

Laparoscopic conservative treatment of colo-vesical fistulas following trauma and diverticulitis: report of two different cases

Case report

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Received 27 May 2012; Accepted 26 March 2013

Abstract: Introduction. The standard treatment of colovesical fistula is the removal of fistula, suture of bladder wall, and then colic resection with or without temporary colostomy. The open approach is more commonly used because the laparoscopic approach seems to have high conversion rates and morbidity. We report two cases of colovesical fistula treated with a laparoscopic conservative approach. We also focus on the long term outcome. Case presentation 1. A 69-year-old male with colovesical fistula that appeared after endoscopic polypectomy in the sigmoid diverticulum underwent a totally laparoscopic conservative treatment without colic resection. Operative time was 210 minutes and blood loss was 300 ml. Time to bowel movement was 60 hours. No complications or fistula recurrence occurred at 48-month follow-up. Case presentation 2. A 34-year-old male with colovesical fistula secondary to diverticulitis underwent totally laparoscopic conservative surgery. Operative time was 160 minutes and blood loss was 150 ml. Time to bowel movement was 72 hours. Fistula reoccurred two weeks after discharge. We performed Hartmann's procedure and defunctioning colostomy with an open approach. No recurrence or complications were found at 36 months follow up. Conclusion. The laparoscopic conservative treatment of colovesical fistula is a safe and feasible technique. When there is no diverticular disease, the conservative approach is very effective.

Keywords: *Laparoscopic conservative treatment • Colon resection • Fistula • Diverticular disease • Recurrence*

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1. Introduction

Colovesical fistula is a rare disease, but the frequency is difficult to determine because it can be due to several potential causes, including many diseases and surgical procedures [1]. However, in his enterovesical fistulas revision, Larsen reported an incidence of 0.5/10000 cases, 20% of whom involved the rectum [2]. Colovesical fistula affects males more often than females at a ratio of 3:1. In fact, the presence of the uterus between bladder and colon-rectum seems to reduce the risk of

fistula [3,4]. The most common cause is complicated diverticular disease (40%–88%) [5]. The incidence of colovesical fistula in diverticular disease has been estimated to be about 2% to 4%, although a wide range between 2% and 23% has been reported [6,7]. Fistula arising from diverticulitis results from inflammation of tissues surrounding the bladder. It could also result from a diverticular abscess that undermined the bladder wall, developing into a colovesical fistula. Other causes are colorectal cancer and Crohn's disease, and rarely, iatrogenic and traumatic causes [5].

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The diagnosis is essentially clinical including pneumaturia (67%–85%) and fecaluria (45%–65%) that are considered pathognomonic. Recurrent genito-urinary infections occur in 57% of cases and are usually caused by typical intestinal flora bacteria [8]. Recurrent diverticulitis frequently precedes the urinary infection. Studying the urinary tract with urinalysis, urine culture and cystoscopy, and the study of intestinal tract with CT, colonoscopy, and barium enema are useful in planning the appropriate surgical approach. The standard treatment of colovesical fistula is fistula removal, suture of bladder wall, and then colic resection with or without temporary colostomy. A conservative treatment does not include colon resection. Laparoscopy is not considered to be the first choice treatment; generally, the open approach is standard [9].

We report two cases of colo-vesical fistula that were treated using a laparoscopic conservative approach. We also focus on the long term outcome.

2. Case presentation 1

A 69-year-old male suffered from recurrent cystitis with fever and pneumaturia that appeared after endoscopic removal of a 2-cm adenomatous polyp in the sigmoid diverticulum. Cystoscopy showed bullous oedema surrounding an erythematous area in the bladder. Biopsies detected urothelial hyperplasia and chronic inflammation. Computerized tomography showed air/fluid level in the bladder and thickening of the bladder wall, which was adhered close to the sigmoid wall; no fistula was evident (Figure 1). Colonoscopy confirmed a small sigmoid diverticulum with no fistula; the patient underwent total laparoscopic abdominal exploration. A 12-mm trocar for the camera was placed at the umbilicus, two 10-mm trocars were placed at the level of right and left iliac fossa, and an assistant 5-mm port was placed along left midclavicular line. We detected a fistulous tract between the sigmoid colon and bladder; we carefully isolated it (Figure 2). Because there were no other diverticula, we decided to not perform colon resection. We clipped the fistulous loop with a weck® Hem-o-lock® clip and then removed it (Figure 3). We then divided the bladder wall from the sigmoid wall. We closed and pulled down the sigmoid wall with a 3-0 braided synthetic absorbable purse-string suture; after curettage of the fistula site, the bladder wall was closed with 2-0 braided synthetic absorbable interrupted suture. We placed fat tissue between the sigmoid and the bladder wall to reduce the risk of fistula recurrence. Operative time was 210 minutes, and estimated blood loss was 300 ml. The catheter was removed after 10 days. Postoperative pain was low and

Figure 1. CT scan showed air/fluid level in the bladder and slight anomalies and thickening of the bladder wall, which was closely adherent to the sigmoid wall.



