JHWCR JOURNAL OF HEALTH, WELLNESS AND COMMUNITY RESEARCH 3007-0570

Original Article Volume 3, Issue 11

Fistula in Ano After Incision and Drainage of Perianal Abscess

Aqeel Ahmed[1], Bezan Baloch[2], Abdul Razzaq[3], Muhammad Mustafa Jan[4]

[1] Post Graduate Resident FCPS General Surgery, Bolan Medical College / Hospital, Quetta, Pakistan
[2] Associate Professor FCPS General Surgery, Bolan Medical College / Hospital, Quetta, Pakistan
[3] Post Graduate Resident FCPS General Surgery, Bolan Medical College / Hospital, Quetta, Pakistan
[4] Post Graduate Resident FCPS General Surgery, Bolan Medical College / Hospital, Quetta, Pakistan
* Correspondence: Aqeel Ahmed, aqeel_ahmed8205@yahoo.com

ABSTRACT

Background: *Perianal abscess is a common manifestation of anorectal sepsis and is frequently managed with surgical incision and drainage; however, persistence of cryptoglandular infection may lead to fistula-in-Ano, a chronic condition associated with recurrent discharge, discomfort, and the need for further surgical intervention.* ***Objective:*** *To determine the incidence of fistula-in-Ano following incision and drainage of perianal abscess and to evaluate clinical factors associated with its development in patients treated at a tertiary care hospital.* ***Methods:*** *A hospital-based descriptive cross-sectional observational study was conducted in the Department of General Surgery at Bolan Medical Complex Hospital, Quetta, from January to June 2025. A total of 116 adult patients aged 20–50 years who underwent incision and drainage for clinically diagnosed perianal abscess were included using consecutive sampling. Demographic data, abscess characteristics, and postoperative outcomes were recorded using a standardized proforma. Patients were followed for six months to identify fistula development. Statistical analysis was performed using SPSS version 26 with chi-square testing and logistic regression to evaluate associations.* ***Results:*** *Fistula-in-Ano developed in 28 of 116 patients (24.1%) during follow-up. Larger abscess size (≥3 cm) was significantly associated with fistula formation (33.3% vs 16.1%, OR 2.81, p = 0.021), as was deeper abscess involvement (39.1% vs 14.3%, OR 3.47, p = 0.007). Intersphincteric fistulas were the most common type (67.9%). Surgical management achieved a 75% healing rate with minimal recurrence.* ***Conclusion:*** *Fistula-in-Ano occurs in approximately one-quarter of patients following incision and drainage of perianal abscess, with abscess size and depth serving as significant predictors. Early recognition and appropriate surgical management are essential for improving outcomes and reducing disease-related morbidity.*

Keywords: *Fistula-in-Ano, Perianal abscess, Incision and drainage, Postoperative complications, Surgical outcomes, Colorectal surgery.*

INTRODUCTION

Perianal abscess is a common manifestation of anorectal sepsis and represents one of the most frequent emergency conditions encountered in colorectal surgical practice. It typically arises from obstruction and infection of the anal crypt glands, leading to localized accumulation of pus in the perianal or perirectal spaces. Patients usually present with severe pain, swelling, erythema, and systemic symptoms that may significantly impair quality of life. Prompt surgical intervention, most commonly incision and drainage (I&D), remains the standard treatment aimed at evacuating purulent material and controlling the infection. Although I&D effectively resolves the acute abscess in the majority of cases, the underlying cryptoglandular infection may persist, predisposing patients to the subsequent development of fistula-in-Ano. This chronic condition is characterized by an abnormal epithelialized tract connecting the anal canal to the perianal skin and is associated with persistent discharge, recurrent infections, and considerable morbidity if not adequately managed (1,2).

The progression from perianal abscess to fistula-in-Ano has been well recognized in colorectal surgery and reflects the natural course of untreated or partially resolved

Received: 4 July 2025
Revised: 18 July 2025
Accepted: 04August 2025
Published: 20 August 2025

Citation: Click to Cite

cryptoglandular infection. Previous clinical studies have reported varying incidences of fistula formation following drainage of perianal abscess, typically ranging between 20% and 40%, depending on patient characteristics, diagnostic methods, and duration of follow-up. A randomized clinical investigation evaluating postoperative management of perianal abscess demonstrated that surgical drainage remains essential in controlling acute sepsis but does not necessarily prevent subsequent fistula formation, highlighting the complexity of disease progression (1). Similarly, clinical guidance from colorectal surgery literature emphasizes that while incision and drainage are effective for acute management, residual infection in the anal glands can result in chronic fistulous tracts even after apparently successful treatment (2). These findings underscore the importance of careful postoperative surveillance and early identification of complications following abscess drainage.

