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Mesh migration into the sigmoid colon after inguinal hernia repair presenting as a colonic polyp: A case report and review of literature

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Abstract

Mesh migration and penetration into abdominal viscera rarely occur after laparoscopic inguinal hernia repair. We present the first case of mesh migration into the sigmoid colon identified as a colonic polyp at initial colonoscopic examination. The patient complained of mild abdominal distention in the lower abdomen over the previous year without changes in bowel habits or stool appearance and without weight loss. By complementary endoscopic ultrasonography, a cavity-like structure beneath the suspected polyp was further confirmed. Enhanced abdominal computed tomography merely revealed local bowel wall thickening and inflammation of the colosigmoid junction. The migrating mesh, which was lodged in the sigmoid colon and caused intra-abdominal adhesion in the lower abdominal cavity, was finally identified via exploratory surgery. The components of inflammatory granulation tissue around the mesh material were diagnosed based on histological examination

of the surgical specimen after sigmoidectomy. In this patient, nonspecific endoscopic and imaging outcomes during clinical work-up led to the diagnostic dilemma of mesh migration. Therefore, the clinical, radiological and endoscopic challenges specific to this case as well as the underlying reasons for mesh migration are discussed in detail.

Key words: Colonoscopy; Surgical mesh; Hernia repair; Sigmoid colon; Colonic polyps; Computed tomography; Foreign bodies

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Core tip: Mesh migration and penetration into abdominal viscera are rarely reported as a long-term complication after inguinal hernia repair. In this case, a migrating prosthetic mesh penetrated the sigmoid colon in a 59-year-old male patient after bilateral inguinal hernioplasty. The migrating mesh mimicked a “colonic polyp” under endoscopy, while it was almost absent on radiological imaging and caused no obvious symptoms. This has never been reported in the previous literature, and it enhanced preoperative diagnostic difficulty. Therefore, clinical, radiological and endoscopic aspects of the case and, more importantly, the possible factors accounting for mesh migration and erosion are analyzed and summarized.

Liu S, Zhou XX, Li L, Yu MS, Zhang H, Zhong WX, Ji F. Mesh migration into the sigmoid colon after inguinal hernia repair presenting as a colonic polyp: A case report and review of literature. *World J Clin Cases* 2018; 6(12): 564-569 Available from: URL: <http://www.wjgnet.com/2307-8960/full/v6/i12/564.htm> DOI: <http://dx.doi.org/10.12998/wjcc.v6.i12.564>

INTRODUCTION

The tension-free method with mesh as a muscle reinforcement technique is regarded as an important part of inguinal hernia repair since it reduces the hernia recurrence rate and recovery period. Superficial wound infection and chronic pain associated with prosthetic mesh are well-known complications^[1], which mainly occur in the early postoperative period. However, serious complications, such as mesh migration and perforation of adjacent organs, are rarely reported and may present symptoms at different time intervals after inguinal hernia repair. Colon penetration by inguinal hernia repair mesh can possibly cause formation of inflammatory granulation tissue within the injured bowel wall leading to misdiagnosis or missed diagnosis. We report the first case of chronic mesh penetration into the sigmoid colon, where the migrating mesh appeared to be a colon polyp under endoscopy, while it was almost asymptomatic and invisible in enhanced computed tomography (CT).

CASE REPORT

The patient was a 59-year-old man with a history of Stoppa-repair for bilateral inguinal hernia 7 years previously. Shortly thereafter, he developed a mild superficial wound infection in the right groin region. However, the infection improved without any medical treatments and did not recur. One year ago, he underwent general examinations in a local hospital due to mild lower abdominal distention. Colonoscopy revealed a “polyp” (2.5 cm × 2.0 cm in size), which was hyperemic and erosive on mucosa and was situated on the upper segment of the sigmoid colon. The colonic lesion was suspected to be an inflammatory protuberance or malignant neoplasm, hence it was biopsied but left untreated. The “polyp” was defined as mucosal inflammation based on histological characteristics. Therefore, the patient was referred to our hospital for further examinations and treatment.

