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Case Report

Colovesical Fistula: A Complication of Sigmoid Diverticulitis-A Case Series

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Abstract

Colovesical fistula is a most common type of enterovesical fistulae, and is most often caused by an inflammatory process, with diverticulitis being the most common cause. We present here the cases of two patients who presented with recurrent urinary tract infections (UTIs) and pneumaturia, as well as a third case who presented with recurrent attacks of lower abdominal pain. Diagnosis was confirmed through computed tomography (CT) imaging, magnetic resonance imaging (MRI) and/or cystoscopy. Surgical management is detailed and discussed, including single-staged & two-staged repairs.

Keywords: Colovesical Fistula; Sigmoid Diverticulitis; Adhesiolysis; Hartmann's procedure

Abbreviations: EVF: Enterovesical Fistulae; UTI: Urinary Tract Infections; NPO: Nil Per Os; POD: Post-Operative Day; CT: Computed Tomography; IV: Intravenous; MRI: Magnetic Resonance Imaging

Introduction

An enterovesical fistula (EVF) is a connection between the epithelialized surfaces of the urinary bladder and the gastrointestinal tract. The most common cause of colovesical fistula – which is an epithelialized tract between the colon and the urinary bladder is diverticular disease, accounting for almost 80% of cases [1,2]. Colonic adenocarcinoma which invades the urinary bladder and Crohn's disease are the second and third most common causes of colovesical fistula. Enterovesical fistulae are rarely iatrogenic, with radical prostatectomy accounting for a noteworthy proportion of recto urethral fistulae [3,4]. The disease process of colovesical fistulae begins with the formation of false diverticula in the sigmoid colon, characterized by the protrusion of the mucosa and submucosa through the muscular is propria where the vasa recta enter the colonic wall to supply blood to the mucosa/submucosa the point of entry of vasa recta is a place of relative weakness of the mesenteric side of the colonic wall). High intraluminal pressure, muscular is hypertrophy, abnormal peristalsis, and narrowing of the lumen, are all factors that contribute to the outpouchings known as diverticula. The increased intraluminal pressure and altered colonic motility direct force radially into the diverticula, resulting in micro and macro perforations (diverticulitis), which can cause a diverticular abscess or phlegm on that ruptures into an adjacent organ, creating an inflammatory fibrous tissue tract between the two lumens, or a "fistula" [4,5]. Fistulae are a rare complication of diverticular disease with an incidence rate of 5% [6] whereas up to 35% of Crohn's patients develop fistulas [4].

Case Presentation

Case 1

A 59-year-old male was referred to the General Surgery Clinic from the Urology Department, with complaints of lower abdominal pain, pneumaturia, and recurrent urinary tract infections (UTIs). On clinical examination, the patient had suprapubic tenderness. His past medical history included hypertension, which was controlled with one medication. Surgical history included multiple cystoscopies, one open surgery for management of urolithiasis, as well as a diagnostic laparoscopy for the biopsy of a retroperitoneal mass, which was found to be benign. A Computed Tomographic (CT) scan revealed a small connection between the

sigmoid colon and the left lateral wall of the urinary bladder, as well as an air locule in the urinary bladder. The benign retroperitoneal mass was also visualized and compared to previous CT scans, with no changes found. Cystoscopy showed an opening in the left lateral wall of the urinary bladder, thought to be the opening of the colovesical fistula. A colonoscopy done a few months prior to presentation revealed diverticulosis. Surgical intervention involved cystoscopy with prophylactic ureteric stenting and a laparoscopic resection of the colovesical fistula as well as a sigmoidectomy and a Hartmann's procedure. Post-operatively, Foley's catheter was kept for 3 days, colostomy was functioning normally. The patient was started on a clear liquid diet on postoperative day (POD) 2 and gradually returned to a full diet over 3 weeks. A second surgery was performed 6 weeks later for reversal of colostomy and colorectal anastomosis. Post-operatively, the patient had a normal bowel movement on POD 4 and gradually returned to normal diet over 4 weeks. He developed a surgical wound infection, which was managed with daily drainage, washing, and dressing as well as intravenous (IV) antibiotics.

