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Evaluation of the risk factors needed to be considered in patients having unusual or persistent disease prior management of fistula-in-ano: Experience in a peripheral medical college hospital of Bangladesh

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Abstract
Background: Fistula-in-ano is a chronic abnormal connection between the anal canal and perianal skin, often resulting from unresolved anorectal abscesses. It poses significant clinical challenges due to recurrence, morbidity, and potential quality-of-life impacts, particularly in males aged 30-50. In resource-limited settings like Bangladesh, atypical or persistent cases are challenging to diagnose due to limited access to advanced imaging. Risk factors such as Crohn's disease, tuberculosis, diabetes, repeated surgeries, or malignancy complicate management. Accurate diagnosis, risk factor identification, and individualized treatment are crucial to avoid complications. Comprehensive evaluation and clinical vigilance are essential for effective outcomes, especially where diagnostic support is minimal.
Aim of the study: The present study aims to analyze the relevant risk factors in patients presenting with unusual or persistent fistula-in-ano at a peripheral medical college hospital in Bangladesh.
Methods: This cross-sectional observational study was conducted over 12 months (from January 2023 to December 2023) in a Peripheral Medical College Hospital in Dinajpur, Bangladesh, enrolling 50 purposively selected patients aged ≥18 years with clinically or radiologically diagnosed recurrent, complex, or persistent fistula-in-ano. Data were collected using structured questionnaires and clinical proformas, documenting sociodemographic details, clinical features, risk factors, investigations, and treatment. Diagnostic tools included fistulograms, MRI, USG, and relevant lab tests. Fistulas were classified using Parks' system, and management included fistulotomy, seton placement, LIFT, or conservative approaches. Outcomes, including wound healing and recurrence, were evaluated over at least six months. Data were analyzed using SPSS version 26 and Microsoft Excel.
Results: Among the 50 patients studied, 84% were male, and most were aged 31-40. Discharge (92%), pain (76%), and swelling (60%) were the most common symptoms. Poor perianal hygiene (56%), smoking (50%), and chronic constipation (40%) were key risk factors. Inter-sphincteric (40%) and trans-sphincteric (30%) fistulas predominated. Diagnostic tools like fistulograms (80%) and MRI/endoanal ultrasound (40%) aided in complexity assessment. Fistulotomy was the most common treatment (44%). The mean wound healing time was 4.2±1.5 weeks. Recurrence occurred in 20%, infections in 12%, and one patient developed incontinence. 74% achieved a complete cure, while 26% had persistent or recurrent disease.
Conclusion: This study emphasizes the need to address key risk factors and utilize early, individualized management for unusual or persistent fistula-in-ano. Despite effective treatment, recurrence and complications remain concerns, highlighting the importance of improved diagnostics, patient education, and standardized protocols, especially in resource-limited peripheral healthcare settings.

Keywords: Fistula-in-ano, risk factors, persistent fistula, unusual presentation and anal fistula management.

Introduction
Fistula-in-ano is a chronic abnormal communication between the anal canal and the perianal skin, typically resulting from a previous anorectal abscess that failed to resolve completely. It continues to be a significant concern in colorectal surgery due to its recurrent nature, associated morbidity, and the potential impact on patients' quality of life. The condition is more prevalent in males and often affects individuals between the ages of 30 and 50 years [1]. Despite its apparent simplicity, the clinical and management of fistula-in-ano become increasingly complex when associated with unusual presentations or persistent disease, often posing

