



PREOPERATIVE MRI EVALUATION OF PERIANAL FISTULA AND ITS IMPACT ON SURGICAL OUTCOME: A PROSPECTIVE OBSERVATIONAL STUDY

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ABSTRACT **Background:** Perianal fistula is a recurring inflammatory anorectal disorder causing significant morbidity and high recurrence rates after surgery. Precise preoperative mapping of fistula tracts, internal openings, secondary extensions, and abscesses is critical for effective surgical planning. Magnetic Resonance Imaging (MRI) offers superior soft-tissue contrast and multiplanar capability, making it the preferred preoperative imaging modality. **Methods:** Park's Classification (1976) categorises fistulas by their relation to the sphincter complex: intersphincteric (45%), transsphincteric (30%), suprasphincteric (20%), and extrasphincteric (5%). The St. James's system grades fistulas from 1 (simple intersphincteric) to 5 (supralelevator extension). The American Gastroenterological Association classifies fistulas as simple or complex, which has prognostic relevance for healing. **Results:** The mean patient age was 48.2 ± 14.5 years, with a male predominance (83.3%). Simple fistulas accounted for 63.3% of cases. MRI achieved 100% sensitivity for abscesses, horseshoe extensions, and supralelevator spread, with overall accuracy exceeding 93% across all parameters. Secondary tracts were detected with 90.9% sensitivity and 94.7% specificity. MRI altered the operative approach in 33.3% of patients. Complete healing rose from 66.7% at 6 weeks to 86.7% at 3 months, and recurrence declined from 16.7% to 13.3%. **Conclusion:** Preoperative MRI accurately characterises perianal fistula anatomy and meaningfully influences surgical planning. Its routine use, particularly in complex fistulas, is associated with improved healing and reduced recurrence.

KEYWORDS :

INTRODUCTION

Perianal fistula is an abnormal tract linking the anal canal to the perianal skin, arising predominantly from cryptoglandular infection. The condition affects approximately 10 per 100,000 persons annually, with men affected nearly twice as often as women and peak incidence between ages 20 and 40.

Secondary aetiologies include Crohn's disease — which carries a 34% incidence of perianal fistulas — radiation injury, tuberculosis, HIV infection, and obstetric trauma. Despite being benign, the disease substantially impairs quality of life through pain, discharge, and repeated operative interventions.

Conventional imaging tools — fistulography, endosonography, and computed tomography — each have limitations in defining sphincteric anatomy and complex extensions. Pelvic MRI has therefore become the gold standard, offering three-dimensional anatomical detail, superior soft-tissue resolution, and excellent sphincteric delineation, with reported sensitivities of 88–100%. This study evaluates the diagnostic accuracy of preoperative MRI and its influence on surgical outcomes in 30 patients.

Aim:

To evaluate preoperative MRI in perianal fistula assessment and its influence on surgical outcome.

Objectives:

- (1) To assess MRI's ability to delineate fistula anatomy and secondary extensions.
- (2) To compare clinical examination findings with preoperative MRI findings.
- (3) To evaluate MRI's effect on surgical decision-making.
- (4) To assess the impact of MRI-guided surgery on healing and recurrence.

REVIEW OF LITERATURE

Anatomy of the Anorectal Area

The anal canal connects the rectum to the exterior and lies within the anal triangle of the perineum between the ischioanal fossae. Two sphincters surround it: the involuntary internal anal sphincter (IAS) and the voluntary external anal sphincter (EAS). The pectinate (dentate) line divides the canal into superior two-thirds and inferior

one-third, serving as an embryologic landmark for differing vascular and nervous supply.

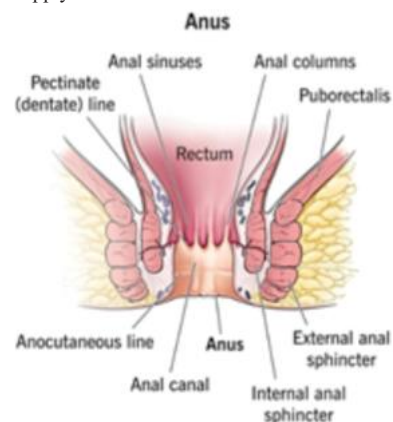


Figure 1: Anatomy of Anorectal Area (Source: Cleveland Clinic)

Classification of Perianal Fistulas

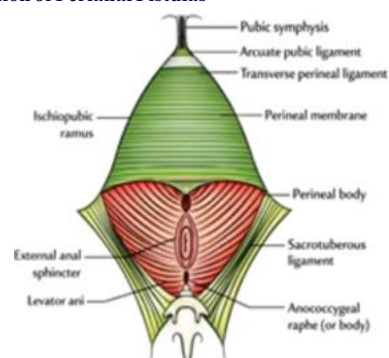


Figure 2: Structures Piercing the Perineal Membrane (Pradeep Shahajirao S, Ramesh Shivappa K 2018)

Role of MRI in Perianal Fistula Evaluation

MRI provides accurate preoperative mapping of fistula tracts, abscess cavities, and their relationship to the sphincter complex. Beets-Tan et al. reported 100% sensitivity for horseshoe fistulas and 96–97% for abscesses in 56 patients. Buchanan et al. demonstrated that MRI-guided planning reduced recurrence by identifying occult tracts. Garg et al. found that MRI changed the preoperative diagnosis in half of simple and over a third of complex fistulas among 229 patients. Konan et al. reported a significant MRI contribution to clinical evaluation in 33.8% of 136 cases, particularly for complex and recurrent fistulas.

MATERIALS AND METHODS

Study Design

A prospective observational study was conducted at the Department of General Surgery, T.S. Misra Medical College and Hospital, Lucknow over 18 months (2023–2026), following Institutional Ethics Committee approval. Informed written consent was obtained from all participants.