Case 2

A 52-year-old male was referred to the General Surgery Clinic by the Department of Gastroenterology after a colonoscopy revealed diverticulosis. The patient complained of lower abdominal pain and pneumaturia. He had no past medical or surgical history. On examination, the patient had lower abdominal tenderness. CT scan revealed air in the urinary bladder as well as a connection between the sigmoid colon and the urinary bladder. A surgical plan was discussed with the patient with the risks explained, and consent was taken. Foley's catheter was inserted under general anaesthesia. Surgery was started with a laparoscopic approach, revealing severe adhesions between the sigmoid colon, small intestines, appendix, and urinary bladder, forming a mass that was completely blocking the pelvic inlet. Adhesiolysis to free the small intestines was done first, after which a small perforation was found on the small intestinal wall. Extensive adhesiolysis was done to separate the sigmoid colon from the posterior wall of the urinary bladder, and then around the sigmoid colon to enter the pelvis. Adhesiolysis was continued down to the level of the rectum, during which a pelvic abscess was found and drained. An intra-operative cystoscopy was performed revealing the opening of the fistula in the right lower segment of the bladder. An intra-operative digital rectal examination was also performed. The fistula tract was never seen, and no repair was performed on the bladder. Primary colorectal anastomosis was ruled out due to the high risk of anastomotic failure anticipated because of the severe inflammatory state of the rectum, the pelvic abscess found intra-operatively, and leakage of stool from the resected portion of the colon. Hence, the descending colon was freed from adhesions to the lateral abdominal wall, and Hartmann's procedure was done, along with an appendectomy as well as resection and anastomosis of the perforated section of small intestines. Urine was clear throughout the surgery and cystoscopy ensured no bladder injury. Post-operatively, the patient was kept NPO until POD 2, and then started on clear liquids when colostomy showed gas output. A Gastrografin enema was done to inspect the rectal stump for leakage on POD 5; no leak was detected. Foley's catheter was removed on POD 6. The patient gradually returned to a normal diet with a plan for colorectal anastomosis in 6-8 weeks. The colorectal anastomosis was performed 7 weeks after the initial surgery, with a protective loop ileostomy, which was reversed 6 weeks later.

Case 3

A 68-year-old female was referred by the Gastroenterology Department, after MRI findings of sigmoid diverticulitis with a para-colic abscess, as well as mural thickening of the sigmoid colon & urinary bladder. Patient had presented with left lower abdominal pain radiating to the supra-pubic area, as well as burning on micturition. On examination, patient had supra-pubic tenderness. Her past medical history included hypertension, controlled with one medication. Conservative management including IV antibiotics & keeping the patient NPO, as well as CT-guided drainage of the abscess, failed to resolve the patient's symptoms. Laparoscopic left hemicolectomy with recto-colic anastomosis was performed. During the surgery, the abscess was drained, a colovesical fistula was identified transacted & closed, dissection carried to free the descending colon, resect the affected portion then perform the colorectal anastomosis; the specimen was removed via a midline, small infra-umbilical incision. Post-operatively, Foley's catheter was kept for 2 days; patient was started on clear liquid diet on post-operative day 3 and gradually returned to normal diet over the course of 3 weeks.

Discussion and Conclusion

The most common presenting symptoms of enterovesical fistulae are terminal pneumaturia, fecaluria, abdominal pain, and recurrent UTIs [7]. Less frequent symptoms include haematuria, urine per rectum (on account of the urinary bladder being a very compliant organ and having a lower intraluminal pressure as compared to the colon), and an inflammatory mass [3] (similar to the operative findings in our second case). Other causes of pneumaturia, such as infections with gas-forming bacteria [8], must be excluded. Charcoal or poppy seed tests, which involve the oral ingestion of either of the two and then evaluating urine for their presence, have shown high sensitivity for confirming the presence of enterovesical fistulae [9,10]. These tests are simple and cheap to perform but provide no input on the etiology or anatomy of the fistula tract. Imaging studies are used to visualize and delineate the fistulous tract. The American College of Radiology recommends CT scanning as the first-line imaging modality for the diagnosis of enterovesical fistulae. CT scan with oral contrast should be performed before IV contrast administration, to allow

the visualization of Gastrografin (oral contrast) within the bladder, a finding suggestive of enterovesical fistula. Other indicative findings include colonic diverticula, wall thickening of the bladder and adjacent bowel, and the pathognomonic feature of air within the bladder [11]. CT scanning may not be able to accurately delineate the fistulous tract as compared to MRI, but it is useful in detecting the location of the fistula, as well as identifying extra luminal pathology and malignancy [3,4].

