Chapter 7
Management of Pouch-Vaginal Fistulas

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Introduction

Since the initial description of restorative proctocolectomy in 1978 by Parks and Nicholls [1], the stapled ileal-pouch anal anastomosis (IPAA) has evolved into the mainstay surgical treatment for most patients who require surgery for ulcerative colitis (UC) and many others with familial adenomatous polyposis (FAP) [2–5]. Pouch vaginal fistula (PVF) is a specific complication after IPAA, first reported by Wong et al. in 1985 [6]. Though not a common problem, with reported incidence rates ranging from 2.9 to 16.7 % [7–19], PVF is a source of considerable morbidity for the patient and a technical challenge for the surgeon. PVF typically presents in the first year after surgery; however, a late presentation might occur even after 10 years from surgery. The optimal management of PVF is not yet determined due to the relative paucity of published data. Most authors agree that the management depends on four basic etiologic/clinical factors: surgery related, sepsis related, disease related, and the location of the fistula.

Surgical technique in any operation is important for successful clinical results, especially in complex procedures such as IPAA. In fact, increased experience has been shown to decrease complications after IPAA [20, 21]. Tissue ischemia at the anastomosis must strictly be avoided and therefore a tension-free anastomosis with good blood supply should be obtained. It is crucial not to damage the rectovaginal septum or "button hole" the vagina when dissecting the rectum, and to avoid incorporation of the posterior vaginal wall when firing the stapler. If identified at the time of surgery, the anastomosis can be disconnected, the vagina repaired, and a hand-sewn anastomosis re-constructed.

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Despite this specific mechanism of injury associated with the double stapled technique, large scale studies have shown no difference in the incidence of PVF after stapled and hand-sewn anastomosis [18, 22–25]. Further, it is important to note that a stapled anastomosis is likely to be more cephalad. Therefore pouch advancement to the dentate line is more likely to be a good remedial option when PVF complicates a stapled anastomosis. Conversely, following an index hand-sewn anastomosis, pouch advancement may not be a viable option. As for pouch type, Wexner et al. found no difference in the incidence of PVF for different pouch types [15].

Pelvic sepsis remains a major determinant in the development of PVF, as highlighted by the high rate of this complication in patients with PVF. Groom et al. [14] found that 65 % of patients with PVF had pelvic sepsis compared with 16 % without PVF. Wexner et al. [15] reported pelvic sepsis in 35 % of their PVF patients. Lee et al. [23] found a significantly greater incidence of pelvic sepsis in patients with a PVF than in those without (26.3 % vs. 6.3 %; p = 0.003). Pelvic sepsis can either be ascending – originating from a disrupted anastomosis, or descending – resulting from an intraoperative contamination or a pelvic hematoma [15, 23]. These mechanisms further emphasize the importance of meticulous technique with attention to hemostasis, contamination, and a tension-free anastomosis with adequate blood supply. Furthermore, pelvic sepsis might be caused by cryptoglandular perianal disease, which is more common in patients with colitis and may lead to an anovaginal fistula [8]. Typically, PVF of cryptoglandular origin is associated with an internal opening of the fistula below the IPAA. A series from St Mark's Hospital reported 2 out of 17 PVFs arising below the IPAA and most likely independent of the original pouch procedure [14].

Careful review of appropriate histopathologic materials by an expert gastrointestinal pathologist may be crucial to future management options. This step is especially true for the small percentage of patients, approximately 2–3 %, who undergo IPAA for UC only to find the long-term diagnosis is Crohn's disease (CD). Lee et al. [23] found a high correlation between PVF and CD, with 12 of the 23 women (52 %) with a preoperative diagnosis of UC eventually diagnosed with CD. Other studies have shown similar results. The average time to development of a PVF is typically longer in patients with CD. Importantly, these patients suffer from a significantly higher rate of pouch failure and ultimately excision. Patients who undergo IPAA for indeterminate colitis also have a high rate of pouch complications including PVF and pouch failure [26]. However, patients whose indication for surgery is familial adenomatous polypos present with a significantly low rate of PVF when compared to IBD patients [27, 28], implying inflammation plays a role in the pathogenesis of PVF.