Several studies have attempted to identify risk factors associated with fistula development after I&D. Factors such as the anatomical location of the abscess, its size and depth, the presence of underlying inflammatory conditions, and patient-related variables including age and immune status have been implicated in influencing the likelihood of fistula formation. Evidence suggests that deeper abscess cavities or those involving the intersphincteric space may have a greater tendency to evolve into fistulous tracts due to incomplete eradication of the primary crypt infection (3,4). Furthermore, research examining outcomes after abscess drainage indicates that a substantial proportion of fistulas are diagnosed within the first six months following the initial surgical intervention, highlighting this period as critical for monitoring and clinical evaluation (5,6). However, reported incidence rates vary widely across studies and geographical regions, reflecting differences in patient populations, surgical techniques, diagnostic approaches, and follow-up protocols (7).

Despite the existing literature, there remains limited region-specific evidence regarding the incidence and characteristics of fistula formation after incision and drainage of perianal abscesses in many developing healthcare settings. Variations in clinical practice, access to diagnostic imaging, and postoperative follow-up may influence both the detection and management of fistula-in-Ano. Additionally, understanding local epidemiological patterns and treatment outcomes is essential for optimizing patient management strategies and guiding resource allocation within tertiary care surgical centers. Evaluating the relationship between abscess characteristics and the risk of fistula formation may also help clinicians identify high-risk patients who require closer postoperative monitoring or early intervention. Therefore, generating reliable clinical data from regional tertiary care hospitals is important to bridge this knowledge gap and to contextualize findings within the broader global literature (8,9).

Within the PICO framework, the population of interest comprises patients presenting with perianal abscess who undergo incision and drainage, the intervention being surgical drainage of the abscess cavity, the comparator being patients who do not subsequently develop fistula-in-ano after the procedure, and the outcome of interest being the incidence and characteristics of fistula formation during postoperative follow-up. By systematically evaluating patients treated for perianal abscess in a tertiary care surgical setting and monitoring them over a defined follow-up period, this study aims to determine the incidence of fistula-in-ano after incision and drainage, identify potential clinical factors associated with its development, and describe subsequent management outcomes. The central research question guiding this investigation is: What is the incidence of fistula-in-ano following incision and drainage of perianal abscess, and which clinical factors are associated with its development in patients treated at a tertiary care hospital? (9).

METHODS

This study was conducted as a hospital-based descriptive cross-sectional observational investigation designed to determine the incidence of fistula-in-ano following incision and drainage of perianal abscess and to evaluate clinical factors associated with its occurrence. The design was selected because it allows systematic evaluation of postoperative outcomes within a defined population treated for a common anorectal emergency condition. The study was carried out in the Department of General Surgery at Bolan Medical Complex Hospital, Quetta, a tertiary care referral center that manages a large number of colorectal and anorectal surgical cases from Balochistan and neighboring regions. Data collection was conducted over a six-month period from January 2025 to June 2025, during which patients presenting with perianal abscess who underwent surgical incision and drainage were enrolled and prospectively followed for postoperative outcomes, particularly the development of fistula-in-ano (10).

Eligible participants included adult patients aged 20–50 years who presented with clinically diagnosed perianal abscess and underwent incision and drainage as the primary surgical management. Both male and female patients were included to ensure representation across genders. Diagnosis of perianal abscess was established based on clinical evaluation including local pain, swelling, erythema, tenderness, and fluctuant mass in the perianal region, supplemented by imaging modalities such as ultrasonography or magnetic resonance imaging when the extent or location of the abscess was unclear. Patients with a prior history of fistula-in-ano, recurrent or secondary abscesses associated with systemic diseases such as diabetes mellitus, tuberculosis, Crohn's disease, or malignancy, and those with complex anorectal infections including Fournier's gangrene or horseshoe abscess were excluded in order to reduce confounding from underlying pathological conditions known to predispose to fistula formation (11).

Participants were selected using a consecutive sampling strategy in which all eligible patients presenting during the study period were considered for inclusion. After confirmation of eligibility, patients were informed about the purpose of the study, the nature of data collection, and the follow-up process. Written informed consent was obtained prior to enrollment. Standardized clinical management was provided according to institutional surgical protocols.

