Female Pelvic Fistulae

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KEYWORDS

• Pelvic fistula • Genitourinary fistula • Rectovaginal fistula • Vesicovaginal fistula
• Urethrovaginal fistula • Vesicouterine fistula

KEY POINTS

- Obstetric injury is the leading cause of pelvic fistulae worldwide; in developed nations, gynecologic surgery is the main cause of genitourinary fistulae.
- The diagnosis and evaluation of pelvic fistulae are accomplished with office-based procedures. Radiologic imaging may be required to optimize surgical planning.
- Pelvic fistulae are primarily treated with surgical intervention.
- A vaginal approach can be used for a variety of pelvic fistulae to decrease hospital stay, overall blood loss, operative time, and postoperative pain.
- The initial surgical repair has the highest chance of success. Success rates decrease with every subsequent attempt.

INTRODUCTION

Female pelvic fistulae have devastating effects on affected women around the world.[1,2] Pelvic fistulae that occur in developing countries are often the result of obstetric injuries and frequently result in women being abandoned by their husbands, leaving them without resources and alienated from their community. Fistulae have been present for millennia, with the first known historical report dating back to 2050 BC with a pelvic fistula identified on mummified Egyptian remains.[3] Pelvic fistula can be challenging to surgically repair. From a historic perspective, the first vaginal approach to fistula repair was described in the mid-1800s.[2] Many of the surgical principles initially reported for surgical fistula repair are still used today.[4]

Despite the impact fistula symptoms have on women worldwide, current literature guiding fistulae management is primarily based on observational data. Physicians therefore rely on expert opinion, such as that presented here, to guide their care of pelvic fistula. The purpose of this manuscript is to present a narrative review on the current management of pelvic fistula, including diagnosis, evaluation, conservative, and surgical treatment options.

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CAUSE AND EPIDEMIOLOGY OF FISTULAE

With the evolution of obstetric care, the cause of pelvic fistula has changed in developed nations but has remained unchanged in developing countries. In developed nations, gynecologic surgery is the leading cause of vesicovaginal fistulae (VVF), and obstetric trauma is the leading cause of rectovaginal fistulae (RVF).[2,4,5] The incidence of VVF after a benign hysterectomy ranges from 0.1% to 0.3%.[2,5] This further varies by route of surgery, with laparoscopy having the highest risk of VVF formation, followed by open abdominal and then vaginal approaches.[1] Other risk factors for development of a genitourinary fistula at the time of pelvic surgery include prior pelvic surgery, endometriosis, prior cesarean section, prior pelvic radiation, concurrent prolapse or antiincontinence procedure, diabetes mellitus, and pelvic inflammatory disease.[1,4]

In developing countries, the leading cause of both VVFs and RVFs is obstetric trauma, which affects 3.5 million women in sub-Saharan Africa and South Asia.[2,4] Because many women in these regions have limited access to hospitals, and these statistics are often extrapolated from hospital data, this likely represents an underestimation of women affected by pelvic fistulae. Obstetric injuries may occur with protracted or obstructed labor as a result of tissue ischemia and may also result from iatrogenic injury at the time of cesarean section. In developed countries, obstetric fistulae are rare but are more commonly reported following forceps-assisted deliveries, midline episiotomies, peripartum hysterectomy, or wound dehiscence of a perineal laceration.[4,6]

RVF are relatively more common in developed countries and can be caused by inflammatory bowel disease (IBD), infectious diseases, anorectal surgery, malignancy, radiation therapy, or congenital anomalies.[7] Crohn disease, a type of IBD, is the second most common cause of RVF. Interestingly, up to 10% of women with Crohn disease will develop an RVF during their disease course.[4,8] Infections, such as diverticulitis, lymphogranuloma venereum, or tuberculosis, can create inflammation and injury leading to a colovesical or a rectovaginal fistula.[2,9]

Vesicouterine, ureterovaginal, and urethrovaginal fistulae are rare entities. Vesicouterine fistulae comprise about 1% to 4% of all genitourinary fistulae, with most caused by surgery, either obstetric or gynecologic.[2,10] Similarly, ureterovaginal fistulae are most commonly caused by ureteral injury at the time of gynecologic surgery. In a systematic review published in 2015, the incidence of ureteral and bladder injury at the time of gynecologic surgery ranges from 0.03% to 1.5% and 0.2% to 1.8%, respectively.[3] Urethrovaginal fistulae have become more prominent with the increase in midurethral sling placement and are also a known complication of urethral diverticulum repair.[2,11] Specifically, the risk of a urethrovaginal fistula following surgical repair of a diverticulum ranges from 1.8% to 6%.[12]

