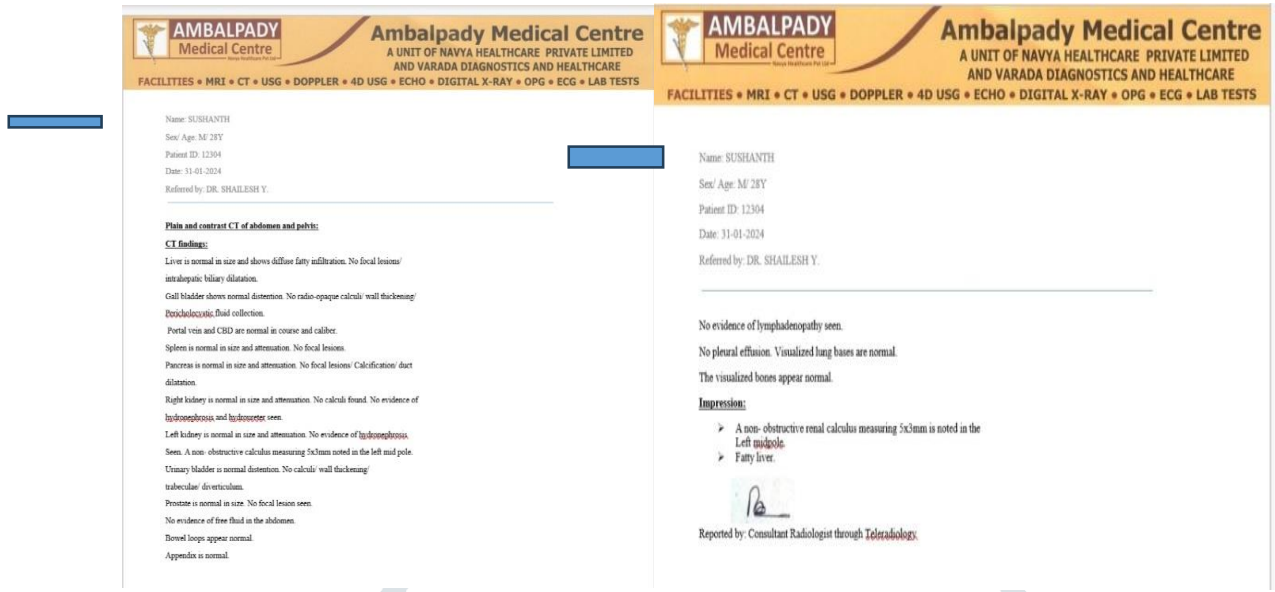


Image 2. After 15th day of follow expelled stone

Image 3. After 45t[h] day of follow period



AMBALPADY Medical Centre
Ambalpady Medical Centre
A UNIT OF NAVYA HEALTHCARE PRIVATE LIMITED
AND VARADA DIAGNOSTICS AND HEALTHCARE
FACILITIES • MRI • CT • USG • DOPPLER • 4D USG • ECHO • DIGITAL X-RAY • OPG • ECG • LAB TESTS

Name: SUSHANTH
Sex/ Age: M/ 28Y
Patient ID: 12304
Date: 31-01-2024
Referred by: DR. SHAILESH Y.

Plain and contrast CT of abdomen and pelvis:

CT findings:

Liver is normal in size and shows diffuse fatty infiltration. No focal lesions/ intrahepatic biliary dilatation.
Gall bladder shows normal distention. No radio-opaque calculi/ wall thickening/ Pericholecystic fluid collection.
Portal vein and CBD are normal in course and caliber.
Spleen is normal in size and attenuation. No focal lesions.
Pancreas is normal in size and attenuation. No focal lesions/ Calcification/ duct dilatation.
Right kidney is normal in size and attenuation. No calculi found. No evidence of hydronephrosis and hydroureter seen.
Left kidney is normal in size and attenuation. No evidence of hydronephrosis. Seen. A non- obstructive calculus measuring 5x3mm noted in the left mid pole.
Urinary bladder is normal distention. No calculi/ wall thickening/ trabeculae/ diverticulum.
Prostate is normal in size. No focal lesion seen.
No evidence of free fluid in the abdomen.
Bowel loops appear normal.
Appendix is normal.

