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Anal Fistula: Contemporary View of Complex Problem

Damir Karlović, Dorian Kršul, Ante Jerković, Đordano Bačić and Marko Zelić

Abstract

Anal fistulas are still a huge challenge for surgeons because of their high incidence, high recurrence rate, prolonged healing time and possible complications such as fecal incontinence. Even though many surgical options have been described, we still do not have the standardized procedure. Patients who suffered from this problem have a low quality of life because of constant anal pain and soiling from anal tracts. Aside from cryptoglandular etiology, fistulas associated with Crohn's disease are separate entity that requires a multidisciplinary approach. This chapter will be an overview of modern approaches in anal fistula treatment regardless of etiology with special consideration on how to avoid adverse outcomes and to improve patients' quality of life.

Keywords: anal fistula, fecal incontinence, cryptoglandular, IBD, sphincter preserving techniques

1. Introduction

Anal fistulas, especially complex anal fistulas, still present a challenge for surgeons because of their high recurrence rate, possible postoperative risk of fecal incontinence and also the fact that nowadays we still do not have a standardized procedure of choice for treatment.

An anal fistula is defined as an abnormal communication between perianal skin and anal canal, filled with granulation and fibrotic tissue that supports chronic inflammation, disabling spontaneous healing. Most fistulas are of cryptoglandular etiology, but can also be associated with inflammatory bowel disease (Mb Crohn), malignancies, trauma, pelvic sepsis or diverticulitis. Incidence of the disease is about 10 cases per 100,000 individuals with a male to female ratio of 2:1 [1, 2].

In the past, various classifications for anal fistulas were proposed. One of the most widespread classifications was Parks' classification which classified fistulas according to their correlation with anal sphincter complex and divided fistulas into intersphincteric, transsphincteric, suprasphincteric and extrasphincteric [3].

Surgeons noticed, using traditional surgical techniques such as fistulotomy, fistulectomy or cutting seton, frequent continence disturbance following operations, especially in cases when fistula tract passed through deeper parts of sphincter complex and internal fistula opening was positioned more proximally in the anal canal.

To simplify classification and to prevent possible postoperative continence disturbance, colorectal surgeons nowadays mostly use simple classification which divides fistulas into two groups: simple and complex, according to the relation of the proportion of the anal sphincter mechanism they pass through. The classification that distinguishes simple and complex anal fistulas helps the surgeon to avoid using traditional techniques to prevent possible continence disturbance, but does not help in the decision which operative technique is best to use in the treatment of complex fistulas. Classification by Garg is extrapolated from multiple clinical scenarios and presents a better correlation with an actual patient case (Figure 1).

Grade I	LOW Fistula with Single Branch Intersphincteric or Transsphincteric	Low Intersphincteric Single branch			Low Transsphincteric Single branch								
Grade II	LOW Fistula with Multiple tracts, Abscess or Horseshoe Intersphincteric or Transsphincteric	Low Intersphincteric with Multiple branches		Low Transsphincteric with Multiple branches		Low Intersphincteric with Abscess		Low Transsphincteric with Abscess		Low Intersphincteric with Horseshoe tract		Low Transsphincteric with Horseshoe tract	
Grade III	HIGH Transsphincteric Fistula with Single Branch Anterior Fistula in Female or Impaired Continence or Crohn's disease or Previous radiation	HIGH Transsphincteric with Single branch				Anterior Fistula in a Female							
Grade IV	HIGH Transsphincteric with Multiple tracts or Abscess or Horseshoe tract	HIGH Transsphincteric with Multiple tracts		HIGH Transsphincteric with Abscess		HIGH Transsphincteric with Horseshoe tract							
Grade V	HIGH Transsphincteric with Supralevator tract or Suprasphincteric or Extrasphincteric	HIGH Transsphincteric with Supralevator tract		Suprasphincteric		Extrasphincteric							
LOW - Involving < 1/3 of External Sphincter, HIGH - Involving > 1/3 of External Sphincter													

Figure 1.
Garg classification of anal fistulas (with permission of Dr. Pankaj Garg).

Simple anal fistulas have only one tract that crosses less than 30% of the anal sphincter complex and can be treated by fistulotomy or fistulectomy with very low postoperative continence disturbance incidence and high healing rate.

