

A COMPARATIVE CLINICAL STUDY OF APAMARGA PANEYYA KSHARA AND SHWADAMSTRAVARUNADI KWATHA IN THE MANAGEMENT OF MUTRASHMARI VIS- À-VIS UROLITHIASIS

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ABSTRACT

Mutrashmari is one of the most common disorders affecting the *Mutravaha Srotas*. The symptoms of *Mutrashmari* are pain in various parts of the urinary system like the *basti*, *mehana* and *sevani* during micturition, obstruction in urine flow, haematuria and urine resembling *gomedaka*, resemble with the clinical presentation of urolithiasis. *Acharya Sushruta* has described a comprehensive approach to its management, including both *Shastra karma* (Surgical interventions) and *Bheshaja prayoga* (Medicinal therapies), such as the use of *ghrita*, *taila* and *Kshara Prayoga*. In this clinical study, *Apamarga Paneeya Kshara* and *Shwadamstravarunadi Kwatha* have been selected to evaluate and compare their efficacy in managing *Mutrashmari*.

The clinical trial was conducted with the aim to compare the efficacy of “*Apamarga Paneeya Kshara* - GROUP A & *Shwadamstravarunadi Kwatha* - GROUP B” in the management of *Mutrashmari* (urolithiasis). The trial was conducted by randomly allocating patients

into two groups, each consisting of 20. In Group A - Patient was advised to take *Apamarga Kshara Capsule* 500mg twice daily along with 2ml *Madhu* and water. In Group B - Patient was advised to take *Shwadamstravarunadi Kwatha* 32ml thrice a day along with *Madhu* as

Anupana. Study period was 30 days. During the treatment, assessment was done on the 7th, 15th and on 30th day. After completion of the study, the effectiveness of the treatments was statistically evaluated based on the gradation of the symptoms observed before and after treatment.

The test of significance showed that both *Apamarga Paneeya Kshara* and *Shwadamstravarunadi Kwatha* have shown statistically significant improvements ($P < 0.05$) in subjective parameters such as pain, burning micturition and retention of urine, as well as in objective parameters like haematuria, urinary cast cells, the site, size and number of stones. This indicates that both treatments were highly effective. *Apamarga Paneeya Kshara* showed superior efficacy in reducing the size and number of stones. On the other hand, *Shwadamstravarunadi Kwatha* was more effective in relieving pain and burning micturition. Both treatments were equally effective in managing retention of urine, haematuria, urinary cast cells and the location of stones.

KEYWORDS: *Apamarga Kshara*, *Shwadamstravarunadi Kwatha*, *Mutrashmari*, Urolithiasis, Kidney Stones.

INTRODUCTION

Acharya Sushruta Classified *Mutrashmari* as one of the *Ashta-Mahagadas*,^[1] describing it as “*Yama*” because of its intense and intolerable pain. Acharya Charaka classified Ashmari as one of the *Bastimarmashritha Vyadhis*, emphasizing its direct involvement with the bladder. In Modern medical science, *Mutrashmari* is correlated with Urolithiasis. The occurrence of Kidney stones varies depending on factors such as geography, Gender and Age. Generally, Men are more affected than women, with a ratio of about 3:1.^[2] The Highest incidence of urolithiasis is observed in individuals aged between 30 and 50 Years. This Condition is considered multifactorial with a combination of genetic, epidemiological, biochemical factors playing a role. Factors such as Socio-economic status and dietary habits can significantly influence the prevalence and distribution of renal stones across different regions of the world. Urolithiasis refers to the formation of stones within the urinary system, including the kidneys and bladder. The symptoms of urolithiasis include pain, dysuria, hematuria and burning micturition. The main symptom of a stone blocking the ureter or renal pelvis is severe, intermittent pain that radiates from the lower back to the groin region, commonly known as ureteric colic, this pain is considered as one of the most intense sensations of pain ever experienced.^{[3][4]}

Acharya Susrutha explained 4 types of Mutrashmari: Vataja, Pittaja, Kaphaja and Shukraja. The treatment of urinary calculus in modern medicine includes conservative approaches such as flush therapy and medical expulsive therapy using alpha-antagonists or calcium-channel blockers. Non-surgical management options include ESWL and the Dormia basket procedure, while surgical treatments involve advanced techniques like PCNL, ureteroscopy, nephrolithotomy, pyelolithotomy, etc.^{[3][4]} All these require highly sophisticated hospital facilities and skilled Surgeon. In Ayurveda, Acharya Sushruta has described a comprehensive approach to its management, including both Shashtra karma (Surgical interventions) and Bheshaja prayoga (Medicinal therapies), such as the use of ghrita, taila and Kshara Prayoga.^[5] In this clinical study, Apamarga Paneeya Kshara^[6] and Shwadamstravarunadi Kwatha^[7] have been selected to evaluate and compare their efficacy in managing Mutrashmari.

