

Incidence of Fistula in Ano Following Incision and Drainage of Perianal Abscess a Prospective Observational Study

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Abstract

Background: Perianal abscess is the most frequent surgical emergency, which may result in the occurrence of fistula-in-ano after incision and drainage (I&D). The objective of the study would be to evaluate the rates and the risk factors of developing a fistula after I&D among an Indian population.

Objective: To determine the incidence rate of fistula-in-ano after I&D of perianal abscess and demographic, clinical and procedural factors that contribute to the development of fistula-in-ano.

Methods: This was a prospective observational study that involved 120 patients and was done after I&D procedure of the perianal abscess. Patients were followed up during 3 months and demographics information, comorbidities, bascabulous aspect, type of anesthesia, and antibiotic prescription were recorded. After 3 months, the cases of fistula-in-ano were evaluated, and risk factor was determined by means of statistical analysis.

Results: The cumulative prevalence of fistula-in-ano was at 33.3%. Males and below the age of 50 years posed more risk to foster fistula. Fistula formation was also higher associated with posterior abscesses and abscesses of large sizes. There was a decreased risk of fistula with the use of antibiotic after operations. The prevalent comorbidities included diabetes and smoking that seemed to have had negative influences.

Conclusion: The proportion of fistula-in-ano after I&D of perianal abscess was 33.3 percent similar to those in the world. The main risk factors that led to the development of fistulas were sex (male), younger age, posterior position of the abscess, diabetes and absence of antibiotic administration. Some of the ways to minimize the risk of fistula include early drainage, proper antibiotic treatment, as well as management of comorbidities.

Keywords: Perianal Abscess, Incision and Drainage, Fistula-in-Ano, Risk Factors, Antibiotics.

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Introduction

Perianal abscess is a common surgical emergency which is manifested by pain and tenderness, edema and in some cases fever; it is the result of an affected anal gland. I and D is still considered the standard of care in the therapy of acute abscesses. A large percentage of such patients however develop a fistula-in-ano which is a long term abnormal tract between the anal canal and the skin around the anus, which causes chronic discharge and pain and most times need further surgery.

Such is the risk of this complication and it should be followed up and predictive factors brought into account. The rate of the development of the fistula after I&D has been mentioned in the literature as varying widely. In a retrospective chart review study carried out at Siriraj Hospital in Thailand, it was reported that 31 percent of the patients developed fistula-in-ano following I&D and younger age and lack of diabetes have been

observed as possible risk factors [1]. In a potential study in Sudan, an incidence of 23 percent was observed with male gender, delayed presentation, diabetes, general anesthesia and less experienced surgeon as the major risk factors [2]. The evidence at the AL-Kindy General Hospital demonstrated that former abscess history or spontaneously rupturing had severe effects because it raised the risk of fistula development. The investigation classified the patients into three groups where the patients with no history of prior episodes showed 30.5 rates of fistula, 72.2 of those with one history had it, and patients with spontaneous rupture did have a 100 percent of fistula rate thus demonstrating the essentiality of proper intervention early [3].

In a retrospective study of 34 patients in Bangladesh, the problem of developing a fistula after I&D affected almost 47 percent of patients,

with majority being males, with the stage where the fistula occurred taking the most normal place, the posterior [4]. In the same way, a study conducted at Baquba Teaching Hospital in Iraq revealed that 63.48 percent of patients with perianal abscess developed fistula-in-ano to buttress the relationship between abscess and fistula-in-ano formation [5]. Some studies mark the importance of early drainage in the prevention of the development of fissures. To give an example, in the PARIS study comprising 1.835 patients, the rate of spontaneous perianal abscess rupture that resulted in the occurrence of fistula was significantly higher (54%) than in patients who received prompt operations of surgical drainage (28.9%) [6]. This observation concurs with early surgery to avoid developing chronic complications. The efficacy of antibiotic prophylaxis to prevent fistulae formation has been practiced. According to a randomized controlled trial, carried out in Iran, results demonstrated that there was a significant reduction in the fistula formation rate among the metronidazole and ciprofloxacin-treated group of patients when compared with the patients treated with the non-antibiotic group, which means that it has an amazing protection effect [7]. The present findings are in agreement with the ones of the study of the Siriraj Hospital, where the risk of developing a fistula was decreased to 17% due to the use of perioperative antibiotics that used to be 48% [1].