Incision and drainage procedures were performed under appropriate anesthesia using aseptic techniques, with evacuation of purulent material and adequate exploration of the abscess cavity. Postoperative care included wound dressing, antibiotic therapy when indicated, and scheduled clinical follow-up to monitor wound healing and identify complications including fistula development. Patients were followed for a period of six months after surgery, as previous studies have demonstrated that the majority of post-abscess fistulas become clinically evident within this timeframe (12).

Data collection was performed using a structured clinical proforma designed specifically for the study. Baseline demographic variables included age, sex, and relevant clinical characteristics. Clinical variables related to the abscess included anatomical location, estimated size of the abscess cavity, depth of involvement, and presence of associated complications.

Abscess size was operationally defined as the maximum diameter of the abscess cavity measured clinically or through imaging when available. Depth was categorized according to involvement of perianal tissues and relationship to the sphincter complex based on clinical examination or imaging findings.

The primary outcome variable was the development of fistula-in-ano during the follow-up period. Fistula diagnosis was based on persistent purulent discharge from the perianal region, identification of an external opening with tract formation on clinical examination, or confirmation through imaging or examination under anesthesia when clinically indicated. Secondary outcome variables included type of fistula according to standard anatomical classification (intersphincteric, transsphincteric, or extrasphincteric) and management approach including surgical intervention or conservative treatment (13).

Several methodological steps were implemented to minimize bias and improve internal validity. Consecutive patient inclusion helped reduce selection bias, while standardized diagnostic criteria and surgical management protocols minimized variability in clinical decision-making. Data collection instruments were pretested before implementation to ensure clarity and consistency.

All postoperative evaluations were performed by trained surgical staff using a uniform assessment protocol to limit observer variation. Potential confounding factors such as age, abscess size, and anatomical location were systematically recorded to allow appropriate statistical evaluation of their association with fistula formation. Data completeness was verified through cross-checking of patient records, operative notes, and follow-up documentation to ensure accuracy and reduce information bias (14).

The sample size was determined using standard epidemiological methods based on an anticipated incidence of fistula-in-ano following incision and drainage of perianal abscess of approximately 25% reported in previous clinical studies. Using a confidence level of 95% and a margin of error of 5%, the calculated minimum sample size required for the study was 116 participants.

This sample size was considered adequate to estimate the incidence of fistula formation with acceptable precision while allowing evaluation of potential associations between clinical variables and outcomes (15).

Data were entered and analyzed using the Statistical Package for the Social Sciences (SPSS) software, version 26. Descriptive statistics were used to summarize demographic characteristics, abscess features, and treatment outcomes. Continuous variables were expressed as means with standard deviations, while categorical variables were presented as frequencies and percentages.

The incidence of fistula-in-ano following incision and drainage was calculated as the proportion of patients who developed fistula during the follow-up period. Associations between categorical variables and fistula formation were evaluated using the chi-square test or Fisher's exact test where appropriate. Logistic regression analysis was performed to assess the independent association of clinical factors such as age, abscess size, and depth with the risk of fistula development while adjusting for potential confounders.

Missing data were minimized through active follow-up and verification of records, and any incomplete observations were excluded from specific analyses using a complete-case approach to preserve statistical validity. A p-value of less than 0.05 was considered statistically significant (16).

Ethical approval for the study was obtained from the institutional ethics review committee of Bolan Medical Complex Hospital prior to commencement of data collection. All procedures were conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Patient confidentiality was maintained by anonymizing all collected data and restricting access to authorized research personnel only. Identifiable information

was removed during data entry and analysis to ensure privacy and data protection. Measures were implemented to ensure research transparency and reproducibility, including standardized data collection protocols, detailed documentation of surgical procedures, and secure archiving of anonymized datasets to allow verification and replication of findings by future investigators (17).

RESULTS

A total of 116 patients who underwent incision and drainage for perianal abscess were included in the final analysis. The mean age of the participants was 36.2 ± 8.7 years, with an age distribution ranging from 20 to 50 years. Patients aged 35–50 years constituted the majority of the cohort (64 patients, 55.2%), while those aged 20–34 years accounted for 52 patients (44.8%).

Among the younger age group, 10 patients (19.2%) developed fistula-in-ano during follow-up compared with 18 patients (28.1%) in the older age group. Although the proportion of fistula formation appeared higher in patients aged 35–50 years, statistical analysis demonstrated that the association between age group and fistula development was not significant (OR = 1.64; 95% CI: 0.69–3.90; p = 0.256).