AIM

The aim of this study is to compare the efficacy of *Apamarga Paneeya Kshara* and *Shwadamstravarunadi Kwatha* in the management of *Mutrashmari* (Urolithiasis).

MATERIALS AND METHOD

Literary source

Relevant *Ayurvedic* and modern literature, including textbooks regarding the disease and treatments were reviewed and followed for the planned study. Along with, Relevant research articles, journals & Internet sources.

Sample source

Patients were selected from the Outpatient, Inpatient Department of Shalya Tantra and from medical camps organized by TMAE's Ayurvedic Medical College & SCS Hospital, Hosapete.

Drug source

Raw drugs used in the study were authenticated by the Department of Dravyaguna. The drug preparations were formulated according to standard procedures. Empty capsules (500 mg) were procured from an authenticated pharmaceutical company.

Table 1: Drug review.

S. no	Drugs Name	Latin Name	Rasa	Guna	Vee Rya	Vipaka	Karma
1	Apamarga	<i>Achyranth es aspera</i>	Katu, Tikta	Laghu, Ruksha, Tikshna	Ushna	Katu	Kapha Vata Shamaka, Vedana, Stapaka, Lekhana, Krimighna Mutrала, Ashmari Nashaka Deepana, Pachana
2	Shwadamstra	<i>Tribulus terrestris</i>	Madhura	Guru, Snigdha	Shita	Madhura	Vrushya, Mutrала, Rasayana, Vatapittahara
3	Varuna	<i>Crataeva religiosa</i>	Tikta, Kashaya	Laghu, Ruksha	Ushna	Katu	Dipana, Krimighna, Kaphavatahara
4	Shunthi	<i>Zingiber officinale</i>	Katu	Guru, Ruksha, Tikshna	Ushna	Madhura	Vatakaphahara, Deepana, Bhedana, Shula-Shophahara

Method of collection of data

Patients suffering from *Mutrashmari* were selected from the Outpatient, Inpatient Department of Shalya Tantra and from medical camps organized by TMAE's Ayurvedic Medical College & SCS Hospital, Hosapete, irrespective of gender, caste, socio-economic status, religion or place of origin.

• Inclusion criteria

1. Patient with *Samanya Lakshana* of *Mutrashmari*.
2. Patient between 20 to 60 years of age group.
3. Size of stone up to 10 mm.
4. Patients with solitary or multiple urinary calculi was included for the study.
5. Patient willing to sign consent form.

• Exclusion criteria

1. Patients who were suffering with severe systemic disorders like
 - a. Renal failure
 - b. Tuberculosis
 - c. HIV I and II
 - d. Pylonephrosis,
 - e. Polycystic Kidney disease,
 - f. Wilms tumor and Others Neoplasm.
 - g. Known case of Urinary obstructive symptoms.

- h. Known case of Hyperparathyroidism.
2. Patients who were contraindicated for *Paneeya Kshara* ^[8].
3. Uncontrolled Diabetes Mellitus and Hypertension.
4. Pregnancy and Lactation.

Study design - A total of 40 subjects diagnosed with *Mutrashmari*, after proper examinations and investigations, who fulfilled the inclusion criteria, were selected and categorized into two groups: Group A and Group B, each consisting of 20 subjects.

Table 2: Plan of study.

Groups	Mode of treatment	Dose	Anupana	Duration
Group A	<i>Apamarga Paneeya Kshara</i>	500mg BD	<i>Jala</i> with 2ml <i>madhu</i>	30 Days
Group B	<i>Shwadamstravarunadi Kwatha</i>	32ml TDS ^[9]	<i>Kshoudra</i> 2ml ^[10]	30 Days

- **Pathya** - *Kulatha, Mudga, Yava, Kushmaanda*. Patients were advised to drink 4-5 liters of water per day.
- **Apathya** - Tomato, brinjal, pea, guava, red meat, milk, milk products, drum stick, calcium and protein rich diet, excess salt, Alcohol.

