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Challenges in management of nephrolithiasis in a patient with class III obesity (BMI 97)

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ABSTRACT

Patients with severe obesity have an increased risk of renal and ureteral calculi formation, and therefore, increased risk of associated complications. Despite the expanding number of people with obesity, there remains a dearth of scientific literature and training in navigating the associated limitations of our healthcare system. We present a case of a patient with severe, class III obesity (BMI 97) who was transferred to our tertiary care center for treatment of obstructive kidney stone disease. We highlight challenges in caring for our patient and discuss our approach and lessons learned for care of this vulnerable bariatric population.

Introduction

Obesity and associated comorbidities such as metabolic syndrome and diabetes are associated with increased risk for urolithiasis.[1,2] Given the significant and increasing portion of the US population affected by these conditions, there is an increasing need to examine and understand the therapeutic approach for those who develop kidney stones. Body habitus may make standard urologic procedures ineffective or unfeasible.[3] While studies examining ureterorenoscopy outcomes in patients with morbid obesity tend to show similar success rates with variable postoperative morbidity, there are fewer studies addressing diagnosis and treatment in patients with severe obesity.[4,5] We present a patient with severe obesity and obstructing stones to discuss the challenges associated with the patient's body habitus and our approach to ensure safe and effective diagnosis and treatment.

Case

A middle-aged patient with Class III obesity (BMI 97), diabetes mellitus, atrial fibrillation, hypertension, and home oxygen requirement presented to an outside hospital with flank pain. Workup revealed acute kidney injury and left hydronephrosis on renal ultrasound. Urinalysis was nitrite negative, leukocyte esterase positive, however, contaminated with squamous cells. Culture ultimately grew candida and mixed urogenital flora. The patient was admitted for management of pyelonephritis and acute kidney injury. Abdominal x-ray was performed to evaluate for possible obstructing stone; however, evaluation was limited by excessive overlying soft tissue. CT scan was unable to be performed due to weight limitations.

The patient was transferred to our hospital for further evaluation of stone burden and possible obstruction. Although the patient had passed two small stone fragments and sand, the patient reported persistent flank pain and the creatinine remained elevated. Repeat X-ray was again nondiagnostic due to excessive overlying soft tissue. Hospital CT and MRI machines were unable to accommodate the patient. We identified a CT scanner in the hospital-adjacent outpatient building, however, safe transportation required coordination with nursing and facilities personnel. CT was ultimately obtained and revealed bilateral kidney and ureteral stones, with 1 cm stone at the left ureteropelvic junction and 2 cm partial staghorn stone in the right kidney (Fig. 1). After preoperative risk stratification and evaluation, which revealed the patient was at high risk for complications, the patient consented to bilateral ureteroscopy with laser lithotripsy.

As our standard fluoroscopy table could not accommodate the patient, we identified a fluoroscopy-compatible bariatric table. Positioning the patient in dorsal lithotomy was challenging due to the level of reinforcement of pressure padding needed. Introduction of a rigid cystoscope proved particularly difficult. Despite appropriate positioning and standard gravity-driven cystoscopic irrigation, the bladder remained collapsed due to the patient's body weight. Bilateral

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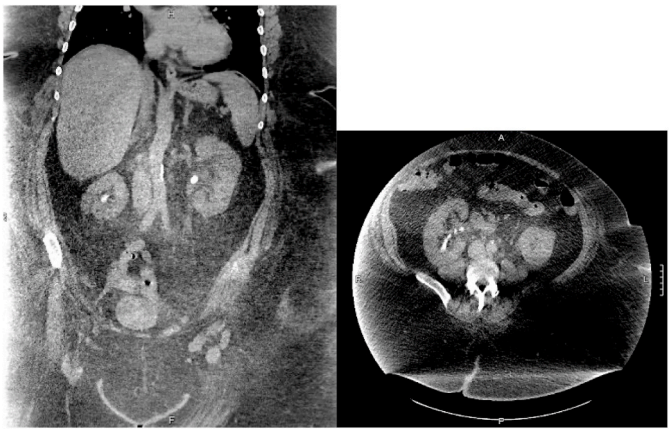

Fig. 1. Coronal and axial CT images demonstrating bilateral renal stones.

ureteroscopy, laser lithotripsy, and stent placement were performed sequentially. Like the bladder, the kidney did not distend normally, making renoscopy more challenging. A ureteral access sheath was used to allow for basket extraction of stone fragments. We elected to use a longer length sheath to enable it to extend beyond the patient's upper thigh festoons. In all, laser lithotripsy involved approximately 2 hours of fragmentation until no residual stone fragments remained. Ureteral stents were secured with danglers which were removed on POD4.

Discussion

This patient ultimately received appropriate and safe care for bilateral nephrolithiasis but there were several challenges in caring for this patient at our tertiary care center.

Inter and intra-facility transport

There were a number of unanticipated challenges related to patient transport. First, transferring the patient from the outside hospital to our hospital required special accommodations with bariatric transport. Next, the patient required transport between buildings in our medical center for imaging. We coordinated with nursing and facility personnel to ensure a route for transport that could accommodate the bariatric bed.

Diagnostic challenges

As discussed, there were a number of diagnostic challenges. Due to the depth of soft tissue, evaluation with US and X-ray were limited. Ultimately, the patient was transferred to our hospital because of these limitations. We encountered the same issues, in addition to both weight and patient diameter limitations of CT and MRI. We ultimately identified a CT scanner in our outpatient building that could accommodate the patient. Although we had a clinical diagnosis at the time of presentation, confirming the diagnosis was prudent to avoid performing an unnecessary procedure on this high-risk patient.

Operative clearance

Given the patient's obstructing stones and hydronephrosis, it would be typical to perform surgical intervention relatively expediently. However, the patient had multiple comorbidities that are associated with an increased risk for postoperative complications. In order to reduce potential complications, coordination with anesthesia, medicine, and cardiology was needed.

Procedural considerations

In the operating room, there were a number of challenges. First, we had to identify a fluoroscopy-compatible bariatric table. Next, multiple team members and a great deal of padding were needed to safely position the patient. In order to insert the rigid cystoscope into the urethra, three staff members assisted with retraction of the surrounding soft tissue. After entering the bladder with the cystoscope, the bladder did not distend with gravity-driven irrigation, making it difficult to confirm appropriate scope positioning. However, we were ultimately able to identify the ureteral orifices and proceeded accordingly. Exchanging instruments required the assistance of multiple personnel and therefore added to operative time. Anticipating a challenging stent removal, we decided to secure danglers and scheduled a planned stent removal before the patient left the hospital.

Conclusion

Diagnosis and management of renal and ureteral calculi in patients who are severely obese presents challenges beyond that of standard care practices. Our experience in an academic, tertiary care facility highlights some of the complexities and important logistical considerations for bariatric urologic care, including transportation, diagnosis, and treatment. Given the elevated risk of stone formation and surgical morbidity in this expanding portion of our population, there is a need for facilities to assess their ability to safely provide care to this patient population.

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