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Case Report

Mesh Migration Into Urinary Bladder After Open Ventral Herniorrhaphy With Mesh: A Case Report

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Ventral hernia repair with mesh products is of increasing popularity. The long-term results of mesh repair of ventral hernia are superior to primary suture repair. However, occasional complications may still present. We report on a 77-year-old man who underwent ventral hernia repair with a mesh 5 years ago with complication of mesh migration into the urinary bladder and enterovesical fistula. The patient presented with lower urinary tract symptoms initially. By urinalysis, persistent hematuria and pyuria were found after antibiotic treatment. For further investigation of hematuria, intravenous urography was performed, which revealed a faint radio-opaque patch at the right pelvis. To obtain a more precise relationship between the lesion and the adjacent organs, computed tomography and cystoscopy were arranged. They confirmed a mesh with stone formation in the urinary bladder. To remove the mesh, segmental resection of the ileum and cystorrhaphy were performed.

Key words: Incisional hernia – Surgical mesh – Complications – Urinary Bladder Calculi

Primary repair of ventral hernia with component separation is still the major repair method. There is increasing popularity of ventral hernia repair with mesh products. The long-term results of mesh repair of ventral hernia are superior to primary suture repair.[1,2] However, occasional complications may still occur. Mesh migration to adjacent organs is one of the complications. It has been reported in some patients with a surgical history of either open or laparoscopic herniorrhaphy with mesh.[3–8] In this case report, a 77-year-old man, who underwent ventral hernia repair with mesh before, had the complication of mesh migration into the urinary bladder and enterovesical fistula with

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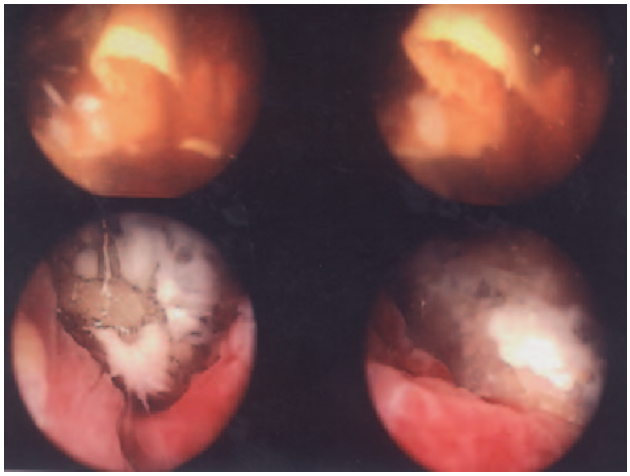

Fig. 1 Cystoscopy showed a foreign body, coated with yellowish stones, inside the urinary bladder, at the dome where the foreign body penetrated.

the initial presentation of lower urinary tract symptoms.

Case Report

In January 2010, a 77-year-old man presented in our clinic with urinary frequency and painful voiding for 2 months. He had undergone an open appendectomy at another hospital 5 years prior, and a ventral hernia developed from the wound 6 months later. The patient received open herniorrhaphy with mesh at the same hospital 1 year ago. He had been well until November 2009, when urinary frequency and painful voiding developed gradually. Because of poor response to medication at another hospital, he was referred to our clinic.

At our clinic, physical examination revealed a scar over the right lower abdomen. Urinalysis showed hematuria and pyuria (red blood cell (RBC), 1000/high power field (HPF); white blood cell (WBC), 700/HPF). Urine culture grew *Proteus mirabilis* and *Escherichia coli* with colony count more than 10^5/mL. Under the impression of urinary tract infection, oral antibiotic was administered. After 7-day antibiotic treatment, the symptoms, hematuria, and pyuria persisted, so intravenous urography was performed for further investigation. It showed a faint radio-opaque patch at the right-side pelvic cavity only on postvoiding film. Both computed tomography (CT) scan and cystoscopy were arranged to evaluate the precise location of the lesion. Abdomen CT scan with contrast performed on February 1, 2010, showed thickened right superior vesical wall, with blurry, stranding change of the adjacent perivesical fat tissue. Some hyperdense strand-like materials coiled in the urinary bladder were also noted. Cystoscopy (Fig. 1) on February 2, 2010, disclosed a foreign body coated with yellowish stones inside the urinary bladder at the dome where the foreign-body penetrated. The stones were crushed with electrohydraulic lithotripsy under cystoscopy. Mesh-like material beneath the stones was found. Therefore, mesh migration into the urinary bladder was highly suspected.

