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Infected Chronic Anal Fissures: Clinical Description, Ethiopathogenic Considerations And Surgical Requirements

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Abstract
Anal fissures are common and painful anorectal disorders, and the chronic form, especially when infected, presents a therapeutic challenge. Perianal infections are often underdiagnosed in chronic anal fissures and their proper management is crucial to reduce morbidity. This ambispective observational study aimed to outline the surgical approach for infected chronic anal fissures and evaluate its effectiveness in preventing recurrence. We included 158 patients with infected chronic anal fissures, the primary outcome being the healing rate, defined by complete re-epithelialization of the fissure with no signs of infection. The treatment plan involved a fissurectomy, complemented by a precise diagnosis and tailored management of fistulous tracts, with interventions adapted according to their type and the perioperative findings. Subcutaneous abscesses were drained, submucosal fistulae were treated with surgical incision and curettage, transphincteric fistulae were drained, setons were placed when necessary and hemostasis was achieved. Recurrence occurred in 8 cases, 75% of which were infected, requiring revision surgery. One pathology report revealed in situ carcinoma. All patients had a full recovery at the end of the follow-up period. Our surgical approach, which combines fissurectomy, curettage of the fistulous tract, and fistulectomy, effectively promotes long-term healing while preserving anal sphincter function. It demonstrates promising results in preventing recurrence, highlighting the importance of a comprehensive management for infected chronic anal fissures in reducing morbidity and improving patient outcomes.
Keywords: *chronic anal fissures, perianal suppurations, coloproctology, surgery, fissurectomy*

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I. Introduction

Fissure in ano is one of the most frequent and painful anorectal disorders. The pathogenic theories explaining its appearance and in some cases its persistence are constantly evolving. Chronic anal fissures represent a therapeutic challenge for proctologists, especially when they are infected. Septic complications of anal fissures remain under-diagnosed and poorly documented, meanwhile they seem to be increasingly incriminated in the persistence and recurrence of anal fissures. Their adequate management is therefore mandatory in order to improve the morbidity of chronic anal fissures.

The aim of this study is to describe the surgical requirements when faced with infected chronic anal fissures and to demonstrate their effectiveness in reducing persistence and/or recurrence.

II. Patients And Methods

Patients

We conducted an ambispective, observational, single-arm study between January 2015 and January 2021 inclusive in our tertiary proctology unit. The inclusion criteria were the existence of pus coating the fissure bed (fig. 1) or the presence of a subcutaneous abscess complicating the anal fissure (fig. 2), whether fistulized or not. We did not include patients with Crohn's disease, tuberculosis and acute hyperalgesic fissures. Patients' clinical and surgical data were extracted from medical records.

Figure 1. Infected anal fissure with visible pus discharge

Figure 2. Subcutaneous abscess associated to an anal fissure, characterized by localized swelling, redness and anal pain, often accompanied by purulent discharge.

Surgical Procedure And Follow Up

Surgery was indicated when facing a persisting anal fissure despite conservative measures (laxatives, anti-inflammatory, topical anesthetics and healing ointments). All the patients were placed on antibiotics postoperatively for 7 days, with follow-ups every two weeks over a period of three months then once a month over six months then every three months over a period of two years, in order to assess the overall wound healing and to look for complications or recurrences. Adverse events were recorded during the procedure and during the follow-up consultations.

Outcome

The main outcome was the effectiveness of our surgical approach, measured by the healing rate. Healing was defined as the re-epithelialization of the fissure bed and the absence of local infection.

Statistical Analysis

Data was collected in a database using the Excel software (Microsoft Corp., Seattle, Washington, USA) and analyzed using the SPSS25 software (IBM Corp., Chicago, USA). Patient characteristics were described as number and percentage for qualitative items and median (interquartile range [IQR]) or mean (± standard deviation) for quantitative ones.

Ethical Aspects

All patients were informed about the surgical procedure, its benefits and its risks. They gave informed consent to be included in this study.