Diagnostic criteria

Diagnosis will be based on diagnostic criteria.

i. Subjective criteria

- *Mahati Vedana* (Pain)
- *Mutra Daha*. (Burning micturition)
- *Mutradhara Sanga*. (Retention of urine)

ii. Objective criteria

Urine test to assess

- *Sarudira Mutrata* (Hematuria)
- Presence of urinary cast cells

USG of abdomen

This was considered as primary criteria for diagnosis, where Site, Size and number of the stone was screened.

Assesment criteria

- A detailed proforma was prepared and assessment was conducted both before and after treatment based on subjective and objective parameters by grading them.
- Pain was assessed using a Visual Analog Scale (VAS) and the readings were translated into grades as follows:
 - 0 on VAS: Grade 0 (No pain)
 - 1-3 on VAS: Grade 1 (Mild pain)
 - 4-6 on VAS: Grade 2 (Moderate pain)
 - 7-10 on VAS: Grade 3 (Severe pain)

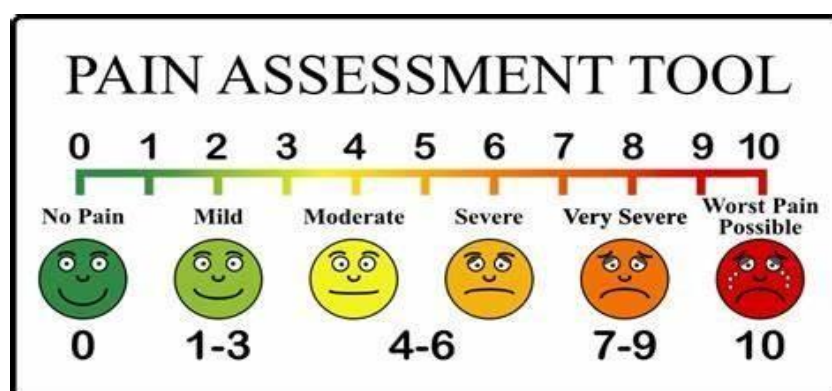


Figure 1: Visual Analog Scale (VAS).

Subjective gradings

Table 3: *Mahati Vedana* (Pain).

S. No.	Pain	Grading
1.	No Pain	0
2.	Mild Pain	1
3.	Moderate Pain	2
4.	Severe Pain	3

Table 4: *Mutra Daha* (Burning micturition).

S. No	Burning Micturition	Grading
1	No Burning Micturition	0
2	Burning Micturition Present	1

Table 5: *Mutradhara Sanga* (Retention of Urine).

S.No.	Retention of Urine	Grading
1.	No retention of Urine	0
2.	Retention of Urine	1

Objective gradings**Table 6: Urinary cast cells.**

S. No	Cast cells	Grading
1	No Cast Cells present	0
2	Few Cast Cells present	1
3	Plenty of Cast Cells Present	2

Table 7: *Sarudira Mutrata* (Hematuria).

S. No	Haematuria	Grading
1.	No RBC in Urine	0
2.	Few RBC in Urine	1
3	Plenty of RBC in Urine	2

Table 8: Site of stone.

S. No	Site of stone	Grading
1	Expelled	0
2	Stone in Renal Pelvis	1
3	Stone in Ureter	2
4	Stone in Bladder	3

Table 9: Size of stone.

S. No	Size of Stone	Grading
1	No Stone	0
2	Size of Stone 1 - 2mm	1
3	Size of Stone 3 - 4mm	2
4	Size of Stone 5 - 6mm	3
5	Size of Stone 7 - 8mm	4
6	Size of Stone 9-10mm	5

Table 10: Number of stone.

S. No	Number of Stone	Grading
1	No Stone	0
2	1 Stone	1
3	2 Stones	2
4	3 Stones	3
5	4 Stones	4
6	5 and above	5

Follow UP**Table 11: Follow-up and Assessment Schedule.**

Day	Procedure
0th day	1.Screening
	2.Enrollment
	3.Initial trail drug administration

7th day	1. Assessment
	2. Continued drug administration
15th day	1. Assessment
	2. Continued drug administration
30th day	1. Final follow-up
	2. Final Assessment

Investigation

- **Blood:** CBC, RFT
- **Urine:** Routine, Microscopic

Radiological investigation

- USG of Abdomen and Pelvis.