DIAGNOSIS AND EVALUATION OF FISTULAE

Diagnosing a pelvic fistula requires a high level of suspicion, detailed history, and thorough pelvic examination. Additional procedures or imaging studies can aid in diagnosis and surgical planning. It is rare to have an iatrogenic fistula without any inciting event or predisposing risk factor, making a patient's medical history the first key step to diagnosis.

Clinical Presentation

Patients with genitourinary fistulae commonly present complaining of continuous urinary incontinence or watery vaginal discharge. Patients often report exacerbation of leakage when changing positions, particularly when going from supine to a sitting or

standing position. As fistulae can be of variable size, the amount and frequency of leakage may vary from continuous to intermittent and in some cases mimic stress urinary incontinence. Patients also often complain of incontinent dermatitis from vulvovaginal irritation from persistent urinary leakage. Similarly, patients with RVF report leakage of gas or stool per vagina, but if the fistula is small, they may simply report a malodorous vaginal discharge.

Physical Examination

A physical examination should start with examination of the external female genitalia, which can show evidence of skin breakdown secondary to irritation from urine or feculent material, as seen in **Fig. 1**. A speculum examination will allow visualization of the vaginal walls to evaluate for scarring or puckering. A transparent plastic speculum can be particularly helpful in this regard. Large fistulae are more easily visible; however, a thorough evaluation is still important, as more than one fistula may be present. The examination should also specifically evaluate for abnormal discharge, fluid collections, or stool. Posthysterectomy genitourinary fistulae tend to be near the vaginal cuff, whereas RVF tend to be near the perineum.[4,6] In rare cases it may be helpful to send a sample of the watery vaginal discharge, as urine can be identified by creatinine or urea concentration. A bimanual examination is important to help determine the size and location of the fistula(e) but also to assess pelvic scar tissue, particularly in proximity of the fistula, as this will affect both the plan for and anticipated success of a surgical repair. A digital rectal examination, as shown in **Fig. 2**, should be done to localize an RVF and to assess the integrity of the anal sphincter complex; however, this is not particularly sensitive or specific.[2]

Office Procedures

There are a variety of office-based procedures that are frequently used to help identify the location of pelvic fistulae, which are described in detail in **Table 1**. With many options available, the workup should be individualized for each patient.

Fig. 1. Vulvar incontinence dermatitis and vitiligo secondary to a chronic vesicovaginal fistula.

Fig. 2. A midlevel RVF seen on a thorough digital rectal examination.

Imaging Options

Although imaging is not necessary to diagnose pelvic fistulae, it can be helpful with complex fistulae and for surgical planning. MRI has become the imaging modality of choice to evaluate RVF, as computed tomography (CT) and ultrasound are less accurate.[13,14] For example, MRI is often superior to CT imaging, as it can help differentiate between active fistulae and fibrotic fistulae.[15] Endoanal ultrasound is inferior to clinical assessment for detection of fistulae but can evaluate the integrity of the anal sphincter complex.[15,16] MRI provides the most accurate and comprehensive imaging assessment of RVF, making it superior to other options.[4,14,15]

Selection of radiologic imaging is determined by clinical findings. In the setting of urinary tract fistulae, both the upper and lower urinary tract should be evaluated. Ureteral compromise has been reported in up to 12% of VVF.[4] Genitourinary fistulae may lead to ureteral strictures that can lead to obstruction or reflux with resultant hydronephrosis.[2] Retrograde pyelography, voiding cystourethrography, and CT urography are all common options chosen for evaluation.[2,4] Retrograde pyelography can visualize the distal ureters, whereas CT urography is better at visualizing the kidneys and upper ureters. Retrograde pyelography is a good option for patients with systemic contrast allergy or renal disease prohibiting intravenous contrast. A cystometrogram is performed by retrograde filling the bladder with radiopaque contrast under fluoroscopy to evaluate for bladder contour, vesicoureteral reflux, and fistulous communication. A voiding cystourethrogram can help identify small fistulous tracts in the bladder or urethra by adding a pressure-flow gradient during micturition.

