Management of Uric Acid Lithiasis with Oral Alkalinization: A Case Report

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1. Abstract

Objective: To present a stepwise, non-surgical approach for the management and prevention of uric acid renal lithiasis, incorporating alkalinization therapy and digital self-monitoring.

Material and Methods: A 47-year-old male presented with obstructive pyelonephritis secondary to uric acid stones. Initial management included JJ stent placement and oral alkalinization with potassium citrate, later switched to pHUp due to gastric intolerance. Maintenance therapy with Theobromine and home urinary pH monitoring using the Devicare pHmeter and My-LitControl App were implemented. Laboratory, imaging, and clinical follow-up were performed over 1yer and 8 months.

Results: Within six weeks, urinary pH stabilized between 7.0–7.5. CT scan demonstrated complete dissolution of the pericatheter stone and marked reduction of other renal stones. The patient remained asymptomatic, adherent to therapy, and stone-free during follow-up with ultrasound, laboratory, and clinical controls.

Conclusions: Personalized alkalinization therapy with pHUp and Theobromine, combined with digital pH monitoring, enables effective non-invasive management and long-term prevention of uric acid stones. Integration of patient-centered, data-driven tools enhances adherence and promotes preventive urology.

2. Introduction

Uric acid nephrolithiasis accounts for 5–10% of kidney stones and is primarily driven by persistently acidic urine and high urinary uric acid concentrations. Achieving and maintaining a urinary pH above 6.5 is critical for stone dissolution and prevention. Traditional therapy with potassium citrate may be limited by gastrointestinal intolerance, highlighting the need for alternative alkalinizing strategies. Recent advances, including pH-modulating supplements such as pHUp and Theobromine, as well as digital self-monitoring tools like the Devicare pHmeter and My-LitControl App, allow for a personalized, patient-centered approach. This report details the successful non-surgical management of uric acid lithiasis using a stepwise therapeutic strategy integrating pharmacologic alkalinization and real-time digital monitoring, leading to complete stone resolution and long-term prevention.

3. Clinical Case Description

a. Patient Information

A 47-year-old male, with high blood pressure and hyperuricemia, presented in March 2024 an obstructive pyelonefritis, expressed with pain and fever, due to an acid uric stone localized in the proximal ureter.

b. Diagnostic Studies

An ultrasound was performed where a 4mm stone was detected in the proximal ureter causing ipsilateral dilation. A double-J stent was placed in March 2024 for drainage and infection control. After the catheter was placed; a non-contrast CT scan (26/03/24) showed 4mm pericatheter pyelic lithiasis stone with a density below 500 HU (400-450UH), consistent with uric acid composition. There were also two left kidney stones of 7 and 4mm approximately also with a density below 500UH.

c. Diagnosis

Uric acid renal lithiasis with obstructive symptoms and mild infection.

d. Treatment

A double-J stent was placed in March 2024 for drainage and infection control. After stabilization, the patient began alkalinization therapy with initially potassium citrate (1 capsule every 8 hours) as urinary alkalinization therapy. However, due to gastric intolerance, the patient advanced the follow-up visit after two weeks. The treatment was then switched to **pHUp (1 capsule every 12 hours)**, achieving better tolerance and maintaining adequate urinary pH levels.

e. Evolution and Follow-Up

The control CT in May 2024 revealed near-complete dissolution of the uric acid stones: the 4mm pericatheter pyelic lithiasis stone was no longer visible; and the two left kidney stones reduced significantly its size.

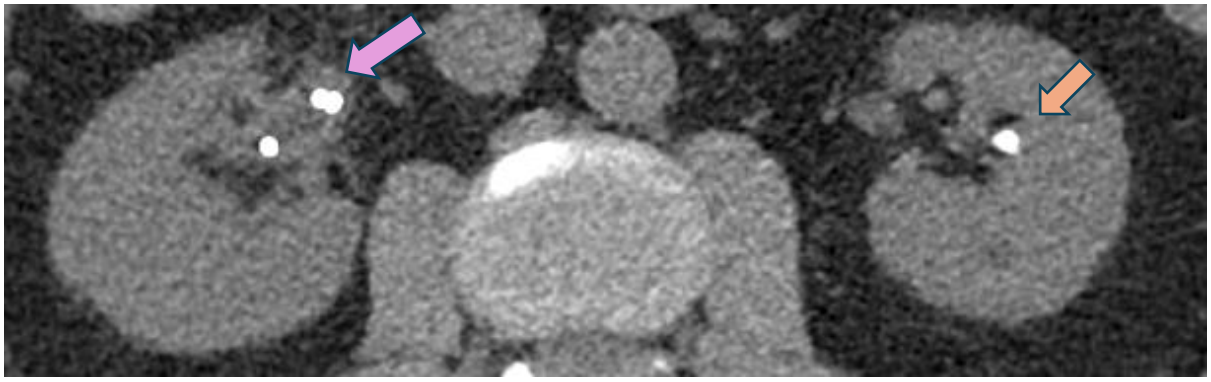


Figure 1 The CT of March 2024 shows a 4mm pericatheter stone that is indicated with a purple arrow, and a 7mm kidney stone that is indicated with an orange arrow.

