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Open Ureterolithotomy In an Era of Endoscopic Surgery for a Patient with Spina Bifida: Was It an Appropriate Decision?

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ABSTRACT

Despite advances in endoscopic surgery, there is still a limited role of open surgery in clinical practice. We report a case of a patient with spina bifida presented with a huge ureteric stone. The management of this case is briefly discussed in this report.

INTRODUCTION

A huge ureteric stone posed much operational difficulty endoscopically, especially if the patient had a concomitant bony deformity. In this respect, we believed that an open approach was suitable.

CASE REPORT

A 42-year-old man diagnosed with myelomeningocele had been scoliotic and paraplegic since birth. Due to the neurological deficit, the patient had developed neurogenic bladder, and he had been relying on a suprapubic catheter for urinary drainage. This unfortunate patient had been plagued by repeated spells of urinary tract infection. It was during one of his latest episodes of infection, complicated by hematuria, that prompted a urological consult, during which an ultrasonography and plain radiograph detected a stone of 3 cm by 2 cm in size located in the left distal ureter with proximal ureteric dilatation (Figure 1). His serum creatinine level at the time was 131 umol/L.

Ureteroscopic lithotripsy was deemed unfeasible in this patient due to his awkward pelvic anatomy posture, causing unlikely access to the stone endoscopically. Instead, an open approach was undertaken via the left loin where the stone was successfully evacuated (Figure 2). Via a Gibson incision with the patient in a supine position, the left ureter was identified after pushing the peritoneum medially. Upon locating the huge stone by palpation, the ureteric part involved was freed, and vessel loops were slung proximally and distally to the stone. Through a longitudinal ureterotomy, the stone was delivered using a pair of forceps. We made certain the absence of other stones by visually inspecting using a flexible ureteroscope. After inserting a 6 F, 24 cm long ureteric stent, we closed the ureterotomy in an interrupted fashion, approximating only the seromuscular layer using polyglactin 5/0 sutures. We placed a drain in the operative area, and the wound was closed in layers. The patient uneventfully recovered from the operation. Prior to his discharge from the ward, he was educated and advised thoroughly with regards to his illness and the likely sequelae. He has followed up in the Urology Outpatient Clinic since, and more than a year after the operation, he has never had a urinary tract infection.

DISCUSSION

It had been reported that patients with spina bifida had a higher rate of developing nephrolithiasis compared to the general population, with an incidence of 9.7 to 10.7% versus 1%, and the rate rose significantly as patients aged [1,2]. Generally, the incidence of nephrolithiasis most commonly occurred between the ages of 35 to 45 [3]. However, the mean age at which patients with spina bifida detected a stone ranged from 20.1 years to 24 years [1,2]. The urological complications seen in this group of patients were reckoned as major risk factors for stone formation, and they included bacteriuria, lower urinary

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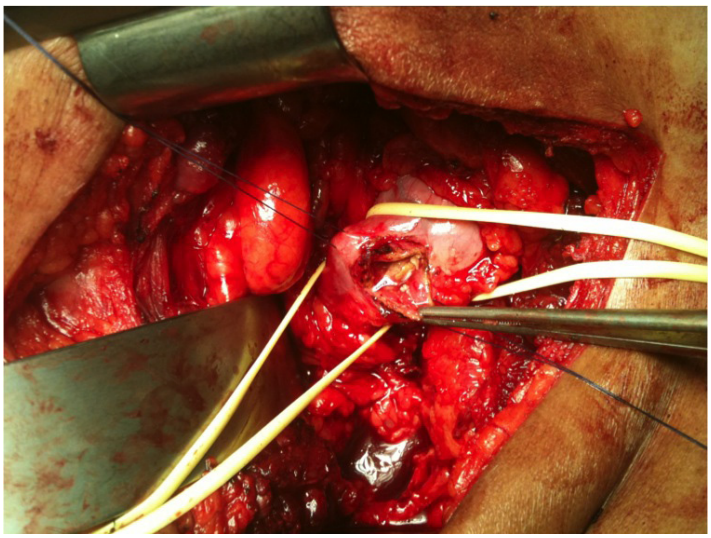
Figure 1. A plain radiograph depicting the extremely distorted pelvis of the patient as well as a large radiopaque stone.

Figure 2. The stone to be evacuated via the ureterotomy during the operation.



tract reconstruction, vesicoureteral reflux, thoracic level spinal defect, and renal scarring [2]. Due to their sensory impairment, the pathology could have been silent and asymptomatic for a long period before discovering a severe complication. Compounding this issue was the attendant physical distortion and disability of the patient rendering the treatment a demanding challenge. Our patient in this case report classically illustrated this unfavorable scenario.