A study recommended cystoscopy and urine cytology for fecal material as first-line investigations when suspecting an enterovesical fistula [12]. Cystoscopy visualization of an area of localized erythema, edema, and congestion in the bladder mucosa is suggestive of a fistula [3]. Colonoscopy is used to find the bowel pathology causing the enterovesical fistula rather than visualizing the fistula tract, [3] and is recommended as a first-line investigation if malignancy is suspected on a CT scan [13]. Once the presence of an enterovesical fistula is confirmed, surgical intervention is generally warranted, with conservative management reserved for those unfit for surgery, those with minimal symptoms with a non-malignant origin of the enterovesical fistula, those with a nonresectable neoplastic process, and those who refuse surgical treatment. [3,4,11] Operative management can be single-staged (as with our third case) or multi-staged (as with our first 2 patients), depending on the location and cause of fistula, clinical condition of the patient, operative findings, and whether the patient was operated on electively or emergently [3,5]. The purpose of surgical intervention is to relieve the patient's symptoms and treat the underlying pathology, which meant definitive pelvic dissection as well as resection of the fistula and involved sections of the bowel, plus either a primary anastomosis with or without the creation of a diverting stoma or a Hartmann's procedure. A single-staged repair should be the first option in most cases; it involves the resection of the fistula and involved segment of the bowel with primary anastomosis. Single-stage procedures in those with an inflammatory cause of fistula are associated with decreased morbidity and shorter hospital stays [14]. Among the reasons to consider a multi-staged repair are severe inflammation, large pelvic abscesses, gross fecal contamination, advanced malignancy, inadequate bowel preparation in emergency cases, and intra-operative complications like ureteric injury [3,14]. A two-staged procedure involves the resection of the fistula and involved segment of the bowel, as well as primary anastomosis with a diverting/protective ileostomy, or a Hartmann's procedure. This should be the chosen pathway for those who would not survive an anastomotic leakage due to co-morbidities. A diverting ileostomy is usually reverted through the ileostomy site, whereas a Hartmann's procedure may need a laparotomy approach to restore intestinal continuity. Three-staged repair, involving a DE functioning colostomy, followed by resection and eventual anastomosis, is not usually recommended. It is usually reserved for patients with extensive comorbidities, associated fecal incontinence, or emergency cases presenting with sepsis (Figures 1-5).

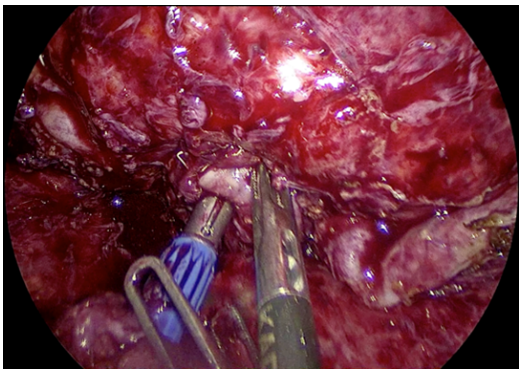

Figure 1: Using a circular stapler for colorectal anastomosis.

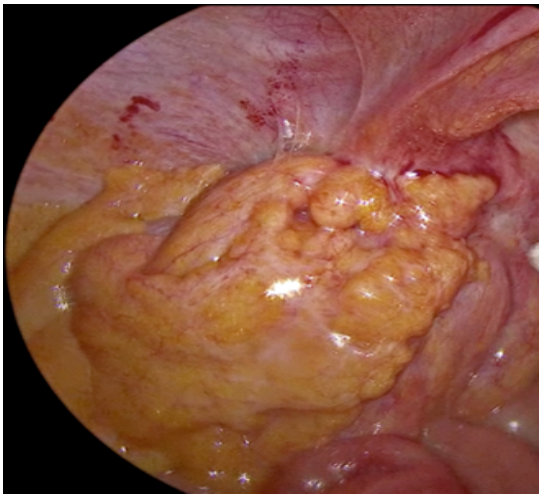

Figure 2: Laparoscopic image showing site of diverticular disease and abscess.

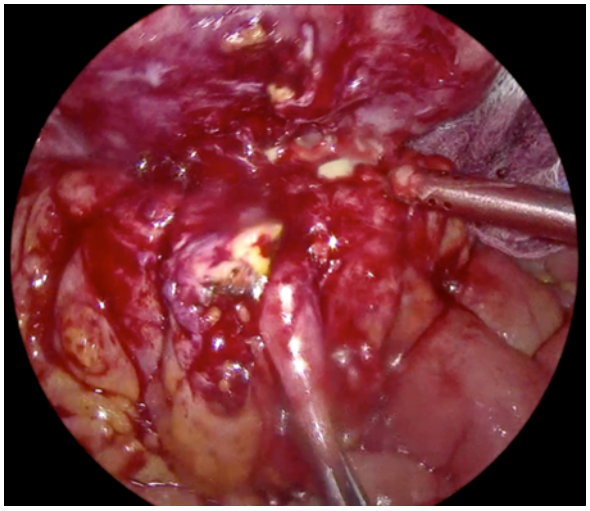

Figure 3: Drainage of abscess.