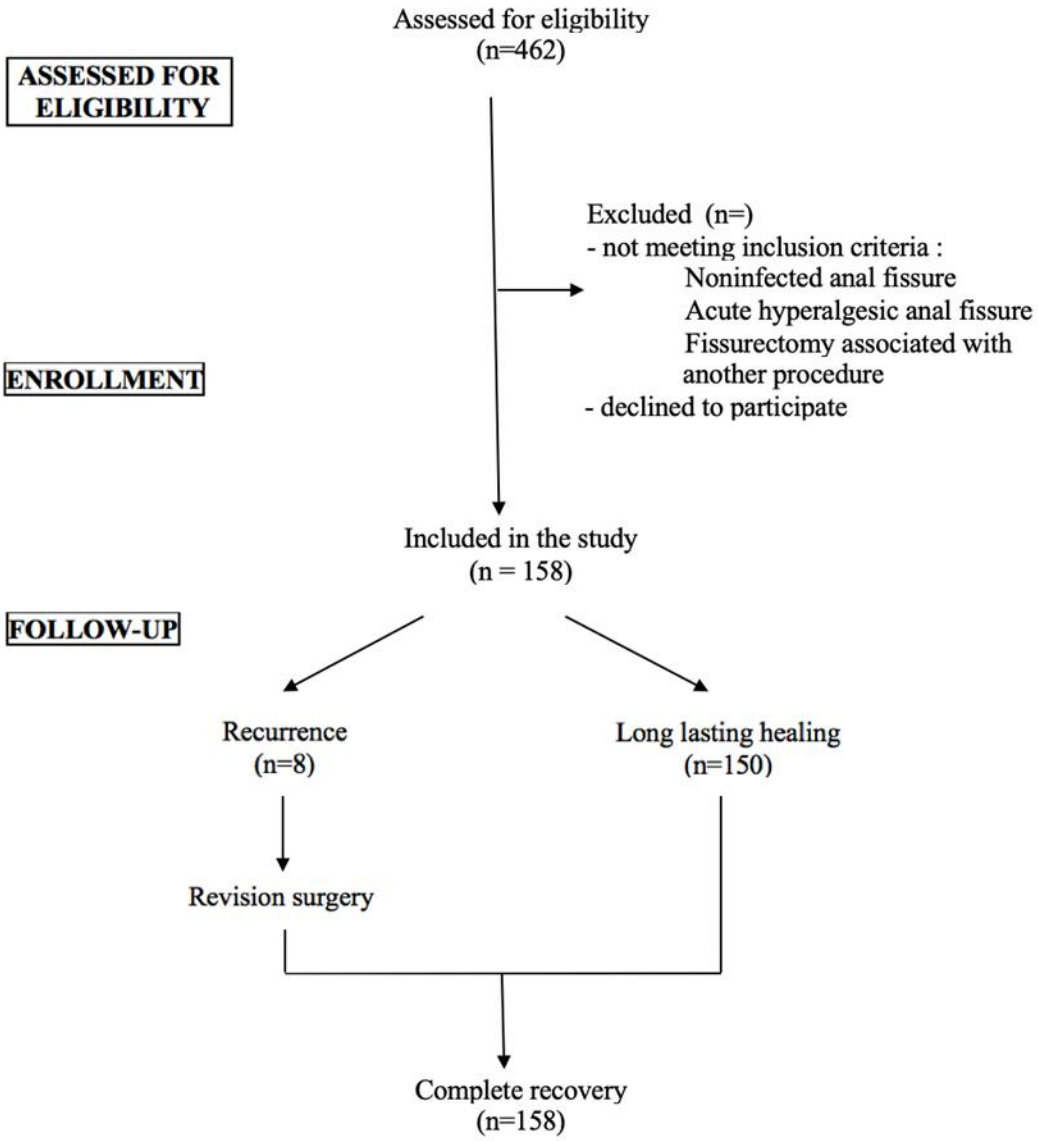

Figure 3. Study flow chart

III. Results

Out of 462 patients operated for anal fissure in our proctology unit during this period, we selected 158 patients responding to the inclusion criteria. The study flowchart is presented in figure 3. Patients' and lesions' characteristics are summarized in Table 1.

The median (IQR) age was 41,3years (19-76years). The sex ratio was 2,1 (51F,107M). patients' characteristics are summarized in Table 1. Suppurative pathologies associated to chronic anal fissures in our study are summarized in Table 2.

