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Colovesical fistula

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Summary

The experience of 66 cases of colovesical fistula is reported. The most common cause was diverticular disease (71%), the remainder being due to malignancy, Crohn's disease, radiotherapy, appendicitis and trauma. The most sensitive investigation was barium enema, which was abnormal in 98% and actually showed the fistula in 57%. In 32 patients a single stage resection was performed, without mortality or significant morbidity and we would advocate this form of treatment for fistulae which are not complicated by gross sepsis or obstruction.

Introduction

The first description of a colovesical fistula is attributed to Rufus of Ephesus in AD 200 *(1)*, but it was not until 1888 that Cripps produced his classic monograph on the subject *(2)*. Treatment has altered radically since that time, with single or staged resections replacing palliative surgery. This article details the experience of 66 cases over a 15 year period in two hospitals. The literature is reviewed and the reported data summated to allow cumulative analysis of the published experience.

Patients and methods

The hospital records of 66 patients presenting with a colovesical fistula from 1971-86 have been reviewed, and our findings are compared with experience of more than 1000 cases reported in the English literature since 1954.

The group contained 39 males and 27 females, and the underlying cause of their fistulae are shown in Table I. Three patients had received radiotherapy for cervical carcinoma and one of these had a compound fistula involving also the vagina. Two patients developed a fistula secondary to acute appendicitis, and both were compound, involving appendix, sigmoid colon and bladder. Similarly one of the patients with Crohn's disease had a compound fistula involving caecum, sigmoid colon and bladder. Only one patient had had a previous hysterectomy. The age range of the group was 25–93 years (mean 61).

Physical examination revealed left iliac fossa tenderness in 32% and a mass in 29%.

The symptoms experienced are shown in Table II. Their duration ranged from 2 days to 4 years (mean 14 weeks).

TABLE I *Aetiology of colovesical fistulae*

	Males (n=39)	*Female (n=27)*
Diverticular disease (n=47)	29	18
Colonic carcinoma (n=8)	6	2
Crohn's colitis (n=4)	2	2
Radiotherapy (n=3)	0	3
Appendicitis (n=2)	0	2
Carcinoma of bladder (n=1)	1	0
Trauma (n=1)	1	0

TABLE II *Incidence of symptoms from colovesical fistulae*

	Number of patients (%)
Pneumaturia	56 (85%)
Frequency	47 (71%)
Dysuria	47 (71%)
Faecaluria	45 (68%)
Nocturia	27 (41%)
Abdominal pain	25 (38%)
Haematuria	15 (23%)
Diarrhoea/Urorrhoea	14 (21%)
Strangury	3 (5%)
Acute retention	2 (3%)
Other	3 (5%)

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Investigations

The blood urea, measured in all 66 patients, was raised in only one—a patient known to suffer from chronic glomerulonephritis.

Urine culture was performed in every case, and was sterile in only one. Of the remainder, 33% had a pure growth, most commonly *Escherichia coli,* and 65% had a mixed growth of bowel organisms.

Sigmoidoscopy was performed in 41 patients, and was abnormal in 15 (37%), but a fistulous opening was seen in only 3 (7%).

Plain abdominal radiography was performed in 56 patients, and a fluid level was noted in the bladder in 16 (29%). This was particularly well seen on the erect lateral view.

An intravenous urogram was performed in 44 patients and was reported as normal in 29 (65%); 15 (35%) were abnormal, showing mucosal irregularity or indentation of the bladder but of these only 4 (9%) actually showed the fistula.

Cystography, performed in only 5 patients, demonstrated the fistula in 2 (40%).

Cystoscopy was performed in 40 patients, and was considered to be abnormal in 38 (95%). The most common finding was an area of bullous oedema; in 14 (35%) the opening of the fistula was seen.

Fifty three patients had a barium enema. This was abnormal in 52 (98%), showing evidence of the underlying disease process, and diagnostic in 30 (57%), where the fistulous tract was demonstrated.

In two patients with a compound fistula following appendicitis the fistula was demonstrated by a barium meal and follow through.