Patients with PVF may be asymptomatic or present with minor symptoms. They may also present with severe symptoms such as vaginal discharge of fecal material or gas, recurrent vaginitis, and vulvar irritation. Some cases of asymptomatic PVF are found on routine pouchography prior to ileotomy closure. Once PVF is

suspected, further investigation is needed to confirm the diagnosis and establish its nature. As noted above, the surgeon should request the pathology slides for expert pathology review. If not clinically evident, a perineogram and a water soluble contrast pouchogram may help to diagnose the presence and the level of the fistula tract. Imaging with computed tomography (CT) scanning, ideally with contrast enema, may also help to identify fistulous tracts, although magnetic resonance imaging (MRI) (T1 weighted with fat suppression and IV gadolinium) is preferable. In expert hands, endoanal ultrasound is also helpful in detecting sphincter deformity, especially in women with a history of vaginal delivery. However, the reliability of endoanal ultrasound is poor for fistula detection because the fistulous tracts in PVF are short and wide.

Although clinical examination in the office will often confirm the diagnosis, careful examination under anesthesia (EUA) may be preferable. EUA allows access to the fistula and excludes associated sepsis while overcoming the potential limitations of patient discomfort. It also allows identification of the level of the internal opening, its relation to the anastomosis (usually the staple line), the direction of the tract, and the location of the external orifice in relation to the vaginal wall, vaginal fourchette, labia, or perineum. While most tracts are short and straight, they can be complex and branched, and a low PVF can mask the presence of a higher fistula from the pouch-body to the mid-body of the vagina. If necessary, introduction of dye, such as methylene blue, into the pouch with white swabs in the vagina to identify staining is useful. Alternatively, for low fistulae, hydrogen peroxide gently instilled into the anus may demonstrate bubbles as they emerge from the vaginal opening. Lastly, patients should typically undergo anal manometry to assess the sphincter pressures, and a pudendal nerve terminal motor latency study to assess for neural impairment, especially in women after childbirth.

Search Strategy (See Table 7.1)

A literature search was carried out to identify articles on PVF. The search was done on the electronic databases PubMed, Embase, and Medline, from 1980 to December 2015. The main search terms used were 'pouch-vaginal fistula', 'ileoanal pouch-vaginal fistula' or 'anal pouch-vaginal fistula'.

Table 7.1 Search Strategy

P (patients)	I (intervention)	C (comparator)	O (outcomes)
Patients who underwent restorative proctocolectomy with ileal pouch anal anastomosis and developed pouch-vaginal fistula	See Table 1	Not applicable	Fistula healing Pouch retention

Results

Many procedures have been proposed for the treatment of PVF, most of them adopted from rectovaginal fistula repairs [29, 30]. The procedures can basically be divided into those performed via a perineal approach or via an abdominal approach. Of note, there are no randomized controlled trials and only one systematic review on the management of PVF. All studies provide level IV evidence. Significant heterogeneity, a small number of patients, and differing reporting practices preclude meta-analysis of the data. Pooled results for the different types of PVF repair are presented in Table 7.2.

Perineal Approach

Seton Drain A draining seton is mainly used for establishing drainage of an associated abscess and for defining the fistula tract. Keighley et al. [12] reported a success rate of 25 % in patients with the use of a seton as definitive treatment. However, Wexner et al. (0/2) [15], Mallick et al. (0/3) [10] and Shah et al. (0/5) [18] all reported 100 % failure rates. Tsujinaka et al. [31] showed complete healing in one patient with an asymptomatic fistula. Arguments against its use are that the seton may damage any residual anal sphincter, which is already thinned out in many women, and that it may encourage further leakage. To date, there is no evidence to

Table 7.2 Pooled results for the different types of PVF repair

Type of repair	Success rate
Perineal approach	
Seton [10, 12, 15, 18, 31]	5/15 (33 %)
Fistulectomy [12, 14, 15]	3/22 (14 %)

Biological
  Collagen plug [33]
  Fibrin glue [31, 42]
	0/11 (0 %)
	2/6 (33 %)

