4th Edition of the Clinical Case Contest related to the non-surgical clinical management of renal lithiasis.

Official template

Title: Pharmacological chemolysis of uric acid lithiasis in a patient undergoing bariatric surgery and chemotherapy.

Keywords (between 3 and 6): Uric acid. Chemotherapy. Bariatric surgery. Chemolysis. Lit-Control

1. Abstract

A woman underwent bariatric surgery and was subsequently diagnosed with breast cancer undergoing mastectomy and chemotherapy + adjuvant hormone therapy. The patient was referred from the oncology department with left lumbar pain and an imaging test showing 4 mm of obstructive lithiasis in the left ureteral meatus together with 15 mm of non-obstructive urolithiasis in the right renal pelvis. After spontaneous expulsion of the obstructive lithiasis, treatment of the right lithiasis with a composition suggestive of uric acid is proposed. The patient did not wish surgical treatment. It was decided to alkalinise the urine by means of pharmacotherapy and dietary recommendations, achieving complete chemolysis. The patient currently remains asymptomatic.

2. Introduction

Urolithiasis has a prevalence of 4-20% and its clinical manifestations are very disabling in the acute phase and in the chronic phase urolithiasis is a warning sign of the onset of other pathologies in the patient (such as cardiovascular diseases).

A valid classification of urolithiasis is according to its composition. Uric acid lithiasis accounts for 10% of all urinary lithiasis. Some of the salient features of this type of urolithiasis are its transparency on radiography, its low density in Hounsfield units on CT and the possibility of dissolution by pharmacotherapy.

Risk factors for urolithiasis of any composition include cardiovascular risk factors (hypertension, hyperglycaemia, dyslipidaemia, dyslipidaemia, obesity and, of course, metabolic syndrome). Although developed countries have achieved a decreasing trend in cardiovascular disease mortality, cardiovascular risk factors are becoming increasingly prevalent and are notable for their numerous comorbidities, including the formation of urolithiasis. Several studies have shown a bidirectional association of urolithiasis with metabolic syndrome.

The specific formation of urate (2, 6, 8-trioxypurine) urolithiasis results from situations involving increased accumulation of uric acid in the body: increased uric acid absorption, accelerated catabolism of purines or reduced elimination of purine metabolisms.

Risk factors for the formation of uric acid lithiasis include malabsorption as well as tumour diseases. Malabsorption (intestinal diseases, bowel resection, bariatric surgery) leads, together with dehydration, to a loss of bicarbonate. This results in a more acidic urine that favours the formation of uric acid urolithiasis. Therefore, those patients who, due to their obesity (associated with other cardiovascular factors), undergo bariatric surgery with the intention of achieving greater control of their risk factors, reduce their predisposition to certain pathologies at the expense of increasing the risk of others, such as urolithiasis of uric acid. On the other hand,

neoplasms also encourage the formation of urate lithiasis because when patients undergo chemotherapy or radiotherapy they suffer cell necrosis in which the tumour cells release uric acid, causing a situation of hyperuricaemia and with it the crystallisation of uric acid.

3. Description of the clinical case:

a. Relevant background

66-year-old woman with a history of bariatric surgery (previous BMI of 37) and subsequent diagnosis of left breast cancer (pT2 N0 M0) treated with mastectomy and adjuvant chemotherapy (for 1 year) and hormone therapy. After completion of adjuvant treatment, left breast prosthesis was placed and right breast symmetry was performed. The disease is currently stable.

b. Diagnostic support studies and results

-PHYSICAL EXPLORATION: haemodynamically stable (vital signs preserved). Negative right renal fist percussion and positive left renal fist percussion (only in the acute phase).

-KIDNEY AND URINARY VIA ECHOGRAPHY, BILATERAL (initial): mild ureterohydronephrosis secondary to lithiasis of about 4 mm in left ureteral meatus. Large lithiasis in the left renal pelvis (Figure 1).

c. Diagnosis

The patient, with the previously described history, came to Oncology for a check-up appointment referring pain in the left renal fossa. For this reason, and after consultation with Urology, she was referred to our unit with treatment (indicated in the Treatment section), preferential urinary ultrasound and analyses. At the urology appointment, the patient was in good general condition, afebrile and clinically and haemodynamically stable. This time the bilateral renal fist percussion was negative. She reported an episode of dysuria and haematuria with expulsion of grit in the urine and since then intermittent pain in the left renal fossa.