All other fistulas are classified as complex. These fistulas cross the anal sphincter at a point that encompasses more than 30% of the external anal sphincter. They can have multiple tracts. Complex fistulas also include those about inflammatory bowel disease (IBD), those which are anteriorly positioned in female patients or those which are recurrent. If those fistulas are treated with fistulotomy or some other traditional technique, it can result in some type of postoperative fecal incontinence. The average rate of continence disturbance, such as flatus or liquid stool leakage following fistulotomy, was observed in 20–25% cases and up to 12% cases after cutting seton treatment [4, 5]. This effect on continence has resulted in traditional surgical techniques being less favorable for complex anal fistulas treatment and the incentive to use minimally invasive sphincter sparing techniques is increasing.

In anal fistula treatment, it is important to apply an appropriate surgical approach to obtain the best postoperative results such as high primary healing rate, low postoperative pain, low risk for any type of fecal incontinence, low recurrence rate and to subsequently increase postoperative patient's life quality.

2. Goals of anal fistula treatment

2.1 Pathogenesis

To delve into the intricacies of anal fistulas, one must first understand hypotheses that currently exist. The most widespread hypothesis is the cryptoglandular one which states that infected or inflamed anal glands are the cause of anal abscess and fistula [6]. This could be due to the ascending inflammation originating in the anal canal or blockage of discharge. Over almost 150 years, much research was done to find out exact relationship between anal glands and anal fistula, and while some researchers found them to correlate, others weren't even able to prove the existence of anal glands or found them to be very variable at best [7]. Nevertheless, this is the predominant theory that surgeons adhere to throughout the modern surgery era, and anal glands seem to be the likely culprit. Despite this, etiology remains uncertain or unknown, but the inflammatory process seems to play a crucial role.

From the anatomical standpoint, it was stated by Parks that anal fistula is the chronic manifestation of anal abscess that is an acute condition. Fistula forms as a consequence of the medio-lateral spread of infection that subsequently may perforate the anal sphincter complex and extend to the perianal skin, thus forming a fistula [3]. More recently, Garg has shown that intersphincteric space plays a major role in anal fistula pathology, stating that almost all complex fistulas have some degree of intersphincteric involvement and that fistula in closed intersphincteric space acts like an abscess and must be treated accordingly [8, 9].

Molecular analyses of an anal fistula are scarce. One study has shown abundant expression of pro-inflammatory cytokine IL-1b in 93 % of the cryptoglandular anal fistulas, along with increased levels of cytokines IL-8, IL-12p40 and TNF- α in anal fistulas [10]. IL-1, especially IL-1 β are strong pro-inflammatory cytokines that can be stimulated by other cytokines, microbial products and even IL-1 β by auto stimulation, which can play a role in the recurrence or persistence of anal fistula. Tozer et al. showed immunological differences between cryptoglandular and Crohn's

disease-associated fistula [11]. While those are undoubtedly valuable findings that advance our understanding of anal fistula pathology, they still don't change anything in our management of this problem.

2.2 Diagnostic methods for anal fistulas

To achieve best results, accomplish a higher primary healing rate, prevent recurrence and risk of postoperative continence disturbance, it is essential to identify the entire course of fistula tract including infected anal gland in intersphincteric space, main and possible secondary tracts. In that way, one can decide which surgical option is best for the patient.

After performing DRE, additional usage of the metal probe with insertion through fistula canal should be done to identify which type of fistula patient has so one can decide which surgical option should be performed. In case of pain, this can be performed under anesthesia (EUA: examination under anesthesia) [12]. In the case of a simple anal fistula, it is usually sufficient to examine as mentioned above, but in cases of a complex anal fistula in most cases, additional diagnostic methods should be done.

Some diagnostic methods that have previously been used to verify the course of fistula tracts, have since been abandoned. One of these techniques is X-ray fistulography. This technique is not performed anymore because it does not show the correlation of the fistula tract to the anal sphincter complex, so in that way, surgeon does not know which type of anal fistula the patient has [13].

Possible options to verify the correlation of the fistula tract with anal sphincter complex are: CT fistulography, endoanal ultrasound (EUS) and MRI fistulography.

CT fistulography can be more accurate in cases associated with acute inflammations and abscesses, but it is somewhat deficient in cases of mature anal fistula.

Endoanal ultrasound (EUS) is a very good option to verify fistula tract correlation with sphincter complex and possible secondary branches but it is a highly operator-dependent technique [14–16].

