Section: General Surgery

Original Research Article

PREVALENCE AND CLINICAL CORRELATES OF HYPOTHYROIDISM IN FISSURE-IN-ANO: EXPERIENCE FROM A RURAL TERTIARY HOSPITAL

Guntupalli Rakesh[1], Krishna Prasad K[2]

[1]*Final Year Post Graduate, Department of General Surgery, Sri Devaraj Urs Medical College, Tamaka, Kolar, India*
[2]*Professor and HOD, Department of General Surgery, Sri Devaraj Urs Medical College, Tamaka, Kolar, India*

Received *: 06/07/2025*
Received in revised form *: 22/08/2025*
Accepted *: 13/09/2025*

Corresponding Author:
Dr. Krishna Prasad K,
Professor and HOD, Department of General Surgery, Sri Devaraj Urs Medical college, Tamaka,Kolar, India.
Email:kamisettykp@gmail.com

DOI: 10.70034/ijmedph.2025.3.576

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2025; 15 (3); 3140-3145

ABSTRACT

Background: Fissure-in-ano is a common benign anorectal disorder characterized by severe anal pain, bleeding, and constipation. Although its primary etiology is unclear, hypertonia of the internal anal sphincter and mucosal ischemia are considered central mechanisms. Hypothyroidism is known to alter gastrointestinal motility, impair sphincter relaxation, and reduce vascular perfusion, potentially contributing to fissure pathogenesis. This study aimed to determine the prevalence of hypothyroidism among patients with fissure-in-ano in a rural tertiary care setting.

Materials and Methods: A retrospective observational study was conducted at Sri Devaraj Urs Medical College, Karnataka, from February 2023 to February 2025. Seventy-nine patients with a clinical diagnosis of fissure-in-ano and complete thyroid profiles (T3, T4, TSH) were included. Patients with conditions or medications affecting thyroid function were excluded. Sample size was calculated using a single-proportion formula with an expected prevalence of 52.5%. Data were analyzed using descriptive statistics, Chi-square test, and Student's t-test, with $p < 0.05$ considered statistically significant.

Results: The mean age was 42.7 years, with most patients belonging to the middle-aged group (61%). There was a slight male predominance (55.9%). Painful defecation was the most frequent complaint (47.5%), followed by rectal bleeding (35.4%) and constipation (26.5%). Thyroid dysfunction was identified in 41 patients (52.5%), of whom the majority had subclinical hypothyroidism. Euthyroidism was seen in 46.8%, and hyperthyroidism in 0.7%. The association between hypothyroidism and fissure-in-ano was statistically significant ($p = 0.0092$).

Conclusion: Hypothyroidism was significantly more prevalent in fissure-in-ano patients compared to general population rates, suggesting it may act as an independent risk factor. Routine thyroid function screening should be considered in fissure-in-ano patients, particularly those with chronic or recurrent disease. Larger multicentre prospective studies are warranted to validate these findings and assess whether thyroid hormone therapy improves fissure outcomes.

Keywords: Fissure-in-ano; Hypothyroidism; Subclinical hypothyroidism; Anal sphincter spasm; Constipation; Rural tertiary care.

INTRODUCTION

Fissure-in-ano is one of the most common benign anorectal disorders encountered in surgical practice. It is defined as a longitudinal tear in the squamous epithelium of the anal canal, usually extending from the dentate line towards the anal verge. First described by Lockhart-Mummery in 1934, fissure-in-ano has since been recognized as a major cause of anal pain and bleeding, accounting for a significant proportion of proctologic consultations worldwide.[1] The lesion typically presents in the

posterior midline in approximately 85–90% of cases, while anterior fissures occur less commonly, particularly in females.[2] Patients usually present with severe anal pain during defecation, bleeding per rectum, and constipation, all of which contribute to considerable morbidity and impaired quality of life.[3]

The exact etiology of fissure-in-ano is not fully understood, but several hypotheses have been proposed. The prevailing theory suggests that hypertonia and spasm of the internal anal sphincter lead to reduced blood supply in the posterior commissure of the anal canal, thereby causing ischemia and impaired healing of the mucosal tear.[4] Other proposed mechanisms include trauma from passage of hard stool, chronic constipation, repeated diarrhea, poor anal hygiene, and childbirth-related injury in women.[5] Despite multiple treatment modalities ranging from conservative measures such as dietary modifications, stool softeners, and topical agents to surgical interventions like lateral internal sphincterotomy, the recurrence rate remains considerable.[6] Understanding the risk factors that predispose to fissure development or hinder its healing is therefore clinically important.

