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Small bowel lesion due to spiral tacks after laparoscopic intraperitoneal onlay mesh repair for incisional hernia

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ABSTRACT

INTRODUCTION: Laparoscopic intraperitoneal onlay mesh (IPOM) repair has become a widely accepted operative technique for incisional hernias. However, tack fixation poses the risk of adhesions and injury to the intestine. We report the case of spiral tacks adherent to the small bowel after IPOM repair for incisional hernia.

PRESENTATION OF CASE: 64 years old male patient who underwent laparoscopic IPOM repair for incisional hernia 1 year after open sigmoid resection. A laminated polypropylene mesh was fixed with titanium spiral tacks. 4 years later, elective open cholecystectomy was performed. Two spiral tacks integrated in the seromusular layer of the small bowel were encountered. Tacks were removed and bowel lesions oversewn with interrupted seromuscular stitches.

DISCUSSION: According to the current literature, complications related to metal spiral tacks in IPOM mesh repair such as intestinal perforation or strangulation ileus seem to be rare. To our knowledge, spiral tacks adherent to the intestine have not yet been published to date. Alternative techniques for mesh fixation are transfascial sutures with single stitches, continuous sutures or fibrin glue, as already used in TAPP and TEP procedures for inguinal hernia repair. The ideal and safest technique for mesh fixation in IPOM repair for incisional hernias remains controversial.

CONCLUSION: Spiral tacks used for intraperitoneal mesh fixation can lead to adhesions and bowel lesions. Sutures, absorbable tacks or fibrin glue are alternatives for mesh fixation. Further clinical trials are needed to evaluate the safest technique of laparoscopic IPOM incisional hernia repair.

1. Introduction

Incisional hernias following abdominal surgery are a frequent complication with a cumulative incidence of 11–20% in the long-term follow-up.[1,2] Laparoscopic intraperitoneal onlay mesh (IPOM) repair has become a widely accepted technique for the repair of ventral incisional hernias.[3–5] Laparoscopic incisional hernia mesh repair leads to a lower incidence of surgical site infections and a shorter hospital stay when compared with the open technique.[4,5] The recurrence rate appears to be the same in laparoscopic or open incisional hernia mesh repair.[3–5] Tack fixation of intraperitoneal meshes poses the potential risk of adhesions and injury to the intestine.[6,7] Transfascial sutures or fibrin glue are an alternative techniques for laparoscopic mesh fixation. However, transfascial sutures are associated with increased incisional wound infection[8] and probably more postoperative pain.[9] Fibrin glue fixation for IPOM repair is still experimental at present.[10–12] Mesh fixation thus remains a controversial issue in laparoscopic IPOM repair. We report the case of titanium spiral tacks adherent to the small bowel following laparoscopic IPOM repair of an incisional hernia.

2. Methods

Report of a clinical case and systematic review of the literature. Search of literature using the PubMed database.

3. Presentation of case

We report the case of a 64 years old male patient with a history of type 2 diabetes, obesity and nicotine abuse. The patient was hospitalized in December 2005 for perforated sigmoid diverticulitis, treated conservatively. 3 month later he underwent an elective sigmoid resection. The procedure was started laparoscopically, then converted to open surgery due to technical difficulties. 1 year after the sigmoid resection, the patient presented 3 midline incisional hernias. Laparoscopic IPOM repair was performed in July 2007. A laminated polypropylene mesh (PROCEED™ Surgical Mesh, Ethicon Inc., Route 22 West, Somerville, NJ 08876, USA) of 25 cm × 30 cm was fixed to the peritoneum with four non-absorbable single suture stitches (2.0 Prolene™, Ethicon Inc., Route 22 West, Somerville, NJ 08876, USA), and titanium spiral tacks

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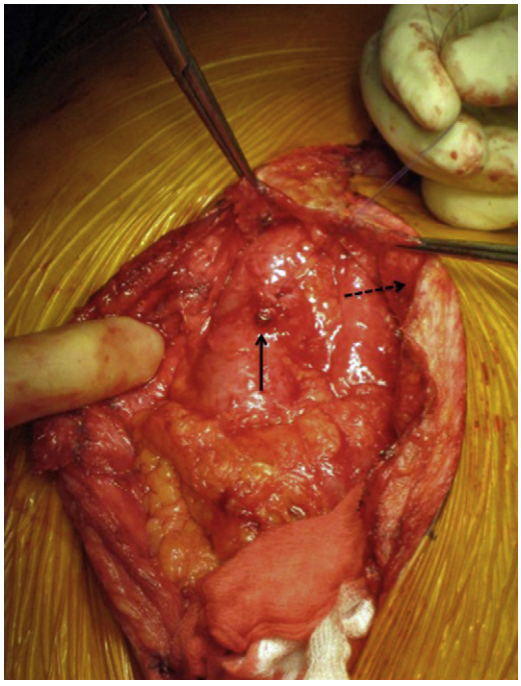

Fig. 1. Small bowel after adhesiolysis. Upper midline laparotomy, mesh incised longitudinally. Arrow: titanium spiral tack adherent to small bowel wall. Dashed arrow: mesh.