Age and sex are consistently shown as contributing risk factors. Males are more prone to develop perianal abscess and subsequent fistula-in-ano. Al-Salem et al. reported that 33.8% of male children developed a fistula after perianal abscess, while none of the females did, suggesting a sex-linked predisposition [8]. In the pediatric population, studies show that over 85% of infants under 2 years presenting with abscess develop fistula-in-ano, necessitating specific pediatric surgical strategies [9]. There is ongoing debate about the optimal timing of fistula treatment. Some authors recommend fistulotomy at the time of abscess drainage to prevent recurrence, while others caution against it due to the risk of iatrogenic fistula formation. In a meta-analysis of six trials, simultaneous fistulotomy significantly reduced the risk of recurrence without increasing incontinence risk, suggesting that in selected patients, early intervention may be beneficial [10].

Despite the available global data, there is a paucity of evidence from Indian populations. Socioeconomic factors, healthcare access, nutritional status, and microbiological profiles may differ, potentially influencing both the natural course of disease and outcomes after I&D. Therefore, this proposed prospective observational study expects to find out the rate of fistula-in-ano after incision and drainage of perianal abscess in an

Indian population and also as to identify which demographic, clinical, and procedural factors were found to be of the higher risk. The following data will come in handy to inform evidence-based clinical decision making, enhance patient outcome, and minimize the impact of recurrent anorectal disease on the practice of surgery in India.

Methodology

Study Design: This was a prospective observational study conducted to determine the incidence of fistula-in-ano after incision and drainage (I&D) of perianal abscess. Patients were followed for three months postoperatively to assess outcomes without modifying standard clinical care.

Study Setting: The study took place in the Department of General Surgery at a tertiary care hospital in India, with all surgical procedures and follow-up evaluations performed within the same institution to ensure consistency.

Study Duration: The study was carried out over a 12-month period, including patient enrollment, surgery, and postoperative follow-up at regular intervals up to three months.

Participants – Inclusion/Exclusion Criteria: Patients aged 18–70 years with a perianal abscess undergoing I&D were included. Exclusion criteria were existing fistula-in-ano, Crohn's disease, malignancy, immunocompromised status, and refusal to consent or follow-up.

Study Sampling: A consecutive sampling method was used. All eligible and consenting patients who presented during the study period were included to avoid selection bias.

Study Sample Size: A total of 120 patients were included based on estimated incidence rates from prior studies, ensuring adequate power while accounting for possible dropouts during follow-up.

Study Groups: No randomization was done. For analysis, patients were stratified based on age, sex, comorbidities, abscess features, and antibiotic use to study associations with fistula formation.

Study Parameters: Key parameters included demographics, comorbidities, abscess size and position, wound characteristics, anesthesia type, antibiotic use, and presence or absence of fistula at three months.

Study Procedure: All patients underwent I&D under anesthesia. Postoperative care included sitz baths, antibiotics, and routine follow-up. Wound healing and fistula development were assessed clinically.

Data Collection: Data were recorded using a structured proforma at baseline and follow-ups.

The same clinical team assessed wound status to ensure uniform documentation.

Data Analysis: Data were analyzed using SPSS v25. Frequencies, means, chi-square, and logistic regression were used to evaluate associations between clinical factors and fistula development.

Ethical Considerations: Institutional Ethics Committee approval was obtained. Written