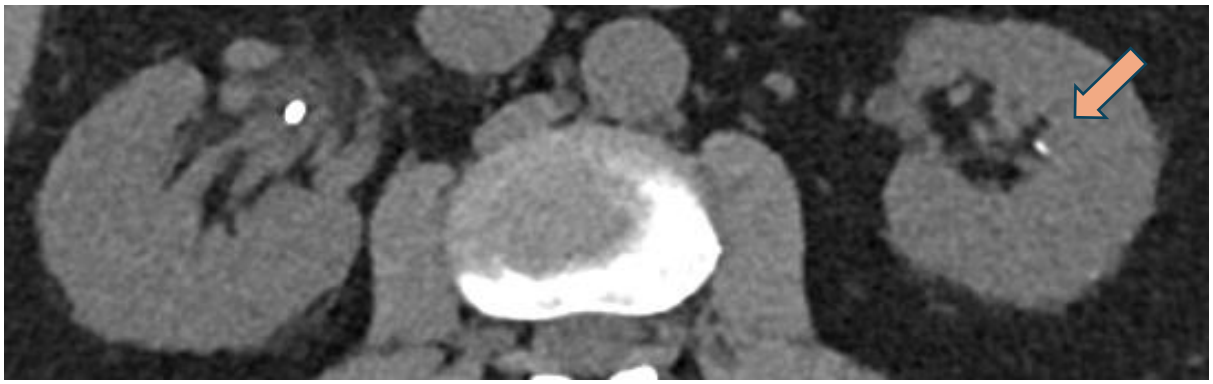


Figure 2: CT scan of May 2024 shows that the right pericatheter stone is no longer visible after treatment, and the left kidney stone has decreased in size.

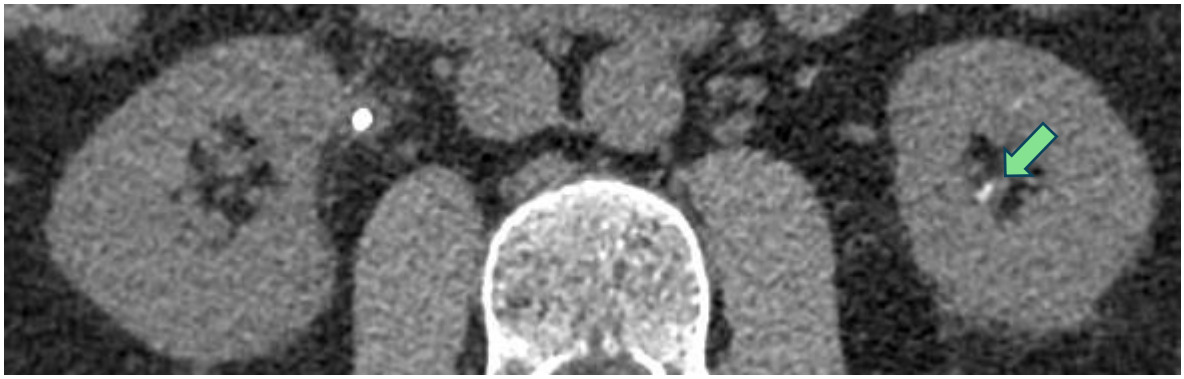
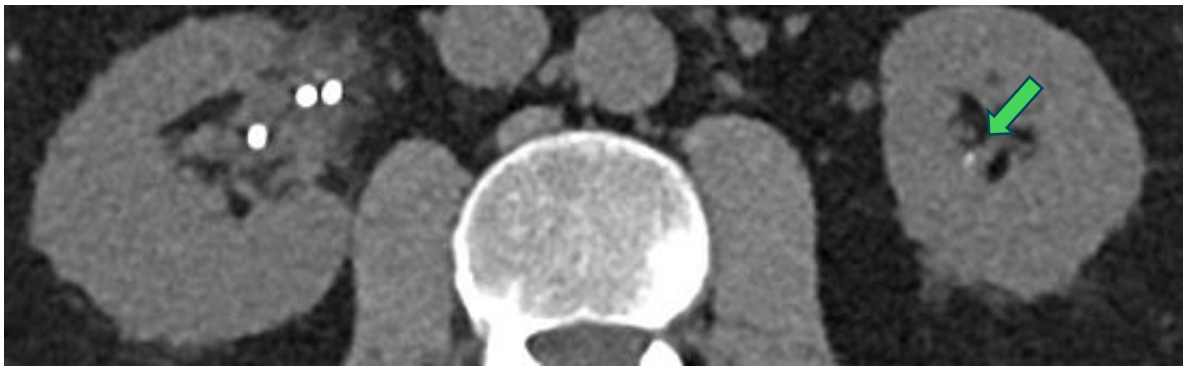


Figure 3: CT scan of March 2024 shows a 4mm left kidney stone that is indicated with a green arrow.



