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Trauma and reconstruction

A successful open neocystolithotomy in studer neobladder with Mitrofanoff for multiple large neobladder stones: A case report and review of the literature

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ABSTRACT

Urolithiasis is a rare complication of orthotopic neobladder after cystectomy. We report a case of a 25-year-old female with studer neobladder and Monti valve presenting with recurrent urinary tract infections, abdominal pain, and difficult catheterization. Imaging revealed multiple large stones in the neobladder. Neocystolitholapaxy and neocystolithotripsy failed, leading to an open neocystolithotomy with retrieval of 14 large stones. Stone composition analysis showed struvite (30%), carbonate apatite (46%), and whitlockite (24%). Neobladder repair with omental interposition was performed. Follow-up confirmed an intact neobladder without leaks. Neobladder stones may be asymptomatic, and open neocystolithotomy is an effective treatment for multiple neobladder stones.

1. Introduction

Urolithiasis is a rare condition but an essential and well-known late-onset complication of orthotopic neobladder and urinary diversion after cystectomy. Incidence rate and time of presentation of urinary stones in patients with history of urinary diversions vary on which type of diversion had been used before. Turk and their colleagues estimated that lower urinary tract stones in patients with orthotopic neobladder are 5% compared to 11% in patients with an ileal conduit.[1]

Neobladder urolithiasis can be asymptomatic and can be diagnosed as incidental finding on imaging investigation. However, it may come with symptoms like recurrent attacks of abdominal pain. Most patients have complain of dysuria and hematuria. In this case, we report a case of multiple large stones in studer neobladder with Mitrofanoff procedure six years after cystectomy which required an open neocystolithotomy.

2. Case presentation

A 25-year-old female patient with a background surgical history of studer neobladder and Monti valve using the appendix (Mitrofanoff procedure) because of emphysematous cystitis and subsequent loss of bladder function six years ago. The patient presented recently in our hospital with recurrent urinary tract infections, abdominal pain, hematuria, and difficult catheterization through the valve. After clinical examination and investigation by X-ray and plain Computed Tomography (CT), they show multiple large stones in the neobladder (Fig. 1A–B).

Trials of neocystolitholapaxy and neocystolithotripsy through the urethra have failed. After that, an open neocystolithotomy of the studer neobladder at the anterior abdominal wall near lower midline was done for the patient, and there were approximately 14 large stones that were retrieved completely (Fig. 2). Then primary repair was done of the studer neobladder with omental interposition as a barrier of suture lines to avoid enterocutaneous fistula. After analysis of the stone's composition, it showed struvite is 30%, carbonate apatite 46%, and whitlockite 24%. Follow-up with cystogram was 14 days post-operative showed intact neobladder wall without evidence of leak or fistula (Fig. 3).

3. Discussion

The neobladder, as an orthotopic bladder substitute, is considered the ideal urinary diversion. It can provide a low-pressure advantage in the quickly emptied continent reservoir.[2] Many types of orthotopic bladder substitutions have been reported. Studer's ileal neobladder is a common procedure because it is easy to be constructed and can provide

Abbreviations: CT, Computed Tomography.

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Fig. 1. A-B: Multiple large neobladder stones.

Fig. 2. neobladder stones after neocystolithotomy.

regular voiding habits. In addition, it can provide good continence and protect upper urinary tract.[2]

This procedure had some late complications. Calculus formation is one of the late complications. The incidence rate of calculus formation in patients with urinary diversion varies according to the type of diversion. In some studies, it has been reported as 3% only and in others as 9%.[3] Turk et al. and their colleagues estimated that neobladder stones after continent urinary diversion were 5%, which required surgical intervention. All of which had no upper tract stones. On the other hand,

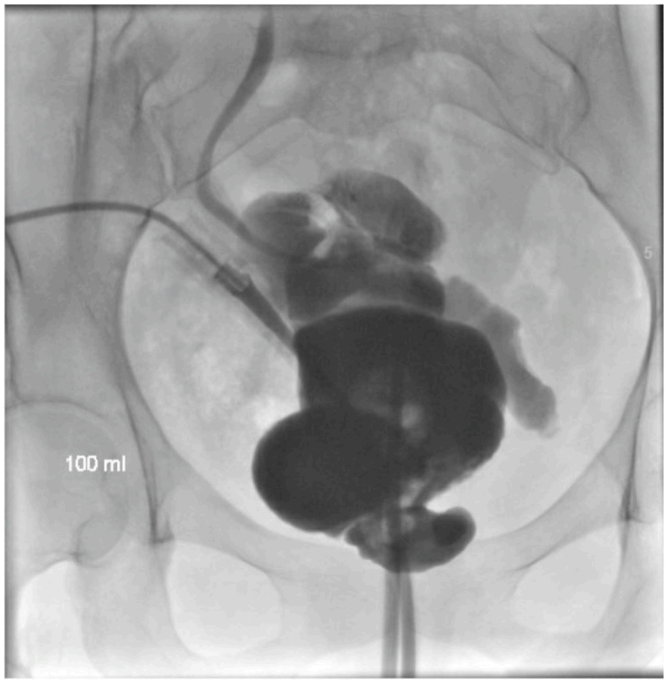

Fig. 3. Cystogram showed no urine leak or fistula.

urolithiasis in the ileal conduit group is 11%. All of which are in the upper tract. They concluded that refluxing technique (Briker) in the ileal conduit might contribute to upper tract stones, while urinary stasis in the orthotopic bladder could attribute more to neobladder stones.[1]

Factors contributing to stone formation in those patients include urinary stasis and recurrent lower urinary infection.[3] The mechanism of stone formation depends on multiple factors. For example, mucus overproduction of bowel mucosa, infected urine, and metabolic acidosis from the previous ammonia absorbed by urinary diversion. These factors lead to hypercalciuria, hypocitraturia, and hyperoxaluria, contributing to stone formation.[3]

Tafuri et al. reported neobladder stones 12 years after undergoing radical cystoprostatectomy. They managed with open neocystolithotomy with 50 stones in total. The stone composition was 70% of struvite and 30% calcium oxalate.[4] Unlike our case, carbonate apatite was the majority of the stone composition. T.W. Hensle et al. studied the effect of regular irrigation on preventing reservoir stones. They found

that reservoir irrigation was statistically significant ($p < 0.001$) in reducing the stones. The incidence of reservoir stones were 42% of patients who underwent bladder augmentation and/or continent urinary diversion. In contrast, 7% only in patients who were strict to self-bladder irrigation developed stones.[5]

4. Conclusion

Neobladder stones might be asymptomatic, or they can present with abdominal pain. Our case had recurrent abdominal pain and urinary tract infection after six years of creating the Studer neobladder and Mitrofanoff procedure. Open neocystolithotomy is a very effective method for removing multiple stones in the neobladder.

Author statement

Maher Moazin: Conceptualization, Methodology, Supervision**. Hamza Tolah**: Writing – original draft. **Waleed Altulayqi:** Writing – original draft. **Fawaz alkeraithe:** writing, editing, data collection.

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Declaration of competing interest

None.

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