Patients' characteristics (n = 158)

Characteristic	Value
Clinical features	
Age (yr)	41.3 (19–76)
Men	107 ()
Posterior location	143 (90.5)
Anterior location	11 (7)
Lateral location	4 (2.5)
Previous history of proctologic surgery	9 (5.7)
Preoperative anal hypertonia at digital rectal examination	41 (82)
Intraoperative features	
Type of anesthesia	
Spinal	153 (96.8)
General	5 (3.2)
Postoperative and follow-up data	
Long-lasting healing	150 (94.9)
Recurrence	8 (5)
Pain relief at week 104	158 (100)

Values are presented as mean (range) or number (%)

Table 1. Patients' characteristics

	n (%)
Pus coating the fissure bed without induration	86 (54,4)
Subcutaneous fistula with an external opening located at 6 o'clock	29 (18,3)
Fissure-fistula	24 (15,2)
Subcutaneous abscess with fistulous tract	16 (10,1)
Fistulized abscess in the anal canal	2 (1,3)
Intramural abscess	1 (0,7)

Table 2. Suppurative pathologies associated to chronic anal fissures

Surgical Technique

All patients underwent surgery in the lithotomy position, under general or spinal anesthesia.

The common operative procedure was a fissurectomy, which was performed using a monopolar electro-cautery. After grasping the sentinel skin tag, the dissection was started with an incision of the anal verge, below the edge of the fissure, then surrounding it, eventually going above the dentate line. The associated subcutaneous abscess and skin pile and were removed within the same piece of tissue. Hemostasis was achieved as needed, and the wound was left open.

The following surgical steps were customized to the suppurative pathologies that were found during perioperative proctologic examination. Submucosal fistulae were treated with a surgical incision and curettage of the fistula tract. Transphincteric fistulae were drained. After opening up the fistula tract, connecting the internal opening within the anal canal to the external opening and creating a groove that would heal from the inside out, a seton drain was placed when we were unable to perform a fistulotomy. (fig 4a and 4b).

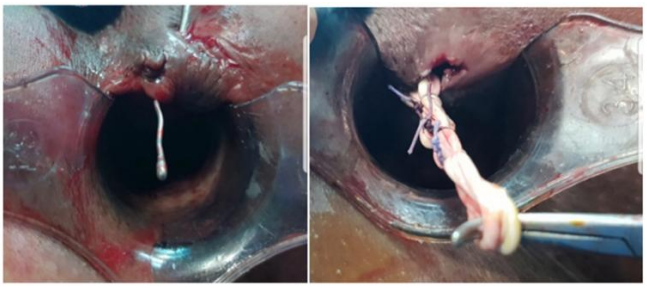

Figure 4. fissure-fistula with management involving adressing both the fissure and the fistulous tract in order to promote healing (a) stylet inserted into the fistulous tract (b) drainage of the transphincteric fistula using a seton

48 patients (30,3%) had in addition a calibrated sphincterotomy in order to reversibly decrease hypertonic sphincter spasm.

Recurrence

Recurrence occurred in 8/158 (5%) cases. 75% of these recurrences were infected. Two patients had a lateral anal fissure associated with an indurated tag hiding a suppurated ulcer in the posterior anal margin with hard and raised edges. Pathology from the excised material revealed an in situ squamous cell carcinoma of the anus. 3 patients had an infected recurrence, with a subcutaneous abscess complicating the anal fissure. 3 other patients had a persisting crater-like infected wound (fig. 5). They underwent a revision surgery. The evolution in all of our patients was a complete recovery.

Figure 5. Pus coating the fissure bed, leading to local inflammation and delaying the healing process.

IV. Discussion

Anal fissure is a linear tear in the epithelium and dermis located in the distal part of the anal canal and extending below the dentate line to the anal verge. Its diagnosis is exclusively based on the patient's clinical examination. The main symptom is a severe anal pain, classically triggered after defecation and usually lingers for a duration ranging from a few minutes to several hours afterward. Chronic anal fissures are not solely defined as lesions persisting after 6 weeks of appropriate medical management. Their definition is rather consensually based on morphological criteria, which are the development of adjacent skin tags, or sentinel tags and the induration of the fissure bed [1,2]. When anal fissures are chronic, anal pain tends to be less marked. Due to the chronic inflammatory phenomena, the edges of the fissure become raised and rolled with a seemingly infiltrated base. They become thicker, mainly at the external pole, forming a cutaneous cap called sentinel tag, that masks the bottom of the fissure. In addition, there is a more extensive loss of the epidermis in the fissure bed, exposing the white fibers of the internal anal sphincter, and a hypertrophied papilla can form at the internal pole of the fissure [1].