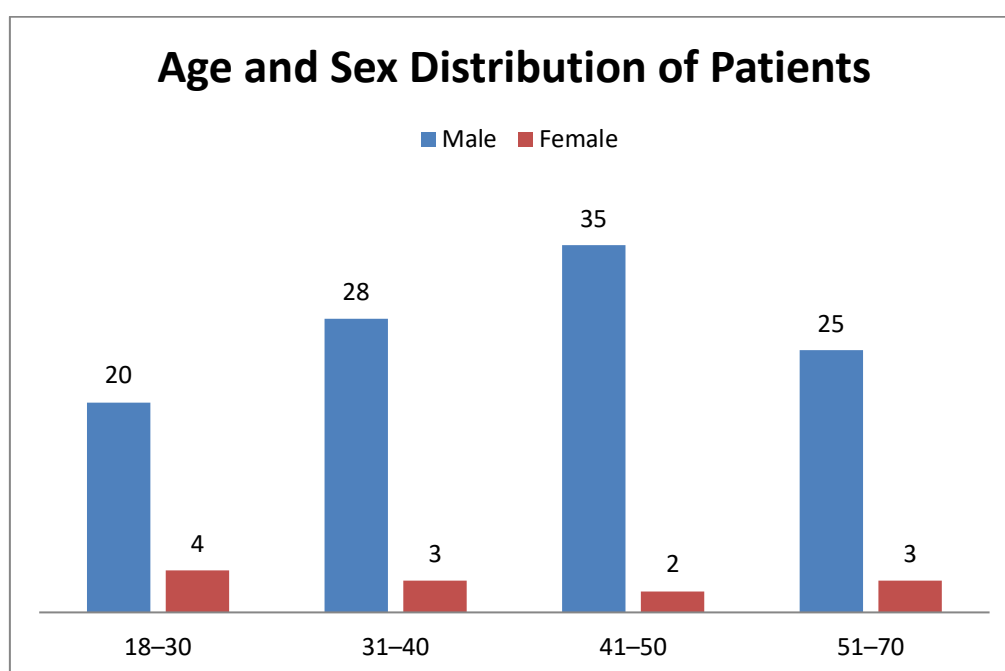
informed consent was taken from all participants, and confidentiality was strictly maintained throughout the study.

Results

Age and Sex Distribution of Patients: Majority of patients were males (90%), with the highest number in the 41–50 years age group. Fistula was more frequent in males aged below 50 (Table 1).

Table 1: Age and Sex Distribution of Patients

Age Group (Years)	Male	Female	Total
18–30	20	4	24
31–40	28	3	31
41–50	35	2	37
51–70	25	3	28
Total	108	12	120

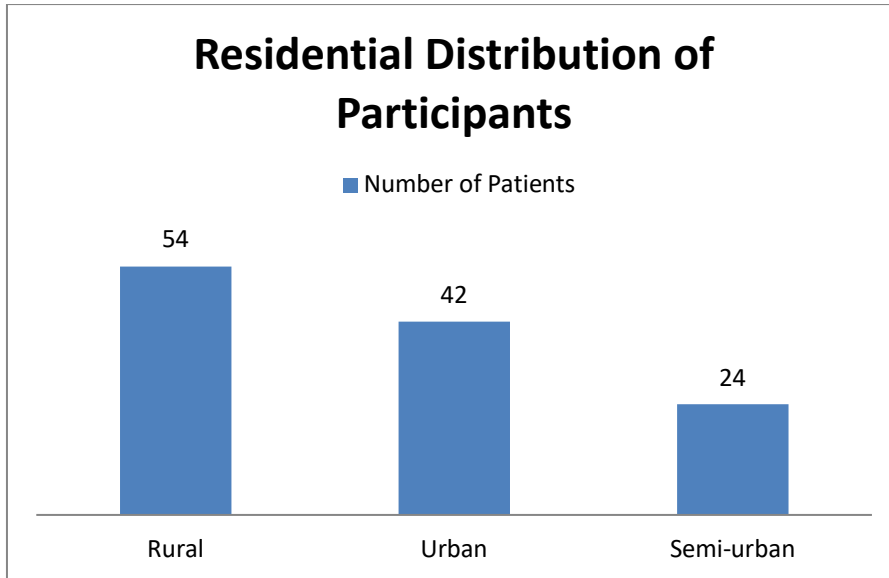


Graph 1: Age and Sex Distribution of Patients

Residential Distribution of Participants: Most patients were from rural areas (45%), indicating a higher incidence or delayed care-seeking behavior in this group (Table 2).

Table 2: Residential Distribution of Participants

Place of Living	Number of Patients	Percentage
Rural	54	45%
Urban	42	35%
Semi-urban	24	20%

