Ureterolithotripsy in the management of calcified double-J catheter.

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Summary.- OBJECTIVE: The authors present their experience in the management of a rare complication observed during long-term use of a ureteral catheter. The calcification along the entire surface of the catheter followed by incrustation can make its removal by means of cystoscopy difficult, thus becoming a great challenge to the urologist.

METHODS: The authors describe their experience in the management of this complication through the analysis of two illustrative cases.

RESULTS: After failing to remove the catheter using extracorporeal lithotripsy, ureterolithotripsy was performed and the calcified ureteral catheter was successfully removed in both cases.

CONCLUSION: Ureterolithotripsy proved to be an effective and safe method in the management of calcified double-J catheter.

Keywords: Ureteral catheter. Lithotripsy. Ureteroscopy. Complication. Urinary lithiasis.

INTRODUCTION

The ureteral catheter has been used since 1967 (1-3) in the treatment of ureteral obstruction and in numerous urological procedures (4, 5). However, several complications have been observed as a result of its use. Among them is the rare complication of calcification of the catheter followed by incrustation, which may lead to major difficulties in its removal (4, 6, 7). It can be observed mainly in patients with a
catheter indwelling for a long period of time, generally for more than 12 weeks (8).

This complication is analyzed through two illustrative cases and the literature is reviewed.

CASE REPORT:

FIRST CASE:

Male patient, 63 years old, with a history of lithiasis of 20 years. He was submitted to a right pyelolithotomy about 7 years ago and a left pyelolithotomy 2 years ago. He consulted for the same symptoms on the right side. Patient evaluation revealed a new stone which was treated by conventional pyelolithotomy, followed by placement of a ureteral catheter as supplementary treatment.

The patient inadvertently did not return for treatment for 4 months. The evaluation tests showed that the kidney was free of stones, but the double-J catheter was calcified along its entire surface.

An attempt to remove the catheter was unsuccessful due to incrustation of the catheter and fragmentation of its distal portion. Extracorporeal lithotripsy was then performed. The patient was submitted to 4 sessions of this treatment with 15,000 shock waves, using the Dornier Compact S lithotripsy equipment. No signs of improvement were observed in the X-ray.

Removal of the catheter was then attempted by means of ureterolitripsy. The Storz semi-rigid ureteroscope with pneumatic lithotriptor was used. The calcifications along the entire surface of the catheter were fragmented, allowing for its removal.

A new double-J catheter was inserted and removed after 15 days, leaving the patient free of stones (Fig. 1).

SECOND CASE:

Female patient, 51 year old, with a bulky incision hernia, associated with renocutaneous fistula after nephrolithotomy for renal lithiasis 12 years earlier. A ureteral catheter was placed for the treatment of the fistula. The patient returned two years later with calcification along the entire surface of the catheter which was demonstrated at evaluation. She was submitted to ultrasonic ureterolithotripsy which achieved successful removal of the catheter (Fig. 2).

DISCUSSION

The ureteral catheter was initially used in the long-term treatment of ureteral obstruction in 1967 by Zimskind. However, the final development of the double-J catheter only occurred 10 years later with Finney (3).

The double-J catheter has been largely used in the treatment of ureteral trauma, fistula and ureteral stenosis; as an ancillary procedure in the treatment of renal stones larger than two cm and ureteral stones larger than one cm by extracorporeal shock wave lithotripsy; in the prophylaxis of symptomatic gestational hydronephrosis, extrinsic ureteral obstruction caused by neoplasias, retroperitoneal
Irritative voiding symptoms caused by the presence of the catheter in the bladder, is a complication inherent to the use of the catheter that may affect up to 90% of the patients, regardless of the material of the catheter (1). There are other symptoms such as low back pain during micturition, triggered by vesico-ureteral reflux; bacteriuria, which might develop with pyelonephritis and sepsis; erosion along the ureter, which might even lead to the formation of fistulas; migration of the catheter along the ureter, both up and down (4); obstruction; and calcification followed by incrustation (6).

Fragmentation of the ureteral catheter is not frequent and is associated to long term use, due to corrosion by urine. The areas most susceptible to fragmentation are those subject to "folds" during catheter placement in a tortuous ureter (2).

Calcification of the catheter with consequent formation of stones is associated to long term use (8) and can result in both obstruction and adhesion of the stones to the catheter walls, making its removal impossible. Calcification can occur in the distal and proximal portions of the catheter, areas where there is more contact with stagnant urine, which is more common in the distal portion (4, 9).

Urinary tract infection or metabolic changes may increase the possibility of stone formation, especially in patients with a history of recurrent lithiasis (1).

Follow-up evaluation of patients with an indwelling catheter should be performed every 6 to 12 weeks through urinalysis and a plain abdominal X-ray.

The bacteria most commonly associated to the calcification of the catheter is Proteus and antibiotics can be administered in patients with recurrent urinary bacteriuria. The presence of leukocyte without bacteria can occur due to depolymerization of biomaterials as a result of the action of lysosomal enzymes (7).

Among the material of which the catheters are made, silicon seems to be the safest; its resistance allows for its use for more than 20 months. Polyethylene catheters have a high incidence of fragmentation after 6 months and are not utilized for long-term use. However, for short term use they are both equivalent.

Through the analysis of a series of 290 patients with lithiasis and a ureteral catheter, Zisman observed 76% of calcification of the catheter after more than 12 weeks’ use.

Extracorporeal shock wave lithotripsy is the initial approach for this type of complication. In case it is not successful, retrograde or anterograde ureterolithotripsy can be performed, since they allow for direct access to the walls of the ureter and to the calcified catheter (2). In regard to the energy source for the fragmentation of the calcified catheter, in the first case a pneumatic lithotriptor was used with excellent results, with no damage to the ureter wall. In the second case an ultrasonic lithotriptor was used with similar results. We believe that the energy source is not a major factor in the treatment of these patients. However, it may influence the risk of ureteral damage. To reduce this risk factor, it is necessary that the surgeon have wide experience with ureteral instrumentation. Recently, with the increasing use of the holmium laser, the risk of ureteral damage can be reduced due to the greater
precision in the fragmentation of the calcified catheter provided by this source of energy (10). Open surgery is reserved as the last option for the treatment of this complication.

In conclusion, the ureteral catheter has been largely used in urology in the last 10 years and its value is well-known in the treatment of ureteral obstruction of various etiologies, urinary fistula and ureteral trauma. However, this procedure is not free of complications, such as fragmentation, irritative symptoms, low back pain, spontaneous migration of the catheter and calcification with incrustation of the catheter in the ureter. A close follow-up of the patients with an indwelling ureteral catheter should be performed every 6 to 12 weeks to prevent complications. One of the factors that can trigger stone formation in the catheter is bacterial infection caused by Proteus species.

Literature describes several treatment options for calcified ureteral stents, such as extracorporeal shock wave lithotripsy, ureterolithotripsy and open surgery. Ureterolithotripsy has proved effective, and with a low morbidity, in the treatment of this complication.

REFERENCES: