

Intraperitoneal Migration of a Mesh Plug from a Hernioplasty Forming a Colocutaneous Fistula with the Cecum: Report of a Case

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Tension-free hernia repair with a mesh plug causes relatively low postoperative pain and allows an earlier return to work, as well as a low recurrence rate. Occasionally, however, hernioplasty can result in complications including mesh migration and invasion of intra-abdominal organs. This report describes the case of a 57-year-old man who had undergone a right inguinal hernioplasty 13 years previously. Recovery was uneventful until he experienced inflammation of the groin, and required open drainage three times for a refractory abscess in his right groin. Additional colonoscopy and x-ray examinations with contrast medium clearly demonstrated a mesh plug that had migrated and penetrated the cecum, forming a colocutaneous fistula. The mesh was successfully removed under general anesthesia, and the inflammation in the groin resolved. (J Nippon Med Sch 2015; 82: 246–249)

Key words: mesh plug, colocutaneous fistula, hernioplasty

Introduction

Lichtenstein and Shore reported the usefulness of the mesh plug in femoral and recurrent inguinal hernias in 1974^{1,2}, and Lichtenstein et al. described the tension-free hernioplasty in 1989³. Robbins and Rutkow⁴ described their own method of plug-and-patch hernioplasty in 1993, which was a simple technique that promised minimal dissection, rapid recovery and low recurrence⁵, and has since been regarded as a useful standard treatment method. Despite its advantages, the use of a mesh plug can lead to complications, such as bowel obstruction and colocutaneous fistula due to migration and violation of intra-abdominal organs^{6–8}, as well as chronic pain requiring explantation of the plug in approximately 6% of cases⁹.

Here, we present the case of a patient who underwent an inguinal hernia repair using a mesh plug who developed a colocutaneous fistula 13 years after the procedure with clear evidence of mesh migration on colonoscopy and contrast media examination.

Case Report

A 57-year-old man was referred from his family physician because of swelling and pain in his right groin of a week's duration. His medical history included a right inguinal hernia repair at a local hospital 13 years earlier; no diabetes mellitus or immunosuppressive diseases were present. No detailed information, however, was available regarding the surgery. The physical examination revealed a painful mass and inflammation exactly on the surgical scar of the right inguinal hernia repair. Blood tests showed inflammation, with WBC 10,800/mm³ and CRP 4.13 mg/dL. There were no other abnormal findings. Abdominal enhanced computed tomography (CT) showed a subcutaneous abscess with an enhanced margin under the swelling in his right groin (**Fig. 1**). The wall of the cecum near the abscess was thickened, which we presumed had been caused by the spread of the inflammation from the abscess. He was admitted and underwent open drainage of the abscess in his right groin under general anesthesia. During surgery, no artificial materials including mesh or suture were found. The culture of the pus from the abscess showed *Escherichia coli*

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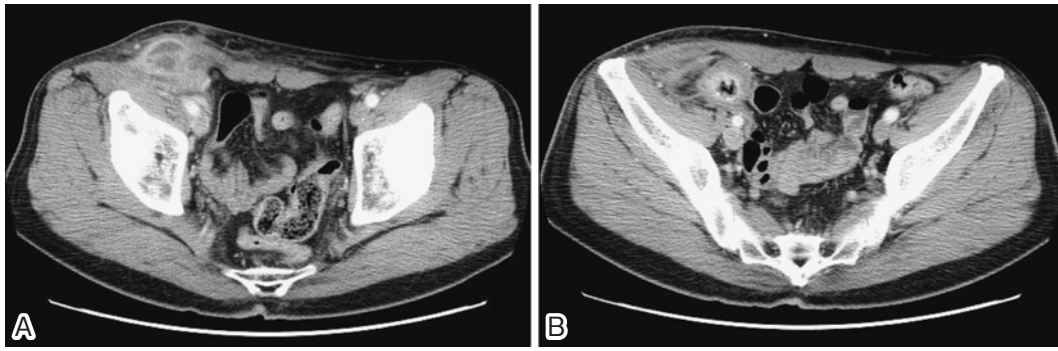


Fig. 1 Computed tomography scan 13 years after the hernioplasty, showing a subcutaneous abscess of the right groin region **A**, and thickened wall of the cecum **B**.

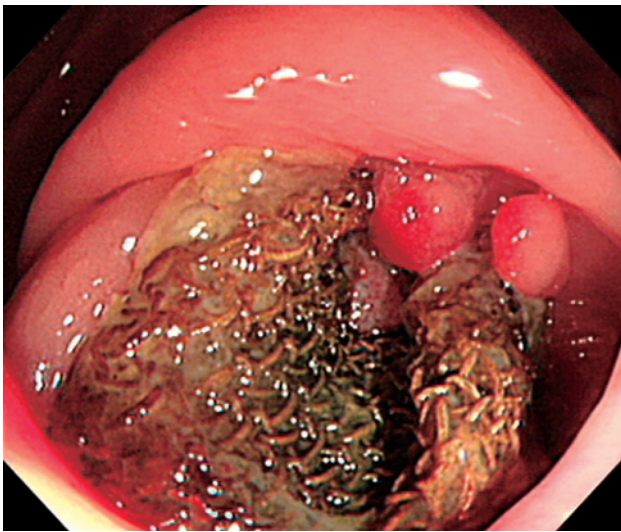


Fig. 2 Colonoscopy revealed that the mesh had penetrated to the cecum.



Fig. 3 Contrast medium study demonstrated a colocolic fistula.