On admission to our gastroenterology department, the patient did not appear to be sick. Neither tenderness on palpation nor rebound tenderness was positive on physical examination. The stool test showed occult blood of 1+. The abdominal CT revealed local bowel wall thickening and inflammatory stranding involving the colosigmoid junction, accompanied by bowel gas accumulation and extension of the proximal sigmoid colon segment (Figure 1). Hyperemic polypoid mucosal changes in the sigmoid colon (approximately 28 cm from the anal verge) were observed *via* colonoscopic re-examination, which occupied 1/4 of the bowel wall circumference (Figure 2A). The lesion was oozing a pus-like substance and was covered with mucus. Complimentary endoscopic ultrasonography confirmed the mucosal lesion to be heterogeneously isoechoic or hypoechoic, with a cavity-like structure below (Figure 2B). It bled easily when biopsied. Pathological examination showed chronic mucosal inflammation with components of necrotizing inflammation. We presumed the colonic lesion to be atypical colonic diverticulitis or a localized abscess. However, there were no positive laboratory test results (white blood cell, erythrocyte sedimentation rate, peripheral blood culture) supportive of our suspicion; hence, we determined that the patient would not benefit greatly from antibiotic therapy, and therefore, no antibiotics were used. An exploratory surgery was undertaken, and endoscopic carbon nanoparticle tattooing was utilized to position the colonic lesion prior to surgery. Screening for enlarged intra-abdominal lymph nodes was negative during laparoscopic intraperitoneal observation. However, the sigmoid colon was found firmly adhered to the abdominal wall. The mesh material was not exposed in the abdominal cavity until adhesiolysis was performed. We identified the presence of left-sided hernia repair mesh penetrating the sigmoid colon from the preperitoneal space (Figure 3). No obvious sinus or fistulas were found between the mesh and colon lumen. Sigmoidectomy with remo-



Figure 1 Abdominal computed tomography findings. Abdominal computed tomography showed bowel wall thickening and inflammatory stranding involving the colosigmoid junction (white arrow).

val of the mesh was performed. Simultaneously, mild adhesion between the right-sided abdominal wall and colon was also observed and separated. The patient received flurbiprofen for postoperative analgesia and prophylactic antibiotics (ornidazole combined with lantamoxef intravenously for 3 d) perioperatively. Pathological analysis of surgical specimen confirmed the substance of the foreign body within the bowel wall along with adjacent inflammatory granulation tissue formation (Figure 4). He was discharged on postoperative day 6 without major complications and recovered uneventfully.

DISCUSSION

Over the past four decades, increasingly wide utilization of hernia-repair mesh during laparoscopic inguinal hernioplasty has significantly reduced the recurrence rate of inguinal hernia. With the introduction of trocars, mesh implantation is carried out distally from the trocar incision^[2], and the superficial infection rate has decreased dramatically (less than 2%)^[3]. In comparison, other complications induced by mesh, such as foreign body reaction, deep-seated infection, consequent mesh migration and perforation into viscera, have been reported sporadically. Incidence rates for such complications remain unknown^[1]. The intestine and urinary bladder were involved in most cases of mesh migration reported from 2003 to 2017^[1,4-10]. A relatively rare case of a migrated mesh in the retroperitoneal region mimicking a cystic adnexal mass was also documented previously^[11].

Depending on the different positional relationship of migrating mesh with visceral organs, clinical manifestations vary significantly and may present from 1 to 20 years after inguinal hernia repair^[12]. Lower abdominal pain and mild tenderness were described in the majority of cases^[4,13], while weight loss, anorexia, symptoms of bowel obstruction, palpable abdominal mass were merely referred to by a few reports^[9,14]. In our case, the male patient complained of mild abdominal discomfort, without other symptoms or positive physical signs, which led to diagnosis delay. Furthermore, the colon-embedded mesh was chronically mildly infected

and surrounded by inflammatory granulation tissue, which limited the diagnostic value of colonoscopy and enhanced abdominal CT. Typical signs caused by gastrointestinal perforation or peritonitis were almost absent on the radiograph. In previously reported cases, migrating mesh plugs were neglected or misdiagnosed as a poorly defined mass^[4], an intra-abdominal neoplasm^[9] or sigmoid diverticulosis^[13] based on radiological investigations.