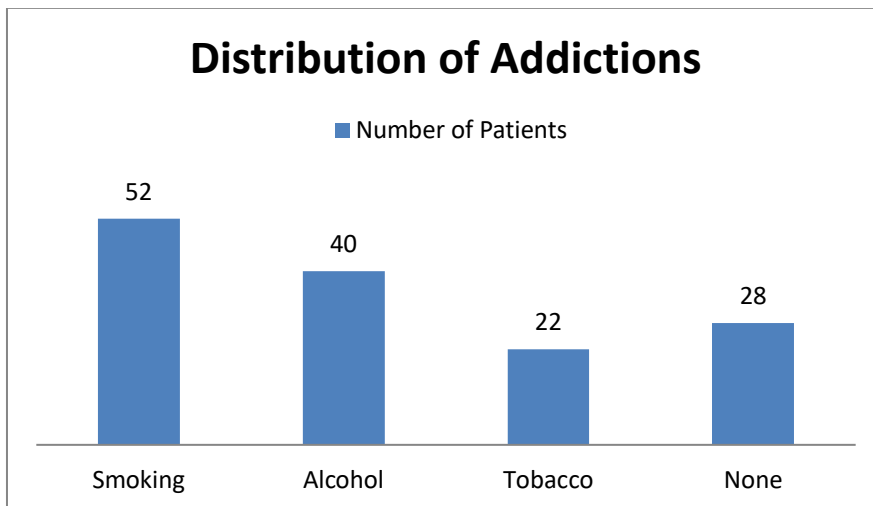


Graph 2: Residential Distribution of Participants

Distribution of Addictions: Smoking was the most common addiction, seen in over 43% of patients and may be associated with delayed healing or fistula risk (Table 3).

Table 3: Distribution of Addictions

Addiction Type	Number of Patients	Percentage
Smoking	52	43.3%
Alcohol	40	33.3%
Tobacco	22	18.3%
None	28	23.3%

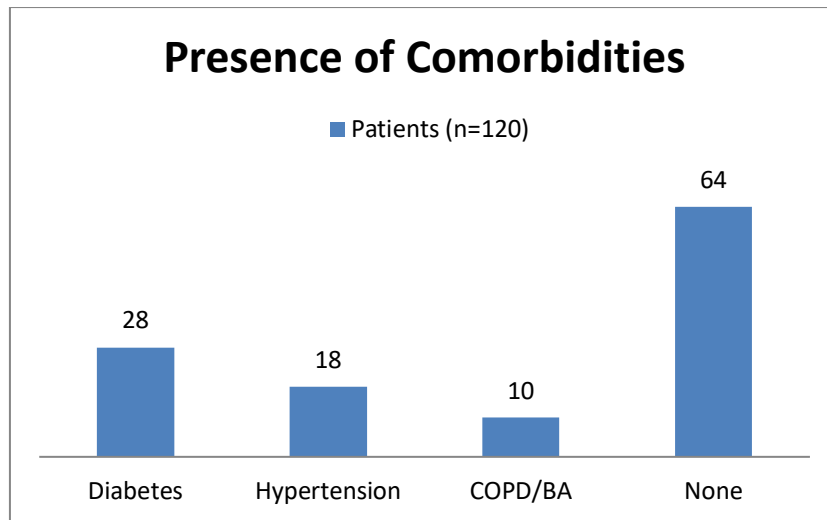


Graph 3: Distribution of Addictions

Presence of Comorbidities: Diabetes was the most common comorbidity and may contribute to higher fistula rates due to poor wound healing (Table 4).

Table 4: Presence of Comorbidities

Comorbidity	Patients (n=120)	Percentage
Diabetes	28	23.3%
Hypertension	18	15%
COPD/BA	10	8.3%
None	64	53.3%

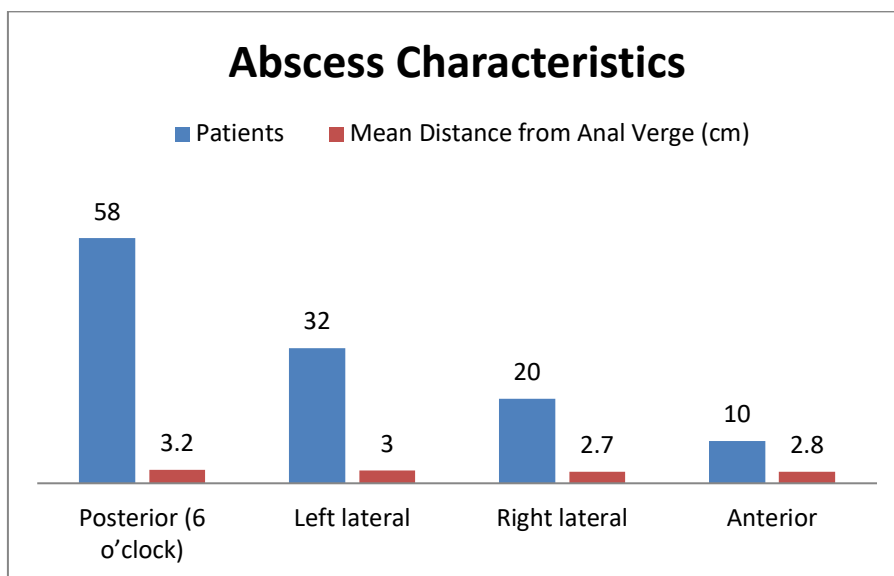


Graph 4: Presence of Comorbidities

Abscess Characteristics: Posterior abscesses were the most common and larger in size, possibly increasing the risk of fistula formation (Table 5).

