Surgical management of neocystolithiasis


ABSTRACT
The objective of this article is to report cases of lithiasis in urinary diversions managed in the Urology Service of the Hospital General de México and to carry out a review of the literature. Patients with cystectomy plus urinary diversion clinically diagnosed with lithiasis in the diversion are presented. All patients underwent stone extraction with open surgery. There was adequate postoperative progression and patients were released from the service within a short period of time.

Key words: neocystolithiasis, urinary lithiasis, cystectomy, Mexico.

INTRODUCTION
Urinary diversions have been well-accepted by both patients and urologists. The intestine is utilized as a bladder substitute in the form of a duct that drains urine to the abdominal wall or it is remodeled to enlarge the bladder or create a substitute. The ileum and colon are the most commonly used segments. Metabolic complications of urinary diversion include intestinal malabsorption syndrome, bladder lithiasis,
chronic diarrhea and lithiasis in the urinary diversion.\textsuperscript{1,2} The most important etiopathogenic factor in lithiasis formation is urinary stasis that is generally facilitated by the presence of intestinal mucus and urinary infections with chronic urease-producing bacteria colonization, by hypocitraturia, hyperoxaluria and alkaline pH.\textsuperscript{3-6} Frequency varies from 10-50\% according to the international literature. The majority of these patients can be treated with minimally invasive techniques. However, extraction through open surgery is considered when other treatment modalities cannot be safely carried out.\textsuperscript{4,5}

\section*{Objective}

The objective of the present article is to report cases of lithiasis in urinary diversion managed in the Urology Service of the \textit{Hospital General de México}, as well as to carry out a review of the literature.

\section*{Materials and Methods}

A series of patients with cystectomy plus urinary diversion and clinical diagnosis of lithiasis in the urinary diversion, detected and managed in the Urology Service of the \textit{Hospital General de México}, is presented.

\textbf{Clinical case 1.} The patient is a 31-year-old man who presented with bladder extrophy, forked scrotum and anal agenesis. He had been operated on at the age of 5 years in which urinary diversion with ileum plus anoplasty was performed. Patient sought medical attention in the urology service due to intense abdominal pain, nausea, vomiting and fever. Simple abdominal X-ray revealed a giant stone in the ileal reservoir that measured 15 x 10 cm (\textbf{Image 1}) and bilateral kidney ultrasonogram showed bilateral pyelecalticlasis. Laboratory work-up reported glucose 89, creatinine 1.6, urea 36, leukocytes 9.4, Hb 10, platelets 341. Urinalysis: pH 5, density 1.015, innumerable leukocytes, bacteria +++ and erythrocytes, 20 to 30 x field. Urine culture (+), Pseudomonas aeruginosa positive at more than 100,000 CFU/mL.

\textbf{Clinical case 2.} The patient is a 27-year-old female with spina bifida. She underwent ileal reservoir procedure for microcyst and urinary incontinency at 19 years of age and had lithotripsy in 2001. Present illness of 2-month progression was characterized by pain upon catheterization for emptying the reservoir, slight and occasional hematuria without clots and bilateral lumbar pain which was the symptom for which she sought medical attention at the urology service. Laboratory work-up revealed: Hb 9.6, platelets 777, glucose 150, urea 108, creatinine 1.5, Na 130, K 5, CI 101. Urinalysis: density 1.010, pH 8.0, abundant leukocytes and bacteria, Hb ++++. Urine culture positive for \textit{E. coli} (>100,000 CFU/mL). Kidney ultrasonogram revealed left hydronephrosis and there was an 8.5 cm hyperechoic image at the right flank, suggestive of stones (\textbf{Image 2}).

\textbf{Clinical case 3.} The patient is a 59-year-old female who had had hysterectomy and cystectomy secondary to uterine cancer plus ileal reservoir 13 years before. She sought medical attention due to bilateral lumbar pain that was predominant on the left side with a 6-month progression. She also presented with fever, chills and pyuria exiting from the reservoir stoma. Laboratory work-up: leukocytes 28, Hb 9.6, platelets 777, glucose 150, urea 108, creatinine 1.5, Na 130, K 5, Cl 101. Urinalysis: density 1.010, pH 8.0, abundant leukocytes and bacteria, Hb ++++. Urine culture positive for \textit{E. coli} (>100,000 CFU/mL). Kidney ultrasonogram revealed left hydronephrosis and there was an 8.5 cm hyperechoic image at the right flank projecting a sonic shadow. Simple abdominal X-ray revealed an 8 x 8 cm radiopaque image at the right flank suggestive of a stone (\textbf{Image 3}).

