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

Offical template

Title: Role of Canoxidin® in the prevention of urinary catheter calcification in pregnant patients.

Keywords: Canoxidin®; Gestation; Double J; Calcification; Urinary acidification.

1. Abstract

We present the case of a 34-year-old pregnant woman (17 weeks) with a diagnosis of obstructive right uropathy, in whom a double J was placed. One month later, she underwent emergency surgery for replacement of the double J due to pain secondary to severe encrustation of the catheter and infection by a multiresistant bacterium. Subsequently, Canoxidin® was prescribed as preventive treatment with the aim of preventing the appearance of catheter calcifications and new urinary tract infections. The new double J was removed 6 months later, the patient being asymptomatic and the double J with no signs of encrustation. The use of Canoxidin® in our patient achieved better tolerance and reduced complications in a pregnant woman at risk.

2. Introduction

Double J ureteral catheters have become one of the most widely used tools by urologists due to their multiple applications. The most common indication for ureteral stents is drainage of an obstructed upper urinary tract [1].

One of its potential complications is encrustation, which is the deposition of crystals on the internal and external surfaces of the stent. Contributing factors include the formation of biofilms, which may be composed of urease-producing bacteria (Proteus, Pseudomonas, Klebsiella...), which favor the synthesis of ammonium, thus raising the urinary pH and allowing struvite precipitation on the surface of the urinary prosthesis. However, fouling can also occur under sterile conditions, the most commonly identified composition being calcium oxalate [1,2]. Gestation entails a series of metabolic alterations at the systemic level that contribute to an increase in calciuria, increasing the risk of this type of complication.

Urinary catheter encrustation can lead to serious complications, especially in chronic carriers, as occurs in up to 13% of cases [1]. The presence of severe encrustation could facilitate catheter rupture during removal, and also induce ureteral injury or avulsion, urinary tract infections and even loss of the renal unit when crystal deposits chronically obstruct urine drainage. This is why prevention of crystallization and encrustation of these devices in urological patients is a priority.

3. Description of the clinical case

a. Relevant background

We present the case of a 34-year-old female patient who was pregnant with twins and one of the two fetuses had a large omphalocele. She had no relevant medical or surgical history. She was allergic to non-steroidal anti-inflammatory drugs. As usual treatment in the context of pregnancy she was being treated with Progesterone 400mg ovules (c/12h), Estradiol via oral 2mg (c/12h), Levothyroxine via oral 25mcg (c/24h) and Vitamin D3 oral suspension 10,000 IU/mL (6 drops c/24h).

b. Diagnosis support studies and results.

She was evaluated in the emergency room by the urology department when she was 17 weeks + 5 days pregnant due to a 3-day history of right renoureteral colic pain refractory to analgesic treatment, without fever or associated voiding symptoms. She had presented a similar episode 5 days earlier, which was managed conservatively. She had no history of urinary lithiasis. Laboratory tests showed a leukocytosis of 12x10e3/ and a CRP elevation of 24mg/L. Ultrasound showed right hydronephrosis with measurement of the renal pelvis diameter of 1.5cm, with no lithiasis images observed by this technique (Image 1).