In Figure 4: CT of May 2024 shows that the left kidney stone has decreased in size.

After this CT, the catheter was removed.

Within 6 weeks, the patient achieved stable urinary pH 7 on a urine strip.

Therapy was adjusted again, replacing pHUp with **Theobromine (1 capsule every 24 hours)** to support ongoing urinary health and reduce the risk of crystal formation.

Given that this is a **young and motivated patient**, he was also encouraged to **monitor urinary pH at home** using the **Devicare pHmeter**. The patient was instructed on how to use the **My-LitControl App**, which allows tracking of **urinary pH and water intake**, promoting adherence and personalized follow-up. This digital self-monitoring approach was recommended as part of the **long-term management plan**, aligning with preventive and patient-centered care principles.

On the following up control at 6 months, an Ultrasound and metabolic evaluation was performed.

- Metabolic Evaluation: serum creatinine 1.03 mg/dL, eGFR 87 mL/min/1.73 m^2, serum uric acid 6.8 mg/dL, calcium 10.2 mg/dL, phosphorus 3.6 mg/dL, and normal PTH.
Urine analysis: pH 7.5, density 1.010 g/mL, 24-hour diuresis 2350 mL, uric acid excretion 550 mg/24h.

. Ultrasound controls revealed stone-free status.

On the following up controls, the patient remained clinically asymptomatic with good tolerance and adherence to the treatment, and with imaging control demonstrating free stone status.

f. Clinical Results

After initial intolerance to potassium citrate, treatment was switched to **pHUp (1 capsule every 12 hours)**, which achieved effective urinary alkalinization and was well tolerated. CT scans showed the resolution of the pericatheter lithiasis, and the significant reduction in size of the other stones.
Subsequently, maintenance therapy with **Theobromine (1 capsule every 24 hours)** was initiated to prevent recurrence and support urinary tract health.
The patient used the **Devicare pHmeter** to monitor urinary pH at home, showing stable values within the therapeutic range.

Progressive improvement was observed, and follow-up ultrasound confirmed a **stone-free status** without the need for surgical intervention.

4. Discussion

Uric acid lithiasis results from persistently acidic urine, often associated with dietary habits, metabolic factors, or low urinary volume. The primary therapeutic goal is to achieve and maintain a urinary pH above 6.5 to favor urate solubility and promote stone dissolution.

In this case, the switch to **pHUp** provided a well-tolerated alternative, maintaining effective alkalinization and achieving complete stone dissolution. Subsequent introduction of **Theobromine** served as a preventive measure, leveraging its known inhibitory effect on uric acid and calcium oxalate crystallization. The combination of these interventions highlights the importance of **individualized management** and **progressive adjustment of therapy** according to tolerance and clinical evolution.

In addition, the integration of **digital monitoring tools**, such as the **Devicare pHmeter** and the **My-LitControl App**, was recommended as part of the **long-term management plan** --- promoted adherence and personalized follow-up, empowering the patient and allowing him to track and participate in the management of the stone disease.

The combination of these measures led to the result of a stone-free status treated non-invasively.

5. Conclusions and Recommendations

This case illustrates how a **personalized, stepwise approach** can achieve both dissolution and prevention of uric acid lithiasis.

- **pHUp** proved to be a **well-tolerated and effective** alkalinizing supplement after intolerance to conventional potassium citrate.
- **Theobromine** offered a **preventive benefit**, supporting long-term urinary health.
- **The Devicare pHmeter** and **My-LitControl App** enabled **real-time monitoring (**tracking urinary pH, water intake, and medication adherence), enhancing adherence and patient engagement.

Regular **digital monitoring** allows clinicians to personalize therapy and patients to stay engaged in their care — a key factor for recurrence prevention. It's also recommended as part of the **long-term management plan** and strengthen the clinician–patient partnership in the management of stone disease.

Overall, this integrated and data-driven approach reflects the principles of preventive urology and supports patient-friendly management of uric acid stone disease, consistent with the evolution toward personalized patient care.

6. Bibliographic References

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