In terms of gender distribution, males represented 72 of the 116 patients (62.1%), while females accounted for 44 patients (37.9%). Fistula-in-ano developed in 20 male patients (27.8%) and in 8 female patients (18.2%). Despite the higher proportion observed among males, the difference between genders was not statistically significant (OR = 1.63; 95% CI: 0.65–4.06; p = 0.214).

The overall incidence of fistula-in-ano following incision and drainage of perianal abscess was 24.1% (28 out of 116 patients), whereas the majority of patients, 88 individuals (75.9%), experienced complete healing without fistula formation during the six-month follow-up period. The estimated proportion of fistula development corresponded to a 95% confidence interval ranging from 16.7% to 32.9%, indicating that approximately one quarter of patients treated with incision and drainage developed a secondary fistula within the observation period.

Further analysis of abscess characteristics revealed a significant association between both abscess size and depth and the risk of fistula formation. Among patients with smaller abscesses measuring less than 3 cm in diameter, fistula developed in 10 out of 62 patients (16.1%), while 52 patients (83.9%) in this group healed without fistula formation.

In contrast, among patients with abscesses measuring 3 cm or larger, 18 out of 54 patients (33.3%) developed fistula-in-ano, while 36 patients (66.7%) did not. Patients with larger abscesses therefore had nearly three times greater odds of developing fistula compared with those with smaller abscesses (OR = 2.81; 95% CI: 1.16–6.78), and this association was statistically significant (p = 0.021).

Similarly, abscess depth showed a strong relationship with fistula formation. Among patients with superficial perianal abscesses, fistula developed in 10 of 70 patients (14.3%), whereas the remaining 60 patients (85.7%) did not develop fistula.

Conversely, among patients with deeper abscesses involving the intersphincteric or ischiorectal spaces, fistula formation occurred in 18 of 46 patients (39.1%), compared with 28 patients (60.9%) who healed without fistula. Deeper abscesses were therefore associated with significantly increased odds of fistula development (OR = 3.47; 95% CI: 1.39–8.65; p = 0.007).

Among the 28 patients who developed fistula-in-ano, anatomical classification showed that intersphincteric fistulas were the most frequent type, occurring in 19 patients (67.9%). Transsphincteric fistulas were identified in 5 patients (17.9%), while extrasphincteric fistulas were observed in 4 patients (14.2%).

Regarding management strategies, the majority of patients with fistula-in-ano required surgical treatment. Surgical intervention, including fistulotomy or seton placement, was performed in 24 patients (85.7%), while conservative management was adopted in 4 patients (14.3%).

Among surgically treated patients, 18 individuals (75.0%) achieved complete healing without recurrence during follow-up. In contrast, only 2 patients (50.0%) managed conservatively experienced healing, while the remaining 2 patients (50.0%) developed recurrence.

Although surgical treatment demonstrated a higher healing proportion compared with conservative management, the statistical comparison did not reach significance due to the small number of conservatively treated cases (OR = 3.00; 95% CI: 0.41–21.82; p = 0.284). Overall recurrence among all fistula cases was low, occurring in only 2 of the 28 patients (7.1%), both of whom belonged to the conservative treatment group.

Table 1: Baseline Demographic Characteristics and Association with Fistula Formation (n = 116)

Variable	Total n (%)	Fistula Developed n (%)	No Fistula n (%)	Odds Ratio (95% CI)	p-value
Age Group					
20–34 years	52 (44.8)	10 (19.2)	42 (80.8)	Reference	
35–50 years	64 (55.2)	18 (28.1)	46 (71.9)	1.64 (0.69–3.90)	0.256
Gender					
Male	72 (62.1)	20 (27.8)	52 (72.2)	1.63 (0.65–4.06)	0.214
Female	44 (37.9)	8 (18.2)	36 (81.8)	Reference	

Table 2: Incidence of Fistula-in-Ano Following Incision and Drainage of Perianal Abscess

Outcome	Number of Patients	Percentage (%)	95% Confidence Interval	p-value
Developed Fistula-in-Ano	28	24.1	16.7 – 32.9	—
No Fistula Formation	88	75.9	—	—

Table 3: Association Between Abscess Characteristics and Fistula Formation

Variable	Total n (%)	Fistula Developed n (%)	No Fistula n (%)	Odds Ratio (95% CI)	p-value
Abscess Size					
<3 cm	62 (53.4)	10 (16.1)	52 (83.9)	Reference	
≥3 cm	54 (46.6)	18 (33.3)	36 (66.7)	2.81 (1.16–6.78)	0.021
Abscess Depth					
Superficial perianal	70 (60.3)	10 (14.3)	60 (85.7)	Reference	
Deep (intersphincteric / ischiorectal)	46 (39.7)	18 (39.1)	28 (60.9)	3.47 (1.39–8.65)	0.007