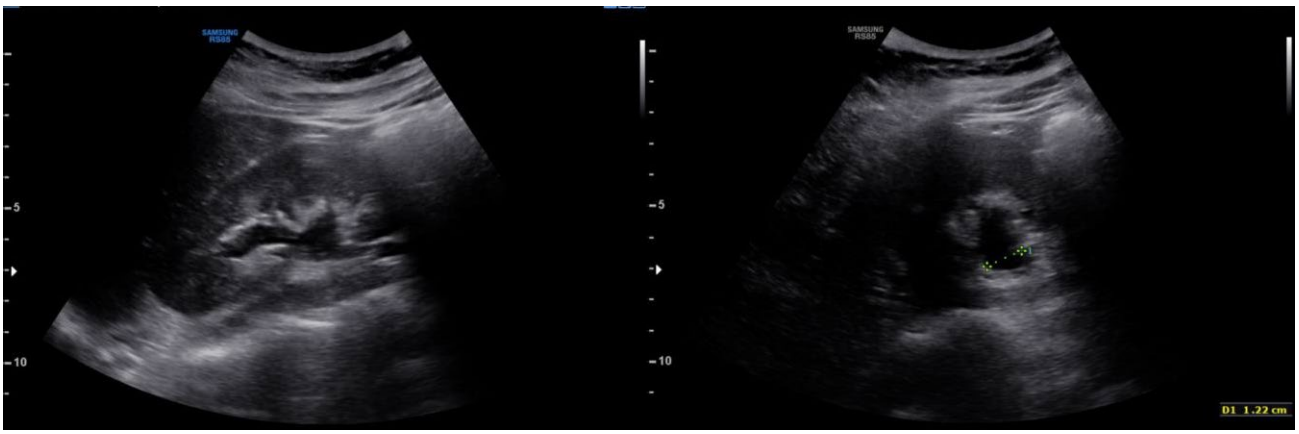

Image 1. Ultrasound images showing right hydronephrosis.

c. Treatment

Due to poor pain control in the context of obstructive uropathy of pregnancy, an urgent right double J catheter was placed, and purulent urine was observed at the time of its ascent. The patient evolved favorably in the postoperative period and was discharged with resolution of pain on the third day and antibiotherapy with Cefixime 400mg.

d. Evolution and follow-up

One month later, the patient was evaluated again in the emergency department by urology as she was 21 weeks + 1 day pregnant due to right lumbar pain uncontrollable with analgesia at home of two weeks of evolution and urinary symptoms with urgency and pollakiuria. She was diagnosed with urinary tract infection (UTI) due to Escherichia coli multidrug-resistant extended-spectrum beta-lactamase (ESBL). Urinary pH was 6.5. Given the diagnosis of complicated UTI and poor tolerance to the double J, after starting targeted antibiotic coverage, the right double J was removed, which was calcified along its entire length and with abundant endoluminal encrustation, and replaced with a new one. The patient evolved favorably and was discharged. Due to the context of the pregnancy and the history of the rapid calcification of the catheter, treatment with Canoxidin® (1 tablet/8h) was started and continued during the rest of the pregnancy.

e. Clinical results

Subsequently, the patient remained asymptomatic from the urological point of view, with good tolerance to the double J catheter and without additional episodes of UTI or readmissions to the emergency department. During the follow-up, the patient was contacted on several occasions to ensure correct compliance with therapy. She gave birth at 36 weeks gestational age by scheduled cesarean section, due to a history of fetal omphalocele. She was evaluated in the urology outpatient clinic 6 weeks after the cesarean section, and therefore 6 months after the placement of the second double J. The urinary pH achieved at that time was 5.5. The double J was removed without incident, and showed no signs of calcification or encrustation (Image 2).

