

A large bladder hematoma resulting from infectious hemorrhagic cystitis after pelvic reconstruction with transvaginal mesh: An unusual complication

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Abstract

A large hematoma resulting from hemorrhagic cystitis after uncomplicated pelvic reconstruction surgery with a transvaginal mesh is rare. A 66-year-old female who underwent pelvic reconstruction with transvaginal mesh presented with acute urinary retention and hematuria on postoperative day 10. Leukocytosis, pyuria, and hematuria were noted in the emergency room. After using cystoscopy to irrigate the coagulum, there was no mesh erosion or bladder perforation on inspection. A large bladder hematoma resulting from infectious hemorrhagic cystitis was confirmed, and uropathogenic *Escherichia coli* was isolated. The clinical condition improved after a 1-week treatment with an indwelling Foley catheter and oral antibiotics. Careful aseptic techniques and antibiotic prophylaxis reduce bacterial contamination only for brief periods of time, and patients may still be at risk for delayed infections. The possible modalities to prevent postoperative urinary tract infection after pelvic reconstruction surgery with transvaginal mesh include shortening the indwelling Foley catheter period and administration of an additional antibiotic during catheter removal. However, the antibiotic policies for pelvic reconstruction with transvaginal mesh demand further cost analyses.

Keywords

Hemorrhagic cystitis, pelvic reconstruction, transvaginal mesh, mid-urethral sling

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Introduction

For the treatment of pelvic organ prolapse (POP) and urodynamic stress incontinence (USI), surgeons have increasingly used prosthetic materials over the past decade. The popularity of the commercial kits of transvaginal mesh (TVM) has surged because they are easier to use when performing surgery and are associated with higher cure rates.^{1,2} Notwithstanding, the use of TVM is associated with a non-negligible risk of complications such as infection, mesh exposure through the vaginal epithelium, erosion into the visceral organs, groin pain, dyspareunia, urinary problems, bladder perforation, fistula formation, and the recurrence of POP or USI.³ Herein, we presented an unusual complication of acute urinary retention caused by a large bladder hematoma resulting from infectious hemorrhagic cystitis after pelvic reconstruction surgery with TVM without mesh erosion or bladder perforation.

Case report

A 66-year-old female, gravida 4 para 4, presented to the outpatient department with both total uterine prolapse and one right femoral hernia for more than 5 years (Figure 1(a)). She had a medical history of hypertension treated with standard medication, and there was no other medical or surgical history. Pelvic examination revealed stage 4 uterine

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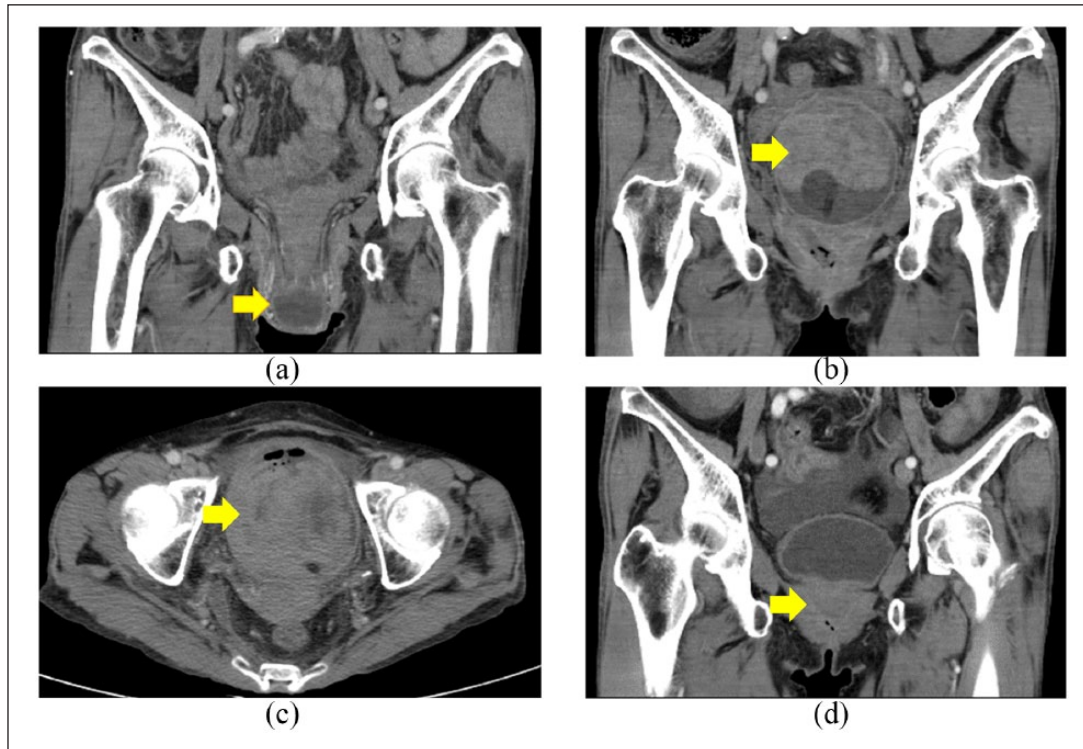