Several suppurative pathologies seem to be clinically associated with chronic anal fissures [3].

A subcutaneous abscess may be located at 6 o'clock immediately at the external edge of the fissure or under the skin tag. It can also be associated with a subcutaneous diverticular bridge or even a submucosal fistula draining pus under the fissure and starting at the distal pole of the anal fissure [4]. Fistulae associated with chronic anal fissures can also be intersphincteric or transphincteric (as per Park's classification) [3]. In Sainio's study, 3.3% of anal fistulae were associated with an anal fissure (fissure-fistula) [5]. Furthermore, Wittmer and Al [6] and Aigner and Al [7] described the association of fistulae with chronic anal fissures in more than 80% of the patients they included study. FitzDowse's series reported this association in 51% of the patients they operated in their unit [8]. Pelta and Al showed that all chronic anal fissures had a pathway extending into the subcutaneous tissue for 1 cm or more and ending in the sentinel tag [9].

The pathogenesis of chronic anal fissures is still controversial. Several ethicopathogenic theories have been put forward to explain the occurrence of anal fissures. Firstly, Arnous and Al incriminated factors related to internal anal sphincter spasm : certain individuals physiologically present increased sphincter pressures, responsible for high resting pressure within the anal canal, which consequently poorly adapts to the passage of hard and potentially traumatic stool. These individuals can also present with fibromyositis and parakeratosis of the perianal skin, thus favoring the occurrence of ulceration [10].

Furthermore, data from Klosterhalfen and Al [6] and Schouten and Al [7] directly implicate a decrease in the posterior anodermal blood flow leading to a delayed healing. It should be noted that the presence of subcutaneous diverticula could bias Doppler interpretations, giving a false appearance of low perfusion of the posterior pole of the anal verge, which could refute the ischemic theory [11]. However, chronic anal fissures can also be seen in patients without anal sphincter hypertonia [10]. They do not tend to heal spontaneously and are resistant to conservative treatment (smooth muscle relaxants, regular local care, adequate management of constipation) [2]. To this day, the exact pathogenesis of chronic anal fissures is still poorly understood [12], especially since they may recur even after pharmacological [2,4] and/or surgical management (whether it is a fissurectomy alone or associated with a sphincterotomy [11,13], or a internal lateral sphincterotomy exclusively [14,15]).

More recent studies suggested an underlying perianal sepsis is contributing to post-surgical recurrences of chronic anal fissures [4,7,13]. According to Goligher, the edges of the fissure seemingly come together as they heal, but in the meantime leave a tunnel between their junction and the fissure bed. This subcutaneous passage can later become infected [14]. Similarly, Pelta and Al suggested that initially, there is a traumatic tear of the anal dermis with a residual subcutaneous opening that may become infected due to impacted feces. The resulting infection and inflammation could be responsible for irritation and therefore internal anal sphincter hypertonia. Thus sphincter hypertonia would be both the consequence of the fissure and the reason for its persistence in a chronic form [13].

However, Parks and Al put forward two pathogenic concepts in which the anal fissure appears first, before being contaminated. His primary theory is that the anal fissure becomes infected and then the pathogens spread to the intersphincteric space leading to the constitution of an intersphincteric abscess. The second theory is that the anal fissure obstructs an anal gland, leading to its suppuration and thus the constitution of an intersphincteric abscess [4]. In fact, the association of a chronic anal fissure with an intersphincteric abscess could easily go undiagnosed, given their identical clinical features, which supports this last theory [3]. All in all, suppurations associated with chronic anal fissures could have a multifactorial ethiopathogeny and still need to be further assessed.

Perianal infections remain largely underdiagnosed when associated with chronic anal fissures [15]. It should be noted that long-term use of antibiotics and anti-inflammatory drugs may contribute to cooling the infection, making the development of suppurative symptoms more quiescent [4]. We argue that now a substantial body of evidence exists supporting that their management begins with the adequate diagnosis of the associated perianal sepsis.