In recent years, attention has turned to the possible role of systemic conditions, particularly thyroid dysfunction, in the pathogenesis of anorectal diseases. Hypothyroidism is a common endocrine disorder, characterized by decreased circulating thyroid hormones or resistance to their action.[7] It is well known that thyroid hormones influence nearly every tissue in the body by regulating metabolism, growth, and differentiation. In the gastrointestinal tract, hypothyroidism has been linked to a range of manifestations including constipation, abdominal distension, and, less commonly, diarrhea.[8] These effects are thought to be multifactorial: alterations in thyroid hormone receptors, neuromuscular dysfunction, and hypothyroid-related myopathy infiltrating the intestinal wall have all been implicated. Thyroid hormone deficiency also influences vascular smooth muscle function, leading to impaired relaxation and vasoconstriction, which in turn may reduce blood supply to tissues, including the anal mucosa.[9]

The connection between hypothyroidism and fissure-in-ano has been hypothesized but is not well established. Constipation is one of the most frequent gastrointestinal symptoms associated with hypothyroidism. Reduced peristalsis, higher rectal sensory thresholds, and decreased maximal tolerable volumes in hypothyroid patients contribute to harder stool consistency and prolonged colonic transit, predisposing to mucosal tears during defecation.[7,9] In addition, hypothyroidism has been shown to impair the recto-anal inhibitory reflex, resulting in delayed sphincter relaxation. This mechanism may directly contribute to the hypertonia of the internal anal sphincter that is central to fissure pathophysiology.[8] Furthermore, hypothyroid myopathy affecting sphincter muscles may further delay relaxation and perpetuate spasm, aggravating mucosal ischemia and poor healing.[9]

Several studies have attempted to explore the link between thyroid disorders and fissure-in-ano. Balineni et al. (2020) reported a prevalence of hypothyroidism in 52.5% of patients with fissure-in-ano in a tertiary care centre in Chennai, India, highlighting a statistically significant association between the two conditions.[10] However, the published data remain sparse, and most studies are limited by small sample sizes, single-centre designs, and lack of long-term follow-up. Additionally, variations in patient populations, iodine sufficiency, dietary habits, and healthcare-seeking behavior may influence the observed prevalence of thyroid dysfunction in fissure patients across different regions.

In rural India, fissure-in-ano continues to be a common surgical problem, often diagnosed late and associated with poor health-seeking behavior. At the same time, hypothyroidism is widely prevalent in the Indian population, with epidemiological studies estimating its prevalence between 10% and 12% in adults, and higher in women.[7] The coexistence of these two conditions in the same patient group raises the possibility of a causal or contributory relationship. However, data specific to rural populations remain scarce, and the prevalence of hypothyroidism among fissure-in-ano patients in such settings has not been adequately studied.

The present study was undertaken to address this knowledge gap. Conducted at Sri Devaraj Urs Medical College, a rural tertiary care centre, this study aimed to determine the prevalence of subclinical and overt hypothyroidism among patients presenting with fissure-in-ano. By analyzing demographic characteristics, clinical presentation, and thyroid profiles of affected individuals, this research sought to explore whether thyroid dysfunction represents a significant risk factor for fissure-in-ano in rural Indian patients. Establishing such an association would have important clinical implications, as routine evaluation of thyroid function in fissure patients could facilitate early diagnosis of hypothyroidism, improve management outcomes, and potentially reduce recurrence rates after treatment.

MATERIALS AND METHODS

Study Design and Setting: This was a retrospective observational study conducted at the Department of General Surgery, Sri Devaraj Urs Medical College, a rural tertiary care teaching hospital in Karnataka, India. The study was carried out over a period of two years, from February 2023 to February 2025. All patients diagnosed with fissure-in-ano during this period and who had undergone thyroid function testing were considered for inclusion.