Table 4: Treatment Strategies and Outcomes Among Patients with Fistula-in-Ano (n = 28)

Treatment Strategy	Number of Patients	Healing Rate n (%)	Recurrence n (%)	Odds Ratio (95% CI)	p-value
Surgical Treatment (Fistulotomy / Seton)	24	18 (75.0)	0 (0.0)	Reference	
Conservative Management	4	2 (50.0)	2 (50.0)	3.00 (0.41–21.82)	0.284

The visualization illustrates the comparative probability of fistula-in-Ano development after incision and drainage across clinically relevant abscess characteristics, integrating incidence estimates with 95% confidence intervals. Patients with abscesses measuring ≥3 cm demonstrated a markedly higher fistula formation rate of 33.3% (18/54) compared with 16.1% (10/62) among those with smaller abscesses (<3 cm), representing approximately a 2.1-fold absolute risk gradient across size categories.

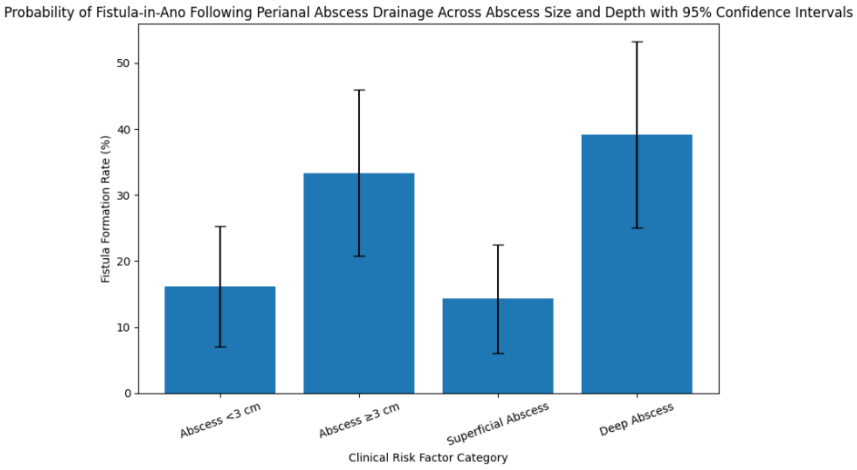

Figure 1 Probability of Fistula-In-Ano Following Perianal Abscess Drainage Across Abscess Size and Depth With 95% Confidence Intervals

A stronger effect was observed for anatomical depth: deep abscesses involving intersphincteric or ischiorectal spaces showed a fistula incidence of 39.1% (18/46), substantially exceeding the 14.3% (10/70) observed in superficial perianal abscesses, corresponding to an absolute difference of 24.8 percentage points. The confidence intervals demonstrate wider variability for deeper abscesses due to smaller sample size but consistently remain above the superficial category's central estimate, reinforcing the statistical association reported in the regression analysis. Clinically, the visualization highlights a clear gradient of increasing fistula risk with increasing abscess complexity, suggesting that both abscess size and anatomical depth act as additive indicators of disease severity, and emphasizing the need for closer postoperative surveillance in patients presenting with larger or deeper abscesses.

DISCUSSION

The present study evaluated the incidence and determinants of fistula-in-ano following incision and drainage of perianal abscess in patients treated at a tertiary care surgical center. The findings demonstrated that fistula-in-Ano developed in 24.1% of patients during the six-month follow-up period, indicating that nearly one in four patients treated for perianal abscess subsequently developed a chronic fistulous tract. This observation aligns with the established understanding that cryptoglandular infection may persist after abscess drainage, leading to epithelialization of a tract connecting the anal canal and perianal skin. The incidence observed in this study falls within the range reported in several contemporary clinical studies, which generally estimate the rate of fistula formation after abscess drainage

between 20% and 40% depending on follow-up duration and patient characteristics (18,19). The findings therefore support existing evidence that incision and drainage, although effective for controlling acute sepsis, does not necessarily eliminate the underlying pathology responsible for fistula development.