Figure 2. Fistulous tract between sigmoid colon and bladder that was carefully isolated.

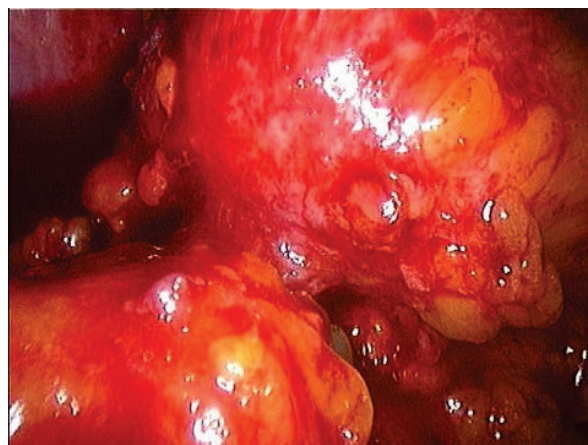
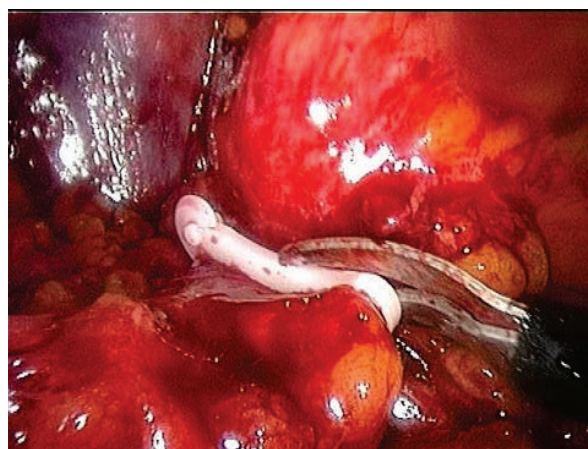


Figure 3. Clipped fistulous loop was divided.



the VAS scale score was 2. Time to bowel movement was 60 hours, and the hospital stay was 8 days. The histological examination showed colonic inflammatory tissue and necrotic tissue in the removed fistulous loop.

No peri- or postoperative complications or fistula recurrence was observed at 48-month follow-up.

3. Case presentation 2

A 34-year-old male suffered colovesical fistula secondary to diverticulitis. The patient was referred because of his history of diverticular disease and recurrent diverticulitis; he reported the onset of abdominal pain, pneumaturia, haematuria and irritating urinary symptoms. Cystoscopy showed an erythematous area with oedema, but colonoscopy did not detect direct or indirect signs of fistula.

MR and CT imaging showing a thickening of the sigmoid tract in proximity to the bladder dome with air in the bladder suggested a colovesical fistula. Therefore, we performed a laparoscopic abdominal exploration with four Trocars placed similarly to that the previous case in this study.

We detected a fistulous loop between the sigmoid tract and bladder wall. The procedure followed the same steps as previously described for the first case. We did not perform colon resection, although there were some sigmoid diverticula. Operative time was 160 minutes and estimated blood loss was 150 ml. Time to bowel movement was 72 hours. The post-operative pain was low and the VAS scale score was 3. The catheter was removed after 10 days. The hospital stay was 7 days.

Recurrent urinary tract infections with fever and fecaluria occurred two weeks after discharge; urinalysis cultured multi-drug resistant *Enterococcus faecalis*. A cystogram showed no evidence of fistula. Therefore, we decided to perform laparoscopic abdominal exploration, which revealed a large abscess closely embedding the bladder and sigmoid tract. After conversion to the open approach, we released and mobilized the sigmoid tract that appeared thickened and brownish-gray in color and was covered by fibrin. For this reason, we decided to perform a 23-cm sigmoid resection, according to the Hartmann's procedure, and defunctioning colostomy. The management of the bladder provided excision of a bladder cuff en-bloc, including necrotic and inflammatory tissue surrounding the fistula site. We carried out a two-layer closure of the defect. Following that, methylene blue was injected into the bladder, and no blue leakage was evident. An omental fat flap was placed between bladder and colon to minimize recurrence rates. Operative time was 240 minutes. Estimated blood loss was 500 ml. The catheter was removed after 10 days. The hospital stay was 10 days.

Histology highlighted areas of hemorrhagic necrosis and multiple foci of abscess. Secondary colo-rectal

anastomosis was performed after 90 days using stapling devices.

At 36 months follow up the patient showed no recurrence of fistula or urinary infections or other complications.

4. Discussion

The gold standard treatment for colo-vesical fistula is not yet established. Nor do the American Society of Colon and Rectal Surgeons' Task Force guidelines on sigmoid diverticulitis not state the most appropriate treatment for colovesical fistula [10,11].