diagnostic and therapeutic challenges in peripheral and resource-limited healthcare settings like those in Bangladesh. The etiology of fistula-in-ano is most commonly cryptoglandular in origin, although a range of conditions, including Crohn's disease, tuberculosis, malignancy, trauma, and radiation proctitis, may lead to complex or atypical fistulae [2, 3]. Accurate identification of these underlying or associated risk factors is crucial before definitive management, as overlooking them can result in persistent symptoms, recurrent fistula formation, or post-operative complications. In such scenarios, a comprehensive evaluation, including detailed clinical history, imaging studies, and sometimes histopathological analysis, is vital to prevent misdiagnosis and subsequent treatment failures [4]. In Bangladesh, fistula-in-ano is frequently encountered in surgical outpatient departments, yet systematic data on atypical or persistent cases are limited, particularly in peripheral medical college hospitals where diagnostic facilities and specialist support may be lacking. Consequently, general surgeons are often required to make therapeutic decisions without the benefit of advanced diagnostic modalities like MRI or endoanal ultrasonography. In such settings, clinical acumen and a high index of suspicion for underlying risk factors are essential to guide appropriate intervention and referral [5]. Several risk factors have been implicated in the persistence or complexity of fistula-in-ano. These include repeated surgical interventions, immunosuppressive conditions such as HIV/AIDS, underlying inflammatory bowel diseases, smoking, diabetes mellitus, and local malignancies [6]. Additionally, recurrent infections due to inadequate drainage or incorrect surgical techniques further complicate the healing process. The recognition of these contributing factors is particularly important in low-resource environments, where repeated surgeries often lead to sphincter damage, fecal incontinence, or chronic pain[7]. Recent studies emphasize the need for individualized and risk-adjusted treatment strategies to improve clinical outcomes. While simple fistulae may be managed effectively by fistulotomy, more complex cases often require seton placement, advancement flap procedures, or ligation of the intersphincteric fistula tract (LIFT) technique. However, success depends heavily on prior identification and correction of modifiable risk factors [8]. Moreover, long-standing or unusual fistulae may harbor hidden pathologies such as carcinoma, necessitating biopsy, and histopathological confirmation before surgical planning [9]. In Bangladesh, rural populations commonly present late with advanced or complicated perianal disease due to cultural taboos, lack of awareness, or limited access to specialist care. This delay often results in chronic fistula formation with underlying risk factors that go undiagnosed. Therefore, it is imperative to evaluate these predisposing factors in peripheral settings to develop a more targeted and effective treatment plan. The present study aims to analyze the relevant risk factors in patients presenting with unusual or persistent fistula-in-ano at a peripheral medical college hospital in Bangladesh.

Methodology and Materials

This cross-sectional observational study was conducted in the Department of Surgery at a peripheral medical college hospital in (Dinajpur), Bangladesh, over 12 months, from January 2023 to December 2023. The study included patients attending the surgical outpatient and inpatient departments with a clinical diagnosis of fistula-in-ano, particularly those with unusual presentations, persistence despite prior treatment, or associated risk factors. A total of 50 patients were enrolled consecutively using purposive sampling based on inclusion and exclusion criteria.

Inclusion Criteria

- Patients aged ≥18 years.
- Clinically or radiologically diagnosed cases of fistula-in-ano.
- Patients with recurrent, complex, or persistent fistulas.

Exclusion Criteria

- Patients with acute perianal abscesses only.
- Fistulas due to malignancy.
- Unfit for surgical intervention or follow-up.

Data Collection Tools and Techniques

Data were collected using a structured questionnaire and a clinical examination proforma to capture comprehensive patient information. The tools documented sociodemographic details such as age, sex, and occupation, alongside clinical features including pain, discharge, swelling, history of previous surgeries, and the anatomical location of the external opening. Relevant risk factors such as diabetes, tuberculosis, HIV status, smoking habits, personal hygiene, constipation, inflammatory bowel disease (IBD), and immunosuppression were also assessed. Diagnostic investigations, including fistulograms, MRI, ultrasonography (USG), and relevant blood tests, were performed as indicated. The type of fistula was classified according to Parks' classification system, and data on the management strategies were recorded. Postoperative outcomes and follow-up findings were systematically documented to evaluate treatment effectiveness and recurrence.

Investigations

- Radiological: Fistulogram, MRI pelvis, or Endoanal ultrasound (where available).
- Laboratory: Blood glucose, ESR, HIV, Mantoux test, and relevant stool and serological tests.

Management

Patients were managed according to the type of fistula and their clinical condition using one or more of the following approaches: fistulotomy, seton placement, ligation of the intersphincteric fistula tract (LIFT) procedure, advancement flap, or conservative management in cases where patients were unfit for surgery or declined intervention.

Outcome Assessment

The outcomes were systematically assessed over a minimum follow-up period of six months post-treatment to ensure a comprehensive evaluation of both short- and long-term results. Key outcome measures included the duration of wound healing, recorded in weeks, and the incidence of postoperative complications such as infections, recurrence, and incontinence. Additionally, the effectiveness of treatment was determined by categorizing patients based on whether they achieved a complete cure or experienced persistent or recurrent disease.