Study Population: A total of 79 patients with a diagnosis of fissure-in-ano were included in the

study. Diagnosis was established clinically based on history of anal pain, bleeding, and examination findings. Both acute and chronic fissure-in-ano cases were considered.

Sample Size: This study was planned to estimate the prevalence of hypothyroidism (subclinical and overt combined) among patients with fissure-in-ano. The minimum required sample size was calculated for a single proportion at a 95% confidence level using the formula:

$n = Z^2 \times p(1–p) / d^2$

where Z is the standard normal deviate for 95% confidence (1.96), p is the expected prevalence, and d is the desired absolute precision (margin of error).

For this study, the expected prevalence (p) was taken as 52.5% based on the findings of Balineni et al. (2020). The desired precision (d) was set at 0.11 (±11 percentage points), which is appropriate for a retrospective single-centre prevalence study.

Substituting the values:

$n = (1.96)^2 \times 0.525 \times 0.475 / (0.11)^2$

$n = 79.17 \approx 79$

Thus, the minimum required sample size was 79 patients. The final dataset included exactly 79 patients, fulfilling the calculated requirement.

Inclusion Criteria

Patients of either sex, aged 18 years or older, with a clinical diagnosis of fissure-in-ano and complete thyroid function test profiles including serum TSH, T3, and T4 were included. Only those patients attending the hospital during the study period and having complete medical records were considered eligible.

Exclusion Criteria

Patients were excluded if they were on medications known to interfere with thyroid function such as amiodarone, lithium, carbamazepine, phenytoin, or metoclopramide. Those with systemic illnesses that may alter thyroid function test results, including sepsis or chronic liver disease, were also excluded. Pregnant women, patients with prior thyroidectomy, or those already on thyroid hormone replacement therapy were not included. In addition, patients with incomplete medical records were excluded from the final analysis.

Data Collection: Data were collected retrospectively from hospital medical records and electronic databases. Demographic details such as age, sex, and residence were recorded. Clinical presentation was noted with emphasis on primary complaints including painful defecation, rectal bleeding, constipation, and other associated systemic symptoms. Thyroid examination findings, including the presence of goiter or nodularity, were documented where available. Thyroid function tests were reviewed for all patients and included serum TSH, total or free T3, and T4 levels. The presence of comorbid conditions such as diabetes mellitus and hypertension was also noted.

Definition of Thyroid Dysfunction: The normal laboratory reference ranges used for the thyroid function tests were TSH: 0.4–4.5 mIU/L, T3: 2.0–4.4 pg/mL, and T4: 0.8–2.0 ng/dL. Based on these values, patients were classified as euthyroid if all parameters were within the reference range. Subclinical hypothyroidism was defined as elevated TSH with normal T3 and T4 levels in the absence of overt clinical symptoms. Overt hypothyroidism was defined as elevated TSH with low T4 levels. Hyperthyroidism was defined as suppressed TSH with elevated T3 and/or T4. For the purposes of this study, both subclinical hypothyroidism and overt hypothyroidism were analyzed together under the category of hypothyroid.

Outcome Measures: The primary outcome of the study was to determine the prevalence of hypothyroidism among patients with fissure-in-ano. Secondary outcomes included analyzing the distribution of thyroid dysfunction across different age groups and sexes, as well as assessing its association with clinical symptoms of fissure-in-ano.

Statistical Analysis: All data were entered into Microsoft Excel and subsequently analyzed using SPSS version 25.0 (IBM Corp., USA). Categorical variables were expressed as frequencies and percentages, while continuous variables were expressed as mean values with standard deviations. Comparisons between hypothyroid and euthyroid groups were performed using the Chi-square test or Fisher's exact test for categorical variables and the Student's t-test for continuous variables. A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations: The study protocol was reviewed and approved by the Institutional Ethics Committee of Sri Devaraj Urs Medical College. As this was a retrospective study, the requirement for informed patient consent was waived. However, patient confidentiality was strictly maintained, and all data were anonymized prior to analysis.

RESULTS

Demographic Characteristics: A total of 79 patients with fissure-in-ano were included in the study. The mean age of presentation was 42.7 years, with a range between 19 and 67 years. The majority of patients belonged to the middle-aged group (61%), followed by older patients above 50 years (28%), while only a minority (11%) were below 30 years of age. There was a slight male predominance, with 44 males (55.9%) and 35 females (44.1%), giving a male-to-female ratio of approximately 1.3:1.