For now, the golden standard for anal fistula diagnosis and classification is magnetic resonance imaging (MRI). MRI helps not only to accurately demonstrate disease extension but also to predict prognosis, make therapy decisions and can be used in some cases in follow-up periods especially in the patient suffering from Crohn's disease or recurrent fistula (**Figure 2**) [16–21].

One other possibility in the verification of main fistula tract and possible secondary branches is using fistuloscope during the diagnostic phase of VAAFT procedure (video-assisted anal fistula treatment) but the technique can also be considered as operator-dependent [22]. VAAFT procedure will be discussed later in this chapter.

2.3 Management principles

It is stated that the ideal treatment for anal fistula lies on two principles. The first is the eradication of sepsis and promotion of fistula tract healing, and the second is preserving the sphincter complex and continence mechanism [23]. With simple fistulas, this can be achieved by laying open the fistulous tract with high healing rates and with no significant continence disturbance [24]. While simple fistulas have simple treatment solutions, the concept of treatment for complex fistulas is somewhat different, and while the above-mentioned principle holds, certain aspects should be explained.

Colorectal surgeons' postulate that internal fistula openings should always be identified and closed. This was shown in a meta-analysis by Mei et al. with class I

Figure 2.
MR fistulography clearly shows horseshoe fistula on axial view.

evidence for significant association between anal fistula recurrence and failure to identify and close internal fistula opening. The same meta-analysis also showed the connection between horseshoe fistula extensions and recurrence [25]. Both of these problems could be solved by applying video-assisted approach in treatment. This covers the first principle.

To achieve the second principle in complex anal fistula, sphincter preserving techniques should be used to address the anal continence problem. Currently, no study compares lay open techniques and sphincter preserving techniques for complex anal fistula treatment but other studies have shown that, in this case, lay open techniques have an unacceptably high incidence of continence disturbance, up to 25% [4]. Meanwhile, sphincter preserving techniques for complex fistulas, with the possible exception of rectal advancement flap, have shown to have no or only minor continence disturbances in up to 1.7% patients [26].

A somewhat different approach, arising from analysis of modern sphincter preserving techniques, to the ideal treatment of anal fistulas was described by Garg. He hypothesized that in order to successfully heal anal fistula, we should bear in mind three principles:

1. Intersphincteric fistula tract acts like an abscess in closed intersphincteric space.
2. Second principle follows the first: intersphincteric fistula must be drained and continuous drainage should be ensured.
3. Healing occurs progressively until interrupted irreversibly by a collection [9].

This may be the reason why most sphincter preserving treatment methods still do not have healing results comparable to lay open techniques.

3. Traditional surgical techniques: fistulotomy, fistulectomy, seton placement

When talking about traditional techniques in anal fistula treatment we refer to fistulotomy, fistulectomy or techniques with seton placement in the anal fistula canal. Even since Hippocrates, there have been advices and different references on how one should treat anal fistula [27]. Traditional techniques were used in the treatment of anal fistula during history, before the development of sphincter preserving techniques.

Fistulotomy as the oldest, simplest and most widely performed procedure in anal fistula treatment has its benefits and drawbacks. This procedure, with its synonym “lay open technique,” is quite a simple procedure in which the surgeon, after insertion of the metal probe, cuts (or lays open) the whole of fistula tract from the internal fistula opening which is located in the anal canal to the external opening situated on the perianal skin. Following this, the surgeon performs curettage of granulation tissue from the fistula tract remnant making, in a sense, an acute wound that should heal by secondary intention. Some surgeons perform additional marsupialization of wound edges the following fistulotomy to reduce postoperative bleeding and to speed up wound healing (**Figure 3**) [28].

In this way, crucial postulates in anal fistula treatment are satisfied, except the preservation of anal sphincter complex to a lesser degree. Even though this procedure has a success rate of more than 90%, it is also associated with some type of postoperative continence disturbance in cases when the fistula tract crosses through deeper parts of the anal sphincter complex and when the internal fistula opening is placed more proximally in the anal canal. The incontinence rate following these procedures vary given the heterogeneity of anal fistulas, but can be up to 28% [4, 29].

In recent times, according to Garg’s classification, this technique should be only reserved for treatment of type 1 and 2 anal fistulae without risk of continence disturbance, meaning low intersphincteric and low transsphincteric fistula (simple anal fistula) [30].

Fistulectomy is performed by excising the whole of fistula tract, removing in that way the whole fistula tract from external fistula opening to internal fistula opening, without preservation of anal sphincter complex. In a meta-analysis that included

Figure 3.
Fistulotomy with marsupialization (shown by red arrows).