RESULTS

The assessment was done based on detailed Performa, adopting a standard scoring method of Subjective parameters (Pain, burning Micturition and Retention of urine) and Objective parameters (Haematuria, urinary cast cells, the site, Size and Number of stones) were assessed before the treatment and on the 30th day of treatment. The data was collected for subjective parameters on the 7th, 15th and 30th day, while objective parameters were assessed before the treatment and on the 30th day of the treatment.

Table 12: Effect of Treatment on Symptoms on 30th Day in Group A.

Symptoms	Mean		Std. Deviation		Mean Rank		Sum of Ranks		Z Value	p Value
	BT	AT	BT	AT	-Ve Rank	+Ve Rank	-Ve Rank	+Ve Rank		
Pain	2.45	0.55	0.510	0.887	10.00	0.00	190.00	0.00	-3.919	<0.001
Burning micturition	0.70	0.15	0.470	0.366	6.00	0.00	66.00	0.00	-3.317	<0.001
Retention of urine	0.30	0.00	0.470	0.000	3.50	0.00	21.00	0.00	-2.449	0.014
Urinary Cast Cells	0.30	0.00	0.571	0.000	3.00	0.00	15.00	0.00	-2.121	0.034
Haematuria	0.50	0.00	0.688	0.000	4.50	0.00	36.00	0.00	-2.640	0.008
Site of Stone	1.45	0.35	0.759	0.489	7.00	0.00	91.00	0.00	-3.244	0.001
Size of Stone	3.55	0.65	0.945	1.182	10.50	0.00	210.00	0.00	-3.974	<0.001
Number of Stone	1.15	0.25	0.366	0.444	8.50	0.00	136.00	0.00	-3.819	<0.001

BT- Before Treatment

AT- After Treatment

A statistically significant improvement was observed in all the symptoms ($P < 0.05$).

Table 13: Effect of treatment on symptoms On 30th Day in Group B.

Symptoms	Mean		Std. Deviation		Mean Rank		Sum of Ranks		Z Value	p Value
	BT	AT	BT	AT	-Ve Rank	+Ve Rank	-Ve Rank	+Ve Rank		
Pain	2.70	0.55	0.571	0.887	10.00	0.00	190.00	0.00	-3.901	<0.001
Burning micturition	0.75	0.15	0.444	0.366	6.50	0.00	78.00	0.00	-3.464	<0.001
Retention of urine	0.30	0.00	0.470	0.000	3.50	0.00	21.00	0.00	-2.449	0.014
Urinary Cast Cells	0.30	0.00	0.571	0.000	3.00	0.00	15.00	0.00	-2.121	0.034
Haematuria	0.35	0.00	0.489	0.000	4.00	0.00	28.00	0.00	-2.646	0.008
Site of Stone	1.45	0.35	0.759	0.587	8.21	5.00	115.00	5.00	-3.208	0.001
Size of Stone	3.50	0.75	0.889	1.293	10.50	0.00	210.00	0.00	-3.922	<0.001
Number of Stone	1.20	0.30	0.410	0.470	8.50	0.00	136.00	0.00	-3.819	<0.001

BT- Before Treatment

AT- After Treatment

A statistically significant improvement was observed in all the symptoms ($P < 0.05$).

Table 14: Comparative effects of both treatments on subjective parameters (symptoms).

S. No	Variable	Time Point	Group	N	Mean Rank	Mann-Whitney U	Z Value	p Value
1.	Pain	BT	A	20	17.78	145.5	-1.723	0.085
			B	20	23.23			
			Total	40				
		FU1	A	20	18.95	169.0	-0.935	0.350
			B	20	22.05			
			Total	40				
		FU2	A	20	18.25	155.0	-1.314	0.189
			B	20	22.75			
			Total	40				
		AT	A	20	20.65	197.0	-0.101	0.920
			B	20	20.35			
			Total	40				
2.	Burning micturition	BT	A	20	20.00	190.0	-0.350	0.727
			B	20	21.00			
			Total	40				
		FU1	A	20	20.00	190.0	-0.322	0.747
			B	20	21.00			
			Total	40				
		FU2	A	20	20.50	200.0	0.000	1.000
			B	20	20.50			
			Total	40				
		AT	A	20	20.50	200.0	0.000	1.000
			B	20	20.50			
			Total	40				
3.	Retention of urine	BT	A	20	20.50	200.0	0.000	1.000
			B	20	20.50			
			Total	40				