Treatment

Of the 66 patients, 3 were considered unfit for operation and they all died within 8 months from respiratory or cardiac disease. Two patients with radiotherapy induced fistulae declined operation. One is still alive a year later and tolerating her fistula well, the other died from recurrent carcinoma after 6 months.

Thirty two patients had a single stage resection, 27 for diverticular disease of the sigmoid colon, 4 for sigmoid carcinoma and one for Crohn's disease. This latter patient had a compound fistula between caecum, sigmoid colon and bladder, and was treated by right hemicolectomy, sigmoid colectomy, and oversewing of the bladder defect. There was no perioperative mortality in this group and no significant morbidity, with patients being discharged after a mean postoperative stay of 14 days (range 9-19 days).

Fourteen patients had a two stage procedure with colectomy and a temporary defunctioning colostomy, 12 for diverticular disease, one for Crohn's disease and one for colonic carcinoma. There were two perioperative deaths from cardiorespiratory complications. One patient with diverticular disease developed an anastomotic leak which healed without further surgery. In the surviving 12 patients, the colostomies were closed after 11-61 days (mean 24) and the individual total inpatient stay ranged from 24-44 days (mean 31).

Seven patients had a 3 stage procedure—5 for diverticular disease and 2 for colonic carcinoma, and all made an uneventful recovery, but the individual total inpatient stay averaged 39 days (range 30-56).

Of the remaining 8 patients, 2 with extensive colonic Crohn's disease underwent panproctocolectomy and remain well 6 months and 2 years later. Two patients with carcinomas—one of distal sigmoid and one of bladder, underwent a Hartmann's procedure, together with a partial cystectomy in the latter patient. Both died of recurrent tumour within 18 months. A third patient with a traumatic fistula underwent a Hartmann's procedure but developed an anastomotic dehiscence and died 8 days after reversal. The 2 patients with compound fistulae between colon, bladder and appendix were cured by appendicectomy combined with oversewing of the defects in colon and bladder. A radiation-induced compound fistula between colon, bladder and vagina was treated by colpocleisis alone, and the patient died of disseminated disease 3 months later.

In patients where the fistula was small, formal closure of the bladder was not performed. All patients received perioperative antibiotic cover and postoperative urinary drainage, and there were no cases of urinary fistula. In those patients undergoing a single stage resection the bowel anastomosis was hand sewn in 30 and stapled in 2. Of the hand sewn anastomoses, 19 were fashioned in one layer and 11 in two. The clinical leak rate in this group was zero, although of the 22 patients in whom a postoperative limited barium enema was performed the radiological leak rate was 9%.

No patient who had a fistula successfully repaired has suffered recurrence during follow-up ranging from 6 months to 15 years (mean 6½ years). Of the patients with colonic carcinoma, 62% have survived 5 years.

Discussion

More than 1000 cases of colovesical fistula have been reported in the last 30 years. We have compared our results with this cumulative data. In the literature diverticular disease accounts for the majority of cases (56.3%), although fistula formation (2%) is an uncommon complication of this condition *(3)*. Carcinoma of the colon (20.1%), Crohn's disease (9.1%), surgical trauma (3.2%), and radiotherapy (3%) follow in incidence, with carcinoma of the cervix, carcinoma of the bladder, and appendicitis accounting for the remainder. The condition is less common in females and some authors attribute this to the interposition of the reproductive organs *(4)*, although prior hysterectomy has been reported overall in only 14.8% of women, and in our series, only 3%.

Fistula formation may occur directly between the two adherent structures or they may communicate via an abscess cavity—the *'foyer intermediaire'* of Chavannaz *(5)*. The fistulous tract is formed as a result of inflammatory, neoplastic or degenerative changes in the involved viscus, and may occur even after diversion of the faecal stream *(6,7)*.

The dome of the bladder is the site of the opening of the fistula in 62% of cases, with 28.5% of fistulae occuring on the posterior wall, and 9.5% in the trigone *(8)*. Although the bladder is intermittently or continuously contaminated by faeces, renal impairment from pyelonephritis is uncommon unless there is distal obstruction to the urinary or faecal stream *(9,10)*.