565 patients comparing fistulectomy and fistulotomy for low anal fistulas, there has been no conclusive evidence as to which procedure is better in simple anal fistula treatment [31].

Failure of treatment with fistulotomy of fistulectomy and recurrence is associated with inappropriate selection of patients with high anal fistulas or those with multiple tracts.

The seton placement technique distinguishes between “cutting” and “loose” seton.

Cutting seton technique is nowadays almost abandoned but was used to convert high anal fistula to low one which was later treated by lay open technique. Seton was made of unabsorbable material, placed through the anal fistula canal and then tightened enabling in that way slow cutting of the sphincter mechanism leaving behind a scar. The idea behind the technique was that it would prevent anal sphincter muscle to split and, in that way, to prevent serious problems with continence disturbance. It was proven however, that this technique has a high incidence of continence disturbance with high morbidity and recurrence rates [5].

When talking about the role of loose seton the situation is somewhat different. Loose seton should be placed through the fistula tract without tightening, helping in that way to reduce sepsis and to mature the fistula tract. This would be the first stage in resolving of anal fistula problem. Many surgeons advocate loose seton placement as an important step of rectal advancement flap procedure or LIFT (ligation of intersphincteric fistula tract) prior to that operation, even though there has not been clear clinical evidence [32, 33]. Seton placement before fistulotomy with sphincter reconstruction has shown its benefits in fistula treatment, namely in converting high transsphincteric to low transsphincteric fistula and also in the acute abscess stage before this procedure to reduce the risk of breakdown of sphincter repair [34].

4. Sphincter preserving techniques: new solutions to prevent postoperative fecal incontinence

As mentioned earlier, the high risk of postoperative continence disturbance after treatment of complex anal fistulas with traditional techniques, have led to the need for the development of new techniques, which would be dubbed “sphincter preserving techniques.” The main characteristic of such techniques is that they prevent or greatly reduce any possibility of postoperative fecal incontinence. Various sphincter preserving techniques were introduced in clinical practice in the last 10–15 years. Among these are laser treatment procedure (FiLaC®: fistula laser closure), fibrin glue treatment, anal fistula plug, VAAFT procedure (video-assisted anal fistula treatment), LIFT procedure (ligation of intersphincteric fistula tract), anal fistula treatment with platelet cells (PRP: platelet rich plasma), RAF (rectal advancement flap) and others [22, 33, 35–42].

Some sphincter preserving techniques weren't broadly accepted given high cost, high recurrence rates or inability to reproduce similar results in other centers. Of above-mentioned sphincter preserving techniques, several gained wider acceptance, such as LIFT, VAAFT, and RAF technique.

4.1 Ligation of intersphincteric fistula tract (LIFT)

Ligation of intersphincteric fistula tract (LIFT) is a sphincter preserving technique first performed and published by Rojanasakul [39]. This technique satisfies all goals

of anal fistula treatment such as the closure of internal fistula opening, removal of infected intersphincteric fistula tract (anal gland) and eradication of remaining fistula tract. It is reserved for the treatment of complex transsphincteric anal fistulas. After identification of fistula tract using metal probe surgeon makes a curvilinear incision on the anocutaneous border entering intersphincteric space and performs preparation of intersphincteric part of anal fistula, followed by removal of the intersphincteric portion of the fistula. Closure of remaining defect of anal fistula on internal and external anal sphincter muscle then follows. Curettage of remaining fistula tract from external fistula opening to external anal sphincter muscle should be performed. Intersphincteric space is then reconstructed and the perianal wound sutured.

According to the two available meta-analyses, this procedure gives an overall success rate of 76.4 and 78 % respectively, with a low complication rate 5.5–13.9%. The most common complication was wound dehiscence, and others were bleeding, infection, hematoma, anal discharge. Only a low grade of postoperative fecal incontinence in 1.4% of patients was recorded (**Figure 4**) [33, 43].

This technique is easily reproducible without the necessity of investment in potentially expensive equipment. In case of dehiscence of intersphincteric space loose seton can be inserted through the intersphincteric wound, thus making conversion of transsphincteric fistula in intersphincteric one, which can be afterward treated by fistulotomy without fear of continence disturbance.

Figure 4.
LIFT procedure: identification of fistula tract in the intersphincteric plane; red arrow showing fistula tract.