CONSERVATIVE MANAGEMENT OF FISTULAE

RVF may heal spontaneously on rare occasions,[4] but conservative management is more likely to be directed at genitourinary fistulae. The mainstay of conservative treatment of VVFs is continuous bladder drainage such as use of a Foley catheter for 4 to 6 weeks. In a retrospective multicenter study with a total of 226 patients with VVF, 60 were initially managed conservatively with a Foley and 11.7% had spontaneous resolution.[17] A separate retrospective study found that prolonged Foley drainage only had a success rate of 1.9% when treating VVFs. They also noted that smaller fistulae,

Table 1
Office-based procedures to detect pelvic fistulae

Procedure	Fistula Detected	Technique/Findings
Tampon test	Vesicovaginal, rectovaginal	Dilute methylene blue is instilled into the bladder or rectum, then a tampon is placed into the vagina. The tampon is removed after 10–15 min and examined for the presence and location of any blue staining. This is often the first procedure done to evaluate a vesicovaginal fistula because it is cost-effective, easy to perform, and well tolerated by patients. The sensitivity and specificity of this test remain unknown.[6] Methylene blue should not be given to patients with a known hypersensitivity to it, and although rare, methemoglobinemia is a potential serious systemic side effect.
Double tampon test	Ureterovaginal, vesicovaginal	Phenazopyridine is taken orally and diluted methylene blue is instilled into the bladder, then a tampon is placed in the vagina. After 20 min, the tampon is removed and examined for the presence and location of blue or orange staining. Blue staining indicates a vesicovaginal fistula, whereas orange staining indicates a ureterovaginal fistula.
Bladder backfill test	Vesicovaginal	Dilute methylene blue or sterile milk is instilled into the bladder, whereas the posterior blade of a speculum is used to visualize any fluid leakage from the anterior vaginal wall/overlying bladder.
Trattner catheter double-balloon test	Urethrovaginal	The inner balloon lying against the urethrovesical junction and the outer balloon abutting the urethral meatus are inflated. Methylene blue or sterile milk is instilled into the catheter, which fills the urethral cavity between the 2 balloons. The posterior blade of a speculum is used to visualize any fluid leakage from the anterior vaginal wall/overlying urethra.
Cystourethroscopy	Vesicovaginal, urethrovaginal	A rigid 70° diagnostic cystoscope or flexible cystoscope is used to perform a full 360° evaluation of the bladder and the urethra evaluating for any visible fistulous tracts. It aids in identifying the location and size of the fistulous tract as well as its proximity to the trigone or ureteral orifices, which can be helpful in surgical planning. This can also allow for evaluation of ureteral involvement by the fistula or ureteral obstruction, which is better known before surgery.
Poppy seed test	Colovesical	Patients consume 50 g of poppy seeds in yogurt and monitor their urine for the next. If poppy seeds are present in their urine, a colovesical fistula is diagnosed. It does not provide information about the precise location of a fistula but it is a cheap test (~$5.37/patient), with a sensitivity ranging from 94% to 100% and a specificity of nearly 100%.[12]

particularly less than 4 mm, were more likely to respond to conservative management.[18] It is reasonable to attempt a trial of continuous bladder drainage for 4 to 6 weeks in fistulae less than 1 cm, with success rates ranging from 12% to 80%.[4] There have also been case reports of spontaneous fistula closure secondary to pessary erosion following pessary removal.[19] Other types of nonsurgical management of genitourinary fistulae include electrocautery, cystoscopic laser ablation, or injection of fibrin or collage glue into the fistulous tract. Briefly, electrocautery and cystoscopic laser ablation deepithelialize the fistulous tract, allowing it to heal with prolonged continuous bladder drainage.[2,4] Fibrin and collage glue are injected into the fistulous tract after deepithelialization to promote closure. Many VVFs are given a trial of conservative management to allow for thorough tissue healing, making it more amenable to a successful surgical repair.

