

Case Report

Clinical characteristics of patients with inguinal hernia mesh migration into the bladder

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Abbreviations & Acronyms

CT = computed tomography
TURBT = transurethral resection of the bladder tumor
UTI = urinary tract infection

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Introduction: We report two cases of mesh migration into the bladder after inguinal hernia surgery.

Case presentation: In the first case, a 48-year-old woman who underwent right internal inguinal hernia repair, 18 months prior, presented with pollakiuria and microscopic hematuria that was resistant to antibiotics. A submucosal tumor was detected at the bladder dome by cystoscopy, and transurethral resection was performed. Intraoperatively, a migrated mesh was observed in the submucosal lesion. In the second case, a 55-year-old man who underwent a right external inguinal hernia repair, approximately 14 years prior, presented with persistent microscopic hematuria and pyuria. Cystoscopy revealed mesh migration to the upper right bladder wall. Both patients underwent partial cystectomy with mesh removal, and their complaints were resolved after surgery.

Conclusion: Mesh migration should be suspected in patients with a history of inguinal hernia repair, accompanied by persistent lower urinary tract symptoms or abnormal urinalysis findings.

Key words: cystoscopy, foreign body migration, inguinal hernia, postoperative complication, surgical mesh.

Keynote message

Hernia mesh migration into the bladder is a rare complication of inguinal hernia repair. Both, the current cases and those previously reported, demonstrated persistent lower urinary tract symptoms or abnormal urinalysis findings. Computed tomography and cystoscopy are useful diagnostic tools in such cases.

Introduction

Inguinal hernias can result from age-related muscle weakness.¹ There are increased number of inguinal hernia surgeries in Japan due to population aging, suggesting an increased number of complications associated with these surgeries.² Here, we report two cases of mesh migration into the bladder after repair surgery for inguinal hernia.

Case presentation

The first case was a 48-year-old woman who underwent right internal inguinal hernia repair using the direct Kugel method, a type of open hernia repair in which a mesh sheet was placed in the preperitoneal cavity, at the age of 46. The patient gradually developed pollakiuria after hernia surgery. Microscopic hematuria was observed. Her family doctor repeatedly prescribed antimicrobial agents for cystitis. However, her symptoms did not improve over the year. She visited other urology clinics. She underwent a cystoscopy, 18 months after the hernia surgery, wherein a mucosal protrusion was noted at the bladder dome. Pelvic CT showed a bladder mass with calcification at the dome (Fig. 1a). She visited our department to undergo TURBT

