Delivery of a massive urinary stone from an augmented bladder using obstetrical forceps

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A 48-year-old man presented for evaluation of an expanding abdominal mass. Twenty years earlier, he had developed Fournier's gangrene requiring extensive debridement. He underwent augmentation cystoplasty with a catheterizable stoma due to a proximal urethral stricture. Fifteen years later, he was found to have a 14 cm x 18 cm bladder augment calculus. Simpson obstetric forceps were passed into the augment to deliver a 1110 gram stone with minimal devitalization of the colonic augmentation tissue. This is the first report of stone management with obstetric forceps in an augmented bladder. The specimen itself is among the largest stones ever reported.

Key Words: bladder stone, surgical techniques, augment cystoplasty

Introduction

The use of bowel segments during bladder augmentation can increase the risk of stone formation. Studies suggest the incidence of stone formation in bladder augmentation patients ranges from 10%-47%[1,2] and are a significant long term complication of this surgery. Although most stones are managed through an endoscopic or percutaneous approach, large volume stones frequently require surgical intervention and can present a technical challenge due to abdominal adhesions and altered anatomy. We present a novel surgical approach for massive stone removal in the augmented bladder which maximizes safety and control of stone removal through the use of obstetrical forceps.

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Case report

A 48-year-old diabetic man presented for evaluation of expanding abdominal mass and fullness localized to his augmented bladder, Figure 1. He had a distant history of Fournier's gangrene of the corporeal bodies and prostate over 20 years ago, which had caused

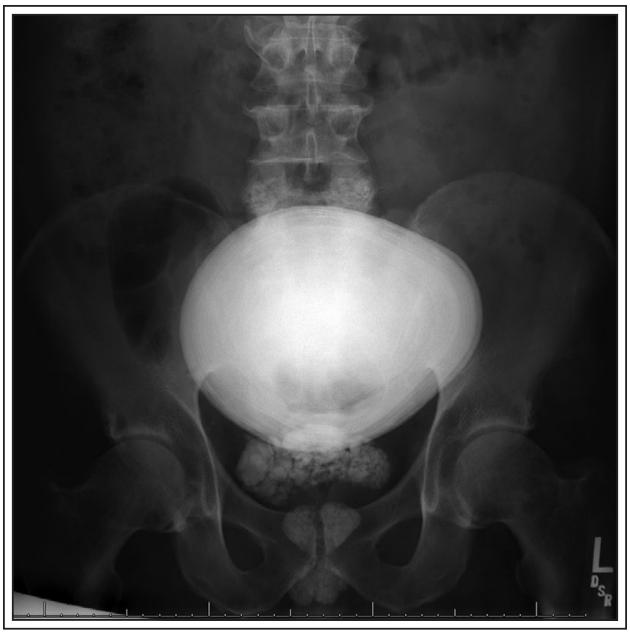

Figure 1. Radiologic and physical presentation. a) KUB demonstrates singular stone in bladder augment separated from a cluster of native bladder stones. b) Abdominal mass is visible on supine exam (cephalad left).

urethral destruction. He was initially treated with a suprapubic tube for 3 years and then transitioned to an augmentation cystoplasty with cecum and appendix continent stoma. He remained asymptomatic and did not return for urologic care until 5 years ago when he began to experience an increasing frequency of urinary tract infections and a growing, non-tender abdominal mass. The infections increased in severity, culminating in a severe right orchitis that required an orchiectomy. During the urologic work up, imaging revealed a 14 cm x 18 cm calculus in the augmented portion of the bladder, Figure 1 and he was referred for surgical removal.

The stone was approached through an infraumbilical midline incision. After lysis of adhesions mobilized small bowel and colon from the augment, an 8 cm cystotomy was made in the dome of the augment. Simpson obstetric forceps, Figure 2, inset were passed into the augment through the cystotomy and the articulating blades were used to confine and control the stone within the augment. The stone was next rotated into a position with the smallest diameter relative to the cystotomy. Gentle pressure was then applied with the forceps in a cephalad direction while an assistant controlled the edges of the cystotomy incision and applied counter tension. This allowed