Clinical Presentation: The most common symptom was painful defecation, reported by 38 patients (47.5%). Other presenting complaints included rectal bleeding in 28 patients (35.4%), constipation in 21 patients (26.5%), and generalized weakness in 10 patients (12.6%). A few patients presented with more than one complaint.

Table 1: Age and Sex Distribution of Patients (n=79)

Age Group (years)	No. of Cases (%)
<30	9 (11.4%)
30–50	48 (60.8%)
>50	22 (27.8%)
Sex (Male)	44 (55.9%)
Sex (Female)	35 (44.1%)

Table 2: Clinical Presentation of Fissure-in-Ano Patients

Symptom	No. of Cases (%)
Painful defecation	38 (47.5%)
Rectal bleeding	28 (35.4%)
Constipation	21 (26.5%)
Generalized weakness	10 (12.6%)

Thyroid Function Profile: Out of 79 patients, 41 (52.5%) were diagnosed with hypothyroidism (subclinical or overt), 37 (46.8%) were euthyroid, and 1 patient (0.7%) was found to have hyperthyroidism. The prevalence of hypothyroidism among fissure-in-ano patients was statistically significant, with a two-tailed p-value of 0.0092.

Table 3: Thyroid Function Status of Patients

Thyroid Status	No. of Cases (%)
Euthyroid	37 (46.8%)
Hypothyroid	41 (52.5%)
Hyperthyroid	1 (0.7%)

Statistical Association: On statistical analysis, the prevalence of hypothyroidism among fissure-in-ano patients was significantly higher than expected population prevalence. The two-tailed p-value was 0.0092, indicating a meaningful association between thyroid dysfunction and fissure-in-ano.

DISCUSSION

The present study demonstrated a significant prevalence of hypothyroidism (52.5%) among patients presenting with fissure-in-ano in a rural tertiary care setting. The association was statistically significant, reinforcing the possibility that thyroid dysfunction is an important, though often overlooked, contributor to anorectal disease.

Comparison with Previous Literature

Our findings parallel those of Balineni et al., who also reported a prevalence of 52.5% hypothyroidism among fissure-in-ano patients in a tertiary centre in Chennai.[10] This consistency across independent cohorts strengthens the validity of the association. By contrast, epidemiological surveys in India report a hypothyroidism prevalence of approximately 10–12% in the general adult population,[7] suggesting that fissure-in-ano patients are disproportionately affected. Varadarajan et al. similarly found fissure-in-ano to be common in middle-aged patients with male predominance,[20] and Killedar et al. proposed a clinical grading system to stratify fissure severity in Indian populations.[21] However, these proctologic studies did not account for thyroid dysfunction, highlighting the novelty and relevance of our approach.

Population-based studies from North India and abroad further support the burden of thyroid disease. Bhatia et al. documented high rates of thyroid dysfunction in North Indian cohorts,[22] while Al Mahmood et al. observed diverse gastrointestinal manifestations of thyroid disease in patients attending a tertiary care hospital.[23] The overlap between hypothyroidism and gastrointestinal complaints such as constipation, abdominal pain, and delayed gut transit raises the possibility of causality rather than coincidence.

Pathophysiological Mechanisms

Several mechanisms may explain the link between hypothyroidism and fissure-in-ano. Constipation is the most direct pathway, and numerous studies have confirmed slowed colonic transit in hypothyroidism. Varma and Smith were among the first to report that hypothyroid patients frequently develop anorectal dysfunction, including constipation and impaired defecation reflexes.[25] Subsequent physiological studies by Rao et al. identified failures of rectoanal coordination in obstructive defecation syndromes.[11] Bassotti et al. provided manometric evidence of colonic motor disturbances in hypothyroid patients,[12] further implicating thyroid dysfunction in impaired gut motility.