(3+), *Bacteroides fragilis* group (3+), pigmented *Prevotella/ Porphyromonas* (3+), *Pseudomonas aeruginosa* (3+), and methicillin-resistant *Staphylococcus aureus* (MRSA) (3+). The patient recovered uneventfully, and was discharged on postoperative day 12. After discharge, however, he experienced similar symptoms in his groin three times, which were treated by open drainage, after which abdominal CT, magnetic resonance imaging (MRI), and colonoscopy were performed. Plain abdominal CT revealed an abscess of 4 cm in diameter under the swelling in his right groin, and the wall of the cecum near the abscess was thickened, as observed in the previous CT. Abdominal enhanced MRI showed the same finding; however, the abscess seemed to be a part of the thickened cecal wall, indicating that it may have originated from the cecum. Colonoscopy revealed an ulcerative lesion in the cecum, with an artificial mesh-like material evident at the bottom of the ulcer (Fig. 2). In addition, injected contrast

medium had flowed from the abscess into the cecum and up into the ascending colon (Fig. 3).

We surmised that a mesh plug used in the right inguinal hernia repair had migrated into the cecum and penetrated its wall, resulting in a subcutaneous abscess and forming a colocolic fistula.

The patient underwent surgical removal of the mesh from the cecum. We did not find the onlay mesh at the groin. In addition, no sutures for plug fixation were found. A laparotomy revealed that the cecum was adhered to the abdominal wall. Probing of the cutaneous fistula re-confirmed that it had originated from the cecum, and the penetration site on the cecum was near the ventral appendix inferior to Bauhin's valve. We removed the mesh along with a part of the cecum and the fistula in a wedge-shape (Fig. 4). As Bauhin's valve was intact, we sutured the cecum primarily. The aponeurosis of the external abdominal oblique muscle was sutured to pre-

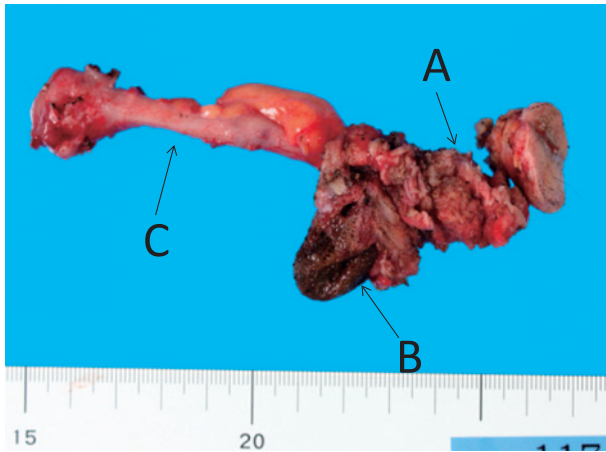


Fig. 4 Operative specimens: A cutaneous fistula; B the mesh plug; C the appendix.

vent recurrence of the hernia. We did not use any mesh to prevent recurrence due to infection in the groin. Judging from its appearance, we concluded that the foreign body was a mesh plug used in the inguinal hernia repair. Pathology revealed no malignancy in the cecum or the fistula.

The patient recovered uneventfully, and was discharged on postoperative day 8. No abnormalities were noted at colonoscopy 2 months postoperatively. To date (2 years since the last operation), the patient has experienced no further symptoms.

Discussion

Although relatively rare, inguinal hernioplasty complications can lead to severe morbidity, as in the present case. The diagnosis of a migrated mesh plug was markedly delayed due to the late onset of the symptoms, the lack of details for the prior hernioplasty, and because the imaging modalities of CT and MRI were unable to detect the foreign body. In addition, the severe inflammatory changes at the fistula site precluded a detailed anatomical identification of the abdominal wall layers, further complicating the diagnosis. The additional colonoscopy and contrast medium studies, however, clearly demonstrated the migrated mesh plug and colofistula. Although plugs might migrate to the intra-abdominal organs regardless of the type of suture⁹, the most plausible remaining explanation for migration of the mesh plug is the use of absorbable sutures for plug fixation. Unfortunately, the details of hernioplasty from the first operation for the subcutaneous abscess in this patient were unknown. No artificial materials were found, including sutures, supporting our assumption. Jeans et al. reported that poor anchoring was the most frequent cause of mesh

migration¹⁰.

In addition, regarding surgical techniques, we should consider peeling off to the preperitoneal layer, removing peritoneal tension, repairing the inguinal hernia using another procedure such as the Lichtenstein method, or avoiding a protruding prosthesis by not placing the mesh too deep within the inguinal canal, and avoiding any inadvertent damage to the peritoneal sac to avoid causing mesh migration.

A PubMed search revealed no previous report of cecum invasion by a migrated mesh plug after inguinal hernioplasty; rather, the most frequent organs violated by migrated mesh are the sigmoid colon and small intestine^{6-8,11,12}. This might be due in part to direct contact between mesh and these organs, bowel adhesion and erosion, and fistula formation. Fixation of the cecum to the retroperitoneum and its more distant location from the internal inguinal ring tend to protect it from mesh migration. It is also possible that the mesh initially migrated into the abdominal cavity and attached to the cecum, resulting in contact inflammation, but this assumption indicates that any abdominal organ could be invaded by migrated mesh.

The other unique factor of this case is the relatively late onset of symptoms related to the hernioplasty. In similar cases on PubMed, it had nearly always taken several years from the surgery for the migration to occur. Our case, however, had the longest time period from surgery to onset of symptoms. Although we cannot specify when the mesh plug began to migrate into the abdominal cavity, the patient was asymptomatic until development of the subcutaneous abscess, and as direct contact between the mesh and organs would likely induce immediate inflammation⁸, it is probable that the migration had occurred recently.

In conclusion, although mesh hernioplasty is a relatively simple procedure with few associated complications, low recurrence, and rapid recovery, surgeons should be aware of the possibility of complications due to mesh migration.

Conflict of Interest: The authors declare no conflict of interest.

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