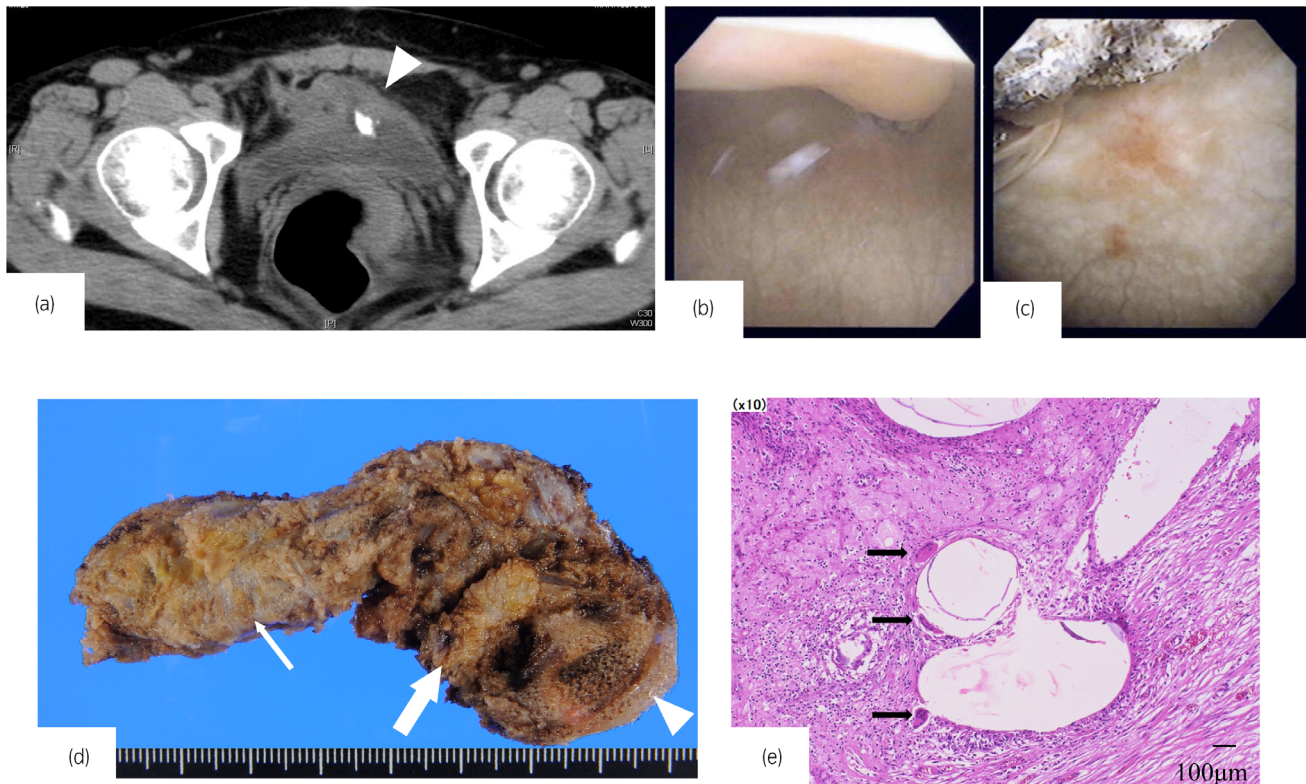


Fig. 1 Wall thickness with calcification at the bladder dome on pelvic CT (arrowhead) (a). Cystoscopic findings on TURBT (b, c). Submucosal protrusion at the bladder (b) and mesh exposed after the resection of the mucosal layer (c). Macroscopic findings of the resected tissue (d). The mesh (arrowhead) penetrated the bladder wall (thick arrow), and fibrous tissue adhered to the mesh outside of the bladder (narrow arrow). Histopathological images of the bladder (e). A low power view of hematoxylin and eosin staining shows epithelioid cells (arrows) and fibroblast hyperplasia at the submucosal layer, without malignant findings.

for the bladder submucosal tumor. During the TURBT, a hernia mesh emerged from the submucosal layer of the bladder mass. The submucosal mass was identified as a migrated hernia mesh instead of a bladder carcinoma (Fig. 1b,c). Therefore, a partial cystectomy was performed to remove the migrated mesh that was exposed 3 cm × 2 cm from the bladder wall to the lumen. The patient was discharged on postoperative day 12 with no perioperative complications. The pathological diagnosis was fibrous overgrowth and granulation tissue in the urinary bladder, without any malignant cells (Fig. 1d,e). After the operation, pollakiuria and microscopic hematuria resolved. Inguinal hernia did not recur for more than 10 years.

The second case involved a 55-year-old man. The patient underwent the mesh plug method, a type of open hernia repair for plugging the hernia orifice with an umbrella-shaped mesh, for a right external inguinal hernia, at the age of 41. Medical checkups revealed asymptomatic microscopic hematuria and pyuria, at the age of 46. He underwent a pelvic CT scan, which showed a tumor on the upper right wall of the bladder (Fig. 2a). There were no bladder tumors, but a mesh erosion into the bladder diverticulum was observed on cystoscopy (Fig. 2b,c). Partial cystectomy was performed to remove the migrated hernia mesh. The patient was discharged on postoperative day 10 with no perioperative complications. The pathological diagnosis was fibrous overgrowth and

granulation tissue in the urinary bladder, without any malignant cells (Fig. 2d,e). Recurrent hernias and abnormal urinalysis findings were not observed for 3 years.