In order to remove the foreign body, exploratory laparotomy was performed on February 3, 2010. During the operation, a folded, ova-shaped mesh, measuring 10 × 8 cm in size was noted, with foul-smelling urine. No stitch was found on the mesh. There were multiple interbowel adhesions between the ileum and urinary bladder. After removal of the mesh, an enterovesical fistula was noted. Segmental resection of the ileum with end-to-end anastomosis and cystorrhaphy were performed. A cystostomy tube was placed in the urinary bladder. Another Jackson–Pratt drain tube was placed near the cystorrhaphy site in the peritoneal cavity. On the day after the operation, fever with lowered blood pressure was noted. The patient was transferred to the intensive care unit for further care under the impression of septic shock. His vital signs stabilized with intravenous empirical antibiotic (ceftazidime) use. Blood culture grew wild-type *E. coli*, which was sensitive to ceftazidime. The patient was given nothing by mouth for 7 days and then started oral intake. He tolerated oral feeding well and was transferred to the general ward. The drainage amount from the Jackson–Pratt drain tube decreased gradually. We removed the Foley urethral catheter first and clamped the cystostomy tube. The drainage amount from the Jackson–Pratt drain tube did not increase significantly after the above procedure. Finally, we removed the cystostomy tube and Jackson–Pratt drain tube. The patient was able to void without difficulty and was discharged. In follow-up, the patient did not complain of lower urinary tract symptoms. Urinalysis was also clear. No evidence of urinary tract infection or recurrence of enterovesical fistula was noted.

Discussion

Avill and Agrawal[3] proposed 2 possible mechanisms for mesh migration: primary mechanical

migration and secondary migration as a result of erosion of the surrounding tissue. The former are mere displacements of the mesh along paths of least resistance brought about by either inadequate fixation or probably by external displacing forces. These displacements are into adjoining anatomic spaces. Secondary migrations, however, are slow and gradual movements of the mesh through transanatomic planes. These are secondary to foreign-body reaction–induced erosion. They are, however, dependent to a great extent on the nature of the mesh biomaterial and on the type of fixation of the mesh, if fixed at all. Thus, the mesh may be initially displaced but later erode into the adjacent tissue.[3] In our case, the migrated mesh traversed different anatomic planes and created an enterovesical fistula, which implies secondary migration more likely. However, because there were no stitches found on the removed mesh, primary migration before secondary migration was also possible.

The nature of the mesh biomaterial may induce erosion. Polypropylene mesh offers long-term stability but can induce acute inflammation, with infiltration by granulocytes and macrophages. Polyglactin mesh causes less inflammation than other meshes. Composite meshes made of multifilament polypropylene and polyglactin have also been developed. These meshes are manufactured with different materials on each surface, strategically positioning the different surfaces to selectively impede or promote tissue ingrowth. The more inert mesh material is intended to prevent adhesions with the underlying viscera, and multiple studies have demonstrated its effectiveness. Samli *et al*[9] demonstrated early tissue reactions in the rat urinary bladder after contact with different synthetic mesh materials. The highest rate of mesh penetrating the bladder muscularis propria at 14 days was noted in the polypropylene mesh group (6 of 12, 50%). The results suggest that the use of polypropylene mesh risks serious postoperative complications. In our present case, we could not identify exactly what mesh compound had been used.

The most frequent presentations of mesh migration into the urinary bladder reported in previous literatures[3–6] were irritating lower urinary tracts symptoms as in foreign body in the urinary bladder.[10] Hematuria was also a common presentation, either being typically painful secondary to infection or painless.[5] Our patient presented with urinary frequency, voiding pain, and hematuria, all of which could be induced directly by foreign body irritation or indirectly by urinary tract infection. In theory, a foreign body in the urinary bladder would become a nidus for stone formation and would harbor pathogens; both increase the risk of urinary tract infection.

Initial investigation included work-up for urinary tract infection, such as urinalysis and urine culture. Kidney, ureter, and bladder (KUB) X-ray is indicated for detection of urolithiasis if there is recurrent urinary tract infection or resistant organism growth. If there is a radio-opaque lesion suspected to be a urinary bladder stone, ultrasound is used to confirm the diagnosis.[2] We performed intravenous urography (IVU) first for persistent hematuria because it could evaluate both the upper and lower urinary tract. IVU was helpful to identify a filling defect in the urinary bladder and a possible fistula between the urinary bladder and other organs.[2] Cystoscopy could reveal features of inflammation secondary to infection. Because cystoscopy is an invasive procedure, it is not a first-line examination. Calcifications and intravesical stones have been observed as in our case. These stones were either actual mesh with calcareous deposits on the surface or were anatomically separate entities secondary to eroding mesh. This could explain the atypical bladder stone IVU image in our case, rather than a typical round and apparent radio-opaque bladder stone. CT scan and lower gastro-intestinal series were also necessary to clarify the presence of enterovesical fistula.[11] Unfortunately, the CT scan of our patient did not reveal the fistula formation.

The management depended on the degree of the mesh migration. One case of simple cystoscopic mesh removal was reported by Agrawal and Avill.[3] In our case, involvement of the bowel was noted on the preoperative CT scan, and it was feared that cystoscopic extraction might cause fistulae or bowel perforation. Laparotomy combined with general surgery for the mesh removal was a reasonable choice.

Conclusions

Mesh migration to the urinary bladder is a rare complication of ventral hernia repair. It usually presents with recurrent urinary tract infection or urinary bladder stones. Once mesh migration to the urinary bladder has been confirmed, thorough image studies to identify the association of the urinary tract and the intestinal tract are necessary for surgical planning.

Acknowledgments

Ethical Committee approval is not required in the place where the case occurred.

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