Figure 1. Contrast-enhanced CT scan of abdomen: (a) preoperative image study, where the yellow arrow indicates prolapsed uterus on coronal section; (b) image study at ER, where the yellow arrow indicates bladder hematoma s/p catheterization on coronal section; (c) image study at ER, where the yellow arrow indicates bladder hematoma s/p catheterization on transverse section; and (d) postoperative follow-up image study 3 months after operation, where the yellow arrow indicates non-prolapsed uterus on coronal section.

prolapse with stage 4 cystocele and stage 3 rectocele. The urodynamic study demonstrated normoactive bladder detrusor muscle contraction and positive urinary leakage on a stress urethral pressure profile study. The preoperative surveillance of serum and urine laboratory studies were within normal limits. The patient underwent pelvic reconstruction and concomitant mid-urethral sling using the Uphold® system (Boston Scientific, Natick, MA) for apical compartment reconstruction fixed at the bilateral sacrospinal ligaments and Obtryx™ mid-urethral sling (Boston Scientific) for USI via bilateral obturator foramen, and there was no concomitant hysterectomy. Total operation time was 60 min, and total blood loss was 50 mL. Prophylactic antibiotics with 1 gm of a first-generation cephalosporin were prescribed 30 min before the operation, and the operation course was uneventful. After the operation, there was no routine use of antibiotics. On postoperative day 3, the residual urine was 84 mL measured by simple catheterization 4 h after removal of the Foley catheter, and she was discharged. However, 7 days after discharge (on postoperative day 10), she presented to our emergency room with gross hematuria and difficulty voiding for 6 h. The laboratory study revealed leukocytosis (serum white blood cell count: 12,350/ μ L), pyuria (urine white blood cell count: >100 per high-power field), and hematuria (urine

red blood cell count: >100 per high-power field). A 16-French Foley catheter was indwelled, and dark reddish urine was drained initially. A distended bladder with a complex inner pattern on the trans-abdominal sonogram suggested hematoma formation, and the lower abdominal computed tomography (CT) scan revealed a large hematoma within the urinary bladder (Figure 1(b) and (c)). Irrigation with a 3-way 20-French Foley catheter for bladder hematoma was performed, and subsequent cystoscopy was conducted to inspect the cause of hematoma formation. During cystoscopy, a large amount of coagulum was drawn out, while no active bleeding or traumatic lesion was noted (Figure 2(a) and (b)). Thus, the final diagnosis was acute urinary retention resulting from acute hemorrhagic cystitis with subsequent bladder hematoma formation. After cystoscopy, the patient was managed with prolonged indwelling of a 16-French Foley catheter and oral antibiotic medication for a urinary tract infection (UTI). The isolated microorganism from the catheterized urine specimen in the emergency room (ER) was *Escherichia coli* (*E. coli*). After a 1-week treatment with an indwelling Foley catheter and oral antibiotics, the Foley catheter was removed, and urination was smooth without difficulty. During the 3-month follow-up period, there was no recurrent POP or USI or voiding difficulty (Figure 1(d)).

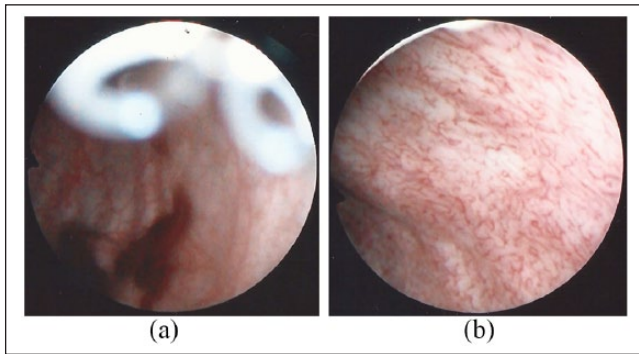


Figure 2. Procedures of cystoscopy: (a) procedure during drawing coagulum and (b) there was hyperemia of bladder mucosa without submucosal hemorrhage or gross hematuria on cystoscopy.

