

3rd Edition of the Clinical Cases Contest related to the non-surgical clinical management of renal lithiasis

Official Template

Title: *Lit control pH up in the medical management of uric acid lithiasis*

Keywords (between 3 and 6): *Lithiasis, uric acid, lit control pH up*

1. Summary (not over 150 words)

Clinical case report of a 54-year-old male, who is diagnosed with a single 16mm kidney stone as an incidental finding in a control CT scan due to a previous left radical nephrectomy. The low Hounsfield units, urinary pH and the non-visibility of the lithiasis in simple X-ray suggest that it is a uric acid stone. Once the patient agrees, chemolytic treatment of lithiasis using Acalka is decided. The patient shows partial improvement using the treatment but refers GI discomfort, so the medication is changed to lit control pH UP and allopurinol + colchicine, since the patient also presented hyperuricemia in control tests. Once the treatment was changed the patient shows a complete resolution of the lithiasis

2. Introduction

Uric acid stones represent approximately 10-15% of all kidney stones and are directly related to 3 factors: 1) hyperuricosuria, 2) low urinary pH and 3) low urinary volume. Over the last few years, an increase in the incidence of uric acid nephrolithiasis has been observed, this is likely related to an increase in metabolic syndrome and obesity prevalence in general population.

Hyperuricosuria, which is defined as a uric acid excretion $> 4\text{mmol/day}$, can be due to nutritional excess, endogenous overproduction (enzymatic defects), myeloproliferative syndromes, chemotherapy, gout or excess catabolism. (1)

On the other hand, low urinary pH promotes uric acid crystallization when values are below 5.8. This is observed when there is a decrease in urinary excretion of ammonium (insulin resistance or gout), increased production of endogenous acids (insulin resistance, metabolic syndrome or lactic acidosis). It can also occur in the context of an excess intake of acids, due to a high protein diet or loss of alkali in circumstances such as diarrhea.

To treat this type of lithiasis, there are various surgical techniques available, from endourological to more invasive techniques, depending on the size and position of the stone. However, uric acid stones can be treated using non-invasive medical treatment with resolution rates ranging from 15 to 79% depending on the published series. (2)

On the one hand, general measures such as increase in fluid intake, decrease in animal proteins consumption and purines-rich foods, can be applied.

On the other hand, urinary pH should be modified and to achieve this, citrate will be administered in doses of 9-12g/day. The dose will depend on our target pH, since it is different if it is for prevention (pH 6.2- 6.8) or chemolysis (6.5-7.2). For those patients who do not seem to achieve pH above 6.5, acetazolamide can be an alternative since it increases the formation of urinary bicarbonate. However, raising pH above 7 is not recommended, as it may increase the risk of calcium phosphate lithiasis formation (1).

Another drug used in this type of patient is allopurinol, since it can change lithiasis composition in patients with gout, to a pattern like patients without gout and it will be used in patients with hyperuricosuria at a dose of 100mg/day. If the patient also has hyperuricemia, we can increase the dose to 300 mg/day. Some authors endorse the use of this drug when alkalizing treatment is not effective

3. Description of the clinical case:

Clinical case report of a 54-year-old male, smoker of 4 cigarettes a day, who has a personal history of high blood pressure and hyperuricemia. In June 2019, he underwent a left partial nephrectomy and removal of a splenic artery aneurysm. During the postoperative period, the patient presented superinfected collections in the lesser sac, which required to be drained by general surgery and prolonged hospital admission.

In October, as part of the patient's follow-up, a CT scan was performed (Image 1,2) in which a 16mm kidney stone was observed at the renal pelvis level. This lithiasis did not require retrograde dilation and presents less than 600 Hounsfield units (UH). To better characterize the lithiasis composition, an abdominal X-ray, a urine sediment and lab tests with serum urate are requested for the next follow-up.

In December, the patient goes to general urology consultation presenting the tests results, and since a radiolucent kidney stone is observed on the abdominal X-ray (Figure 3) and the sediment has a pH of 5.5, uric acid lithiasis is suspected as the first possibility. The presence of hyperuricemia (serum urate 8.50) on his results supported this diagnosis. The patient is referred to the specialized lithiasis consultation.

Once he was evaluated at the specialized consultation in March 2020, the patient was asymptomatic, so it was decided to start treatment with Acalca, taking two doses with two different meals and a 6 month follow-up, also requesting new lab tests and a CT scan.