Transanal ileal advancement flap [9, 10, 14, 15, 18, 23, 31, 34]	81/173 (47 %)
Transvaginal [10, 12–15, 18, 35, 36]	48/79 (60 %)
Gracilis muscle interposition [15, 31, 37–39]	6/10 (60 %)
Trans-anal pouch advancement [19, 41]	2/4 (50 %)
Abdominoperineal approach	
(a) Abdominoperineal approach [10, 15, 16, 18, 19, 31, 42–44]	Overall success rates 50–75 %
Pouch advancement	8/16 (50 %)
Redo pouch	20/39 (51 %)
(b) Pouch excision 60/401 (15 %)	100 %

(a) Some studies not indicating different success rates for pouch advancement vs. redo pouch

(b) Number represents the percentage of patients eventually requiring pouch excision

support seton use except for initial control of sepsis before definitive repair. However, there are no studies to show whether use of a seton before definitive repair of PVF improves outcomes. One exception might be a fistula below the IPAA involving little or no sphincter muscle, where a draining seton followed by fistulotomy may be successful.

Fistulectomy Coring out of the fistula tract with repair of the internal opening at the pouch level has been described with disappointing results [12, 14, 15]. There is currently no evidence to support its use in the management of PVF.

Biological Therapy

The use of a collagen button plug to treat PVF was first reported by Gonsalves et al., with healing observed in 4/7 (57 %) of ileal pouch-vaginal fistulas at 16 weeks [32]. The technique involves securing the button portion of the collagen plug on the pouch side of the fistula with four dissolvable sutures. The button of the plug detaches within 4 weeks with the collagen matrix left in situ. Disappointingly, these results were not maintained long-term with 0/11 PVF successfully healed at 2 years [33]. Early success probably related to the persistence of the collagen plug within the tract, but failure of local tissue in-growth coupled with the relatively short length of PVF led to long-term failure. Given these results, the use of biological tissue plugs cannot be recommended for the management of PVF. Tsujinaka et al. [31] reported the instillation of fibrin glue in the fistula tract with complete healing in 1 patient with a minimally symptomatic fistula and failure in 2/3 symptomatic patients who eventually required pouch advancement and a redo pouch.

Transanal Ileal Advancement Flap

An ileal pouch advancement is essentially a variation of the mucosal advancement flap used for a high perianal fistula. A flap of mucosa and submucosa is mobilized from the ileal pouch, the internal opening is excised, and the flap is advanced and sutured beyond the internal fistula opening. Mallick et al. [10] reported healing rates of 42 % (20/48) when advancement flap was performed as a primary procedure and 66 % (4/6) when performed secondarily after a different procedure. Similar results have been reported by others. Tsujinaka et al. [31] showed healing rates of 60 % (6/10), while Shah et al. [18] and Ozuner et al. [34] reported success rates of 44 % (17/39) and 45 % (15/24), respectively. Lee et al. [23] had a slightly higher success rate of 50 % (10/20), with the rate increasing to 83 % (10/12) when excluding patients with CD. Wexner et al. [15] reported successful fistula healing in 8/16 patients with this approach in a survey of North American colorectal units, whereas Groom et al. [14] reported only one success in 10 attempts. Advantages of the ileal pouch advancement flap include the relative simplicity of the procedure and that the flap has more distal mobility [9]. The disadvantages of this approach include the

suboptimal exposure, the risk of damage to the sphincters in patients with border-line incontinence, and the fact that the flap lies on the high pressure side of the PVF. Circumferential advancement of the pouch is both technically easier and ensures more mobilization than does anterior or anterolateral flap advancement.