\textbf{Clinical case 4.} The patient is a 19-year-old man born with myelomeningocele requiring surgical repair, circumcised at 4 years of age, had Indiana bag procedure at 8 years of age that was later managed with clean intermittent catheter and L5-S1 spinal decompression at 14 years of age. He sought medical attention due to 4-month urine leakage upon self-catheterization accompanied with small quantities of fresh blood as well as multiple detritus. He presented
Clinical case 5. The patient is a 23-year-old woman with bladder extrophy. She had bilateral sacroiliac osteotomy with bladder remnant removal, abdominal wall closure and Indiana-type continent urinary diversion. Patient presented with menarche at 11 years of age, rhythm 28 x 8, first sexual intercourse at 17 years of age, 1 sexual partner, 0 pregnancies, date of last menstruation Oct. 9, 2008, most recent PAP smear had no alterations. She sought medical attention 2 weeks after a fall resulting in abdominal contusion, reservoir bleeding and signs of shock for which she was hospitalized and transfused. Imaging studies revealed stone in the neobladder. Physical examination revealed mid supra-infra-umbilical scar, stoma in right flank with functioning Foley catheter that was draining urine slightly tinged with blood. Laboratory work-up: Hb 9.1, Hct 26.4, leukocytes 7.3, platelets 317, glucose 99, creatinine 0.7, urea 15, uric acid 3.3, Na 143, Cl 109, K 3.9. Simple abdominal X-ray revealed radiopaque image at right L4-L5 paravertebral level. Loopography showed no leakage but did show a filling defect at the right L4-L5 paravertebral level. Abdominal CAT revealed 3 x 3 cm stone in the neobladder.

■ DISCUSSION

There are basically two types of urinary diversion: non-continent diversions, of which the Bricker-Wallace II technique stands out, and continent diversions. Continent diversions can be orthotopic, with anastomosis to the urethra (Hautmann technique) and heterotopic, with urine exit through the anus (Mainz II technique) or self-catheterizable (Mainz I technique).2,4,9,10

Patients with neural tube defects are at greater risk for urinary lithiasis than the general population. Even though stones can form at any level of the urinary apparatus, they are more frequent in the bladder. Urinary infection, permanent catheters and bladder enlargement have all been identified as risk factors for bladder lithiasis. Bladder lithiasis is 10 times more prevalent in myelomeningocele patients with enterocystoplasty.3

Clinical manifestations are variable and include abdominal or flank pain, urinary infections, macroscopic hematuria, self-catheterization difficulty and alterations in continence mechanism.4

Therapeutic alterations include open surgery and endoscopy, depending on the size of the stone. Open surgery success rate for lithiasis is 90-100%. Endourologic treatment is minimally invasive, safe
and efficient with long-term satisfactory results. Percutaneous management is the treatment of choice for these patients. Open surgery is reserved for large stone lithiasis that could damage the intestinal segment if stones were fragmented inside it.5,6,8

Navarro et al. reported on a series in which mean complication onset time was 50 months, with a 7-100 month range. There was a 63% recurrence rate attributed to persistent bacteriuria and therefore long-term antimicrobial prophylaxis had to be considered.5,6,8

Shock-wave extracorporeal lithotripsy is a less invasive treatment but its success rate (25-35%) in urinary diversion patients is not good.4 In the series reported by Navarro et al., neobladder stones were managed with percutaneous neocystolithotripsy without stoma to avoid possible continence mechanism injury. Stoma use is only recommended in flexible cystoscopy and laser lithotripsy when stones are extracted with an Ellik evacuator and not with foreign body tweezers.5

Since many patients are asymptomatic, periodic studies such as simple abdominal X-ray and ultrasonography are recommended along with abundant liquid intake and periodic reservoir irrigation to eliminate mucus and crystals. Treatment with acetohydroxamic acid is used in patients with recurrent urinary infections and a history of lithiasis in urinary diversion. Metabolic studies are also recommended due to the possibility of the patient presenting with metabolic abnormalities that are susceptible to treatment.3,6

**RESULTS**

In the present series, lithiasis onset was from 8-26 years after urinary diversion was performed, which was a longer time when compared with other series. All patients underwent open surgery for stone extraction and there were no technique-related complications. Only one patient presented with postoperative intestinal paresis. All patients were released from the hospital within a short period of time and all with good prognoses (Image 4).

**CONCLUSIONS**

Late postoperative complications in urinary diversion include stoma stenosis (up to 30%), parastomatostomal hernia, peristomal dermatitis, mucosal prolapse of the intestinal segment, changes in intestinal mucosa structure (metaplasia), ureterointestinal juncture stenosis (22%), lithiasis (16%), urinary infections and in some cases, serious urinary sepsis. In the present series four patients presented with giant stones and one patient presented with various 1 cm stones. Open surgery was the best therapeutic option for all five patients. All patients had presented with recurrent urinary tract infection, underlining the need for control and strict periodic surveillance in order for there to be opportune detection.

**BIBLIOGRAPHY**