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Case Report

Symptomatic Distal Ureteral Stone in an Ileal Ureter: Treatment by Combined Supine Ureteroscopy and Mini Percutaneous Nephrolithotomy

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Abstract

Urolithiasis is a well-known and common late complication in patients with urinary diversion. Patients without urinary diversion lead to symptoms such as hematuria and ureteral colic, whereas stones in patients with urinary diversion tend to be asymptomatic and are often diagnosed incidentally during staging examinations of oncologic diseases. We report the case of a 64-year-old male patient with a lower pole kidney stone and a stone in the ileal ureter substitution. He presented with diffuse abdominal and left-sided flank pain. CT revealed the diagnosis of urolithiasis in the ileal ureter substitution and the lower pole of the left kidney. We performed a combined retrograde, flexible ureteroscopy and a mini percutaneous nephrolithotomy (combined intrarenal surgery) without any complications and no residual stone fragments postoperatively. This case presentation demonstrates that in patients with urinary tract diversion, urolithiasis can still cause problems.

Keywords: urinary diversion, lithiasis, endoscopy, treatment, ureteroscopy

Introduction

Urinary diversion with the use of intestine is essential to radical cystectomy. A further indication for urinary diversion is ileal ureter substitution. The development of urolithiasis in patients with an ileal conduit is a common complication after radical cystectomy. Its incidence has been reported to be between 2.6% and 15.3%.[1] To our knowledge, this is the first reported case of urolithiasis in ileal ureter substitution. Symptoms of the patients may vary from abdominal pain, recurrent urinary tract infection, and hematuria to completely asymptomatic patients wherein urolithiasis is diagnosed coincidentally.[2] Stone formation in urinary diversion is a complex process and yet not fully understood. Treatment of urolithiasis in patients with intestinal urinary diversion was previously described using shockwave lithotripsy (SWL), antegrade or retrograde endoscopic techniques (ureteroscopy [URS]), percutaneous nephrolithotomy (PCNL), and in several cases open surgery was performed.[3]

Case Presentation

A 64-year-old male patient presented to our department from another hospital because of a lower pole stone of the left kidney and in the ileal ureter substitution diagnosed by CT. Recurrent abdominal and left-sided flank pain caused the admission to the hospital. Except for an ileal reconstruction of the left ureter because of an iatrogenic avulsion of the ureter during URS in 2010, the medical history was unobtrusive.

The CT scan showed a 12 mm large renal calculus in the left kidney and a 12 mm ureteral calculus in the lower part of the urinary intestine diversion (Figs. 1 and 2). Ultrasonography of the left kidney revealed a hydronephrosis and the lower pole stone. Laboratory parameters were not elevated. We performed a combined intrarenal surgery (CIRS) through mini-PCNL (M-PCNL; 16.5F Amplatz sheath, STORZ) and flexible URS. Stone disintegration was performed with the holmium:YAG laser. After M-PCNL, a 16F nephrostomy was inserted. On the first postoperative day, ultrasonography and X-ray showed the patient was stone free. Therefore, the nephrostomy was removed on the first postoperative day. After catheter removal at the second postoperative day, the patient was discharged from hospital in absence of subjective complaints. Afterward a stone analysis revealed a calcium phosphate stone.

Discussion

Stone formation in patients with urinary diversion or orthotopic neobladder is known as a common late complication and has been reported before. Its incidence is reported in