Transvaginal Repair

Sagar et al. [35] reported the results of transvaginal repair for PVF in 11 patients, each of whom had previously undergone an attempt to close the fistula with a collagen button plug. Nine (81 %) were successful at a median follow-up of 14 (6–56) months and the remaining two patients described symptomatic improvement. Burke et al. [36] published the St. Mark's Hospital experience with transvaginal repair for PVF in 14 patients. They reported total success in 11/14 patients (78 %), although 8 required multiple attempts to achieve long-term success. The largest series of transvaginal repair of PVF reported by Mallick et al. [10] from the Cleveland Clinic described a 55 % healing rate (15/27) when repair was performed as a primary procedure and 40 % (2/5) when performed secondarily after a different procedure. O'Kelly et al. [13] reported successful repair in 5/7 patients (71 %) with this approach, and once again some patients in this series required more than one attempt before complete healing was achieved. Others have reported success rates of 0 % (0/1) [18, 31], 27 % (3/11) [15], and 100 % (1/1) [12, 14]. The repair can also be augmented by placement of a collagen patch between the pouch and the vagina.

Advantages of the transvaginal approach include better exposure than the transanal approach, decreased risk of damage to the anal sphincters, and decreased tension. The procedure can be repeated if necessary and yields satisfactory results with relatively less morbidity. Possible complications include dyspareunia, although none of the patients reported dyspareunia in the series from St. Mark's [36], and hematoma because of the vascularity of the vagina. However, this risk can be minimized with meticulous technique, drainage, and use of a vaginal pack [13, 18]

Gracilis Muscle Interposition Flap

There are five small published series reporting on the utility of the gracilis muscle interposition flap specifically for the treatment of PVF. Gorenstein et al. [37] reported successful repair in two women with PVF. Previous attempts at local repair had failed in both patients and a simultaneous diverting loop ileostomy was constructed. Anterior sphincteroplasty was performed in one patient for associated incontinence. Wexner et al. [15] reported results of a multicenter study including treatment of PVF in 26 patients, 4 of whom underwent gracilis interposition flap with a 50 % success rate. In a later publication, Wexner et al. [38] published results of gracilis flap in 53 patients, two of whom for the indication of PVF. One patient had complete healing and the patient who did not heal was

eventually diagnosed with CD and opted to have a permanent ileostomy. Zmora et al. [39] published their experience with the gracilis interposition flap in 9 patients. Only one patient had a PVF and the fistula ultimately completely healed. Another report by Tsujinaka et al. [31] described one patient with a failed gracilis interposition. In general, interposition flaps are particularly useful after previous failed repairs as well as when abdominal procedures are contraindicated. The expected perioperative morbidity is 33–50 % and includes perineal wound infection, urethral stricture, fever, urinary retention, and perineal bleeding [38, 40]. Perhaps because of the technical challenge, the procedure seems to have been underused. This procedure should be preceded by fecal diversion. At present, the low reported numbers and the relative complexity of the procedure prevent it from being strongly recommended as a first-line treatment. Another form of flap used for treating rectovaginal fistulas is the martius flap; however results with treating PVF have not been published.

Transanal Pouch Advancement

The technique of transanal disconnection of the ileal pouch from the IPAA, advancement of the pouch, and re-suture at the dentate line can be employed in patients with PVF, especially in slimmer patients with demonstrable mobility of the pouch above the level of the anastomosis. As noted above, advantage of this procedure is that it allows healthy, full thickness tissue to be delivered to the perineum. This operation should be offered after stoma creation. Both Fazio et al. [41] and Heriot et al. [19] showed that this procedure was successful in 1/2 of their patients.

Abdominoperineal Approach

"High" PVF that arises from the mid-body of the ileal pouch requires a transabdominal approach. This approach may also be selected after failed local repairs and in patients with ongoing pelvic sepsis due to abscess cavities with granulation tissue that cannot be completely removed using a local approach. The pouch needs to be carefully mobilized down to the level of the pelvic floor with attention given to the anterior wall of the pouch and the posterior wall of the vagina. There are basically three surgical options: pouch advancement, pouch redo with a new handsewn IPAA, and pouch excision. The reported overall success rates for treating a PVF via the abdominoperineal approach are approximately 50–75 %[10, 15, 16, 18, 19, 31, 42–44]. Despite these relatively high success rates, it should be noted that transabdominal revision of the pouch is technically demanding, carries a significant risk of loss of the pouch [10, 16, 18], and an unsuccessful attempt may result in significant loss of small bowel with the risk of short gut syndrome. The patient needs to be fully counseled about these risks and preferably referred to a center of excellence in this field.