Data Analysis

Data were entered and analyzed using Microsoft Excel and SPSS (Version 26.0). Categorical variables were presented as frequencies and percentages. Continuous variables (e.g., wound healing time) were expressed as mean ± standard deviation.

Results

The study findings showed that most patients were males (84%)

and within the 31-40 age group (36%), as shown in Table 1. Common presenting symptoms included discharge (92%), pain (76%), and swelling (60%) (Table 2). Notably, poor perianal hygiene (56%), smoking (50%), and chronic constipation (40%) were the most prevalent risk factors identified (Table 3), underscoring the importance of addressing lifestyle and hygiene-related contributors. Inter-sphincteric (40%) and trans-sphincteric (30%) fistulas were the most common (Table 4). Diagnostic tools such as histograms (80%) and MRI/endoanal ultrasound (40%) played a significant role in assessing disease complexity (Table 5). Treatment modalities varied, with fistulotomy being the most commonly employed method (44%) (Table 6). Outcomes revealed a recurrence rate of 20%, infection in 12% of cases, and one instance of incontinence. The mean wound healing time was 4.2±1.5 weeks, and 74% of patients were considered completely cured, while 26% had persistent or recurrent disease (Table 7).

Table 1: Demographic Characteristics of Study Participants (n = 50)

Variables	Frequency (n)	Percentage (%)
Age group (in years)		
<20	3	6.00
21-30	15	30.00
31-40	18	36.00
41-50	9	18.00
>50	5	10.00
Sex		
Male	42	84.00
Female	8	16.00

Table 2: Clinical Presentation of Fistula-in-Ano (n = 50)

Symptoms & History	Frequency (n)	Percentage (%)
Discharge	46	92.00
Pain	38	76.00
Lump/Swelling	30	60.00
Previous fistula surgery	18	36.00
Anterior opening	8	16.00
Posterior opening	35	70.00
Lateral opening	7	14.00

Table 3: Identified Risk Factors among Patients (n = 50)

Risk Factors	Frequency (n)	Percentage (%)
Diabetes Mellitus	12	24.00
Tuberculosis	4	8.00
Smoking	25	50.00
Alcohol Use	8	16.00
Chronic Constipation	20	40.00
Inflammatory Bowel Disease (IBD)	3	6.00
HIV or Immunosuppressive Status	2	4.00
Poor Perianal Hygiene	28	56.00
Sedentary Lifestyle	16	32.00

Table 4: Types of Fistula Based on Evaluation (n = 50)

Fistula Type	Frequency (n)	Percentage (%)
Inter-sphincteric	20	40.00
Trans-sphincteric	15	30.00
Supra-sphincteric	5	10.00
Extra-sphincteric	3	6.00
Complex/Multiple tracts	7	14.00

Table 5: Investigations and Relevant Findings (n = 50)

Investigation	Abnormal Findings (n)	Percentage (%)
Fistulogram	40	80.00
MRI/Endo-anal USG	20	40.00
Raised Blood Sugar	12	24.00
HIV Positive	2	4.00
Mantoux Positive	4	8.00
Raised ESR	10	20.00

Table 6: Management Strategies Applied (n = 50)

Treatment Type	Frequency (n)	Percentage (%)
Fistulotomy	22	44.00
Seton Placement	12	24.00
LIFT Procedure	6	12.00
Advancement Flap	3	6.00
Conservative/Medical	7	14.00

Table 7: Postoperative Outcome and Follow-up (n = 50)

Outcome Parameter	Frequency (n)	Percentage (%)
Infection	6	12.00
Recurrence	10	20.00
Incontinence	1	2.00
Recurrence at 6 Months	10	20.00
Follow-up Visits Completed	42	84.00
Completely Cured	37	74.00
Persistent/Recurrent Disease	13	26.00
Mean Wound Healing Time	4.2 ± 1.5	