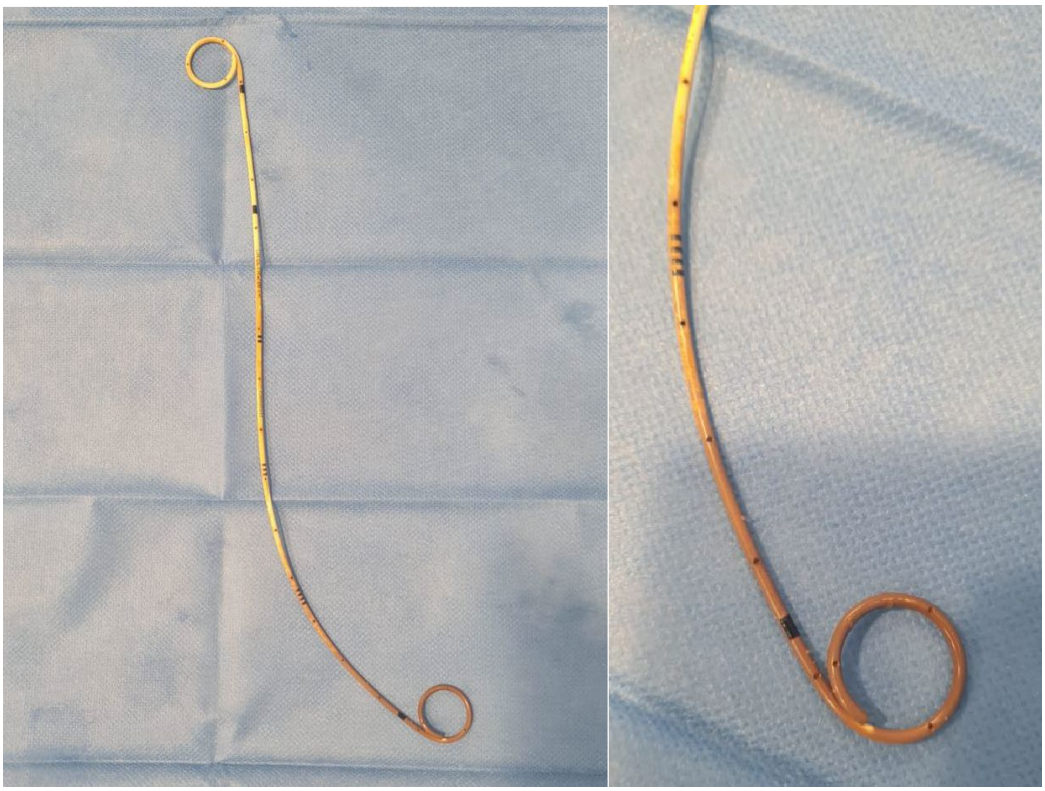

Image 2. Aspect of the double J catheter removed after 5 months of treatment with Canoxidin®.

4. Discussion

The gestational period in female patients involves a series of physiological changes in multiple body systems, among which the nephrological and genitourinary ones are of special importance. Physiological hydronephrosis occurs in pregnancy in approximately 90% of cases, which may be contributed to by both the decrease in ureteral peristalsis as a consequence of the effects of progesterone and the direct extrinsic compression of the distal ureter by the elongated uterus and may even produce a certain degree of obstructive uropathy that favors urinary tract infections or colicky pain [3]. On the other hand, at the renal level there is an increase in the glomerular filtration rate of 30-50%, increasing the filtered levels of sodium, uric acid and calcium. Hypercalciuria also increases due to the suppression of parathyroid hormone production and the increase of 1,25-dihydroxycholecalciferol, formed in the placenta, which in turn increases enteric absorption of calcium. Likewise, gestation is associated with an elevation of urinary pH. These antecedent changes may lead to an increased lithogenic risk in pregnant patients [3,4].

The treatment of obstructive uropathy in pregnant patients is based initially on urinary diversion by placement of double J catheters or nephrostomies in those cases where indicated. This is a safe technique, although with significant complications during follow-up due to the high rate of incrustation of these devices, usually requiring replacement every 4-7 weeks [5]. Calcification of the urinary catheters can lead to their dysfunction

in cases of endoluminal obstruction or severe calcification, with residual effects on the urinary tract such as the development of ureteral strictures and repeated infections that can have repercussions on maternal-fetal morbidity. Likewise, the pain produced by the incrustation leads to a deterioration in the quality of life, with a great limitation for analgesic treatment and in some cases may lead to preterm induction of labor in up to 47% of patients [6]. In the case of our patient, uncontrollable pain and infection by a multidrug-resistant organism made it necessary to replace the double J 4 months after its first placement.

The metabolic composition of urine plays a determining role in the formation, structure and severity of urinary catheter encrustation. Reduced diuresis, increased calciuria, oxaluria, uricosuria, uricosuria, phosphaturia and dwell time may play an additional important role. A higher pH could also favor phosphate fouling [7]. This is why treatment with urinary acidification and the use of crystallization inhibitors may be useful to prevent or reduce the risk of fouling of devices in prolonged contact with urine. In the case presented, Canoxidin® which combines both compounds (L-methionine as acidifier and Phytate and Theobromine as crystallization inhibitors), helped to prevent encrustation of the second double J catheter placed over a period of 6 months.

5. Conclusions and recommendations

The prevention of calcification and encrustation of urinary catheters is a priority in urological patients in order to prevent additional complications and morbidity secondary to this situation. Despite the scarce evidence available, treatment with urinary acidification and the use of crystallization inhibitors seems to be useful, especially in chronic patients. In the clinical case presented, treatment with Canoxidin® helped prevent encrustation of a double J catheter for 6 months in a pregnant patient at risk.

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

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