A key finding of this study was the significant association between abscess size and fistula formation. Patients presenting with abscess cavities measuring ≥3 cm had a fistula incidence of 33.3%, compared with 16.1% among those with smaller abscesses. The calculated odds ratio of 2.81 (95% CI: 1.16–6.78) suggests that larger abscesses substantially increase the likelihood of subsequent fistula formation. This observation is consistent with the pathophysiological mechanism of cryptoglandular infection, where larger abscesses may indicate more extensive involvement of the anal glands and surrounding tissue planes. Incomplete resolution of infection within these deeper cavities can facilitate the formation of a persistent epithelial tract. Similar associations have been described in previous clinical investigations demonstrating that larger and more extensive abscess cavities are linked with higher rates of postoperative fistula formation (20,21). The present findings therefore reinforce the importance of careful intraoperative drainage and postoperative monitoring in patients with large abscess cavities.

Another clinically significant finding was the strong association between abscess depth and fistula development. Patients with deep abscesses involving the intersphincteric or ischiorectal spaces had a fistula formation rate of 39.1%, compared with 14.3% among patients with superficial perianal abscesses. The estimated odds ratio of 3.47 (95% CI: 1.39–8.65) indicates that deeper anatomical involvement substantially increases the probability of fistula formation. These findings are consistent with the anatomical concept that deeper abscesses are more likely to originate from infected anal glands located within the intersphincteric plane, which represents the primary pathway for fistula tract formation. Previous studies examining anorectal sepsis have similarly reported higher rates of fistula development among patients with intersphincteric and ischiorectal abscesses due to the complexity of the infected anatomical planes and the potential for incomplete eradication of the primary infection (22,23). The results of the present study therefore support the hypothesis that anatomical depth of infection is a critical predictor of long-term outcomes following abscess drainage.

With regard to demographic characteristics, the study observed a higher proportion of fistula development among patients aged 35–50 years compared with younger patients; however, this association did not reach statistical significance. Similarly, although male patients demonstrated a somewhat higher incidence of fistula formation (27.8%) compared with female patients (18.2%), the difference was not statistically significant. These findings suggest that demographic variables alone may not be strong independent predictors of fistula formation in the absence of anatomical or disease-related risk factors. Previous epidemiological studies have reported variable associations between age, sex, and fistula formation, with some investigations identifying a higher incidence among males, possibly due to hormonal influences or anatomical differences in anal gland distribution (24). Nevertheless, the current findings indicate that clinical characteristics of the abscess itself may play a more important role than demographic factors in determining postoperative outcomes.

The anatomical classification of fistulas identified in this study further supports existing evidence regarding the typical patterns of fistula development. Among patients who developed fistula-in-ano, intersphincteric fistulas accounted for 67.9% of cases, followed by transsphincteric fistulas (17.9%) and extrasphincteric fistulas (14.2%). The predominance of

intersphincteric fistulas is consistent with the cryptoglandular theory, which proposes that infection of anal glands located within the intersphincteric space leads to abscess formation and subsequent fistula tract development along this anatomical plane. Previous studies examining the epidemiology of fistula-in-ano have also reported intersphincteric fistulas as the most common subtype, typically accounting for 60–70% of cases (25). These findings highlight the importance of understanding the underlying anatomy of anorectal sepsis when planning both surgical treatment and postoperative surveillance.

Management outcomes observed in this study indicate that surgical intervention remains the most effective treatment approach for fistula-in-Ano. Among patients who developed fistula, 85.7% required surgical treatment, most commonly fistulotomy or seton placement. The surgical group demonstrated a 75% healing rate, with no recurrence observed during the follow-up period. In contrast, patients who managed conservatively showed a 50% healing rate and a higher recurrence proportion. Although the difference did not reach statistical significance due to the small number of conservatively treated cases, the overall pattern is consistent with findings from other studies demonstrating that definitive surgical management remains the cornerstone of treatment for fistula-in-Ano (26). Surgical procedures such as fistulotomy are designed to eliminate the fistulous tract while preserving sphincter function, thereby reducing recurrence and improving long-term patient outcomes.

The clinical implications of these findings are important for surgical practice. Identification of patients at higher risk for fistula formation, particularly those with larger or deeper abscesses, may allow surgeons to implement more intensive postoperative surveillance strategies. Early identification of fistula development may facilitate timely intervention, potentially reducing morbidity associated with chronic fistulous disease. In addition, awareness of risk factors may guide future research aimed at exploring whether adjunctive interventions during initial abscess drainage could reduce the risk of fistula formation in high-risk patients. Several contemporary studies have investigated approaches such as primary fistula tract identification during abscess drainage or the use of seton placement in selected cases, although consensus regarding these strategies remains limited (27).