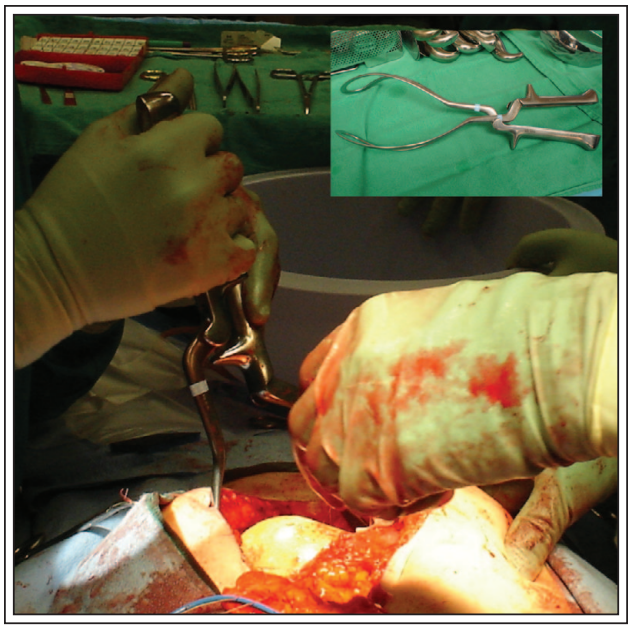

Figure 2. Extraction of large urinary stone with obstetric forceps. Appropriate and careful placement of the Simpson obstetric forceps (inset) facilitates delivery of stone.

removal of the stone completely intact, Figures 2 and 3, without mucosal trauma or uncontrolled tearing of the cystotomy incision. An anastomotic stricture between augment and bladder was noted and incised and

Figure 3. Delivery of urinary stone specimen. After removal (right), examination reveals an intact 14 cm stone (left).

reconstructed during the procedure. Additional small stones were also removed from the bladder proper using Randall stone forceps under direct vision. Total operative time was 183 minutes. A total of 1445 grams of stone material was removed. A cystostomy tube was placed through a counter incision and the cystotomy was closed with absorbable sutures.

After surgery, the patient's recovery was delayed by a temporary ileus. There was no evidence of urine leak or metabolic derangement during admission and he was discharged home on postoperative day 8. He remained asymptomatic during subsequent recovery and his suprapubic tube was removed on postoperative day 21 after an unremarkable cystogram. He resumed intermittent catheterization per stoma with instruction for irrigations and remains asymptomatic. The stone in this study had a dry weight of 1110 grams and a calculated wet weight of 1370 grams. The single large stone wet weight was calculated as a proportion of volume based on CT measurements. Dry weight was measured 2 months after surgery at University of Michigan pathology. Composition analysis revealed mostly calcium phosphate.

Discussion

Large urinary stones-whether from native, augmented, or constructed bladders have been reported to range in size from 238 g -1175 g in size,[1,2] with one historical report of 1.4 kilogram stone in the 19th century.[3] The stone in this study had a weight of 1110 g-1370 g, thus making it one of the largest urinary stones ever reported and certainly the largest extracted from an augmented bladder. Interestingly, it was mostly composed of calcium phosphate, which is typical in alkaline environments, and not struvite which is common in a chronically infected setting. However, mucus containing calcium and phosphate may also be key factors in the formation of stones in an augment cystoplasty.[4]

Surgical approaches for large calculi within an augment cystoplasty vary considerably depending on stone volume and type of augment. Use of obstetric forceps for non-obstetric indications has been previously reported for removal of large, slippery objects from the rectum[5-7] and native bladder.[3,8] However, the reports are sparse, few, and not previously described for removal of stones from an augmented bladder. For massive stones with an augmented bladder, we found that the use of Simpson obstetric forceps provides an elegant solution to an uncommon yet complicated problem and results in minimal tissue trauma or need for subsequent reconstruction. In conclusion, obstetric forceps can effectively extract heavy urinary stones without significant damage to augmented bladder tissues. □

References

1. Becher RM, Tolia BM, Newman HR. Giant vesical calculus. *JAMA* 1978;239(21):2272-2273.
2. Hatanaka Y, Yoshioka N, Imanishi M. [Giant bladder stone nine years after neobladder construction: a case report]. *Hinyokika Kiyo* 2008;54(11):745-747.
3. Williams JP, Mayo ME, Harrison NW. Massive bladder stone. *Br J Urol* 1977;49(1):51-56.
4. Khoury AE, Salomon M, Doche R et al. Stone formation after augmentation cystoplasty: the role of intestinal mucus. *J Urol* 1997; 158(3 Pt 2):1133-1137.
5. Burre SP. Unusual application of obstetrical forceps. *JAMA* 1969;209(4):562-563.
6. Peet TN. Removal of impacted rectal foreign body with obstetric forceps. *Br Med J* 1976;1(6008):500-501.
7. Andrabi SI, Johnson NA, Malik AH, Ahmed M. Extraction of a rectal foreign body - an alternative method. *Ulus Travma Acil Cerrahi Derg* 2009;15(4):403-405.
8. Jeffery JT. Successful delivery of huge bladder stone with obstetric forceps. *Urology* 1983;21(2):162-163.