When faced with a chronic anal fissure, especially if it is resistant/recurrent, physical examination should focus on looking for a purulent discharge. If it is present, an associated fistula or diverticular tract should be considered [16]. A bidigital rectal examination is advisable diagnose a swelling related to an intersphincteric abscess [3]. When palpating the distal pole of the fissure, any detected external orifice needs to be catheterized. If the latter is related to a fissure-fistula, the inserted catheter emerges from the fissure bed [17]. Personal experience suggests that it is preferable to catheterize this orifice with a reduced calibre stylet, preferably a lacrimal stylet, as conventional Lockard-Mummery styli are generally too bulky to catheterize any type of fistulous tract, particularly subcutaneous fistulae [9].

After the adequate diagnosis, respecting the principles of fistula management seem to condition the treatment outcomes. Our surgical approach combines a fissurectomy combined with curettage of the fistulous tract and fistulectomy and seems to guarantee a long-lasting healing while "safeguarding" the functional integrity of the anal sphincter system.

Our results regarding the effectiveness of this surgical approach are consistent with those found in analogous reports and we argue that now, a substantial body of evidence exists supporting this choice of management instead of the systematic lateral internal sphincterotomy when faced with a chronic anal fissure.

V. Limitations

While our study provides valuable insights into the management of infected chronic anal fissures, its observational design, small sample size, and lack of comparison to alternative treatments limit the strength of its conclusions.

VI. Conclusion

The management of chronic anal fissures requires meticulous diagnosis of the suppurative conditions associated with them and their appropriate treatment, in order to achieve quick healing and prevent their persistence or recurrence.

It seems like Lockhart Mummery's famous statement about cryptoglandular fistulas could be extrapolated to fistulas associated with anal fissures: "the reputation of many surgeons has been much more tarnished by ineffective operations on anal fistulas than by laparotomies. The poor results of laparotomies are

easily buried under flowers, while fistulas travel the world showing off the unfortunate consequences of their treatment".

What Is Already Known On This Topic:

- Recent pathogenic theories suggest that chronic anal fissures may not only be caused by sphincter spasm and ischemia but also by infections or abscesses that complicate the condition.
- The study highlights the surgical management of infected fissures, including the combined approach of fissurectomy and curettage of fistulous tracts, as an effective method for promoting healing. It suggests that this approach can prevent recurrence while maintaining the functional integrity of the anal sphincter system, which might be preferable over more invasive techniques like sphincterotomy. This contrasts with older studies that generally favored lateral internal sphincterotomy (LIS) as the primary treatment for chronic anal fissures. By demonstrating that fissurectomy and related procedures can provide long-lasting healing, the study adds a new perspective on the importance of managing infections and fistulas early in the treatment of chronic anal fissures.

What This Study Adds:

- The study provides an in-depth look at suppurative pathologies associated with chronic anal fissures. It brings attention to the fact that these conditions may be overlooked during diagnosis, which could lead to poor treatment outcomes. By classifying and describing these associated conditions, the study helps clinicians better recognize and address them during the diagnostic workup of patients with chronic anal fissures, which could improve overall treatment success.
- The study provides detailed long-term follow-up data, with patients being monitored for up to two years. This adds valuable information regarding the healing rates and recurrence rates associated with surgical treatment for infected chronic anal fissures. It reports a 5% recurrence rate, with most recurrences being infected, which is lower than expected in many previous studies and may indicate the effectiveness of the proposed surgical approach.
- Clinically, the study provides practical guidance on managing chronic anal fissures complicated by infection. By showing that a combination of fissurectomy, abscess drainage, and fistulotomy can achieve good healing outcomes while reducing the risk of recurrence, the study offers a treatment algorithm for patients with infected anal fissures, particularly those who have not responded to conservative treatments.

Conflict Of Interest: The authors declare they have no conflict of interest

Consent To Participate: The study was conducted in accordance with the Declaration of Helsinki and was approved by our local ethics committee on November 16th, 2021 (Number 142/21/PM). All patients were informed about the surgical procedure, its benefits and its risks. They gave informed consent to be included in this study. The authors affirm that human research participants provided informed consent for publication of the images in Figures 1, 2, 4a, 4b and 5.

Availability Of Data And Materials: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Authors' Contributions:

Dr TAJDINE and Dr BENASS proposed the concept and designed the study. Dr BENASS and Dr LARAQUI contributed to the acquisition of data. Dr. TAJDINE supervised the data collection. Dr BENASS performed the statistics, interpreted the data and wrote the manuscript with the help of Dr TAJDINE. All authors read and approved the final version of the manuscript.

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