At the follow-up consultation, the patient remained asymptomatic, and the imaging tests revealed a thinning of the lithiasis (Images 4, 5), which was still located in the renal pelvis, in addition to a slight retrograde dilatation with fatty trabeculation that was not evident on the previous CT scan. The test results showed higher urate values when compared to the previous results (serum urate 10.4).

However, the patient had decided to quit his alkalizing treatment with acalka due to gastrointestinal discomfort, referring to a feeling of fullness and "poor digestion".

As the alkalizing treatment has been partially effective, it was decided to prescribe lit control pH UP to lower the dose of potassium citrate, a possible cause of gastrointestinal discomfort, along allopurinol 300 mg/24h and colchicine.

The patient is evaluated after 6 months bringing in a new imaging test where a complete resolution of the lithiasis is shown (Figure 6,7)

EXPLORATION AND COMPLEMENTARY TESTS



Image 1



Image 2

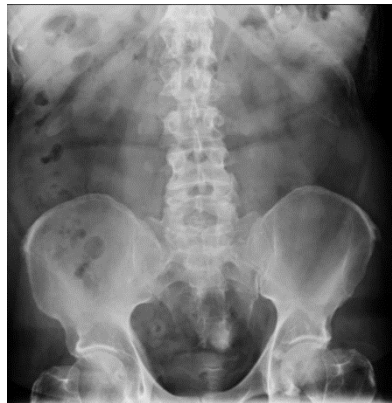


Image 3



Image 4



Image 5

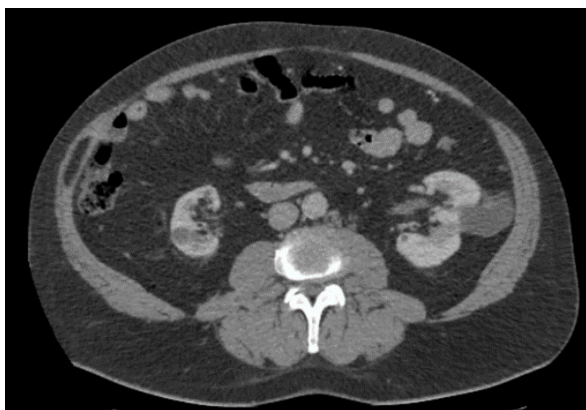


Image 6



Image 7

4. Discussion

Pharmacological therapy based on urinary alkalization is a strategy endorsed by clinical guidelines for the treatment of uric acid lithiasis. This should be combined with general measures such as increasing water intake and nutritional modifications.

To achieve urinary alkalization, we can opt between various substances such as potassium citrate, sodium citrate or sodium bicarbonate. The latter two are the main option in patients at risk of hyperkalemia, although these lead to an increased risk of calcium lithiasis formation by increasing urinary sodium, in addition to posing a risk for patients with congestive heart failure, liver cirrhosis or poorly controlled high blood pressure. (3)

In one of the cohort studies with the largest sample, Tsaturyan et al. they treated 216 patients with oral medication and obtained a follow-up CT scan after the first 6 weeks. In this cohort, a response of 75% was documented. However, among those who did not show an adequate response to treatment, 22.1% ended up in surgery and 5% abandoned treatment due to adverse effects. (4)

In the cohort study of Moore et al. failure rate was 35.7% and up to 21% of patients did not tolerate it adequately. The main factor of treatment response was maintaining pH levels above the solubility product of uric acid. (5)

Treatment with potassium citrate is not without side effects. One of the most frequent are gastrointestinal complaints that are evident in the form of abdominal distension, diarrhea and nausea in up to 2.5% of patients; which is why it is usually contraindicated in patients with gastrointestinal ulcers. (6)

It is for this reason that for our patient the use of lit control pH UP that combines potassium citrate with magnesium citrate managed to reduce the abdominal discomfort caused by taking Acalca without losing alkalizing strength and therefore chemolysis.

5. Conclusions and recommendations

The incidence of lithiasis is increasing in developed countries due to the increase in the prevalence of sedentary lifestyle and obesity. The high recurrence of lithiasis requires an individualized evaluation, depending on the features of both the patient and the stone, as well as the different pathologies that may lead to this disease.

Non-surgical approach for uric acid stones, not only prevents recurrence, but also represents a safe and effective therapeutic option for its management, even in those cases with high lithiatic load.

Additionally, patients with high surgical risk or with factors that a priori may imply contraindication to surgery (such as high anesthetic risk, significant obesity), may benefit from this type of treatment.

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

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