4.2 Video-assisted anal fistula treatment (VAAFT)

Video-assisted anal fistula treatment (VAAFT) procedure is the only technique that enables visualization and operation of anal fistula from within fistula tract, using

pecially designed equipment. This sphincter preserving technique was developed by Meinero who described short and long-term results [22].

Using a special instrument (fistuloscope), the surgeon visualizes the fistula tract from inside, which helps to identify possible secondary branches of the fistula tract,

Figure 5.
Intraoperative view of the fistula tract through fistuloscope.

Figure 6.
Fulguration of the fistulous tract.

Figure 7.
View of the debris after fulguration.

abscess cavities and later destroys all chronic granulation tissue in the fistula tract making in that way an acute wound which should heal by secondary intention. The important part of this technique is also to identify the internal fistula opening inside the anal canal and to close it securely (**Figures 5–9**).

Many surgeons worldwide accepted this technique in their everyday practice for the treatment of complex anal fistulas [22, 38, 44–46].

The main indication for this technique is the treatment of complex anal fistulas, especially cases with multiple secondary branches which are deep in

Figure 8.
Postoperative view after VAAFT for complex horseshoe fistula.

Figure 9.
Healed wounds in the same patient.

the ischioanal fossa and are not easily reached. Also, VAAFT has its benefits in treatment of patients who have anal fistula associated with Crohn's disease, helping to ameliorate symptoms associated with chronic anal fistula such as pain and soiling, thus significantly increasing patient's quality of life [44, 47]. VAAFT technique is comparable with other sphincter preserving techniques to healing and patient satisfaction. Diminished postoperative pain, earlier recovery after surgery and smaller postoperative perianal wounds allows for earlier return to normal activities [48].

In case of failure, this technique can be repeated because there is no risk for any continence disturbance following this procedure. The proposed mechanism whereby repeated procedures have an incremental effect is the conversion of complex fistula with multiple tracts into a more manageable, low or simple fistula, which can be called conversion of the fistula [38].

VAAFT technique has been proven to be a safe procedure, associated with good functional outcomes and a very low incidence of complications [22, 44, 45], which was shown in a published meta-analysis [46]. It showed a recurrence rate ranging from 7.5 to 33.3% with a weighted mean recurrence rate of 17.7%. Recurrence rates varied significantly depending on the method of internal fistula opening closure (mattress suture, stapler, rectal advancement flap). No affection of anal continence was documented.

4.3 Rectal advancement flap (RAF)

This technique is one of the oldest techniques which were and still are reserved for the treatment of complex anal fistulas especially in cases with large internal fistula opening. When discussing this technique, we can't talk about the "pure" sphincter preserving technique because flap should be performed by dissection of anorectal mucosa and adjacent internal anal sphincter muscle, so in that way, internal anal sphincter muscle does not stay intact.

When doing this procedure surgeon should identify and excise the internal fistula opening in the anal canal. Then the U-shaped or rhomboid flap with a wider base side should be performed by dissecting anorectal mucosa and adjacent internal anal sphincter muscle. Curettement and irrigation of the whole fistula tract should be performed, followed by suture of a defect in sphincter complex left by earlier fistula tract. The site is then covered by previously prepared flap and sutured. Even though much research has been made about optimal flap thickness, researchers found that there was a statistically higher rate of primary healing in cases with thicker flaps, but also have noticed a higher rate of mild postoperative continence disturbance which was more severe than the thicker flap was (**Figure 10**) [41, 49, 50].

There have been many publications and several systematic reviews and meta-analyses on this technique where the effectiveness was shown to be 60–80%, but the same cases also reported some degree of postoperative fecal disturbance [42, 50, 51].

Factors that could affect healing after flap procedure are obesity and smoking, so patients should be advised to quit smoking and to try to reduce their weight prior to flap operation [52–54]. To increase the effectiveness of this technique one should perform bigger rhomboid or U-shape flaps using the minimally invasive approach, avoiding tissue trauma made by surgical cautery, avoiding excessive grasping as well as the too big strain of suture line.

Figure 10.
Formed rectal advancement flap.

5. Other solutions for anal fistula treatment

As mentioned earlier in this chapter, there is no universal approach for anal fistula treatment. Some other possible solutions may be hybrid sphincter preserving techniques, fistulotomy with primary sphincter reconstruction, TROPIS (trans anal opening of the intersphincteric space) and use of autologous platelet rich plasma in anal fistula treatment.