AMBALPADY Medical Centre
Ambalpady Medical Centre
A UNIT OF NAVYA HEALTHCARE PRIVATE LIMITED
AND VARADA DIAGNOSTICS AND HEALTHCARE
FACILITIES • MRI • CT • USG • DOPPLER • 4D USG • ECHO • DIGITAL X-RAY • OPG • ECG • LAB TESTS

Name: SUSHANTH
Sex/ Age: M/ 28Y
Patient ID: 12304
Date: 31-01-2024
Referred by: DR. SHAILESH Y.

No evidence of lymphadenopathy seen.
No pleural effusion. Visualized lung bases are normal.
The visualized bones appear normal.

Impression:

- A non- obstructive renal calculus measuring 5x3mm is noted in the Left midpole.
- Fatty liver.

Reported by: Consultant Radiologist through Teleradiology.

Discussion:

Mootrashmari roga is explained under the broad heading of mutra apravuttijanya mutravaha sroto vikara. It is one among the eight variety of mootra krichra, so krichramutrata is its cardinal feature. Asamshodhana sheelasya apathya karinam are the classical causes of mootrashmari. In already aggravated form of dosha or in the bahudosha avastha if the person indulges in further apathya (unwholesome food), it will further aggravate the already vitiated dosha. During jatharagni paka, ingested food gets divided into prasada bhaga and kitta bhaga. Sthula Prasadabhaga nourishes the rasa-raktadi dhatu and kitta bhaga turns into vit-mutradi mala. Sthula prasada bhaga further undergoes rasadhatvagni paka and formation of sukshma prasada bhaga and kitta occurs. Sukshma prasada bhaga nourishes rakata, mamsadi dhatu and kitta bhaga forms kapha. During this stage of pacchyamana avastha, if there is influence of apathya, it will aggravate the tulya dosha. Here tulya dosha is kapha dosha. Because of apathya sevana, kitta kapha turns into vitiated kitta kapha. Basically kapha is kitta bhaga of rasa, now because of vitiation, vitiated kitta kapha will have affinity towards kitta vit mutradi. Because of khavaigunya it mixes up with mutra and enters into mutravaha srotas (basti) and forms Mootrashmari. Hence kapha is the upadhana karana for mootrashmari. The patient's personal history confirmed that, there is rasadhatvagni dushti leading to kapha sanchaya and prakupita kapha gets sthana samshraya in mutravaha srotas producing symptoms like gradual development of burning micturition and pain abdomen. Water restrictions, dehydration and physical activity dislodges the ashmari and obstructs the urinary tract, hence these factors are the aggravating factors in the present study. Dominant feature in this case was intolerable pain during micturition, so it is considered as vataja variety of mootrashmari. The clinical diagnosis is confirmed by CT (KUB) gold standard diagnostic tool for ashmari. This case was acute one, so according to the chikitsa siddhanta mootrashmari is a daruna vyadhi and medical management only holds good in the taruna avastha (early stages). Hence in the present study, present stage is the eligible stage for aushadhi chikitsa. Under the aushadhi chikitsa, kapha vata shamaka aushadis are considered the best. As in ashamri roga, kapha is mandatory factor and vata is the sthanika dosha. In the list of ashmarihara aushadi yoga, Pashanabheda takes the supreme place. Pashanabheda is a controversial drug, but its twelve source plants are available and all are having similar properties like that of Pashanabheda. *Bryophyllum pinnatum* is the source plant of Pashanabheda and is available in costal Karnataka. Because of tikta, kashaya rasa and katu vipaka, it has bastishodhana, bhedaa, mootravirechaniya, vrunashodhaka, vrunaropaka, raktasthambhaka properties. Pcoumaric, ferulic, syringic, caffeic, p-hydroxybenzoic acid, karmpferol, quercetin, Quercetin-3-L-rhamonsido-L-arabinofuranoside isolated, quercetin-3-diarabinoside, kaempferol-3-glucoside isolated, flavone glycoside quercetin-3-O-alpha-L-arabinopyranosyl-alpha-L-rhamnopyranoside isolated are the different chemicals responsible for its antimicrobial activity, wound healing property, Antilithogenic activity, hepato-protective activity, anti-inflammatory activity. Antiurolithiatic activity of this drug is evidenced by folklore clinical practices and also by anti urolithiatic activity of In vitro dissolution study model. Considering all the above factors, the drug Pashanabheda (*Bryophyllum pinnatum)* was selected for the present study. But for administration of medicine in kshara, kashaya and churna yoga, palatability is a major challenge. Hence in this case, Pashanabheda kashaya was modified into Ghana kashaya form and filled in the capsule. Scores are given for each primary and secondary outcome measures (table no.9 and 10) for assessment of the treatment. Before the treatment assessment of primary outcome measures by C.T. Abdomen (KUB) findings like (S.T.O.N.E. score) size of the stone –given 5scores, topography- 6 scores, obstruction – score 1, total numbers of stone – score 3 and evaluation of stone density was given as score-. In the same way before treatment secondary outcome measures like vedana (pain during micturition in basti)- given