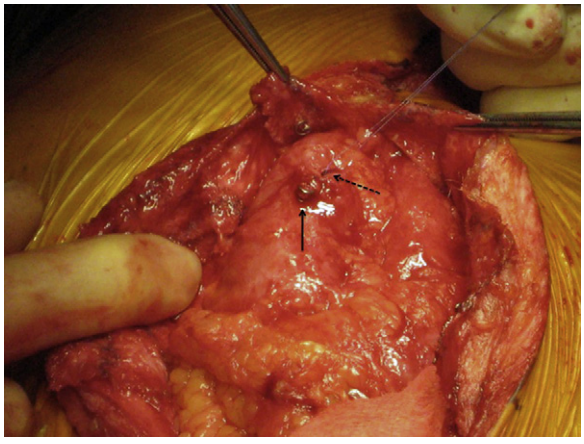

Fig. 2. Metal tack integrated in small bowel wall. Upper midline laparotomy, mesh incised longitudinally. Arrow: titanium spiral tack integrated in small bowel wall. Dashed arrow: bowel lesion after removal of a tack, oversewn with seromuscular stitch (PDS 4.0).

(ProTack™, Covidien, 15 Hampshire Street, Mansfield, MA 02048, USA). In November 2010 the patient was hospitalized again for acute calculous cholecystitis. The abdominal CT scan showed metal spiral tacks in proximity to the small bowel. Acute cholecystitis was treated conservatively and elective cholecystectomy was scheduled 2 month later. Due to the large intraperitoneal mesh and the previous abdominal surgery, an open cholecystectomy was performed. Access to the abdomen was achieved though an upper midline laparotomy. During adhesiolysis, two titanium spiral tacks adherent to the small bowel were encountered (Fig. 1). The tacks were completely integrated in the seromuscular layer of the small bowel (Fig. 2). The tacks were removed to avoid future complications, such as small bowel perforation or strangulation ileus. The seromuscular lesions in the intestinal wall were closed using interrupted single stitches (PDS 4.0). Cholecystectomy was subsequently performed without difficulty. Due to the sutured small bowel lesions, a gradual return to normal diet was performed. Postoperative recovery was uneventful; the patient could be discharged home 6 days postoperatively.

4. Discussion

Metal tacks adherent to the small bowel were encountered incidentally in the presented case. However, they could have led to serious complications, such as intestinal perforation with subsequent peritonitis or strangulation ileus.

Complications related to spiral tacks seem to be rare. Searching PubMed for the terms “spiral tack” and “complication” revealed a case report of small bowel obstruction due to a displaced spiral tack after TAPP inguinal hernia repair[7] and another case report of a spiral tack as lead point for volvulus after TEP inguinal hernia repair, respectively.[13] To our knowledge, spiral tacks adherent to the intestine have not yet been published to date.

The ideal and safest technique for mesh fixation in IPOM repair for incisional hernias remains controversial. Whereas transfascial suture fixation leads to less mesh shrinkage,[9] the transfascial sutures are associated with a higher incidence of surgical site infections.[8] Whether transfascial sutures lead to more pain postoperatively compared with tack fixation remains unclear.[9,14] Another option for suture mesh fixation in laparoscopic IPOM hernia repair are continuous sutures,[15] but continuous suturing in laparoscopic surgery, especially if performed on the parietal peritoneum, is technically demanding and time consuming.[14]

Absorbable tacks offer an alternative to the nonabsorbable metal tacks. In a porcine model, absorbable tacks showed the same adhesion strength and abdominal wall peel force than metal tacks.[16] However, no clinical trial has compared these two types of tacks for mesh fixation at present.

Two experimental studies investigated the use of fibrin glue for mesh fixation in IPOM hernia repair using a rat model. These studies showed a good adhesive strength of the fibrin glue and reduced early adhesion formation.[10,17] On the other hand, two other experimental studies using a porcine model showed an increased contraction and migration of the mesh when fixed with fibrin glue compared with tacks.[11,12] Fibrin glue is already used for mesh fixation in TAPP and TEP procedures for inguinal hernia repair and seems to reduce postoperative pain significantly.[18–20] Fibrin glue thus can serve as an adjunct to mechanical fixation to reduce the number of tacks or transfascial sutures. Whether fibrin glue fixation alone is also feasible in the clinical setting for IPOM incisional hernia repair remains to be investigated.

5. Conclusion

Metal tacks used for intraperitoneal mesh fixation can lead to adhesions and bowel lesions. Sutures, absorbable tacks or fibrin glue are alternatives for mesh fixation. Further clinical trials are needed to evaluate the safest technique of laparoscopic IPOM incisional hernia repair.

Conflict of interest statement

None.

Funding

None.

Ethical approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Authors' contributions

Drs. Tobias Haltmeier and Yves Groebli have no financial and personal relationships with other people or organisations that could inappropriately influence (bias) their work and no sources of funding to declare.

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