5.1 Hybrid sphincter preserving techniques

Hybrid sphincter preserving techniques are combinations of two or more sphincter preserving techniques in a single procedure to increase healing rates and achieving better results.

Several reports exist with different combinations of techniques with authors trying to achieve higher healing rates, but the majority of reports are on a single institution basis or case reports with a small number of patients.

A combination of VAAFT and LIFT techniques was performed with intention of secure closure of internal fistula opening from intersphincteric space and additional exploration and eradication of remaining fistula tract from external fistula opening with identification of possible secondary branches using fistuloscope [55, 56]. VAAFT

was also used in different combinations with other sphincter preserving techniques such as FiLaC® procedure and with RAF procedure in cases with large internal fistula opening [38, 44, 57].

The combination of LIFT technique with the insertion of a bioprosthetic graft in intersphincteric space was also described in a study that included 31 patients, where the success rate was 94% in a one-year follow-up period [58]. Another study combined LIFT and human acellular dermal matrix as a bioprosthetic plug with a reported success rate of 95% on a 21-patient sample [59]. Rectal advancement flap with the injection of porcine dermal collagen implant through the external opening was combined in a study which included 24 patients with a success rate of 82.5% in a 14-month follow-up period [60].

It was to be expected that surgeons started to combine two or more sphincter preserving techniques to achieve better results, but until evidence is found that one technique, or combination of techniques, has significantly better results over the others, they should be tailored individually depending on patient's case.

5.2 Fistulotomy with primary sphincter reconstruction

This approach in the treatment of anal fistulas has the same operative philosophy as fistulotomy or fistulectomy, but is reserved for higher fistulas. In this procedure surgeon after eradication of the fistula tract and possible secondary fistula branches to prevent recurrences, makes additional anal sphincter reconstruction to try to eliminate the possibility of postoperative fecal incontinence. Ratto et al. reported a 93.2% overall success rate with a low morbidity rate using this approach. Overall postoperative fecal incontinence was 12.4% mainly post-defecation soiling, without significant changes in anorectal manometry parameters [61]. Voon et al. reported their experience in using this technique and had good outcomes with a very low rate of continence disturbance in follow-up period [34]. Even though this technique has been implemented in guidelines for anal fistula treatment by several surgical societies, it wasn't accepted worldwide as the standardized procedure [62]. In case of abscess formation as the initial presentation, it is crucial to place seton drainage to give enough time for maturing of the fistula and to prevent continence disturbance following fistulotomy.

5.3 Trans anal opening of the intersphincteric space (TROPIS)

This technique was described and published by Garg, who used this approach in the treatment of high complex anal fistulas with a high primary healing rate and very low incidence of morbidities [8]. It is well known that high intersphincteric parts of anal fistula and abscesses are difficult to reach through intersphincteric approach or probing from external fistula opening, as well as that they are usually branching.

TROPIS approach also satisfies golden principles in the treatment of anal fistula such as identification and resolving internal fistula opening problem, as well as intersphincteric fistula tract with the accompanying anal gland, and also eradication of remaining fistulous tract by curettement.

The procedure is done by laying open intersphincteric space through internal anal with preservation of external sphincter. The external tracts in the ischioanal fossa should be curetted and the intersphincteric space is left open for secondary healing. In the initial prospective cohort which included 61 patients, the success rate was 84.6%

with no significant changes with continence. The study included patients with high transsphincteric (anterior and posterior) and high intersphincteric type of fistula [8].

TROPIS procedure is an excellent approach for posterior high transsphincteric type and high intersphincteric type of anal fistula, especially if transsphincteric fistula is located at the puborectalis level. However, combination with drainage (preoperative seton placement and postoperative drain placement in remaining tract from external fistula opening), curettement or excision of external tracts is necessary to reduce recurrences.

5.4 Use of autologous platelet rich plasma in anal fistula treatment

Autologous platelet rich plasma (APRP) is nowadays used in various fields of medicine such as orthopedics, plastic surgery, dental medicine, but also in the treatment of anal fistula in the last decade. APRP is platelet concentration derived from centrifuged full blood after removal of red blood cells. Such prepared plasma is a rich source of various growth factors implicated in regeneration and tissue healing [63, 64].