Table 5: Abscess Characteristics

Location (Clock Position)	Patients	Mean Distance from Anal Verge (cm)	Mean Size (cm)
Posterior (6 o'clock)	58	3.2	2.8
Left lateral	32	3.0	2.5
Right lateral	20	2.7	2.4
Anterior	10	2.8	2.2

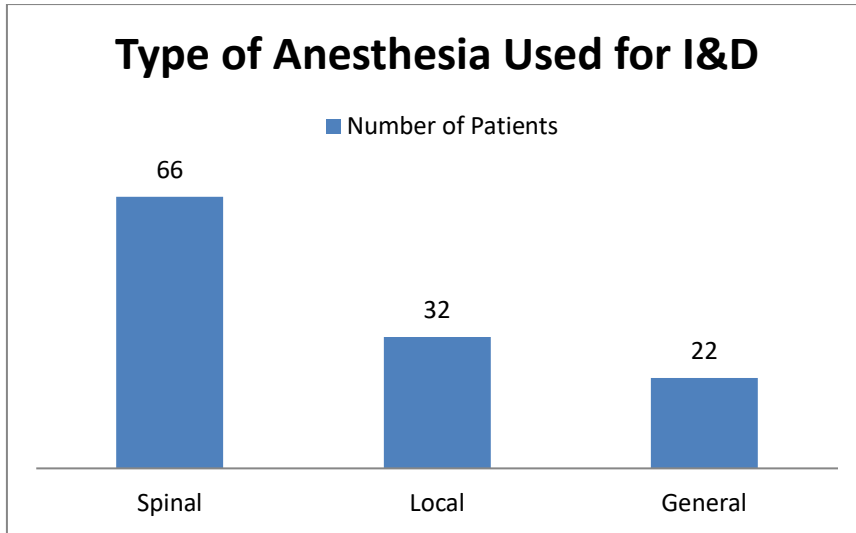


Graph 5: Abscess Characteristics

Type of Anesthesia Used for I&D: Spinal anesthesia was the most commonly used, but general anesthesia was linked with slightly higher fistula rates (Table 6).

Table 6: Type of Anesthesia Used for I&D

Anesthesia Type	Number of Patients	Percentage
Spinal	66	55%
Local	32	26.7%
General	22	18.3%

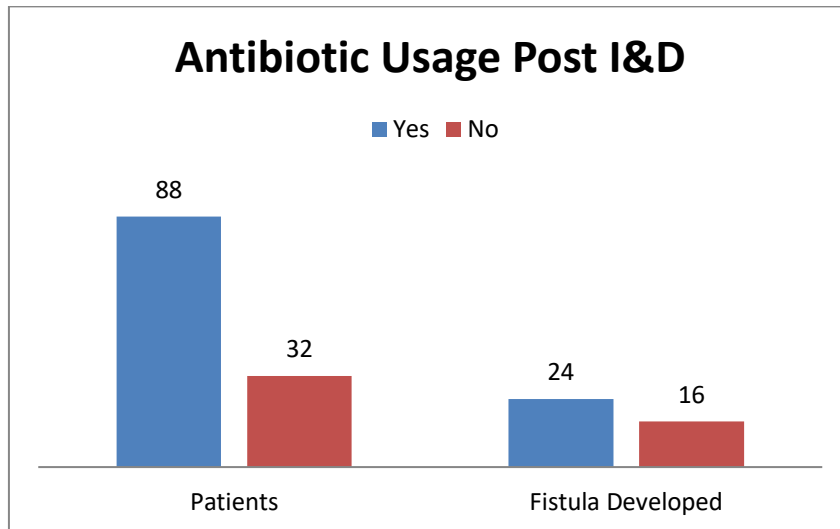


Graph 6: Type of Anesthesia Used for I&D

Antibiotic Usage Post I&D: Fistula development was higher in those not given antibiotics, suggesting a protective effect of antibiotic therapy (Table 7).

