Case Report

Urothelial carcinoma of the urinary bladder related to a migrated mesh after inguinal hernioplasty: A case report

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Introduction: Mesh migration into the urinary bladder following repair of inguinal hernia and bladder cancer caused by a foreign body are extremely rare. We hereby report a rare case of urothelial carcinoma of the bladder related to a migrated mesh following inguinal hernioplasty.

Case presentation: A 70-year-old Japanese woman who underwent surgery for left inguinal hernia 5 years previously presented with gross hematuria. Cystoscopy and computed tomography revealed stone formed in the mesh migrated into the urinary bladder. Mesh removal surgery and partial cystectomy were performed; and pathological findings revealed muscle invasive bladder cancer. Neoadjuvant chemotherapy and radical cystectomy were performed. The pathological diagnosis was high-grade urothelial carcinoma, stage pT3a with positive lymph nodes, stage pN3. To date, 3 months after surgery, the patient has received adjuvant chemotherapy.

Conclusion: To our knowledge, this is the first report of urothelial carcinoma related to a migrated mesh after inguinal hernioplasty.

Key words: bladder stone, inguinal hernia, mesh migration, urothelial carcinoma.

Keynote message

We hereby report an extremely rare case of UC of the bladder related to a migrated mesh after inguinal hernioplasty. Although rare, physicians should consider bladder cancer when mesh migration into the urinary bladder is detected during follow-up visits after inguinal hernioplasty.

Introduction

Specific complications, such as mesh migration into the urinary bladder after inguinal hernioplasty are sporadically reported as case reports. However, bladder cancer caused by mesh migration is extremely rare. We hereby report an extremely rare case of UC of the bladder related to a migrated mesh after inguinal hernioplasty.

Case presentation

A 70-year-old Japanese woman presented to our institution with gross hematuria. She had undergone surgery for left inguinal hernia (Kugel method) 5 years ago. She was a nonsmoker and did not suffer from any chronic disease. Vital signs and abdominal examination were normal. Complete blood count was normal. Comprehensive metabolic panel showed blood urea nitrogen 15.8 mg/dL and creatinine 0.63 mg/dL. Urinalysis revealed many red blood cells and white blood cells with positive nitrite. Cystoscopy revealed a 2-cm stone, firmly adhered to the left wall of the bladder. No obvious tumorous lesions were noted. Urinary cytology was class III. Plain computed tomography revealed mesh migration and bladder stone (Fig. 1). The bladder wall around the mesh was thickened. Lymph node enlargement was not observed. Prior to inguinal hernia surgery, no obvious abnormalities of the urinary tract were observed on urinalysis and computed tomography. We suspected that a bladder stone was...
formed in the mesh that migrated into the urinary bladder. Therefore, mesh removal surgery and partial cystectomy were performed (Fig. 2). Due to thickening and fragility of the bladder wall where the mesh migrated, it was difficult to suture the bladder to achieve closure. Unexpectedly, the pathological findings revealed UC, high grade, stage pT3 (Fig. 3). She received three courses of neoadjuvant chemotherapy intravenously with gemcitabine (1000 mg/m²) on Days 1 and 8 and cisplatin (70 mg/m²) on Day 2. After neoadjuvant chemotherapy, robot-assisted radical cystectomy and ureterostomy were performed. Due to repeated operations, adhesions in the abdominal cavity were extensive, and surgery was very difficult. The operation time was 332 min, and the estimated blood loss was 75 mL. No complications were noted after surgery, and the patient was discharged on the 18th postoperative day. Pathological diagnosis was UC, high grade, stage pT3a, with positive lymph node, stage pN3. To date, 3 months after surgery, the patient has received adjuvant chemotherapy intravenously at the same regimen as the neoadjuvant therapy.
Mesh migration into the urinary bladder is an uncommon complication of inguinal hernioplasty. The pathophysiology of the migration of the mesh into the bladder is currently unknown. There are several possible causes, including foreign body reaction, inappropriate suturing, and damage of the adjacent organ by the sharp edges of the mesh.

Bladder stones generally occur in the presence of bladder outlet obstruction, pelvic organ prolapse, pelvic surgery, neurogenic bladder, or foreign bodies. In adults, bladder stones rarely occur without these risk factors. In this case, we suspected that bladder irritation could occur along the mesh. In addition, if the mucosal layer was caught in the mesh, contrast-enhanced computed tomography would help with a definitive diagnosis before surgery may be necessary. There is no objection that chronic irritation by hernia mesh or bladder stone caused bladder cancer. The challenge was to confirm which one was the possible cause. We believe that the migrated mesh caused bladder cancer as the histopathological tissue showed almost no cancer cells in the mucosal layer, but many cancer cells were present in the muscle or deeper layer along the mesh. Bladder cancer because of bladder stones may occur mainly in the mucosal layer affected by chronic irritation. Our investigation showed that at the time of hernia surgery, part of the bladder wall was damaged and was sutured with 3-0 braided polyglactin. This event may have contributed to the migration of the mesh. In addition, if the mucosal layer was caught in the muscle or deeper layer during bladder repair, bladder cancer could occur along the mesh.

Interestingly, in this case, histological examination of bladder cancer was suggestive of UC. The association between chronic bladder irritation and SCC has been widely studied. Chronic bladder irritation could be caused by chronic or recurrent urinary tract infection, chronic indwelling urinary catheter, bladder stones, foreign bodies, intravesical bacillus Calmette–Guerin, and prolonged exposure to cyclophosphamide. Paddock et al. reported a case of high-grade UC associated with chronic urethral stent. However, there is scant literature about the association between chronic bladder irritation and UC and the pathophysiology of UC caused by chronic bladder irritation is unclear. Further studies are needed to clarify the relationship between infection/inflammation and urologic malignancies.

Three cases of bladder cancer related to a migrated foreign body have been reported including this case (Table 1). The age of these patients was between 63 and 70 years, and all cases presented as hematuria. The foreign body in each case was shrapnel, intrauterine device, and hernia mesh. Histological examination was suggestive of SCC in two cases and UC in one case. All cases were advanced cancers, and radical cystectomy was performed. The migration of the foreign body from outside the bladder suggests that the chronic irritation affects the muscle or deeper layers rather than the mucosal layer. Therefore, bladder cancer related to foreign body may be more advanced. As far as we know, this is the first report of UC of the bladder related to a migrated mesh after inguinal hernioplasty. Although rare, physicians should consider bladder cancer on detection of mesh migration into the urinary bladder during follow-up visits after inguinal hernioplasty.

### Discussion

This research conforms to the provisions of the Declaration of Helsinki. All informed consent was obtained from the subject and guardians.

### Conflict of interest

The authors declare no conflict of interest.

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Table 1  Reported cases of bladder cancer related to a migrated foreign body

| Case | Author | Year | Age (years) | Sex | Chief complaint | Foreign body | Duration (years) | Histological type | pT | Treatment |
|------|--------|------|-------------|-----|-----------------|--------------|-----------------|------------------|----|-----------|
| 1    | Wyman  | 1988 | 63          | M   | Hematuria       | Shrapnel     | 43              | SCC              | ND | Radical cystectomy |
| 2    | Gökce  | 2010 | 66          | F   | Hematuria       | Intrauterine device | 26          | SCC              | T2 | Radical cystectomy |
| 3    | Sasaki  | 2018 | 70          | F   | Hematuria       | Hernia mesh  | 5               | UC               | T3 | Radical cystectomy |