Open ureterolithotomy has been superseded nowadays by endoscopic procedures as well as extracorporeal shockwave lithotripsy. There is limited acceptance for the traditional open surgical method for stones. In fact, only 1.5 to 3.5% of patients had to undergo open surgery [4]. A distorted anatomy along the ureter or restricted movement of the hip and lower limbs potentially makes ureteroscopy difficult, if not impossible. In fact, abnormal anatomy, large stones of at least 3 cm, and endoscopic failure constituted a majority of the indications of open surgery [5,6]. The provision of flexible scopes could overcome this access issue, but its inherent restricted capabilities make them an undesirable choice in eradicating ureteric stones, especially if the stone burden is substantial. Additionally, a stone of sizable proportions was also preferentially treated through an open method due to the time required if the stone was cleared endoscopically. The reported operative duration for open surgery was between 76 to 92 minutes [5,6]. The main disadvantage of the open method was the more severe pain experienced by patients and an extended recovery time, with a mean hospitalization stay between 4.2 to 4.7 days [5,6]. A paper by Ather et al. assessing the outcome of 1 195 patients with primary ureteric stones reported that although the endoscopic method had a higher complication rate of 32% compared to the open method, which had a rate of 13%, that the open method was potentially more life threatening. The paper reported complications such as myocardial infarction, pulmonary edema, and respiratory insufficiency that occurred exclusively among patients undergoing open surgery [5]. Another almost similar paper on 654 patients, however, did not observe this result [6]. Laparoscopic ureterolithotomy was gaining momentum lately, and with a conversion rate to open surgery as low as 2%, it appeared to fill the gap between the endoscopic and the open method [4]. It inherited the advantage of minimal access yet was able to gain access to stones despite anatomical distortion or stone size, although it was somewhat less effective for lower ureteric stones [4]. However, there was a significant learning curve in laparoscopic surgery, and it reportedly was associated with ureteric stricture rates as high as 15 to 20%, perhaps due to the improper handling of tissue and instruments during surgery

because of a lack of tactile sensation [7]. However, widespread improvements in operation techniques and the maturation of laparoscopic instruments might change this landscape.

Despite the advancement of minimally invasive surgery, the role of open ureterolithotomy would probably never be eliminated. Could this operative technique be improved further? In tandem with its diminished utilization, there were a very limited number of studies on open ureterolithotomy after the year 2000. Our case provided an opportunity to look back at this almost obsolete surgical technique.

The ureter was usually incised longitudinally in a standard procedure. Comparing longitudinal ureterotomy and transverse ureterotomy, Douglas et al. concluded that transverse ureterotomy was associated with significantly less urinary leakage, shorter hospital stays, and no ureteric narrowing [8]. Another interesting paper, reported by Sharma et al., described mini-access ureterolithotomy (MAU) in which only a short, 4 cm skin incision was made, and the operation was performed using an operating loupe (x 2.5), a fiber optic headlamp, and modified retractors. In this study, only 1 out of the 112 cases was a failure, and the mean operating time and hospital stay were 28 minutes and 42 hours, respectively. The complications that occurred were described as few and minor [9]. The ureteric stricture formation rate was as high as 24% if the stone impact duration was more than 2 months [10]. Therefore, open surgery provided a prospect to assess and resect any diseased ureteric segment [11].

Groups of patients with spina bifida are unique and require additional attention and effort. We believe that patients with spina bifida should be offered periodic urological assessments as part of the treatment regime. Early intervention may render a much more effortless treatment plan and cause considerably less morbidity to the patients. In addition to other known risk factors, it had been reported that up to 50 to 70% cases of spina bifida can be prevented if folate deficiency is corrected during the antenatal life [1,12]. Clearly, in many parts of the world, the standard of care for pregnant women is still less than ideal and its improvement is very much desirable. It had been reported that there is an increased risk of developing neural tube defects among populations with lower socioeconomic status as measured by income, education, and occupation [13]. The treatment for spina bifida requires a multidisciplinary approach and should last a lifetime for any 1 patient. The prevalence of spina bifida ranges from 0.2 to as high as 2.92 per 1 000 in various countries across the continents, and at least 50% of these patients develop significant upper urinary tract dysfunction [1,12]. Certainly, a tremendous amount of medical input is sought for their treatment. In fact, an approximation of 460 923 (USD) and 56 511 (USD) is spent on medical and nonmedical costs, respectively, for a child with spina bifida during a lifetime [14]. A decline in the prevalence of spina bifida should translate into an extensive saving of time, money, manpower, and other resources that can be channeled into other aspects of health care.

Although reluctantly chosen, we felt an open approach to our patient was a justifiable decision, given that the patient had such an unusual pelvic anatomy coupled with a large ureteric stone, and these indications had been repeatedly mentioned in many papers aforementioned. In this aspect, laparoscopic practice appeared promising and might have been preferred. Regardless, a preventive effort against spina bifida and its complications is much more desirable.

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