Ureterovaginal fistulae can be managed nonsurgically by placing an indwelling ureteral stent in the affected ureter for 6 to 8 weeks. A double-J stent is preferred to decrease the risk of stent migration out of the renal pelvis and can be done in either an antegrade or retrograde fashion. A retrospective study of 20 patients found that this endoscopic approach was successful in 64% of patients with ureterovaginal fistulae.[20] If the fistula resolves with ureteral stenting, the stent can be removed after 6 weeks. Some recommend serial CT urograms at 3-month intervals to evaluate for ureteral stricture formation.[2,4] If the fistula does not respond to conservative management, a plan for surgical intervention should be made. Nonsurgical treatments, for all types of genitourinary fistulae, should be used for patients who are poor surgical candidates; have very small, uncomplicated fistulae; or are strongly opposed to surgical interventions.

OPTIMIZING SURGICAL MANAGEMENT OF FISTULAE

Most pelvic of fistulae will require surgical intervention. It is also well established that the initial repair has the highest chance of success.[2,4,17] Being cognizant of factors that may optimize surgical repair including perioperative management and timing of surgical intervention can improve successful repair.

Timing of Surgical Repair

A controversial topic for fistula repair is timing of surgery. Optimal tissue integrity most amenable to surgical repair includes minimal inflammation, maximal pliability, and tissue mobilization with absent tissue necrosis. With these tissue characteristics, surgeons optimize their ability to secure a tension-free and watertight fistula closure. For some patients, this will occur within 72 hours of injury diagnosis, but for most of the patients with fistula, this will take 3 to 12 months to occur depending on the cause, location, and size of the fistula. Genitourinary injuries detected within 72 hours of surgery have an excellent chance of resolution if surgical repair is performed immediately.[21,22] In developed nations, this is not uncommon; however, in developing nations, patients present months to years after the original injury.[1,6] When the timing of surgical repair does not fall into this immediate or delayed diagnosis time frame, the decision becomes more difficult. Traditionally, for genitourinary fistulae, a 3- to 6-month waiting period has been discussed to maximize tissue integrity.[2,4,6,23] During this waiting period, some suggest monthly pelvic examinations so that surgery can proceed once tissue integrity is deemed adequate. Two studies done by Waaldijk showed a successful closure of greater than 90% of fistulas that were closed within 2 months of onset.[4,21,22] For RVFs, literature suggests a shorter standard waiting time from 8 to 12 weeks after injury. Obstetric third- and fourth-degree injuries should

be repaired immediately, but nonobstetrical RVF do normally require a waiting period to allow optimization of medical conditions that may have contributed to fistula formation. Other factors such as prior radiation or active IBD may require additional time to allow the fistulous tract to mature before surgical repair. Timing of surgical repair is variable, and this decision should be highly individualized for each patient.

Perioperative Considerations

Thorough preoperative counseling is important to set realistic expectations when describing chances of a successful surgical repair including potential complications, risk of failure and need for repeat surgical repair, and the recovery period. Risk factors for failure include significant vaginal scarring, large fistula size, infection, and prior pelvic radiation. Preoperatively, barrier creams or ointments, in addition to routine perineal hygiene, are used to prevent skin breakdown or perineal dermatitis from urine or feculent material.[24] Preoperative antibiotic prophylaxis is universally recommended for urogynecologic procedures, including fistula repair, by the American College of Obstetricians and Gynecologists.[25] Following surgery, the need for continuous postoperative bladder drainage for 1 to 2 weeks cannot be overemphasized and dates back to at least 1852.[2,4,26] Before catheter removal, a cystometrogram should be performed to confirm resolution; if the findings suggest a persistent fistula, continued postoperative catheter use may ultimately result in successful closure. There is no literature to support the use of antibiotics for the duration of catheter placement following fistula repair, so the decision whether to use antibiotic prophylaxis in this setting rests with the surgeon.

SURGICAL TECHNIQUES FOR FISTULA REPAIR

The keys to a successful repair are represented in **Fig. 3** and include a tension-free, watertight, and well-vascularized fistula closure. Intraoperatively, adequate mobilization can help obtain a tension-free closure. The fistulous tract can be partially or completely resected. A partial resection leaves more durable tissue for reapproximation, whereas complete resection may result in greater vascularization by removing the scarred fistulous tract.[2] For very large fistulas, surgeons may opt to leave the fistulous tract in place in order to maximize the amount of tissue available for closure. Advancements in laparoscopic and robotic surgery allow for many minimally invasive surgical options; however, it is important to remember that many pelvic fistulae are amenable to a vaginal approach.[27] Vaginal surgery provides many advantages including shorter hospital stay, decreased intraoperative blood loss, decreased operative time, and less pain.[4,27] This section focuses on key pearls to the surgical management of the major types of pelvic fistulae.