Discussion

Based on a literary search, a large urinary bladder hematoma after pelvic reconstruction surgery with TVM without bladder perforation or mesh erosion was an unusual complication. Concomitant surgery of POP and USI is not associated with an increasing risk of bladder storage symptoms, urgency incontinence, or long-term obstructive voiding symptoms but is associated with short-term voiding difficulties.⁴ However, in the present case with acute urinary retention, the exact etiology was from infectious hemorrhagic cystitis with subsequent bladder hematoma formation as the cultured microorganism from the present case, uropathogenic *E. coli* (UPEC), is the most common bacteria involved in UTIs. These peritrichous adhesive organelles express type 1 pili and the mannose-binding adhesin, FimH, on the surface of the cell wall that binds to mannose-coated proteins on the outermost layer of the urothelium, known as umbrella cells.⁵ The UPEC replicate within the umbrella cells and subsequently cause cell lysis, spilling more bacteria into the urine. Before the cells die, a signaling cascade initiated by toll-like receptor 4 (TLR-4) is activated to recruit polymorphonuclear leukocytes (PMNs) to combat the infection. However, the high affinity monomannose-binding uropathogenic phenotype is likely selected for within the urinary tract by facilitating UPEC interactions with umbrella cells and allowing them to better resist clearance by the bulk flow of urine and, possibly, other host defenses.⁶

In 2013, Dr Lusardi reported that receiving prophylactic antibiotics was associated with a lower rate of bacteriuria and other signs of infection, including surgical patients who undergo bladder drainage for at least 24 h postoperatively.⁷ Moreover, Dr Mutone suggested that pelvic floor surgery was a risk factor for temporary urinary retention postoperatively, and a return to normal voiding might take longer in older patients and those patients with a previous history of incontinence or prolapse operations. Thus, inefficient emptying of urine might be a cause of UTI after pelvic floor surgery.⁸ Most patients undergoing pelvic reconstruction, anti-incontinence

surgeries, urethral diverticulum, or fistula repairs require urinary catheters for longer than 24 h. In addition, Dr Sutkin studied patients who received surgery to correct prolapse, incontinence, or both and found that 9% of patients might develop a symptomatic UTI within 6 weeks postoperatively, even with the use of prophylactic antibiotics during indwelling catheter use or clean intermittent self-catheterization (CISC).⁹ Dr Sutkin also constructed a decision tree model that randomized women requiring CISC for voiding dysfunction after prolapse or incontinence surgeries to prophylactic antibiotics or no antibiotics, and prophylactic antibiotics were favored for UTI prevention.¹⁰ Dr Ghezzi compared the incidence of catheter-associated UTIs in two groups of patients who had undergone tension-free vaginal tape and cystoscopy procedures for stress urinary incontinence. All 104 patients maintained an indwelling Foley catheter 24 h postoperatively. Six of the women received preoperative ampicillin/sulbactam 1 h prior to the sling operation. The other 54 women received the same preoperative antibiotics and a single dose of oral prulifloxacin 14 h after the surgery, at a time when the antimicrobial activity of the preoperative antibiotic was thought to be negligible. Urine cultures were positive in 0% in the treatment group versus 23% in the control group at the time of Foley removal 24 h after surgery. These findings suggest a decrease in asymptomatic bacteriuria at catheter removal due to the administration of an additional antibiotic when the protective effect of the preoperative prophylactic antibiotic began to wear off.¹¹ However, the treatment of catheter-associated asymptomatic bacteriuria is not recommended in UTI prevention.¹² Another study by Dr Chan et al. found no difference in the incidence of postoperative UTIs by reversing the sequence of vaginal cleansing and urethral catheterization.¹³

Prolonged catheterization is one risk of the catheter-associated UTI, while Dr Huang et al.¹⁴ reported that the average postoperative bladder drainage time was 4.7 ± 4.5 days (range 1–25 days) among 65 women undergoing pelvic reconstruction with TVM. In addition, Dr Zhang et al.¹⁵ suggested a cutoff postvoid residual urine volume of 200 mL might be proper for defining postoperative voiding dysfunction to avoid overtreatment. In our case, 3-day postoperative bladder drainage with a postvoid residual urine volume of 87 mL was not associated with voiding dysfunction, which might result in postoperative UTI, but female sex, bacterial colonization, and catheterization itself might be the risk factors causing postoperative UTI.¹⁵

However, potential complications resulting in pelvic hematoma after pelvic reconstruction with TVM, including bladder injury, bleeding more than 500 mL, or urinary tract injury or perforation, should be concerning as well. In addition, synthetic mesh-augmented pelvic floor repair may pose unnecessary risks.¹⁶ Thus, it is suggested that synthetic mesh for POP should be used only in complex cases and restricted to those surgeons with appropriate training.¹⁷ For women who are deemed fit for surgery, standard repair with native tissue could be a pragmatic option to avoid mesh-related complications.¹⁶

Conclusion

To our knowledge, a large bladder hematoma resulting from acute hemorrhagic cystitis is a very rare event after pelvic reconstruction surgery and concomitant mid-urethral sling. Careful aseptic techniques and antibiotic prophylaxis reduce bacterial contamination only for brief periods of time, and patients may still be at risk for delayed infections. The possible modalities to prevent postoperative UTI after TVM include shortening the indwelling Foley catheter period and administration of an additional antibiotic during catheter removal. However, the antibiotic policies for pelvic reconstruction with TVM demand further cost analyses.

Declaration of conflicting interests

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Ethical approval

Our institution does not require ethical approval for reporting individual cases or case series.


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Informed consent

The patient described herein had given written informed consent to the use of deidentified patient data for use in research and education.

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