Calcified double-J stent management at the Hospital General “Dr. Manuel Gea González”


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KEYWORDS
Encrustation; Ureteral stent; Calcified; Mexico.

Abstract
Background: Encrustation is a clinical problem that occurs in both external and internal urinary diversion catheters; the chemical constituents of urine combine with the stent to produce a matrix upon which a stone will later form.

Aims: The objective of this article was to describe the management and results obtained in patients with calcified double-J stents at the Hospital General “Dr. Manuel Gea González”.

Material and methods: A retrospective, observational, cross-sectional study was carried out. All patients with a calcified ureteral stent at the Urology Service of the Hospital General “Dr. Manuel Gea González” within the time frame of January 2010 to July 2011 were taken into account. They were classified according to the FEcal Ureteral Stent Grading System created by the Department of Urology at the Loyola University Medical Center in Maywood, Illinois.

Results: Ten patients (5 men and 5 women) presented with calcified double-J stent and their mean age was 46 years. The mean length of time with the indwelling double-J stent was 10.2 months; 4 of the patients were classified as grade II, 2 as grade III, 2 as grade IV, and 2 as grade V. The problem was resolved in 3 of the patients through open surgery, in 3 through laparoscopy, in 3 through endoscopy, and one patient underwent extracorporeal shock wave lithotripsy (ESWL). At present all patients are free from residual stones.

Discussion: The management of retained and encrusted ureteral stents can be a surgical challenge for the urologist and represents an increased risk for patient morbidity. However, there is a wide variety of therapeutic options for approaching this pathology.

Conclusions: The presence of a classification system and management protocol for calcified ureteral stents enables a standardized approach to this phenomenon.

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Introduction

The introduction of the ureteral stent in 1967 revolutionized the way urinary tract obstructions were managed and it became one of the most widely used urologic accessories. Current indications for its use include the prevention and treatment of ureteral obstruction secondary to intrinsic, extrinsic, or iatrogenic causes such as urolithiasis, stricture, and malignancy. A calcified ureteral stent is defined as one that cannot be removed by cystoscopy in the first attempt without the aid of other auxiliary measures due to encrustation or the formation of a stone within the stent (fig. 1). 1-3

Modern ureteral stents have a double-pigtail (double-J) design and are made of synthetic polymers (polyurethane/polyethylene). The ideal material for a ureteral stent is biocompatible, radiopaque, encrustation-resistant, prevents infection, causes very little discomfort, is economically accessible, and effectively improves the urinary tract obstruction. However, currently no ureteral stent meets all those requirements. 4

The majority of polymer-based ureteral stents have a mean indwelling time of 3 to 6 months. Current advances in the stents are focused on preventing symptoms or complications associated with their placement, such as infection, migration, dysuria, and calcification. 5-6 These advances may reduce the desire of the patient to have the stent removed thanks to a decrease in the related symptomatology and these data, together with an increase in stent use, can be extrapolated to an increase in future calcified double-J stents. 7-9

In March 2009 the Department of Urology at the Loyola University Medical Center in Maywood, Illinois published the FECal Ureteral Stent Grading System, along with a management protocol that enable cases to be resolved with the most effective methods depending on the classification grade of the stent 10. The aim of the present study was to describe the management and results obtained in patients with a calcified double-J stent seen at the Hospital General “Dr. Manuel Gea González”.

Methods

A descriptive, retrospective, observational and cross-sectional study was carried out. All the patients presenting with a calcified ureteral stent that were managed within the timeframe of January 2010 to July 2011 at the Urology Service of
Calcified double-J stent management at the Hospital General “Dr. Manuel Gea González” were included in the study.

The stents were classified according to the FECal ureteral stent grading system (fig. 2) as follows:

- Grade I: Minimal linear encrustation at either of the pigtail loops
- Grade II: Circular encrustation that completely encloses either of the pigtail loops
- Grade III: Circular encrustation that completely encloses either of the pigtail loops, with some linear encrustation along the ureteral portion of the stent
- Grade IV: Circular encrustation that completely encloses both of the pigtail loops
- Grade V: Diffuse and bulky encrustation that completely encloses both of the pigtail loops, as well as the entire ureteral portion of the stent

Results

A total of 92 double-J stents were placed during the above-mentioned time frame, of which 10 patients (10.86%) presented with calcified double-J stent. Those patients included 5 men and 5 women and their mean age was 46 years. The mean catheter indwelling time was 10.2 months and according to the FECal ureteral stent grading system, 4 of the stents were grade II, 2 were grade III, 2 were grade IV, and 2 were grade V (fig.3); 3 of the calcified stents were resolved through open surgery, 3 through laparoscopy, and one through ESWL (table 1). Only one patient had a failed first attempt that was later resolved through ESWL. At present all of the patients are free from residual stone.

The differences in the management of the calcified double-J stents between the protocol suggested by the Medical Center in Maywood and our institution are the approach used for the proximal pigtail loop in grades II, III, and IV, as well as in the grade V complete stent calcification. The suggested protocol is Holmium laser, ESWL, or percutaneous nephrolithotomy (PNL), all of which we substituted with the laparoscopic approach (fig. 4), given that holmium laser was not available at that time at our hospital. Even so, the results were satisfactory and there was complete resolution in the first procedure in 90% of the patients.

<table>
<thead>
<tr>
<th>Grade</th>
<th>N</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>0</td>
<td>NA</td>
</tr>
<tr>
<td>II</td>
<td>4</td>
<td>Endoscopic</td>
</tr>
<tr>
<td>III</td>
<td>2</td>
<td>Open/endoscopic</td>
</tr>
<tr>
<td>IV</td>
<td>2</td>
<td>Open</td>
</tr>
<tr>
<td>V</td>
<td>2</td>
<td>Laparoscopic/endoscopic</td>
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Figure 2 Calcification grades.

Figure 3 Radiologic calcification grades.
Discussion
Retained and encrusted ureteral stent management can be a surgical challenge for the urologist, as well as an increased risk for patient morbidity. However, there are many options for approaching this pathology that include open surgery, laparoscopy, the percutaneous approach, and endoscopy with lithotripsy (hydraulic and laser). Taking into account that the patient sample obtained in our hospital was smaller than those reported in the medical literature, we had pathology resolution with a single procedure in 90% of our cases, as opposed to the 80% reported in other hospitals worldwide. The complications associated with calcified double-J stent include infections, stent fracture, ureteral obstruction, and loss of renal function.

Conclusions
Having a classification system of and management protocol for calcified ureteral stents enables a standardized approach to this phenomenon. However, due to the limited access to all the management options in the different institutions, the treatment plan to follow should be individualized for each patient.

Conflict of interest
The authors declare that there was no conflict of interest.

Financial disclosure
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References