Analytically, renal function was within the normal range and there was no elevation of acute phase reactants.

Given the conclusions of the complementary tests, the patient was diagnosed with left nephritic colic and a non-contrast abdominopelvic CT scan was requested together with an abdominal X-ray and urinalysis with control urine culture, where the following results were obtained:

-ABDOMINOPELVIC COMPUTARISED CT ABDOMINOPELVIC WITHOUT CONTRAST (control after expulsion treatment): Absence of lithiasis in the ureteral meatus. Persistence of 20 mm lithiasis in the left renal pelvis (370 Hounsfield Units), without dilatation of the excretory tract (Figure 2).

-X-RAY OF THE SUPINE ABDOMEN: no lithiasis is visualised in the left pyelic lithiasis.

-UROCULTURE negative and SEDIMENT with abundant uric acid crystals.

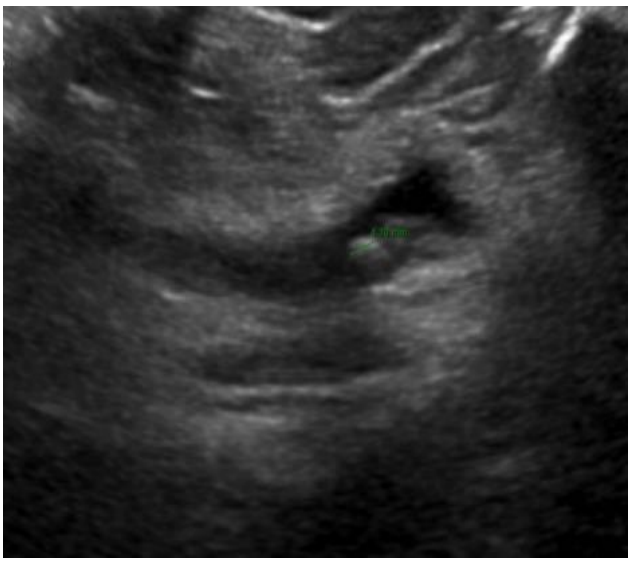

Figure 1. Ultrasound of the kidney and urinary tract, BILATERAL (initial)

Figure 2. Abdominopelvic Computer Tomography without contrast (control after expulsion treatment)

d. Treatment

For the management of renal colic in the acute phase (from Oncology), expulsion treatment (aimed at ureteral lithiasis) was prescribed with Tamsulosin 0.4mg/day, regular analgesia with Paracetamol and NSAIDs and Metoclopramide as an antiemetic.

Given the suspected uric acid composition of the urolithiasis and once the hygienic-dietary measures had been indicated (high water intake, exercise and appropriate dietary restrictions), alkalinising treatment was started, according to EAU guidelines, with Allopurinol 300 mg one tablet per day and potassium and magnesium citrate (Lit-Control® pH Up) at a dose of one capsule every 12 hours.

During follow-up, the patient visited the emergency department several times due to episodes of renal colic. Therefore, it was decided to urgently bypass the urinary tract with a left double-joint catheter. Alkalinising treatment was maintained. However, the dose of potassium and magnesium citrate (Lit-Control® pH Up) was increased to one capsule every 8 hours.

The use of the myLit-Control® App was recommended in order to facilitate monitoring and follow-up by the patient and the physician, with both having access to the urinary pH measurement along with water intake.

e. Developments and follow-up

At the three-month follow-up, a control abdominopelvic CT scan showed a slight decrease in the size of the lithiasis.

Subsequently, after six months of treatment, the patient reported to be asymptomatic. The urinary pH results of the application showed good compliance with treatment (pH between 6.5 and 7 during treatment as prescribed). A control non-contrast abdominopelvic CT scan showed the efficacy of the treatment with a very significant reduction in the size of the left pyelic lithiasis.

- ABDOMINOPELVIC computed tomography without contrast treatment): Normopositioned left double jota catheter. Nephrolithiasis in the left renal pelvis which has decreased from 2 cm to 4.8 mm (Figure 3).