Table 7: Antibiotic Usage Post I&D

Antibiotic Prescribed	Patients	Fistula Developed	Percentage (%)
Yes	88	24	27.3%
No	32	16	50.0%

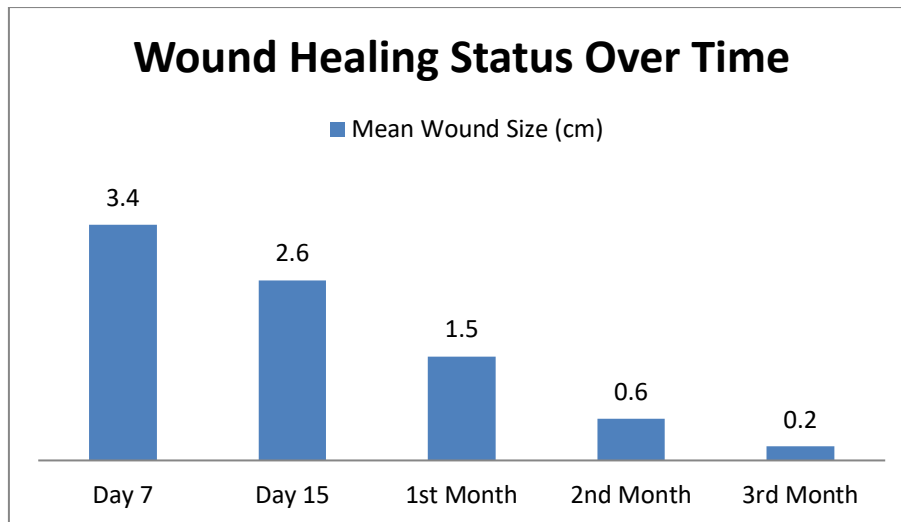


Graph 7: Antibiotic Usage Post I&D

Wound Healing Status over Time: Wound healing progressed steadily over 3 months, with most patients healing by the 2nd month (Table 8).

Table 8: Wound Healing Status over Time

Time point	Mean Wound Size (cm)	Healed Patients (n)
Day 7	3.4	0
Day 15	2.6	18
1st Month	1.5	72
2nd Month	0.6	102
3rd Month	0.2	112

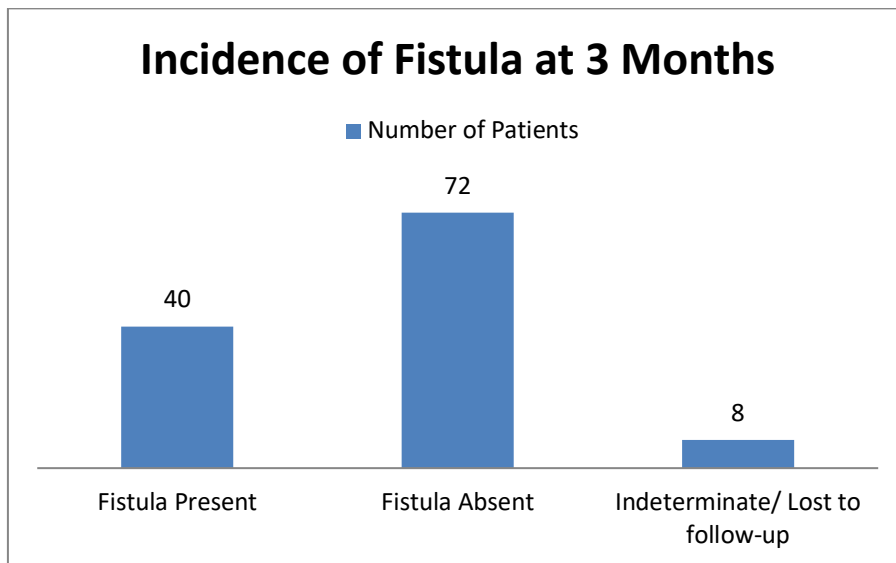


Graph 8: Wound Healing Status over Time

Incidence of Fistula at 3 Months: The incidence of fistula-in-ano was 33.3%, aligning with global data on post-I&D complications (Table 9).