Incomplete peritoneal repair, inadequate fixation or inappropriate amount of implantation space are possible reasons accounting for mesh migrating into intra-abdominal viscera, occasionally followed by fistulas formation or mechanical bowel obstruction^[15]. In addition, the sharp edges of prosthetic mesh or tackers could injure the viscera serosal layer^[16,17], initiating the intra-abdominal inflammatory process and subsequent mesh erosion. The bowel injury incidence rate ranged between 0.4% and 5.6% in previous studies^[18]. Considering that the patient in our case was almost asymptomatic, the factors responsible for painless mesh migration are as follows: (1) The foreign body reaction to mesh enables gradual movement of the mesh through the anatomic planes in the abdominal cavity, particularly along the paths of low resistance^[17]; (2) In some occasions, the mesh can be encapsulated by the omentum during its migration and create a channel into hollow organs along with inflammatory reaction and peristaltic bowel movement^[5]; (3) Gram-positive cocci are generally responsible for superficial wound infection and can further trigger the deeper infection. Bacterial biofilm can develop over the mesh due to chronic contamination by staphylococcus species, which results in painless mesh migration through the tissue^[19] and (4) Prosthetic mesh material decreases the formation of the mesothelial cell layer in peritoneal repaired defects, predisposing the irregular surface of mesh to be surrounded by scar tissue, thus the inflammation is localized.

To prevent further erosion of migrating mesh and preserve the function of affected viscera, total removal of the mesh via laparoscopy or laparotomy is advised in clinical practice, along with either partial or entire resection of the organ^[1]. Meanwhile, the possible wound sinus or enteric fistulas linked to the mesh should be completely eradicated by excision in combination with medication therapy (antibiotics, somatostatin and parenteral nutrition). Tailoring the mesh, appropriate suture placement and adherence to principles of antisepsis during hernia repair surgery are crucial in avoiding long-term mesh-related complications.

ARTICLE HIGHLIGHTS

Case characteristics

A 59-year-old male patient developed mild lower abdominal distention 7 years after repair surgery of a bilateral inguinal hernia. A colonic lesion was found under his endoscopic examination and was suspected to be a polyp. However, the complementary radiological imaging and subsequent endoscopic ultrasonography (EUS) failed to provide enough clues for exact diagnosis. The patient was referred for explorative surgery, during which a prosthetic mesh was confirmed as migrating into the sigmoid colon from its original

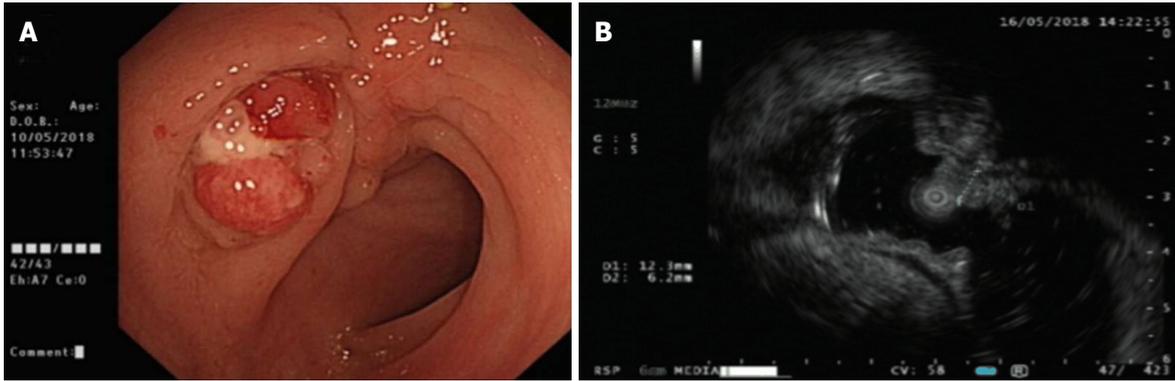


Figure 2 Endoscopic findings. A: Colonoscopy revealed a polypoid lesion in the sigmoid colon, which was hyperemic and oozed a pus-like substance; B: Endoscopic ultrasonography showed a mucosal lesion (1.23 cm × 0.62 cm) with a cavity-like structure below in sectional dimension.