To date, the usual surgical approach is fistulectomy, the suture of bladder wall after curettage or the excision of bladder cuff, the colic resection with one- or two-stage anastomosis [9]. An omental fat flap is usually placed between the bladder and colon to minimize recurrence [12]. The approach is usually open, because the laparoscopic procedure is burdened by a high conversion rate and morbidity [13]. Only few cases of laparoscopic treatment of colovesical fistula are reported in literature [13-18].

Laparoscopic surgery for complicated diverticular disease, including fistulas, has not yet been accepted as the treatment of choice; it is usually reserved for elective cases [19,20]. Generally, internal fistulas that complicate diverticulitis are associated with high conversion rates and post-operative morbidity, resulting from close adhesions as well as insufficient surgical experience [16,18,21-23]. However, several recent series have reported acceptable conversion rates [24]. It seems that higher experience-acquired technical skills might lower conversion rates and intra- or postoperative complications. Other authors have demonstrated that laparoscopy did not affect recurrence rates [9].

Colic resection has high mortality and morbidity rates resulting from adhesions, paracolic abscesses, colon and mesocolon shortening, and colic parietal thickening that are caused by diverticulitis [21]. For this reason, some authors prefer a conservative approach. Moreover, Naraynsingh et al. reported a modified Hinchey classification for surgical decision-making in patients with perforated left-sided diverticulitis with faecal peritonitis; they suggested colic resection only for colic scarring and stricture and a possible conservative treatment for colovesical fistula [25].

Lewis et al. reported the results of three cases of colovesical fistula treated with open conservative surgery, removing only fistulous tract and suturing the parietal defects. At the 12- and 26-month follow up, two cases

were successful. Despite no fistula recurrence being evident, in the third case a urinary infection occurred and the patient died one year after surgery for bowel obstruction [26].

Moorthy *et al.* performed five laparoscopic-assisted surgeries for colovesical fistula. The bowel was mobilized intracorporeally and then exteriorized through a small incision. The mesenteric vascular division and bowel resection was carried out extracorporeally in three cases.

In two patients having both Crohn's disease and diverticulitis, only stapled fistulectomy was performed without colic resection. The patient with colovesical fistula secondary to diverticulitis had a recurrence of the fistula [27].

The reported cases were treated with totally laparoscopic conservative surgery of colovesical fistula. Our technique is a laparoscopic surgery that includes dissection and removal of the fistulous tract, curettage of the necrotic and inflammatory bladder tissue surrounding the fistula site and closure with suture, reinforcement of the colonic wall with suture, placement of fat tissue between colon and bladder.

The key point is to prepare an accurate surgical plan between the colon and bladder wall to identify the fistulous tract. The identification of a suitable plan allows reduction of intra- and postoperative bleeding, conversion, and morbidity rates.

In our opinion, this technique could be performed in cases with no diverticular disease and it is possible to identify and prepare accurately the fistulous tract between colon and bladder.

In the first case in the present study, there was no diverticular disease and the inflammation of colon-sigma was limited. Indeed, the fistula that appeared after polypectomy was the main cause. The polypectomy was performed in a sigmoid diverticulum, the wall of which lacks the muscle layer and is weaker. Trecca *et al.* reported the risk of colon perforation after colonoscopy ranged from 0,01% to 3%. The incidence increased when the

colonoscopy was accompanied by an operative procedure such as biopsy or polypectomy [28]. Magdeburg *et al.* reported that colovesical fistula after colonoscopy occurred in about 0.055% of cases. The incidence increased to 1.24% in patients who underwent operative colonoscopy [29].

In the second case reported in this study, the colovesical fistula was a complication of diverticulitis and the inflammation widely involved the colic-sigmoid tract. The fistula recurrence resulted from an abscess that arose from extended diverticular disease.

The operative times were comparable to that of an open approach with colic resection. The postoperative pain was low as shown by low score on the VAS scale and low requirements for analgesic therapy. There were no incisional hernia during the long-term follow-up. These results compare favourably with those reported for open surgery [9]. The early restoration of bowel movement that resulted from preserving intestinal integrity allowed a shorter hospital stay. When necrotic and inflammatory tissues are not evident in the bladder wall, the excision of bladder cuff is not necessary, but it is sufficient to remove the bladder wall edges involved by the fistula.

5. Conclusion

This study demonstrates that the laparoscopic conservative treatment of colovesical fistula without colic resection is a safe and feasible technique. In the second case we report here, the fistula recurrence highlights the high risk of failure of the conservative approach if the diverticular disease extensively involves the colic-sigmoid tract. When the fistula is not due to diverticulitis, the conservative approach is very effective. In our opinion, laparoscopic conservative surgery could be offered as therapeutic option in selected cases. Prospective randomized trials are necessary to suggest it as the standard treatment.

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