		FU1	A	20	21.00	190.0	-0.374	0.708
			B	20	20.00			
			Total	40				
		FU2	A	20	21.50	180.0	-1.433	0.152
			B	20	19.50			
			Total	40				
		AT	A	20	20.50	200.0	0.000	1.000
			B	20	20.50			
			Total	40				

BT- Before Treatment FU1- Follow Up 1 FU2- Follow Up 2 AT- After Treatment N- Number

Table 15: Comparative effects of both treatments on objective parameters (symptoms).

S. NO	Variable	Time Point	Group	N	Mean Rank	Mann-Whitney U	Z Value	P Value
4.	Urinary cast cells	BT	A	20	20.50	200.0	0.000	1.000
			B	20	20.50			
			Total	40				
		AT	A	20	20.50	200.0	0.000	1.000
			B	20	20.50			
			Total	40				
5.	Hematuria	BT	A	20	21.35	183.0	-0.541	0.588
			B	20	19.65			
			Total	40				
		AT	A	20	20.50	200.0	0.000	1.000
			B	20	20.50			
6.	Site of stone	BT	A	20	20.50	200.0	0.000	1.000
			B	20	20.50			
			Total	40				
		AT	A	20	20.83	193.5	-0.215	0.829
			B	20	20.18			
			Total	40				
7.	Size of stone	BT	A	20	20.98	190.5	-0.271	0.786
			B	20	20.03			
			Total	40				
		AT	A	20	20.05	191.0	-0.310	0.756
			B	20	20.95			
			Total	40				
8.	Number of stone	BT	A	20	20.00	190.0	-0.411	0.681
			B	20	21.00			
			Total	40				
		AT	A	20	20.00	190.0	-0.350	0.727
			B	20	21.00			
			Total	40				

BT- Before Treatment

AT- After Treatment

There is statistically no significant difference between Group A and Group B in all parameters like pain, burning micturition, retention of urine, urinary cast cells, haematuria, Site of stone,

size of calculi and number of stone ($P>0.05$).

Table 16: Showing overall assessment of result.

Parameter	Mean % improvement	
	Group A	Group B
Pain	77.55%	79.63%
Burning Micturition	78.57%	80%
Retention of urine	100%	100%
Urinary Cast cells	100%	100%
Hematuria	100%	100%
Site of Stone	75.86%	75.86%
Size of Stone	81.69%	78.57%
Number of Stone	78.26%	75%

DISCUSSION

Mutrashmari is classified as one of the eight *Mahagadas*, because it is a *Tridoshaja Vyadhi* and it is *Marmashrayee* and the *Vyaktha Sthana* of *Mutrashmari* is *Basti*, which is one of the *Dashavidha pranayatanas* (Ten vital organs). When the disease becomes severe, it may require surgical intervention, this indicates the critical nature of the disease.

The severity of pain associated with *Mutrashmari* is compared to the pain of childbirth, making the patient's life miserable. The intense pain is caused by the stone obstructing the urinary tract, leading to severe spasms, haematuria and retention of urine. If this condition is left untreated for longer duration, then the condition gets worsens causing the hydronephrosis, infection or even renal failure. In severe cases, if surgical intervention is not performed in time, then the patient may suffer with life threatening complications which includes sepsis and death.

Apamarga Paneeya Kshara is effective in managing kidney stones due to its *Bhedana* (stone breaking), *Pachana* (digestive), *Mutrala* (diuretic) and *Shodhana* (purification) properties. It has *Kapha-Vata Shamaka* and *Kapha-Pitta Samshodhaka* effects on the body. The presence of phytochemicals like alkaloids, saponins and potassium salts enhances its ability to dissolve and fragment the stones. These compounds help to alkalize the urine, reducing its acidity and preventing further stone formation and also helps to prevent the growth of micro-organisms. Its diuretic activity increases urine output, aiding in the expulsion of stones, while *Shodhana* property of *Apamarga Kshara* eliminates the Pathogenic Micro-organisms from the Urinary tract, its anti-inflammatory properties reduce swelling and pain in the urinary tract, providing overall relief from symptoms.