Discussion

To the best of our knowledge, 27 cases of hernia mesh migration into the bladder have been reported; however, most of them were conducted by general surgeons, not urologists.^{3–17} These previous studies focused on warning that hernia mesh could migrate into the bladder or discussing the mechanisms of this complication and appropriate preventive repair methods for it. However, little is known about the subjective symptoms and abnormal urinalysis findings caused by the mesh migration into the bladder. In Table 1, we have summarized the characteristics of 27 previously reported patients and our two cases, focusing on the major complaints and diagnostic methods.^{3–17} Pollakiuria (38%) was the most frequent chief complaint, followed by gross hematuria (34%) and recurrent UTI (31%). Hence, hernia mesh migration in the bladder can be considered as a differential diagnosis in patients with a history of hernia repair and persistent urinalysis abnormalities or lower urinary tract symptoms. Cystoscopy (48%) and pelvic CT (24%) were useful for the diagnosing mesh migration in many cases. Cystoscopy is a useful examination to directly detect and diagnose migrated

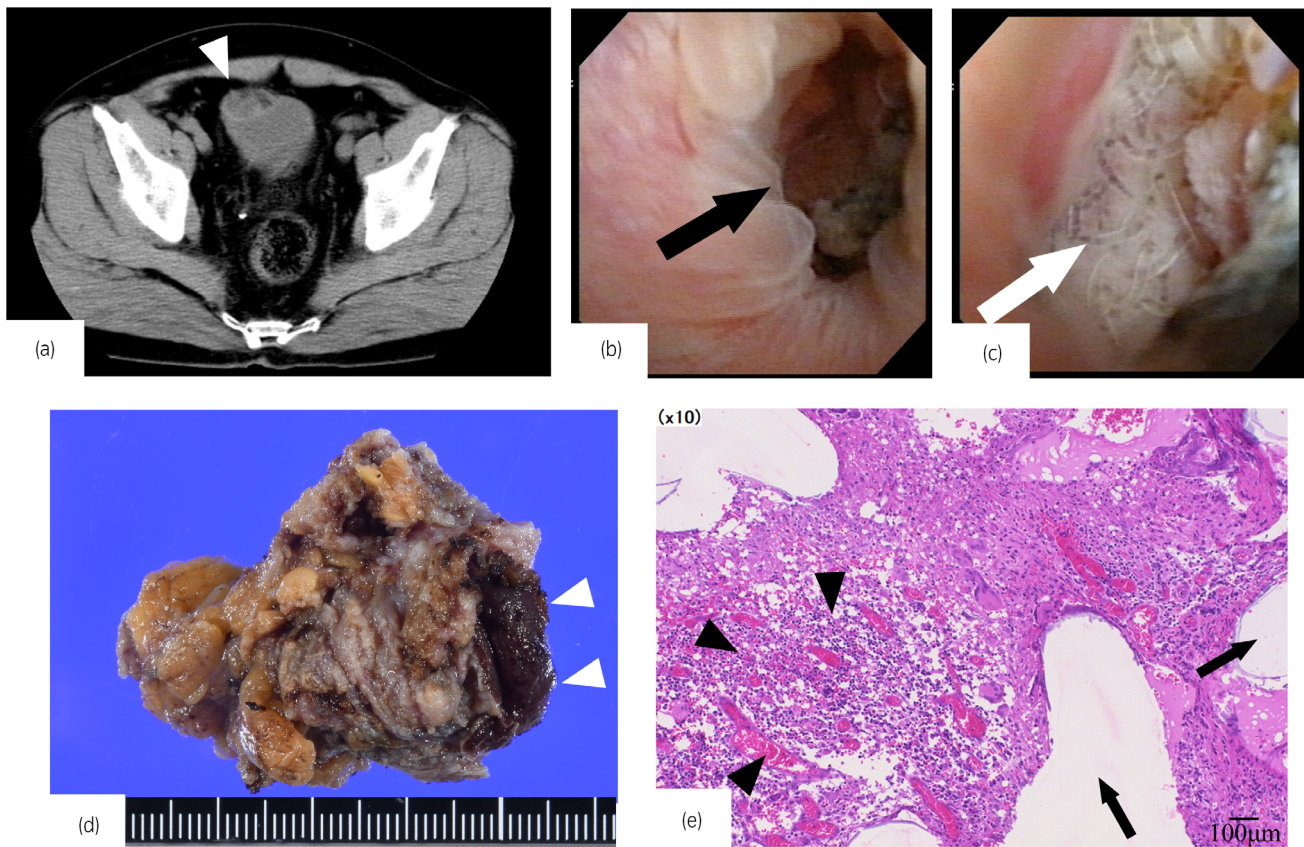


Fig. 2 Abnormal wall thickness at the upper right side of the bladder in the pelvic CT (arrowhead) (a). Migrated mesh is seen at the diverticulum of the bladder by cystoscopy (arrows) (b, c). Macroscopic findings of the resected tissue (d). Most of the mesh invades the bladder, and is exposed towards the mucosal side of the bladder (arrowheads). Histopathological images of the bladder (e). A low power view of the hematoxylin and eosin staining shows the hollow spaces surrounded by epithelial cells, revealing the area of migrated mesh (arrows) as well as lymphocyte infiltration and vascular hyperplasia (arrowheads) without malignant findings.