Pneumaturia was present in 85% of our patients. This compares with 61% in the literature, where urinary frequency was the commonest symptom (64%). Many patients' symptoms were mild and not disabling, and it was not uncommon for the patient to wait for months or even years before seeking medical attention.

In the literature a positive urine culture is not universal, and is reported in 78% of cases with 58% of these having a mixed growth. In our experience, urine culture was positive in 98% of cases, with a mixed growth in 65%. The one patient in whom it was negative was on antibiotics at the time.

The literature contains many reports comparing the diagnostic accuracy of cystoscopy and barium enema. Both should be performed in the initial assessment of the patient in an attempt to determine the actiology of the fistula. The barium enema is nearly always abnormal

and is reported to outline the tract in 35% of cases. In our experience the tract was seen in 57% of cases. A fluid level in the bladder can be expected to be visible on a plain radiograph in 8% of cases but in our series this was improved to 29% with the use of an erect lateral view. Cystoscopy will positively identify the fistula in 35–40% of cases. In the remainder there may be an area of bullous oedema or faecal material may be seen inside the bladder. Sigmoidoscopy will demonstrate the fistula in less than 10%, but should not be omitted since it may provide a histological diagnosis. Intravenous urography will delineate the fistula in only 8%, and may be normal in up to 65% of cases. Cystography is diagnostic in up to 27% in the literature, but is not often performed; elevation of the bladder wall at the site of attachment of the colon, the 'beehive sign', is said to be diagnostic *(11)*. Instillation of dye into the rectum or bladder can be used to confirm or locate the fistula in doubtful cases *(12)*, but we have never found this necessary.

The earliest treatment for colovesical fistula was defunctioning colostomy, proposed by Barbier de Melle in 1843 *(13)*. However it is rare for the fistula to close following this procedure alone *(14)*, and it is therefore reserved now for patients with a poor prognosis. Local measures such as division of the tract with oversewing of the colon and bladder with or without the interposition of omentum is not generally recommended as the diseased tissues heal poorly and recurrence is common, although one report does advocate this procedure for selected cases of diverticular fistulae *(15)*. Hartmann's procedure is unpopular because reversal is difficult due to adhesion formation from previous surgery and pelvic sepsis *(16)*.

Surgical practice for many years favoured three stage resection, but as prophesised by Charles Mayo in 1950, single stage procedures are becoming much more widespread *(17)*. Preliminary defunctioning colostomy is recommended when intestinal obstruction or abscess formation are present, or where there has been previous radiotherapy, but the majority of cases can be treated by a single procedure thereby reducing both morbidity and duration of hospital stay *(18)*. In some series this was achieved at the expense of increased mortality *(19,20)*, but this is not our experience, nor that of others *(12,21–23)*. In our patients single stage resection was reserved for non-obstructing lesions without gross sepsis, where the anastomosis was entirely satisfactory, and wherever these criteria were not met a staged procedure was performed. Colovesical fistula rarely requires emergency surgical treatment, and by waiting for the acute phase to settle a single stage operation can frequently be successfully undertaken *(23,24)*. For patients requiring a three stage resection the interval between the first and second stages should ideally be about 6 weeks, but reduced to 2-3 weeks for colonic carcinoma *(5)*. Longer delays do not improve results, but may make the procedure more difficult because of increasing fibrosis.

Whichever procedure is used it is essential that only healthy tissues should be anastomosed, and in radiation induced fistulae in particular this will require mobilisation of the splenic flexure. Opinion is divided over the treatment of the bladder defect, but it is generally agreed that postoperatively the bladder should be drained with a catheter for 7–10 days *(10,22)*. In our experience it is unnecessary to formally close small bladder defects. Of the recognised long-term sequelae *(14)* we have observed one case of vesical calculus, one case of chronic cystitis, and no cases of colonic stricture.

Invasion of the bladder from colorectal carcinoma does not carry a particularly poor prognosis, so long as an *en bloc* resection of colon and bladder is performed. The 5 year survival of patients with macroscopic tumour clearance is 56–62% *(8)*. In our experience single stage resection can give very good results even in the elderly, and we would recommend this as the treatment of choice for uncomplicated colovesical fistula from diverticular disease or colonic carcinoma.

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