Shwadamstravarunadi Kwatha is effective in the management of kidney stones, using the combined therapeutic properties of its key ingredients like *Gokshura*, *Varuna* and *Shunti*.

- **Gokshura:** *Gokshura* has the qualities like *Madhura rasa*, *Guru-Snigdha guna*, *Sheeta Virya*, *Madhura Vipaka*, and it is *Vata-Pitta doshahara*, it has *Mutrala*, *Ashmarighna* Properties. Its Chemical composition includes Nitrates, essential oils and alkaloids which acts as diuresis and tribulosin provides an analgesic effect.
- **Varuna:** *Varuna* with its *Tikta* and *Kashaya rasa*, *Ruksha* and *Laghu guna*, *Ushna Virya* and *Katu vipaka* qualities, acts as *Vatakapha doshahara*. *Varuna's Bhedana*, *Ashmarighna* properties helps to break down the stones. Lupeol, a chemical component provides anti-inflammatory effects, while Varunol acts as diuretic and has lithotriptic properties.
- **Shunthi:** *Shunthi* has the qualities like *Katu rasa*, *Guru*, *Ruksha* and *Tikshna guna*, *Ushna Virya* and *Madhura Vipaka*. It has *Vata-Kapha doshahara* properties and also has *bhedana karma*. Its Chemical Composition includes gingerone and gingerol, both have anti-inflammatory, anti-oxidant and anti-spasmodic effects that help in relieving pain and discomfort associated with stones.

Together, these ingredients work synergistically to reduce the stone size, improve urine output and alleviate the other symptoms of *Mutrashmari*.

CONCLUSION

The clinical similarities between *Mutrashmari* and urolithiasis have been observed, based on similarity between descriptions in *Ayurvedic* texts and contemporary science. Classical *Ayurvedic* texts mentioned the choice of treatment based on the stage of *Ashmari*, that is conservative treatment for *Tarunavastha* (Early stage) and surgical treatment for *Pravruddhavastha* (Advanced stage).

Incidence

This condition predominantly affects individuals in the 30-50 age group.

Ahara and Vihara

- *Ahara* and *Vihara* plays a crucial role in the management of *Mutrashmari*.
- Adequate water intake (3-4 Liters per day), avoiding the suppression of urine urges and avoiding the Consumption of junk food are important preventive measures.

Study results

Both the Groups showed statistically significant improvements (P value < 0.05) in the subjective parameters such as pain, Burning micturition, Retention of urine and in the objective parameters such as Site, Size and number of stones. Thus, the treatment was highly effective in both groups.

Comparison of the effects

- *Apamarga Paneeya Kshara* Showed superior results in reducing the Size and number of stones, showcasing its lithotriptic action and stone dissolving properties.
- *Shwadamstravarunadi Kwatha* was more effective in alleviating symptoms such as pain and burning micturition, with its potent analgesic and anti-inflammatory effects.
- Both Drugs were equally effective in managing Retention of urine, Hematuria, Urinary cast cells, and the location of stones due to their diuretic, anti-inflammatory, and lithotriptic properties.

Statistical comparison

The Mann-Whitney U test revealed

- Group A showed better results in reducing the size and number of stones.
- Group B was superior in relieving pain and burning micturition.
- Both groups were equally effective in managing retention of urine, haematuria, urinary cast cells, and the location of stones.

Overall effectiveness

Although, *Apamarga Paneeya Kshara* was more effective in reducing stone size and the number of stones and *Shwadamstravarunadi Kwatha* excelled in managing pain and burning micturition, the overall statistical comparison revealed no significant difference between the two treatments. Both drugs showed marked improvement across all parameters, which indicates that both drugs are equally effective in the overall management of *Mutrashmari*.

Further scope

- The 30-day treatment duration may have been insufficient to expel all the stones, Future studies could explore a longer treatment duration for complete stone expulsion.
- The sample size of 40 patients is Small. Larger-scale studies are recommended.
- Stone analysis should be conducted to determine, which type of stone is most responsive to these treatments.

- Future research could focus on specific types of *Mutrashmari*.

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