Subsequent follow-up visits confirmed preserved renal function and absence of symptoms for months. Therefore, an appointment was made for removal of the left double-joint catheter with subsequent ultrasound scan and urinary metabolic study.

Figure 3. ABDOMINOPELVIC COMPUTER TOMOGRAPHY WITHOUT CONTRAST (control at 6 months of treatment)

f. Clinical results

One year after treatment, the patient had no lithiasis on ultrasound with stable renal function and no symptoms for at least 6 months.

-BILATERAL KIDNEY AND URINARY TRACK SCAN (one year after treatment): Absence of left pelvic nephrolithiasis. No dilatation of excretory urinary tract (Figure 4).

- BLOOD ANALYTICS: Cr 0.76 Calcium 10 Na 137 K 3.80 Cl 103 Leucocytes 8.130 CRP 0.4.

-Normouricemia (5.2 mg/dl).

- URINARY METABOLIC STUDY: Urinary pH 6,5. Uric acid in urine 752 mg per 24 hours.

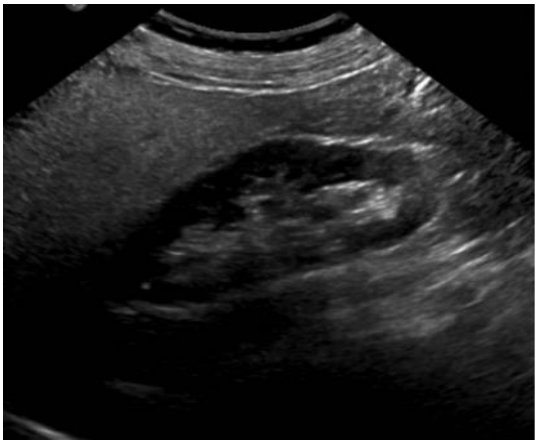

Figure 4. KIDNEY AND URINARY TRACK SCAN, BILATERAL (one year after treatment)

4. Discussion

This case can be analysed from different perspectives as it presents several risk factors that may influence stone formation, in particular uric acid, which are discussed below.

Firstly, uric acid stones form when there is a high concentration of uric acid in the urine and an acidic urinary pH, as hyperuricaemia does not lead to uric acid precipitation in the urinary tract unless the pH is acidic. Chemotherapy, especially in cases of cancer treatment, can increase uric acid concentration due to cell lysis. The release of cellular products, including nucleotides, increases the concentration of uric acid in the blood and thus in the urine, which may promote stone formation.

Secondly, bariatric surgery, by altering the anatomy and function of the digestive system, can lead to malabsorption of certain nutrients, minerals and electrolytes. This includes the absorption of oxalate and citrate, factors that may influence the formation of kidney stones. In addition, malabsorption can contribute to metabolic acidosis, increasing the concentration of uric acid in the urine and favouring the formation of uric acid stones.

Therefore, it is essential to assess and correct possible nutritional deficiencies caused by malabsorption after bariatric surgery. Any chemotherapy-related metabolic disturbances should also be monitored and corrected. Adequate hydration and urinary pH control may be key strategies to prevent uric acid stone formation. In some cases, the use of medications such as urine alkalinisers may be considered.

Thirdly, given the complexity of the case, a multidisciplinary approach with the collaboration of a urologist, a nutritionist, an oncologist and other specialists may be essential to provide comprehensive patient care.

In summary, the management of this type of patient where urolithiasis, in this case uric acid urolithiasis, has multiple triggers requires a thorough assessment of the contributing factors and a multidisciplinary approach to address all dimensions of the case. Regular follow-up and adaptation of the treatment plan as needed are essential to ensure the best possible care for the patient.

5. Conclusions and recommendations

There are many factors that trigger lithiasis and its diagnosis is increasing, partly due to advances in complementary tests and their treatment. For this reason, we must be aware of the risk factors, to change the hygienic-dietary measures, and of all the therapeutic alternatives, adapting them to the composition of the lithiasis. In this case we focus on uric stones.

The interaction of malabsorption, chemotherapy-induced metabolic acidosis and high uric acid concentration in the urine increases the risk of formation and growth of uric kidney stones. In this context, alkalinising agents increase urinary pH by decreasing the solubility of uric acid, which favours its elimination. This chemolysis makes it possible to optimise medical resources and avoid more invasive surgical interventions.

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