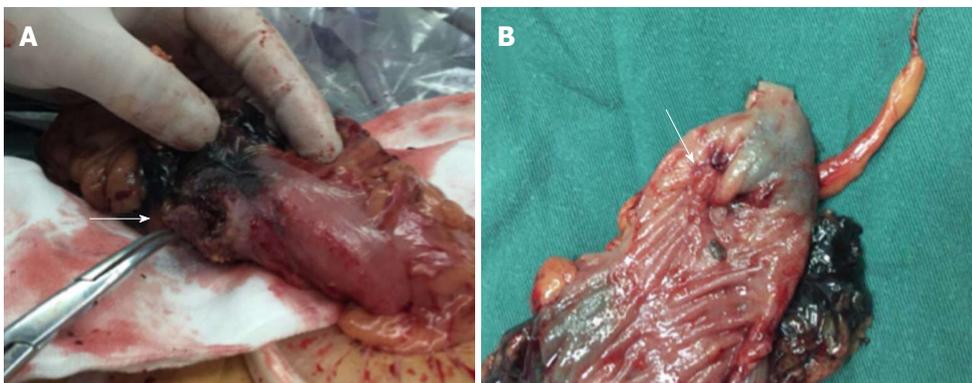


Figure 3 Intraoperative findings. A: Mesh (arrow) penetrated the sigmoid colon and was intimately involved in the bowel wall; B: The "polyp" (slanted arrow) was observed on the luminal side of the bowel wall.

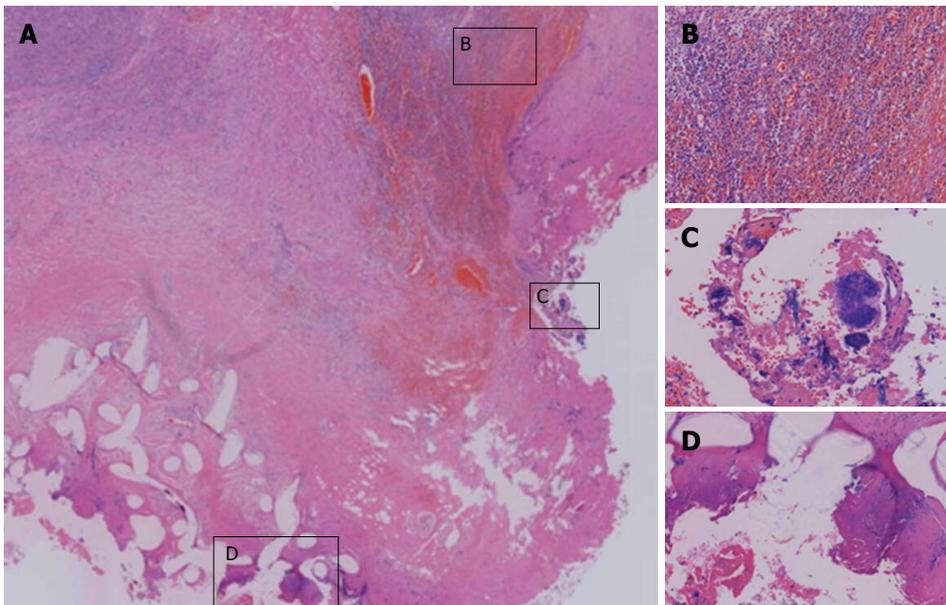


Figure 4 Histological findings revealed by Hematoxylin and Eosin staining of paraffin-embedded sections from the surgical specimen. A: The presence of a foreign body in the bowel wall, which caused inflammatory infiltrate and granulation tissue formation in the surrounding tissue (magnification × 10); B: Infiltration of massive inflammatory cells and formation of granulation tissue (magnification × 100); C: Foreign-body giant cells were observed (magnification × 200); D: Prosthetic mesh material (magnification × 100).

position. Sigmoidectomy with removal of the mesh was performed. Histological investigations also demonstrated the existence of a foreign body within the

affected bowel wall.