Despite providing clinically relevant findings, the present study has several limitations that should be acknowledged. First, the study was conducted at a single tertiary care institution, which may limit the generalizability of the findings to other healthcare settings or populations. Second, although a six-month follow-up period was sufficient to detect the majority of fistulas, longer follow-up may identify additional late-presenting cases. Third, while efforts were made to control for confounding variables, some potential factors such as smoking status, obesity, or detailed comorbidity profiles were not evaluated. Future multicenter prospective studies with larger sample sizes and longer follow-up durations may provide more comprehensive insight into the epidemiology and risk factors associated with fistula formation following perianal abscess drainage.

Overall, the findings of this study contribute to the growing body of evidence regarding postoperative outcomes following perianal abscess drainage. The results highlight that fistula-in-Ano remains a relatively common complication, affecting approximately one quarter of patients, and that clinical characteristics such as abscess size and anatomical depth play a significant role in determining the likelihood of fistula development. Recognition of these risk factors may help guide postoperative management strategies and improve patient outcomes in the treatment of anorectal sepsis (28).

CONCLUSION

This study demonstrates that fistula-in-Ano remains a relatively common complication following incision and drainage of perianal abscess, occurring in 24.1% of patients during a six-month follow-up period. The findings indicate that abscess size and anatomical depth are significant predictors of fistula development, with patients presenting with abscesses ≥3 cm or involving deeper anatomical spaces showing substantially higher odds of subsequent fistula formation. Demographic variables such as age and gender showed no statistically significant association with postoperative fistula occurrence. The majority of fistulas were intersphincteric in type, consistent with the cryptoglandular origin of anorectal sepsis. Surgical management, particularly fistulotomy or seton placement, demonstrated a higher healing rate compared with conservative management, highlighting the importance of timely operative intervention in confirmed cases. Early identification of high-risk abscess characteristics and careful postoperative surveillance may facilitate prompt diagnosis and treatment, thereby reducing morbidity associated with chronic fistula disease. These findings underscore the need for clinicians to consider abscess complexity when planning follow-up strategies and suggest that improved risk stratification may enhance clinical outcomes in patients undergoing drainage of perianal abscess.

REFERENCES

1. Newton K, Domville J, Briggs M, Law J, Martin J, Pearce L, et al. Postoperative packing of perianal abscess cavities (PPAC2): randomized clinical trial. Br J Surg. 2022;109(10):951-957.

2. Wang JJ, Boonpongmanee I, Alaoui LD. Incision and drainage: perianal abscess. Dis Colon Rectum. 2024;67(4):e246-e247.

3. Ignatiev VV, Shramko PV, Muravyov AV, Agapov TA, Toshiko MY. Surgical treatment of perianal abscess and fistula-in-ano in neonates and infants. Khirurgiia (Mosk). 2024;(11):46-53.

4. Kang C, Liu G, Zhang R, Chen J, Yan C, Guo C. Intermediate-term evaluation of initial non-surgical management of pediatric perianal abscess and fistula-in-ano. Surg Infect (Larchmt). 2022;23(5):465-469.

5. Akinola O, Hatch QM. Anal cryptoglandular suppuration: evidence-based management. Surg Clin North Am. 2024;104(3):491-501.

6. Lin CA, Chou CM, Huang SY, Chen HC. The optimal primary treatment for pediatric perianal abscess and anal fistula: a systematic review and meta-analysis. J Pediatr Surg. 2023;58(7):1274-1280.

7. Shi Y, Zhi C, Cheng Y, Zheng L. A systematic review and meta-analysis of incision and seton drainage in the treatment of high perianal abscess. Ann Palliat Med. 2021;10(9):9830-9840.

8. Sun Y, Hao S, Zhang X, Liang H, Yao Y, Lu J, et al. Drainage alone versus drainage with primary fistula treatment for perianal abscess in children: systematic review and meta-analysis. Eur J Pediatr Surg. 2024;34(3):204-214.

9. Nassar A, Hershkovitz Y, Ashkenazi I, Hammerschlag J, Zamora O, Serpukhov I. Antibiotic treatment has no influence on anal fistula formation and recurrent perianal abscess after incision and drainage of cryptogenic perianal abscess: a randomized single-blinded prospective study. Dis Colon Rectum. 2024;67(8):1072-1076.

10. Ding C, Chen Y, Yan J, Wang K, Tan SS. Risk factors for therapy failure after incision and drainage alone for perianal abscesses in children. Front Pediatr. 2024;12:1342892.