Diversion

A diverting ileostomy is commonly used in patients with PVF, mainly to control patient symptoms and pelvic sepsis and to divert fecal material from the repair. Some authors have reported healing with the ileostomy only [15, 31]; however, most authors combine construction of the diverting ileostomy either before or at the time of repair [10, 18, 23]. Lee et al. [23] found higher success rates (60 % vs. 45 %) when a diverting ileostomy was performed before a transanal pouch advancement. However, there is little evidence that a diverting ileostomy improves the chance of PVF healing. A permanent diversion, with or without pouch excision, is opted when all other attempts have failed.

Recommendations

As noted above, all studies provide low quality data, providing weak recommendations.

1. Patients presenting with pelvic sepsis should undergo EUA and seton drainage.
2. A diverting ileostomy should be considered for all patients before or at the time of repair.
3. Local repair should be attempted first for low PVF.
4. An abdominoperineal approach should be reserved for "high" PVF and failed attempts at local repair.

A suggested algorithm based on results and recommendations is presented in Fig. 7.1.

Personal View of the Data

The management of pouch complications such as PVF presents a major challenge to the surgeon. Therefore, these patients should ideally be referred to large volume experienced centers for a more optimal outcome. The surgeon should diligently study the patients' prior relevant history including pathology and operative reports, as well as physiologic and imaging tests in order to tailor the correct procedure for each patient. Patient counseling includes explaining that successful treatment often requires several operations over a long time period in order to achieve healing. Patients with CD should also be aware of the higher rate of pouch failure they may encounter. Local repair via the perineal approach should be considered when dealing with a low PVF, and that the transanal ileal advancement flap, gracilis interposition, and pouch advancement are all viable options with equivalent success rates. The abdominoperineal approach should be left for high fistulas and those failing previous local attempts. Although not supported by high quality data, a laparoscopic
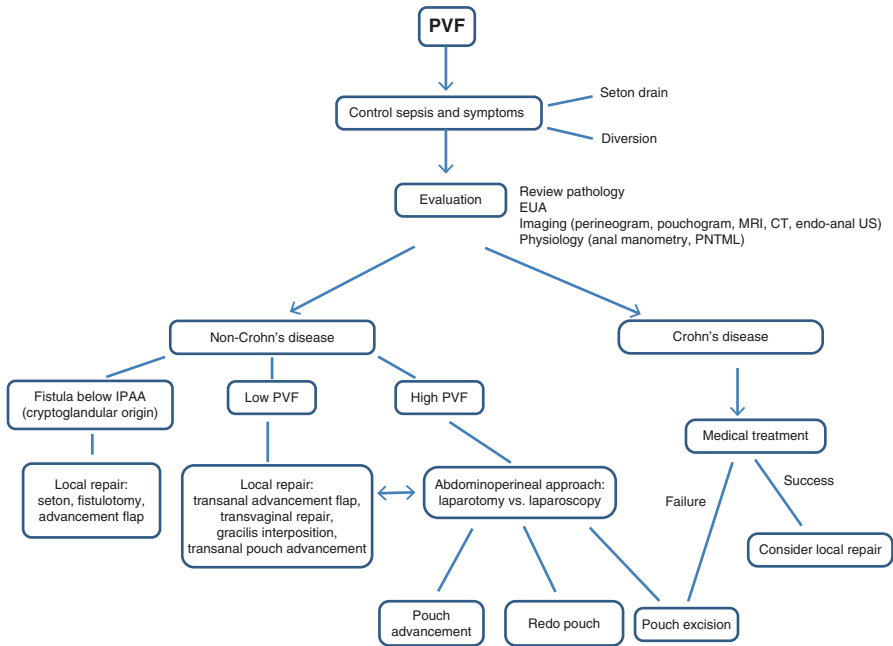
Fig. 7.1 Suggested treatment algorithm

diverting loop ileostomy before or at the time of repair offers the patient symptom relief, better sepsis control, and perhaps an increased chance of healing. It seems that no single procedure is appropriate for all cases of PVF; therefore the surgeon should be familiar with the existing armamentarium of treatment options and be continually updated on their success rates.

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