Vaginal Approach to Vesicovaginal Fistula Repair

Current literature quotes success rates of 80% to 98%, with the first attempt at VVF repair through a vaginal approach.[2,4,28,29] These success rates drop exponentially with each subsequent attempt. One of the largest case series on genitourinary fistulae, including 303 patients, reported a 98% success rate for a VVF repair on first attempt, using a vaginal approach.[29]

Visualization is the first step to repair. Stay sutures can be placed to increase exposure, and a pediatric Foley catheter can be placed through the fistulous tract to bring the fistula into the surgical field. If the fistula tract is too small for a catheter, lacrimal duct dilators or vascular catheters can be used to cannulate the fistulous tract and aid in dissection and closure. Depending on the location of the VVF in relation to the

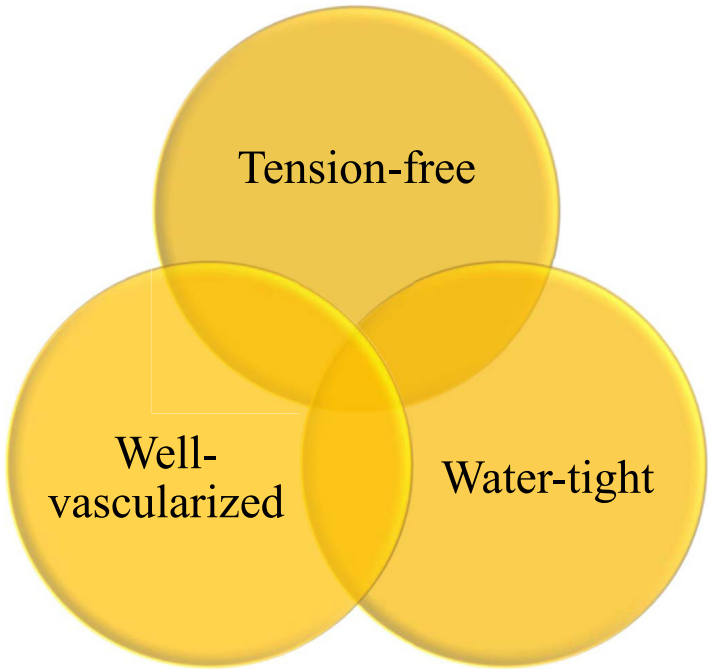

Fig. 3. The key surgical principles to a successful fistula repair.

bladder trigone and the ureteral orifices, intraoperative ureteral stents may be helpful for orientation and safety during repair.

The Latzko technique is used for simple VVF repairs and does not typically excise the fistula tract. It is best used for apical VVF repairs posthysterectomy. With this procedure, an elliptical incision is made around the fistula mobilizing 2 to 3 cm of vaginal epithelium around the fistula tract. The fistula is closed followed by imbricating the fibromuscular connective tissue over the tract in 1 or 2 layers. The vaginal epithelium is then closed with interrupted or mattress sutures. This technique is simple, efficacious, and requires minimal operating time with success rates greater than 90%.[2,4,17,30]

Larger fistulae may require more extensive dissection, and adequate closure may require a vaginal flap. Starting with an inverted "U" incision adjacent to the fistula, the vaginal epithelium is mobilized to allow for nonoverlapping suture lines, and the flap can help provide a tension-free closure of the underlying adventitia. Too much dissection compromises vascularity, but too little dissection can place undue tension on the surgical site, either of which can weaken the repair. The bladder wall should be closed in 2 layers with 3-0 vicryl in an interrupted or running fashion. If the fistula involves the trigone, the surgeon should consider whether a vertical or transverse closure would be better with regard to the position of the fistula relative the location of the ureters. Ideally, the first layer should result in a watertight closure with additional layers added for insurance. The remaining vesicovaginal fibromuscular connective tissue is then closed in 2 to 3 additional layers and the addition of a flap interposition could be considered for additional healthy vascular supply and/or to help fill significant dead space.[2,4] A complete discussion on pelvic flaps is beyond the scope of this manuscript but rectus, gracilis, Martius, or omental J-flap can be used. If a bladder backfill demonstrates the repair is watertight, a terminal cystoscopy may not be

necessary and has the potential to place unwanted stress on the repair. A catheter should be left in place for 1 to 2 weeks, allowing for continuous bladder draining and minimal tension on the repair.