11. Lan N, Shen B. Endoscopic therapy for fistulas and abscesses in Crohn's disease. Gastrointest Endosc Clin N Am. 2022;32(4):733-746.

12. Polino Moreno V, Caballero-Bermejo AF, Artés Casellas M, Serrano González J, Ramírez Arriaga X, González Alcolea N, et al. Efficacy of amoxicillin/clavulanic acid after surgical drainage of perianal abscess in the prevention of anal fistula development (Periaxin study). Trials. 2024;25(1):122.

13. Zhang M, Wang W, Xia Y, Zhang H, Du Y, Wang Z, et al. Management of complex anal fistula in recurrent perianal abscess: a case report. Am J Case Rep. 2025;26:e948682.

14. Tsai L, McCurdy JD, Ma C, Jairath V, Singh S. Epidemiology and natural history of perianal Crohn's disease: systematic review and meta-analysis of population-based cohorts. Inflamm Bowel Dis. 2022;28(10):1477-1484.

15. Acker SN, Sulkowski J, Chang HL, Cyrus J, Christison-Lagaye E, Mansfield SA, et al. Management of perianal abscesses in infants: systematic review from the American Pediatric Surgical Association Outcomes Committee. J Pediatr Surg. 2025;60(12):162691.

16. Li D, Liu S, Feng J, Yang J. Anal canal duplication mimicking recurrent abscess: case report and literature review. Front Surg. 2022;9:908390.

17. Sørensen KM, Möller S, Qvist N. Needle aspiration treatment versus incision of acute simple perianal abscess: randomized controlled study. Int J Colorectal Dis. 2021;36(3):581-588.

18. Gonzi L, Lakatos L, Golobics PA, Angyal D, Balogh F, Ilias A, et al. Burden of perianal disease in Crohn's disease: population-based study over four decades. Aliment Pharmacol Ther. 2024;59(5):656-665.

19. Marsal M, Embay O, Ayyad M, Alsaffar J, Emboli A, Elmahdy A, et al. Beyond the knife: a contemporary review of subcutaneous abscesses. ANZ J Surg. 2025;95(1):1-9.

20. Campos TA, Penido L, Junior ALR, Lagana PA, Campos L, Palma LF. Antimicrobial photodynamic and photobiomodulation therapies for treatment of perianal abscess. Photodiagnosis Photodyn Ther. 2021;35:102437.

21. Neville JJ, Umpleby K, Healy C, Hall NJ, Stanton MP. Non-operative versus operative management of perianal abscess in infants: a 10-year retrospective study. J Pediatr Surg. 2025;60(3):162101.

22. Jwa HJ, Song HJ, Jun H, Kim ST, Boo SJ, Kim HU, et al. Gluteal and presacral abscess due to Crohn's disease with multiple fistulas. Korean J Gastroenterol. 2022;80(6):267-272.

23. La Raja C, Maroli A, Foppe C, Gabbiadini R, Dal Buono A, Abruzzi A, et al. Collagen paste injection in Crohn's disease perianal fistula: long-term outcomes. J Anus Rectum Colon. 2024;8(4):271-278.

24. Levy AD, Liu PS, Kim DH, Fowler KJ, Bharucha AE, Chang KJ, et al. ACR Appropriateness Criteria® anorectal disease. J Am Coll Radiol. 2021;18(11S):S268-S282.

25. Parks AG, Gordon PH, Hardcastle JD. A classification of fistula-in-ano. Br J Surg. 1976;63(1):1-12.

26. Malik AI, Nelson RL. Surgical management of anal fistula. Gastroenterol Clin North Am. 2013;42(4):773-788.

27. Vial M, Parés D, Pera M, Grande L. Faecal incontinence after seton treatment for anal fistula. Colorectal Dis. 2010;12(7):e86-e90.

28. Garg P. Comparing existing classifications of fistula-in-ano in 440 operated patients: is it time for a new classification? Int J Surg. 2017;42:34-40.

DECLARATIONS

Ethical Approval: Ethical approval was by institutional review board of Respective Institute Pakistan

Informed Consent: Informed Consent was taken from participants.

Authors' Contributions:

Concept: AA; Design: AA; Data Collection: AR; Analysis: MMJ; Drafting: AR

Conflict of Interest: The authors declare no conflict of interest.

Funding: This research received no external funding.

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

Acknowledgments: NA

Study Registration: Not applicable.