Study Population

Thirty adult patients with clinically diagnosed perianal fistula, scheduled for elective surgery, were enrolled.

Inclusion Criteria

Inclusion: age ≥ 18 years, clinically diagnosed perianal fistula, elective surgical candidate, willing to consent.

Exclusion Criteria

Exclusion: MRI contraindications, acute perianal sepsis, known malignancy, pregnancy.

Sample Size

Sample size of 30 was calculated assuming 90% MRI sensitivity at a 95% confidence interval with 10% margin of error.

MRI Protocol

Data Collection

Clinical data, MRI findings, and intraoperative observations were recorded. MRI features documented included fistula type, internal and external opening locations, secondary tracts, abscess, horseshoe extension, and supralelevator spread. Intraoperative findings served as the gold standard. Postoperative wound healing, recurrence, and infection were evaluated at 6 weeks and 3 months.

Statistical Analysis

Data were analysed using SPSS v22.0. Sensitivity, specificity, PPV, NPV, and diagnostic accuracy were calculated against intraoperative findings. Descriptive statistics (mean $\pm$ SD) were used for continuous variables.

RESULTS

Demographic Profile

The cohort comprised 25 males (83.3%) and 5 females (16.7%), with a mean age of 48.2 ± 14.5 years (range 21–75). The largest age group was 41–50 years (33.3%). Pain was the dominant symptom in 23 patients (76.7%), followed by swelling (60.0%), discharge (53.3%), and recurrent abscesses (26.7%).

Clinical Presentation

Physical Examination

On examination, external openings were present in all 30 patients (100%) and internal openings in 29 (96.7%). The mean external opening distance from the anal verge was 1.3 ± 0.48 cm and internal opening 1.5 ± 0.37 cm; mean tract length was 5.5 ± 2.12 cm. Simple fistulas were identified in 19 patients (63.3%) and complex fistulas in 11 (36.7%).

Type of Fistula

MRI vs. Surgical Findings (Diagnostic Accuracy)

MRI correctly identified all 9 surgical abscesses and all 5 horseshoe fistulas and 4 supralelevator extensions (100% sensitivity each). Secondary tracts were detected in 10 of 11 cases (sensitivity 90.9%). Detailed performance metrics are shown in Table 1.

Table 1: Diagnostic Performance of MRI Against Intraoperative Findings

Parameter	Abscess	Secondary Tract	Horseshoe	Supralelevator Extension
Sensitivity (%)	100.0	90.91	100.0	100.0

Specificity (%)	95.2	94.74	96.0	96.15
PPV (%)	90.0	90.91	83.33	80.0
NPV (%)	100.0	94.74	100.0	100.0
Accuracy (%)	96.67	93.33	96.67	96.67

Impact of MRI on Surgical Decision-Making

Postoperative Outcomes: Healing and Recurrence

Table 2: Postoperative Outcomes Following MRI-Guided Surgery

Parameter		At 6 Weeks (n=30)	At 3 Months (n=30)
Recurrence		5 (16.7%)	4 (13.3%)
Surgical Site Infection		3 (10.0%)	1 (3.3%)
Healing	Complete	20 (66.7%)	26 (86.7%)
	Partial	10 (33.3%)	4 (13.3%)

DISCUSSION

Perianal fistula poses surgical challenges owing to complex anatomy, high recurrence, and sphincter injury risk. Accurate preoperative imaging is therefore essential for reducing complications and improving functional outcomes.

The demographic profile in this study — mean age 48.2 years and 83.3% male — closely mirrors published cohorts. Mishra et al. reported a mean age of 48.5 years, and Konan et al. described 77.9% male patients among 136 cases. The predominantly middle-aged male presentation reflects the established epidemiology of cryptoglandular fistula disease.

Symptom distribution in our cohort — pain (76.7%), swelling (60.0%), discharge (53.3%) — closely mirrors Shahzad et al., who reported pain in 79.6% and discharge in 56.1%. Simple fistulas constituted 63.3%, consistent with Sarda et al.'s rate of 67.2%.

MRI diagnostic performance in this study is comparable to the best reported benchmarks. Beets-Tan et al. found 100% sensitivity for horseshoe fistulas and 96–97% for abscesses. Kummari et al. reported 100% sensitivity and 97.06% specificity for abscess detection. Shahzad et al. recorded an overall accuracy of 94.9%, while our figures showed 96.67% accuracy for abscesses, horseshoe findings, and supralelevator extensions — confirming MRI's reliability across fistula characteristics.

MRI altered the operative plan in 33.3% of patients, a finding closely aligned with Konan et al.'s 33.8% contribution rate. Buchanan et al. demonstrated that MRI-informed planning reduces recurrence and revised operative decisions in 10% of primary fistulas after MRI review.

Healing improved from 66.7% at 6 weeks to 86.7% at 3 months, while recurrence declined from 16.7% to 13.3% and surgical site infection fell from 10.0% to 3.3%. Sarda et al. reported a 24.6% recurrence rate without systematic MRI use, suggesting preoperative imaging may attenuate recurrence risk.

Limitations include the modest single-centre sample and short follow-up. Larger multicentre studies with extended follow-up are warranted to validate these findings. Cost and availability of MRI also remain barriers in resource-limited settings.

CONCLUSION

Preoperative MRI is a highly reliable tool for evaluating perianal fistula, demonstrating high sensitivity and specificity across all anatomical parameters assessed. It modified surgical decision-making in one-third of patients and was associated with progressive improvement in healing and a decline in recurrence. These findings support routine preoperative MRI for all patients with perianal fistula, with particular emphasis on complex cases. Multicentre studies with larger cohorts are recommended for further validation.

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