Urethrovaginal Fistula Repair

A layered urethrovaginal fistula repair has success rates greater than 90%.[31] They are approached very similarly to the described technique for VVF repairs discussed earlier. Very distal urethrovaginal fistulae may or may not be symptomatic depending on the location, but proximal urethrovaginal fistulae pose a challenging repair. Fistulae located in or near the urethrovesical junction may compromise the intrinsic sphincter mechanism of the urethra with resultant stress urinary incontinence (SUI) even if the fistula is successfully closed. Placing buttress sutures through the periurethral tissue may aid with both the fistula repair and improve symptoms of SUI, but a concomitant or staged antiincontinence procedure, such as an autologous fascial sling, could be considered. For a urethrovaginal fistula repair, a catheter is first placed through the urethra into the bladder. As described with VVF repair, a circumferential or "U" incision can be made around or adjacent to the urethrovaginal fistula. A scalpel, Metzenbaum, or tenotomy scissors can be used to sharply dissect the vaginal epithelium off of the underlying fibromuscular tissue. Adequate dissection can extend to the descending pubic rami and/or into the retropubic space, as needed to allow for tension free closure. The edges of the urethra are reapproximated with 2-0 or 3-0 absorbable sutures in an interrupted fashion followed by 2 to 3 additional layers of imbricating vaginal fibromuscular tissue and ultimately the vaginal epithelium. Depending on the extent of the dissection, an interposed flap can be used here as well. An indwelling Foley catheter is left in place for continuous bladder drainage for 1 to 2 weeks. In the setting of a urethrovaginal fistula, a synthetic mesh midurethral sling should not be placed at the time of fistula repair. Because SUI may be an issue for patients following urethrovaginal fistula is repaired, it may be reasonable to consider placing a concurrent pubovaginal sling during the fistula repair,[32] whereas others would wait to address SUI as a staged, secondary procedure.

Ureterovaginal Fistula Repair

Ureterovaginal fistulae can be repaired vaginally but are most commonly approached abdominally via laparotomy or laparoscopy (traditional or robot-assisted). Success rates for a traditional open ureterovaginal fistula repair are reported as ~90% in observational studies.[33,34] Once intraperitoneal access is obtained, the bowel is retracted into the upper abdomen using Trendelenburg and/or packing. The ureter is identified at the pelvic brim, and retroperitoneal access is obtained. The ureter is then mobilized to the level of the fistula, with care taken not to disrupt the periureteral tissue so as to not compromise ureteral blood flow. Once the fistula tract is released and the diseased ureter excised, the vagina is closed in 1 or 2 layers with absorbable sutures and a ureteroneocystostomy is performed at a site away from the prior fistula for the highest chances of a successful repair.[4,33] A ureteroneocystostomy involves transecting and then spatulating the ureter proximal to the fistula. The bladder dome is then incised and the ureter tunneled through and anchored to the bladder mucosa. The ureteral adventitia is also sutured to the overlying bladder peritoneum for added support. To avoid undue tension on the ureteroneocystostomy, either a psoas hitch or a Boari-Ockerblad flap can be performed.[4] Ureteral stents should be left in place for 4 to 6 weeks, and continuous bladder drainage with a Foley catheter should be maintained for 1 to 2 weeks to promote bladder recovery and prevent ureteral stricture formation.

Vesicouterine Fistula Repair

Vesicouterine fistula repairs are commonly performed through an abdominal approach using surgical techniques that can also be applied to an abdominal VVF repair. These types of fistulae are frequently seen after obstetric injury following a cesarean section. Once intraperitoneal access is obtained, the bladder is dissected off of the uterus to level of the fistula where the fistula tract is then resected. Once the bladder and uterus are free from each other, each is closed in 1 to 2 layers in a perpendicular fashion as to avoid overlapping suture lines. To further separate these 2 otherwise abutting repairs, an omental, peritoneal, or sigmoid epiploic flap can be interposed and anchored with absorbable sutures between the bladder and uterus.[2,33] The most definitive treatment of a vesicouterine fistula is a hysterectomy at the time of repair if childbearing is complete.[6]