2 scores, Mootra dhaarasanga (obstruction in flow of urine)- given score 1 and krichra mutrata- given score 2. Along with that before treatment secondary outcome measures of quality of life assessed by WISQOL Questionnaire which was given total score of 46. Every 15th day follow up of the patient was done, to see the symptomatic relief or aggravation of complaints and any adverse effect of the drug. After 15 days of treatment follow up, patient came with an expelled stone (in digital caliper scale measured 3.8mm size-fig no.2). After completion of treatment on the 45th day assessment was done. Under that after the treatment assessment of primary outcome measures by C.T. Abdomen (KUB) findings are (S.T.O.N.E. score) size of the stone changed 5 scores to 3, topography changed 6 scores to 2, obstruction changed to 1 score to 0, total numbers of stone changed to 3 scores to 1 and evaluation of stone density was changed to 6 scores to 3. In the same way after treatment secondary outcome measures like vedana (pain during micturition in basti, mootra dhaarasanga (obstruction in flow of urine) and krichra mutrata- given score 0 with complete relief from all symptoms. Along with that after treatment quality of life assessed by WISQOL Questioners also got good score of 135, showing effect of the Pashanabheda kashaya ghana capsule in the present study.

Conclusion:

- Kapha dosha is upadana karana (mandatory factor) for the formation of Mootrashmari roga.
- Influence of apathya sevana (unwholesome food) vitiate the rasadhatvagni hence becoming the reason for aggravation of vitiated kapha.
- Kapha and vatahara chikitsa are best in Mootrashmari chikitsa. Pashanabheda is one such drug which has the supreme place in the list of ashmarihara dravya.
- *Bryophyllum pinnatam* one of the source plant of pashanabheda and is proved as the best drug in the case of mootrashmari / Nephrolithiasis.

References:

1. AdityaS.Pawar , Department of Internal medicine, Devision of Nephrology and Hypertension myoclonic, Rochestar , MN, USA https://www.urologyannals.com/article.asp?issn=0974,7796;year=2018;volume=10;issue=1;spage=87;epage=93;
2. K.V.Krishnadas, Text book of medicine, 5th edition,pp-1466,p.1138.
3. T.R.Harrison, Harrison's principles of internal medicine, Volume2, 19th edition Pp-2770 p.1866.
4. Acharaya Sushrutha, Sushrutha samhita, Vaidya Yadavji Trikamaji Editor, 1st Ed, 2010, Varanasi, Chaukambha Sanskrit Sansathan, Pp.824, Pg no 277.
5. T.R.Harrison, Harrison's principles of internal medicine, Volume2, 19th edition Pp-2770 p.1868.
6. Acharya Bhavamishra, Bhavaprakasha nighantu, Prof. Krishnachanda Chunekar Editor, 1st Ed, 2010, Varanasi, Chaukambha Sanskrit Sansathan, Pp: 960, p.101.
7. Sarangadhara, Sarangadharasamhita, edited by ParsuramaVidyasagar, Pandurangjwaji, 1931, Pp : 398 , p.206
8. Sarangadhara, Sarangadharasamhita, edited by ParsuramaVidyasagar, Pandurangjwaji, 1931, Pp : 398 , p.174
9. Wilson R. Molina, Fernado j. Kim, Department of Urology, Denver health medical center,Denwer,https://www.scielo.br/j/ibju/a/GvJkkSbZ7wqw5SxzwF7xhqJ/?lang=en#:~:text=during%20follow-up.
10. Krislina Penniston, University of Wisconsin-Madison, department of Urology, https://urology.wisc.edu/wp-content/uploads/2019/04/WISQOL-copyright-2017.pdf