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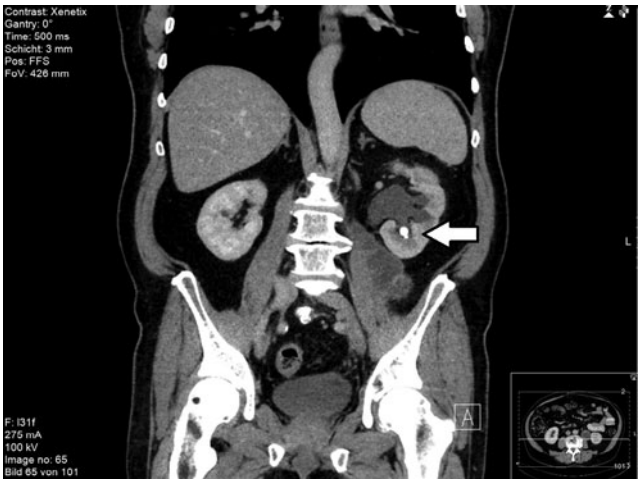

FIG. 1. CT scan showing lower pole stone of left kidney (shown with *arrow*).

2.6%–15.3% of the patients.[1] Patients can be completely asymptomatic; however, in most cases patients develop symptoms such as ureteral colic, recurrent infection, or hematuria. Contributing factors for developing stones in urinary diversion have not yet been completely understood and seem to be complex and multifactorial.[3,4] Regarding the literature, structural, metabolic, and infectious factors are mentioned.[1–4] Recently described risk factors of stone formation in patients with urinary diversion are urinary stasis because of a high postvoiding residual volume, urinary tract infections with urea splitting organisms, encrustation and stone formation on foreign bodies (e.g., ureteral stents and suture), excessive mucus production, or a chronic metabolic acidosis because of electrolyte imbalance.[1] Of course, patients with former urolithiasis have a higher risk of another urolithiasis event. Patients with metabolic disorders, such as hyperoxaluria, hypocitraturia, and hypercalciuria also have a higher risk of stone formation. These patients usually tend to develop magnesium ammonium phosphate (struvite) and calcium phosphate stones.[3] Lindsay et al. postulated that stone analysis of patients with an ileal conduit revealed struvit and calcium phosphate stones as most common findings with 64% and 25%, respectively.[1]

FIG. 2. CT scan showing stone in ileal ureter (shown with *arrow*).

Regarding our patient, we presume that the ileal part replacing the ureter was build too long with the anastomosis linked directly to the renal pelvis and ended with an ileovesical anastomosis. Therefore, the ileal part holds a large volume of urine with the risk of urine stasis, mucus production, and metabolic acidosis. However, with the medical history of stone formation in this patient, the recurrence rate of another stone event is higher than the general population. Furthermore, the ureteral calculi of the urinary diversion might have been a renal calculi before with a spontaneous movement inside the urinary diversion.

Over the past decades, many different therapeutic options have been introduced for stone therapy in urinary diversion. PCNL, URS, and even SWL are mentioned in the literature for the treatment of urolithiasis in these patients. This is the first published case in which a CIRS was effectively performed in a patient with an ileal ureter substitution. However, the therapeutic strategy should be chosen with regard to stone size and location, patient's comorbidities, anatomical conditions, and surgeon experience. In a retrospective study, Lindsay and colleagues could show that of 77 patients with an ileal conduit and stone formation, the PCNL had the highest stone-free rate compared with URS and SWL, whereas the complication rate among these three minimal-invasive therapies was not different.[1]

In this particular case, we chose the retrograde URS because of the ideal position of the stone near to the ileovesical anastomosis. However, depending on the length of the urinary diversion, it might be more useful to perform an antegrade approach in case of proximal ureteral stones.

Conclusion

Urolithiasis in patients with urinary diversion is yet not completely understood. The risk factors are known to be of a multifactorial pathogenesis. Among the different treatment options, PCNL has proven to be superior to URS and SWL. However, the stone treatment depends on individual patient characteristics, localization of the stone, and the stone burden. This report shows that CIRS is a minimal-invasive procedure with a high stone-free rate and a low complication rate.

Disclosure Statement

No competing financial interests exist.

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Abbreviations Used

CIRS = combined intrarenal surgery
M-PCNL = mini-PCNL
PCNL = percutaneous nephrolithotomy
SWL = shockwave lithotripsy
URS = ureteroscopy

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