VI Edition of the Clinical Cases Contest on

non-surgical clinical management of Kidney Stones

Official template

Title: USE OF THEOBROMINE AS AN URIC ACID STONE DISSOLUTION ENHANCER IN A YOUNG PATIENT WITH A SINGLE KIDNEY.

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Key words (3 to 6): theobromine, single kidney, uric acid stone, alkalization.

1. **Abstract (no longer than 150 words).**

Uric acid stones represent 7-10% of kidney stones and are developed in a context of high serum and urinary uric acid concentrations, low urinary pH, and low urine output. Treatment consists in alkalizing urine, reducing the consumption of purine-rich foods, and using uric acid crystallization inhibitors.

2. **Introduction**

Theobromine is a natural methylxanthine derivated from cocoa, able to inhibit the nucleation and crystallization of uric acid. The objective is to present two patient cases in which the clinical utility of theobromine in the treatment of uric acid nephrolithiasis is corroborated. In both cases, we talk about young patients with single kidney because of previous stone complications that ended up in nephrectomy.

3. **Clinical Case description**

The first case is a 41-year-old male patient with a single left kidney due to nephrectomy 20 years ago for kidney stones, with preserved renal function (serum Creatine 1 mg/dL). The patient was overweight with a BMI of 29, with no other cardiovascular risk factors, and was on no regular treatment.

The patient was referred to the Urology department for a transient episode of oligoanuria that coincided with discomfort in the left renal fossa. He denied recurrent urinary tract infections or previous episodes of renoureteral colic. An ultrasound revealed 6mm stone localized in the lower calyceal group in the left kidney, without urinary ectasia. A metabolic study was requested, which revealed elevated serum uric acid levels (7.6 mg/dL), hyperuricosuria and hypocitraturia in 24-hour urine samples (1.5 L/24 h), and an acidic urinary pH (pHo 5).

The patient began treatment with a low-uric acid and oxalate diet, hydration (2L/24h), and allopurinol 100mg/24h combined with potassium citrate 20mEq/8h.

He was re-evaluated after 6 months of treatment, reporting a weight loss of 15kg and poor adherence to alpurinol treatment, while maintaining only potassium citrate 20mEq/24h. The ultrasound revealed the diagnosed lithiasis (not seen on XR).

A change of treatment was decided, starting 500mg of theobromine daily with 1 gram of bicarbonate, while maintaining dietary recommendations.

At 6 months, a follow-up CT scan revealed no signs of urinary tract stones or dilation. The patient did not experienced any new episodes of colic or infections.

In the second case, we present a 49-year-old male patient with a single right kidney due to nephrectomy 2 years ago for renal ectasia secondary to ureteral lithiasis with renal function decline. The patient had obesity grade-I (BMI of 30), with no other cardiovascular risk factors.

This patient was followed-up periodically in our monographic lithiasis check-up, under regular treatment with allopurinol 100mg/24h and potassium citrate 10mEq/24h, together with dietary control.

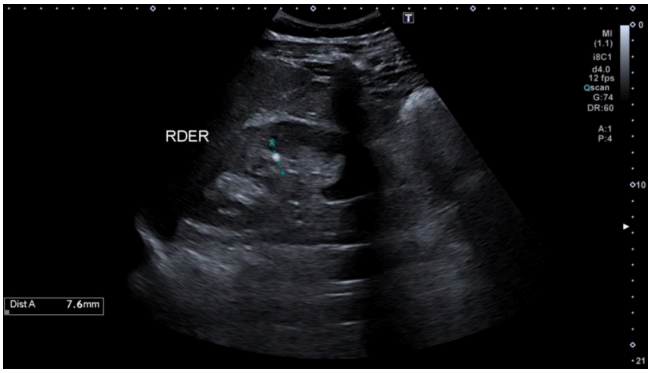
During follow-up, ultrasound was performed, visualizing a calyceal stone measuring 7.6mm (Image 1). In the metabolic study, urinary pH was 5, with hyperuricosuria, and normal uric acid levels. We decided to suspend treatment with allopurinol, to change treatment from potassium citrate to 1 gram of bicarbonate, and to start treatment with theobromine 500 mg/8h.

After 6 months, it was re-evaluated with new ultrasound control, with a reduction in the size of the stone to 3mm (Image 2).

The patient was asymptomatic, with no urinary infections, no renoureteral colic, or decreased diuresis.

Image 1

Image 2



4. **Discussion**

Theobromine as a treatment for the dissolution of uric acid stones has already been published in case series with statistically significant results in in-vitro studies.

Regarding the use of alkaline citrate and/or bicarbonate supplements with theobromine, this has already been mentioned as a possible benefit for the oral chemolysis of uric acid stones; however, no statistically significant results have been published.

After reviewing the scientific literature, although there are publications on the inhibitory effect of theobromine on uric acid crystallization in in-vitro studies, robust trials providing real-world clinical evidence are lacking.

5. **Conclusions and recommendations**

In our cases, theobromine was effective in enhancing the dissolution of stones, along with alkalizing treatment of urine, with successful resolution of the stones using non-surgical treatment. It can be considered an effective and safe treatment option as an alternative to surgical treatment in patients with a single kidney due to a history of lithiasis complications.

6. **Bibliographic references (* of special interest, ** of extraordinary interest)**

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