Rectovaginal Fistulae Repair

RVF repair approach depends on the location of the injury. **Fig. 4** demonstrates a very distal RVF likely as seen with a chronic fourth degree obstetric laceration as well as a mid-level RVF with a probe delineating the fistulous tract. High rectovaginal or colovaginal fistulae are best suited for an abdominal approach, whereas midlevel and distal RVF can be repaired via a transvaginal, perineal, or transrectal approach. RVF repairs have a lower probability of success than genitourinary fistulae.[2] In a retrospective cohort study, success rates at 1 year postoperatively ranged from 35.2% to 95% with the average success of transvaginal and transanal repairs being 55.6%.[35] Most of the RVF that gynecologists see are those related to an obstetric injury seen in the postpartum time period.[4,35] With a fistula at the mid to distal vagina and an intact perineal body, a transverse or vertical incision encircling the fistula tract or a "U" incision in the vagina or the perineum can be used to gain access to the fistula tract. Either an upright or an inverted "U" perineal incision can be used when a sphincteroplasty is planned as part of the repair. One nonrandomized comparative cohort study compared a traditional inverted "U" perineal incision with an upright "U" posterior fourchette incision and found the latter approach decreased postoperative wound complications while maintaining a similar functional outcome.[36] A vaginal repair is performed as follows: the vagina is dissected off of the anterior rectal wall. This dissection is continued laterally around the fistulous tract to allow for a tension-free repair. The fistula tract is excised or used as part of the rectal closure. The rectal muscularis and submucosa are then imbricated over the rectal mucosa. An additional 2 to 3 layers of interrupted 2-0 or 3-0 absorbable sutures are used to provide additional support between the rectum and posterior vaginal wall. Flaps, such as a sphincteroplasty or Martius, could be used if needed. Finally, the vaginal epithelium is closed. For low RVF with a damaged perineal body and separated anal sphincter, an episioproctotomy is done, by first making an incision between the vagina and rectum. Once this is mobilized, the repair proceeds similarly to a fourth-degree obstetric laceration repair. which includes reapproximating the rectal mucosa, then the internal anal sphincter is imbricated over the rectal mucosa. The external anal sphincter is closed by either an end-to-end or an overlapping technique based on surgeon preference, as there are no data to favor one over the other.[37] The perineal body is reconstructed by bringing together the bulbocavernosus muscles, then the transverse perineal muscles after which the vaginal epithelium is reapproximated.

A diverting colostomy can be considered but is commonly reserved for recurrent fistula repairs.[38] It is also important to be able to distinguish a normally nonpainful RVF from its painful relative, the fistula-in-ano. A fistula-in-ano is a result of infected anal

Fig. 4. A patient with both a distal RVF involving the anal sphincter complex and a midlevel RVF approximately proximal to the hymen.

glands that rupture through the rectum and vagina, leading to a high chance of failure with typical RVF repair.[39] Postoperative care has evolved for RVF surgery and based on colorectal data, there is no need for a low-residual diet, delayed feeding, or postoperative antibiotics.[2,40]

SUMMARY

Pelvic fistulae remain challenging for both patients and surgeons. Successful repair is most likely to result if an accurate diagnosis is obtained and appropriate surgical repair planned. Success rates for initial surgical repair of genitourinary fistulae are typically greater than 90%, whereas rectovaginal fistula repairs are approximately 55%. Regardless of the fistula type, ensuring a tension-free, "watertight", well-vascularized closure is the cornerstone to successful fistula repairs. Literature guiding pelvic fistula care is predominantly based on observational data and expert opinion.

CLINICS CARE POINTS

- Current literature guiding clinical care for pelvic fistulae management is based on observational data with very limited level I evidence.

- A trial of continuous bladder drainage for 4 to 6 weeks can be used in pelvic fistulae less than 1 cm, with success rates ranging from 12% to 80%.[4]
- Timing of surgical repair is variable but should be deferred until tissue integrity is maximized.
- Most of the pelvic fistulae are best repaired vaginally with success rates for initial surgical repair of genitourinary fistulae greater than 90%, whereas rectovaginal fistula repairs are ~55%.

DISCLOSURE

The authors have nothing to disclose.

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