Discussion

Fistula-in-ano is a distressing and recurrent condition that presents a significant challenge in colorectal practice, particularly when associated with unusual or persistent manifestations. The findings from this study at a peripheral medical college hospital in Bangladesh provide important insights into the epidemiological characteristics, risk factors, diagnostic approaches, treatment modalities, and postoperative outcomes in managing complex or recurrent fistulas. The male predominance (84%) in the study cohort aligns with previous reports indicating that fistula-in-ano is more prevalent in men, possibly due to higher exposure to risk factors such as smoking, poor hygiene, and physical labor [10, 11]. The most commonly affected age group was 31-40 years (36%), which reflects the disease's predilection for the working-age population, potentially impacting their productivity and quality of life [12]. Discharge (92%), pain (76%), and swelling (60%) were the most frequently reported symptoms, which are consistent with the classical presentation of anal fistulas as documented in global studies [6, 13]. Notably, a substantial portion (36%) had a history of previous fistula surgery, suggesting that recurrence is a significant concern, particularly in the absence of optimal risk factor management and standardized surgical techniques. Among the identified risk factors, poor perianal hygiene (56%), smoking (50%), and chronic constipation (40%) were the most prevalent. These findings highlight the importance of lifestyle and behavioral components in the pathogenesis of anal fistulas. Poor hygiene may promote chronic perianal infection, while smoking has been implicated in impaired wound healing and increased inflammation [14]. Chronic constipation can lead to repeated trauma to the anal canal, exacerbating cryptoglandular obstruction, the most common etiology of anal fistulas [1]. Other notable comorbidities included diabetes mellitus (24%) and tuberculosis (8%), both of which are well-documented contributors to fistula chronicity and delayed healing [15].

Although relatively rare, tuberculosis-related fistulas must be considered in endemic regions such as South Asia. In terms of classification, the majority of fistulas were inter-sphincteric (40%) and trans-sphincteric (30%), consistent with Parks' classification, where these types represent the most frequent anatomical varieties [16]. Complex or multiple tract fistulas (14%) were also observed, often more resistant to treatment and having higher recurrence rates. Diagnostic tools played a crucial role in delineating fistula tracts and complexity. Fistulography (80%) remained widely used, but its diagnostic accuracy is generally considered inferior to MRI or endoanal ultrasound, both used in 40% of cases. MRI is particularly valuable in assessing secondary tracts, horseshoe extensions, and sphincter involvement, which are pivotal in preventing recurrence [17, 18]. Surgical treatment was the mainstay of management. Fistulotomy was the most commonly performed procedure (44%) and is generally considered the gold standard for simple fistulas with minimal sphincter involvement [19]. However, more complex cases required advanced procedures such as seton placement (24%), LIFT (12%), or advancement flap (6%). Conservative approaches were reserved for patients with high surgical risk or minimal symptoms (14%). Postoperative outcomes indicated a recurrence rate of 20% and infection in 12% of cases, which, although within the range reported in other studies, underscore the need for comprehensive preoperative assessment and individualized treatment planning [2]. Only one patient (2%) developed incontinence, indicating that sphincter-preserving techniques were likely considered in the surgical decision-making process. The mean wound healing time was 4.2 ± 1.5 weeks, which compares favorably with international benchmarks [6]. Importantly, 74% of patients were completely cured, while 26% had persistent or recurrent disease. This recurrence rate reflects the inherent difficulty in managing complex fistulas, particularly in resource-limited settings where access to advanced imaging and experienced colorectal surgeons may be constrained.

Limitation of the study

The relatively small sample size and lack of long-term follow-up may have affected the assessment of recurrence and treatment efficacy. Advanced imaging modalities such as MRI were not universally available, possibly impacting diagnostic accuracy. Additionally, data collection relied on patient self-reporting for some risk factors, introducing potential recall bias. The absence of a control group and standardized treatment protocols further limits the ability to draw definitive conclusions regarding causality and the comparative effectiveness of interventions.

Conclusion and Recommendations

This study highlights the importance of identifying and addressing key risk factors such as poor perianal hygiene, smoking, and chronic constipation in patients with unusual or persistent fistula-in-ano. Inter-sphincteric and trans-sphincteric fistulas were the most prevalent types, with fistulotomy being the primary treatment. Despite satisfactory healing rates, recurrence and complications remain notable challenges, particularly in resource-limited settings. Early diagnosis using appropriate imaging and individualized treatment planning are essential for improving outcomes. These findings underscore the need for greater awareness, patient education, and the adoption of standardized management protocols to reduce recurrence and enhance the quality of care in peripheral healthcare institutions.

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