mesh. Pelvic CT can easily detect foreign matter close to the bladder, such as a mesh, and should be considered in patients suspected of having mesh migration for early diagnosis. Some cases, such as ours, require a transurethral surgery, such as TURBT or bladder lithotomy, to reach the correct diagnosis. The median period from the initial hernia repair to the diagnosis of mesh erosion into the bladder was 60 months (3–300 months). These findings suggest that mesh erosion into the bladder progressed slowly.

In all previous cases, surgical removal of the migrated mesh, with or without partial cystectomy, was performed to treat mesh migration into the bladder. The patient's complaints and urinalysis abnormalities resolved completely after the surgery. Interestingly, none of the previous or current cases showed recurrent inguinal hernia during the follow-up period after mesh removal surgery, even though the mesh was not present in the inguinal region. This may be partly because of inflammation of the surrounding tissues of the hernia mesh, and that caused adhesions in the inguinal region that prevented recurrent hernias.

Laparoscopic hernia repair was performed in 17 cases. This suggests that laparoscopic surgery poses a higher risk of mesh migration than open surgery given that primarily open surgery has been performed since a long time, until recent

years. Considering mesh migration into the bladder as a differential diagnosis would be more important in the future because laparoscopic hernia repair has recently increased in many countries.^{1,2}

Conclusion

We encountered two cases of inguinal hernia mesh migration into the bladder. Mesh migration into the bladder should be suspected in patients with a history of inguinal hernia repair, accompanied by persistent lower urinary tract symptoms, or abnormalities in urinalysis. Cystoscopy and pelvic CT should be considered, even if a long time has passed since the hernia surgery.

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Author contributions

Takahiro Akimoto: Conceptualization; data curation; writing – original draft. Shigenori Kakutani: Writing – review and editing.

Table 1 Chief complaints and diagnostic examination in previous reports and our cases

	Previous cases (n = 27)	Case 1	Case 2	All cases (n = 29)
Chief complaints				
Hematuria	14 (50%)	Presented	Presented	16 (57%)
Microscopic	4 (15%)	Presented	Presented	6 (21%)
Gross	10 (37%)			10(34%)
Pyuria	5 (19%)		Presented	6 (21%)
Pollakiuria	10 (37%)	Presented		11 (38%)
Recurrent UTI	9 (33%)			9 (31%)
Bladder stone	7 (26%)			7 (24%)
Key examinations for diagnosis				
Cystoscopic surgery	3 (11%)	Performed		4 (14%)
Cystoscopy	13 (48%)		Performed	14 (48%)
Ultrasonography	2 (7%)			2 (7%)
CT	7 (26%)			7 (24%)
Laparotomy	8 (30%)			8 (28%)
Cases failed to diagnose with a single cystoscope or TURBT	6 (22%)			6 (21%)
Period from hernia repair to diagnosis of mesh migration (month)	Median 60.0 (3–300)	18	165	Median 60.0 (3–300)
Age (year)	Median 63.5 (38–85)	48	55	Median 62.5 (38–85)
Sex (female: male)	(3: 23)†	Female	Male	(4: 24)†
Type of hernia repair (open: laparoscopic)	(9: 17)‡	Open	Open	(11: 17)‡

†Sex is not mentioned in one case. ‡There is no description whether hernia repair was performed laparoscopically in one case.

Jun Kamei: Conceptualization; supervision; writing – review and editing. Haruki Kume: Writing – review and editing. Tet-suya Fujimura: Writing – review and editing. Yutaka Enomoto: Conceptualization; supervision; writing – review and editing.

Conflict of interest

The authors declare no conflicts of interest.

Approval of the research protocol by an Institutional Reviewer Board

N/A.

Informed consent

Written informed consent was obtained.

Registry and the Registration No. of the study/trial

N/A.

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