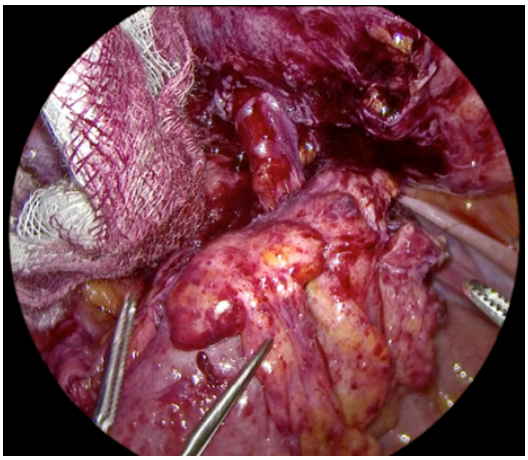

Figure 4: Colo-vesical fistula.

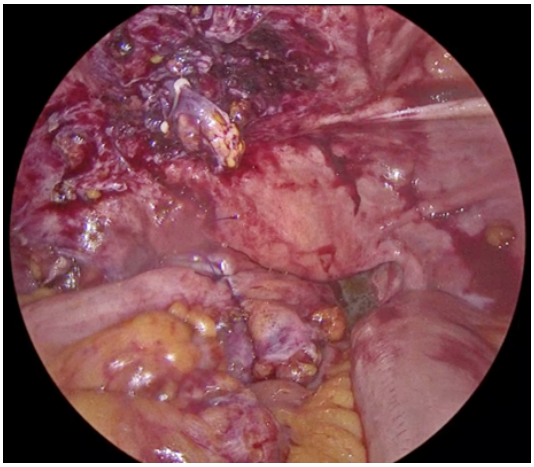

Figure 5: Colorectal anastomosis.

Bladder repair depends on the intraoperative visualization of the fistulous tract, the presence of an abscess, and the underlying causative pathology. Partial cystectomy or ileal conduit may be necessary in cases of bladder malignancy. Methylene blue can be used to distend and visualize the fistulous tract, and then excision of the tract with primary closure can be performed. Other methods of managing the bladder include suprapubic cyst ostomy, omental interposition, and bladder drainage with a urinary catheter. A study of 74 cases of enterovesical fistula caused by diverticulitis or Crohn's disease concluded that bladder repair is only necessary when an obvious defect is seen. The majority of their patients were managed with post-operative urinary catheterization, which was sufficient for bladder healing [15]. A retrospective study of 32 patients with enterovesical fistula due to diverticulitis reported no complications in patients who had their Foley's catheter removed on the 7th postoperative day, as compared to those who had late catheter removal [16]. There is no consensus on the need for prophylactic ureteric stenting. It is not associated with a high risk of complications and does not ensure the prevention of ureteral injury or detection of said injuries [17-19]. In summary, we presented a case series of 3 patients with EVF managed surgically, with two cases of two-stage repairs involving Hartmann's procedure, and one of sigmoidectomy with primary colorectal anastomosis. Bladder repair was performed in the first case, fistulous tract was identified then cut & closed in the third case; whereas, in the second case, the fistulous tract/defect in the bladder could not be visualized, deeming surgical repair unnecessary and urinary decompression with Foley's catheterization as the best option. Enterovesical fistula is most frequently caused by diverticulitis. The diagnostic test of choice is CT scan. The low rate of spontaneous fistula closure, along with the risk of urosepsis and ongoing quality of life issues associated with conservative management, favours a surgical intervention as the best approach to management. A single-stage repair is the preferred method of management but should be deferred in cases of severe inflammation, pelvic abscesses, fecal contamination, or severe co-morbidities.

Statements

Ethical Approval: This case series was presented to & reviewed by the Ethical Committee at Medcare Hospital, ethical clearance was provided to carry out the study at Medcare Hospital. Ethical approval decision reference number: MCH|Ethics|001, granted on 01/10/2022.

Informed Consent & Written Informed Consent: consent & written informed consent for publication of the cases details with any accompanying images was taken from all three patients involved in this case series. Written consent will be made available to the Editor upon request.

Conflict of Interest Statement: The authors have no conflict of interest to declare.

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Author Contributions: Dr. Hussam Al Trabulsi contributed to the acquisition, analysis and interpretation of the work; Dr. Issam Hreirati and Dr. Tala Muassess contributed to drafting the case series and revising it critically for important intellectual content. All three authors agreed to be accountable for all aspects of the work. Dr. Hussam Al Trabulsi provided the final approval of the version to be published.

Data Availability Statement: Data is available in Medical Records Department at Medcare Hospital, and would be provided upon reasonable request while protecting patients' anonymity.

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