Table 9: Incidence of Fistula at 3 Months

Outcome	Number of Patients	Percentage
Fistula Present	40	33.3%
Fistula Absent	72	60%
Indeterminate/ Lost to follow-up	8	6.7%

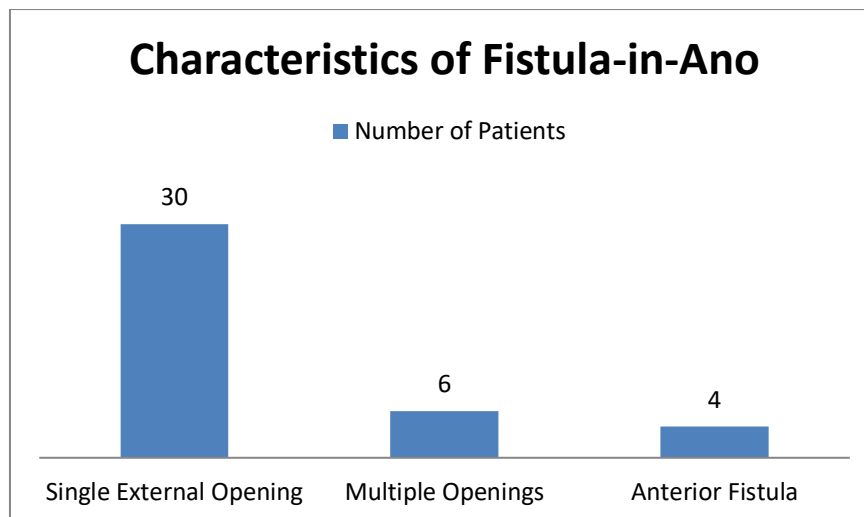


Graph 9: Incidence of Fistula at 3 Months

Characteristics of Fistula-in-Ano: Most fistulas were single and posterior in location, with multiple tracts observed in a minority of cases (Table 10).

Table 10: Characteristics of Fistula-in-Ano

Type of Fistula	Number of Patients	Percentage
Single External Opening	30	75%
Multiple Openings	6	15%
Anterior Fistula	4	10%



Graph 10: Characteristics of Fistula-in-Ano

Discussion

This prospective observational study aimed to assess the incidence and predictors of fistula-in-ano following incision and drainage (I&D) of perianal abscess. In our study, the overall incidence of fistula formation was 33.3%, which closely aligns with global data reporting rates between 23% and 47%. For instance, Lohsiriwat et al. (2010) reported a fistula incidence of 31% after I&D, while a study from Sudan by Ali and Hamza (2025) showed a slightly lower rate of 23% [1, 2]. Similarly, Ahmed et al. (2022) reported a higher incidence of 47.05% in Bangladesh, particularly in males [4].

We found that males under 50 years constituted the majority of cases and had a higher risk of developing fistula, consistent with previous studies that identified younger age and male sex as risk factors. A similar pattern was also found in the research conducted by Al-Salem et al. (1996), Macdonald et al. (2003), where a male inclination was also stated to exist especially among the young adults and children [8, 9].

They found that the most prevalent in our study were the posterior (48.3%) as compared to the anterior ones, and were more extensive in size giving greater possibility of developing a fistula. This point aligns with those in the PARIS Study (2025) as well: posteriorly situated and bigger abscesses had a higher chance to lead to fistulas [6]. Notably, our results indicated that the use of antibiotics lowered the development of fistulas by a significant margin (27.3% vs. 50%). This finding is supported by the results of Ghahramani et al. (2017), who revealed the prophylactic effect of metronidazole and ciprofloxacin on the prevention of fistulas prevalence (post-I&D reduction) [7].

In this study, we noted improved healing in non-diabetic patients, which supports findings that diabetes is a significant comorbidity to wound

healing and the course of fistulas (Dhahir, 2020) [5]. Also the most frequently applied type of anaesthesia was the spinal one; however, it was only slightly higher in the occurrence of the fistula, contrary to Ali and Hamza. All in all, our results support the ideas of early drainage, correct antibiotic prescription and comorbidity management as modifiable factors that serve to decrease the possibility of fistula-in-ano after I&D. Our findings partially match the previous literature, but also provide local Indian statistics, that is rather scarce in the international evidence base.

Conclusion

This study highlights that the incidence of fistula-in-ano following I&D for perianal abscess is 33.3%. Key predictors include male sex, younger age, larger abscess size, and absence of antibiotic prophylaxis. The findings emphasise the importance of early intervention, appropriate antibiotic therapy, and management of comorbidities in reducing fistula formation rates. Our study provides valuable insights into the specific factors influencing fistula development in an Indian population, contributing essential data to the global understanding of post-I&D complications.

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