The procedure consists of curettement of fistula tract and closure of internal fistula opening with an additional injection of previously prepared platelet rich autologous blood sample [65]. The majority of publications combined mucosal advancement flap with APRP injection [65–67]. Several publications reported an average healing rate from 60 to 90% [40, 66–68]. The drawbacks of mentioned publications were that they had a relatively small number of patients enrolled and still no meta-analyses exist on the subject. No problem with any type of postoperative fecal incontinence was reported. This is still considered to be a somewhat experimental procedure and is not widely used. The platelet separation procedure requires special equipment that is often only available in larger institutions. Also cost per patient exceeds that of the other techniques, which is why this technique needs more solid evidence for a patient benefit before it can be considered to become one of the mainstream sphincters preserving treatments.

6. Anal fistula in Crohn's disease

We can say that fistulas associated with Crohn's disease present a special entity in the treatment of anal fistulas. This kind of fistula presents a huge challenge for surgeons despite numerous surgical possibilities and technical advancements in recent years. Symptoms associated with Crohn's anal fistula include purulent drainage, severe pain, possible continence disturbance which all can lead to a significant reduction in quality of life. These kinds of fistulas are often recurrent and hard to treat. The incidence of anal fistulas in patients with Crohn's disease is 5 to 40% and is more common in patients who have a higher severity of colorectal inflammation [69–71].

Even though numerous surgical techniques have been described for the treatment of this kind of anal fistulas, the choice of which technique is best often depends on the anatomy, presence of local inflammation, type of fistula, and surgeon's experience (**Figure 11**) [72–74].

Many management proposals have been published, but all had higher reports of postoperative complications such as continence disturbance, infection and high recurrence rate compared to the same type of fistulas not associated with Crohn's disease. Currently, numerous novel surgical sphincters preserving techniques are being

Figure 11.
Perianal form of Crohn's disease in female patient: multiple treatment methods combined (fistulotomy with marsupialization, seton placement, VAAFT).

studied to less invasively induce fistula healing while maintaining fecal continence. When we discuss surgical treatment of complex anal fistulas in Crohn's disease, the goal should be to ameliorate symptoms associated with this kind of fistulas and to improve patients' quality of life. Although, various endoscopic and surgical techniques exist, there is no gold-standard treatment strategy for patients with perianal fistulas [44, 47, 75, 76].

Treatment of Crohn's disease-associated anal fistula should always be multidisciplinary including surgeons, radiologists and gastroenterologists with the use of antibiotics, immunosuppressors and anti-inflammatory agents [77–81].

General principles in the treatment of this condition are underlined here, but the treatment of an anal form of Crohn's disease is a complex topic, requiring a chapter on its own.

7. Discussion and conclusion

The problem of anal continence presents a big obstacle when trying to treat anal fistula. It is of paramount importance to avoid any continence disturbances which in itself presents a hurdle to implementing more successful but invasive procedures regarding the anal sphincter mechanism. The solution might lie in a relatively new paradigm that puts intersphincteric space as a likely culprit to fistula recurrence or nonhealing, and subsequent shift in surgical approach. These new approaches still require multicentric verifications to be implemented as a mainstream treatment option.

Overall, novel approaches in anal fistula treatment, while not entirely successful in all of the patients, offer a significant increase in patients' quality of life, and allow for repeated surgical procedures if the initial operation fails at no expense on the anal sphincter.

While various researchers made different molecular research on anal fistula that increased our understanding of fundamental pathologic mechanisms, still no findings translate into clinical practice in the sense that they made any difference on already existing surgical approaches.

The most widespread classification of fistulas are somewhat inadequate and do not transfer well to clinical situations. Parks classification may describe the relation of the anal fistula to anal sphincter muscles but does not distinguish between simple and complex fistulas. St. James University Hospital classification also doesn't seem related to the clinical situations in the era of sphincter preserving techniques. A possible solution to this may be Garg classification that still needs confirmatory commentaries from other colorectal surgeons and proctologists.

Anal fistulas in Crohn's disease present a different challenge. With current surgical solutions, we cannot hope to cure the condition but rather to ameliorate symptoms. Medical therapy in combination with surgical solutions can significantly reduce the severity of the disease and even hope to eradicate it completely.

The anal fistula condition remains a daunting task for the surgeon and a strenuous malady for the patient. Even though recent years brought advancements in the form of sphincter preserving techniques, which greatly improved treatment options, still no golden standard for anal fistula treatment exists. This problem still seems unlikely to resolve given the heterogeneity of pathology unless a radically different approach or breakthrough isn't achieved.

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