Clinical diagnosis

Mesh migration into the sigmoid colon after inguinal hernia repair.

Differential diagnosis

Based on the endoscopic and radiological investigations from this case, a colonic polyp caused by migrating mesh should be differentiated from an inflammatory protuberance, malignant neoplasm, atypical colonic diverticulitis or a localized abscess involved in the sigmoid colon. Abdominal distention occurring in the lower abdomen could indicate functional disorders of the intestine, intestinal infection, enteritis, bowel obstruction, habitual constipation, hernia, diseased urinary bladder or gynecological diseases (for women) and so on.

Laboratory diagnosis

A stool test showed occult blood of 1+. However, there were no positive results from other laboratory tests (e.g., white blood cell, erythrocyte sedimentation rate, peripheral blood culture).

Imaging diagnosis

Abdominal computed tomography (CT) showed bowel wall thickening and inflammatory stranding of the colosigmoid junction with bowel gas accumulation and extension of the proximal colon segment. Hyperemic polypoid mucosal lesion was observed in the sigmoid colon via colonoscopy, which was located at approximately 28 cm from the anal verge. EUS identified a cavity-like structure beneath the heterogeneously isoechoic or hypoechoic mucosal lesion.

Pathological diagnosis

Chronic mucosal inflammation with components of necrotizing inflammation was confirmed by histological investigation of the endoscopic tissue biopsy from the "colonic polyp". Pathological features of the surgical specimen showed the substance of the foreign body within the defected bowel wall of the sigmoid colon, along with adjacent inflammatory granulation tissue formation.

Treatment

Sigmoidectomy with removal of mesh and lysis of the adhesions between lower abdominal wall and colon were performed. The patient received flurbiprofen for postoperative analgesia and prophylactic antibiotics (omidazole combined with latamoxef) perioperatively. He recovered uneventfully, and abdominal distention was relieved thereafter.

Related reports

Penetration and erosion of migrating hernia repair mesh into the small bowel, cecum, transverse colon, sigmoid colon, urinary bladder or retroperitoneal region were previously reported in the literature. Most patients complained of abdominal pain and mild tenderness, and pain occasionally increased with food intake. An abdominal mass could be palpable when migrating mesh initiates severe adhesions between viscera. Meanwhile, symptoms including weight loss, anorexia, and fatigue could develop. Bowel obstruction could occur due to intraluminal penetration of migrating mesh.

Term explanation

Mesh migration and penetration into viscera are rare complications after laparoscopic inguinal hernia repair, which could present at different time intervals postoperatively. For the most part, the variable and nonspecific clinical manifestations caused by migrating mesh lead to diagnosis delay. Total removal of the deep-seated prosthetic mesh with organ resection via laparoscopy or laparotomy is first considered and advised in clinical practice. Possible wound sinus or enteric fistulas linked to mesh should be cautiously explored and completely eradicated by excision in combination with drug therapy (antibiotics, somatostatin and parenteral nutrition). Colonoscopic retrieval of intraluminal migrating mesh can be attempted in absence of enteric fistulas.

Experiences and lessons

Mesh migration after inguinal hernia repair is difficult to detect or distinguish

via imaging modalities due to the nonradiopaque property of mesh prosthesis. Metal clips or tackers used to fasten mesh are radiopaque but still occasionally missed by internists. In addition, inflammatory tissue formation caused by foreign body can prevent an accurate preoperative diagnosis. Therefore, the case-based learning as well as detailed collection of patients' medical history provides clinicians with more clues to analyze CT scan with orientation. Overreliance on ultrasonic or radiological investigations occasionally leads to misdiagnosis and missed diagnosis of specific foreign bodies.

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