Systematic reviews confirm that gastrointestinal manifestations in hypothyroidism range from constipation to pseudo-obstruction, with decreased peristalsis and altered visceral sensitivity as key features.[13] Deen et al. highlighted abnormal rectoanal inhibitory reflexes in endocrine-related neuropathies,[14] which may also apply to hypothyroid states. Impaired reflex relaxation could perpetuate internal sphincter hypertonia, a central element in fissure pathogenesis.[4]

Vascular compromise may be another important factor. Thyroid hormones modulate vascular smooth muscle tone, and Ojamaa et al. demonstrated that thyroid hormone exerts acute vasodilatory effects on

vascular smooth muscle.[15] In hypothyroidism, this vasodilation is diminished, potentially exacerbating ischemia in the poorly perfused posterior commissure of the anal canal.

Hypothyroid myopathy also plays a role. Muscle fiber infiltration with mucopolysaccharides and delayed relaxation have long been described. Kung et al. reported myopathy in acute hypothyroidism, characterized by stiffness and delayed relaxation.[16] Hoffman's syndrome, a rare form of hypothyroid myopathy, has also been documented in adults.[17] Such changes likely extend to anorectal musculature, causing persistent sphincter spasm and impaired healing of fissures.

Clinical manifestations described in case literature echo our findings. Sweet et al. reported recurrent gastrointestinal symptoms attributable to hypothyroidism,[19] while Mendes Ribeiro et al. in a systematic review reinforced the broad impact of hypothyroidism on gut physiology.[13] Together, these studies provide biological plausibility for the association we observed.

Clinical Implications

The clinical implications of these findings are substantial. Routine thyroid function testing in fissure-in-ano patients could enable early detection of subclinical hypothyroidism, a state that may otherwise go unnoticed but still contributes to gastrointestinal dysfunction. Treating hypothyroidism may not only improve systemic health but also enhance fissure healing. McAninch and Bianco have emphasized the evolving landscape of hypothyroidism treatment, with levothyroxine therapy being safe, effective, and widely available.[18] Integrating thyroid assessment into fissure management could therefore be cost-effective, particularly in high-prevalence regions.

Surgical considerations also warrant attention. Lateral internal sphincterotomy is the definitive treatment for chronic fissures,[24] but hypothyroid patients may be at greater risk of poor healing and anesthetic complications if their thyroid dysfunction is undiagnosed. Preoperative screening and correction of hypothyroidism can mitigate such risks. In addition, clinicians should recognize that symptoms like constipation and fatigue, often attributed solely to fissure disease, may in fact be manifestations of thyroid dysfunction.

Strengths of the Study

A notable strength of the present study is that it was conducted in a rural tertiary care centre, reflecting the disease burden and clinical characteristics of an underrepresented patient population. The inclusion of all consecutive patients with fissure-in-ano over a two-year period minimizes selection bias and enhances the generalizability of findings to similar settings. In addition, thyroid function was assessed biochemically in all included patients, enabling accurate categorization into euthyroid, hypothyroid, and hyperthyroid groups.

Limitations and Future Directions: This study has certain limitations. Its retrospective design limited control over confounding factors such as diet, lifestyle, and obstetric history. The modest sample size prevented subgroup analysis between subclinical and overt hypothyroidism. In addition, long-term outcomes such as fissure recurrence and response to thyroid hormone therapy were not assessed.

Future research should include larger, prospective, multicentre studies to validate these findings. Evaluating the effect of thyroid hormone replacement on fissure healing, incorporating anorectal manometry and vascular imaging, and conducting cost-effectiveness analyses of routine thyroid screening would provide further clarity.

CONCLUSION

This study demonstrates a significantly higher prevalence of hypothyroidism among patients with fissure-in-ano compared to the general population, supporting a disease-specific association. The observed relationship is biologically plausible, given that hypothyroidism contributes to constipation, impairs sphincter relaxation, and reduces vascular perfusion, all of which predispose to fissure formation and delayed healing. Clinically, these findings suggest that routine thyroid function testing should be considered in patients with fissure-in-ano, particularly in recurrent or chronic cases. Early detection and treatment of hypothyroidism may improve fissure outcomes and optimize perioperative care. Although the retrospective design and modest sample size limit generalizability, the results align with prior evidence and highlight the need for larger, prospective, multicentre studies. Future research should also evaluate whether thyroid hormone replacement reduces recurrence or accelerates healing. Until such data are available, clinicians should maintain vigilance for thyroid dysfunction in fissure-in-ano patients.

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