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Original Research Article

A STUDY OF CORRELATION BETWEEN CLINICAL FINDINGS, MR FISTULOGRAM FINDINGS AND INTRA-OPERATIVE FINDINGS IN CASES OF FISTULA IN ANO

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A B S T R A C T

Background: Fistula in ano is an abnormal tract between the anal canal and perianal skin, commonly arising from cryptoglandular infections. Clinical examination alone may not adequately delineate the extent of fistulous tracts, necessitating imaging for comprehensive evaluation.

Materials and Methods y: A prospective observational study was conducted on 30 patients with fistula in ano at a tertiary care hospital in Western Maharashtra. All patients underwent clinical assessment, MR fistulogram which was reported using St. James University Hospital Classification, followed by surgical exploration. Data on demographic profile, fistula classification, and intraoperative findings were collected and analyzed using Cohen's kappa for assessment.

Results: The majority of cases were males aged 21–40 years. Grade I fistulae were the most common (53.33% on MRI, 50% in surgical findings). Minor discrepancies were noted in identifying secondary tracts and abscesses. The kappa value of 0.90 indicated almost perfect agreement between MRI and surgical findings.

Conclusion: MRI shows excellent correlation with surgical findings and is a reliable non-invasive tool for preoperative assessment of fistula in ano. It improves surgical planning and reduces the risk of recurrence.

Keywords: Fistula in ano, MRI Fistulogram, St. James Classification, Surgical Correlation, Perianal Abscess.

INTRODUCTION

Fistula in ano is an abnormal tract or tunnel that forms between the anal canal and the skin near the anus. It usually develops because of an infection in the anal glands, which leads to the formation of an abscess.[1] When the abscess drains or bursts, it may leave behind a persistent passage that fails to heal, forming a fistula. Fistula in ano is a frequently encountered perianal surgical condition. In over 90% of cases, it results from infections of the cryptoglandular epithelium, with most infections being acute and a smaller proportion exhibiting a chronic, low-grade course.[2,3]

A thorough clinical evaluation, with good lighting, proctoscopy, and digital rectal examination, is typically sufficient for diagnosis. However, physical examination alone may not always reveal the full extent of the fistula, making imaging modalities essential for comprehensive assessment. Accurate anatomical visualization of the fistulous tract with its side branches if any and its relationship with anal

sphincters is crucial for selecting the most appropriate surgical approach and minimizing recurrence rates.[4,5]

Various imaging techniques, such as fistulography, computed tomography, endoanal ultrasonography, and magnetic resonance imaging (MRI), can aid in delineating the fistula.[6,7] MRI, first utilized for fistula in ano cases in the early 1990s, offers superior soft tissue differentiation, facilitates the detection of tracts beyond the anal canal, identifies high fistulas, and provides images relevant to surgical planning.[8-10]

The Association of Coloproctology of Great Britain and Ireland recognizes MRI as a highly sensitive and specific imaging tool for diagnosing primary fistulous tracts and recommends its use, particularly for complex or recurrent cases.[11,12]

Traditionally, Park's classification is used to categorize fistula in ano into different grades. However, this system does not encompass certain significant findings, leading to the development of an MRI-based classification that correlates Park's surgical classification with anatomical details observed in axial and coronal MR images.[13]

Several studies have examined the accuracy of preoperative MRI in identifying additional details that may not be apparent through clinical examination alone, thereby assisting surgeons in intraoperative decision-making.[14-16]

This study aims to evaluate the correlation between Clinical Findings and MRI findings with intraoperative observations in cases of fistula in ano.

MATERIALS AND METHODS

This prospective observational study was conducted in the Department of General Surgery at a tertiary-level hospital in Western Maharashtra. The study included 30 patients diagnosed with fistula in ano, aiming to evaluate the correlation between clinical findings, MR fistulogram findings, and intra-operative findings.

Inclusion Criteria
- Patients diagnosed with fistula in ano based on clinical examination.
- Patients aged 18 years and above.

- Patients willing to participate and provide informed consent.

Exclusion Criteria
- Patients with known inflammatory bowel disease, tuberculosis, or malignancy.
- Patients with contraindications to MRI.

Study Procedure: All eligible patients underwent a detailed clinical examination, including per-rectal examination and assessment of external fistulous openings. MR fistulography was performed to classify the fistula according to the St. James University Hospital Classification. Intra-operative findings were recorded during definitive surgical management, and the type and extent of the fistulous tract were documented.

Data Collection and Analysis: Data were collected prospectively and included patient demographics, fistula classification based on MRI, and surgical findings, and post-operative outcomes. The correlation between clinical, MRI, and surgical findings was analyzed, and Cohen's kappa coefficient was used to assess agreement between MRI and intra-operative findings. Epiinfo 7.2.1 and SPSS 21 was used for data analysis.

Ethical Considerations: Approval was obtained from the Institutional Ethics Committee, and informed consent was taken from all participants before inclusion in the study. Patient confidentiality was maintained throughout the study.

RESULTS

We evaluated 30 cases of Fistula in Ano who met the study criteria.

Age and Gender Distribution

In our study, the highest number of cases were observed in the 21 to 40 years age group, with 13 cases (61.9%), including 11 males (52.4%) and 2 females (9.5%). This was followed by the 41 to 60 years age group, which had 9 cases (42.9%), consisting of 8 males (38.1%) and 1 female (4.8%). The 60 to 80 years age group accounted for 8 cases (38.1%), all of whom were males (38.1%). The overall distribution showed a higher prevalence of fistula in ano among males across all age groups. [Table 1]

Table 1: Age and Gender Distribution

Age Group	Male	Female	Total
21 to 40	11	2	13
41 to 60	8	1	9
60 to 80	8	0	8

In our study, MRI findings were classified according to the St. James University Hospital Classification of Fistulae in Ano revealed that the majority of cases belonged to Grade I, accounting for 53.33% (16 participants). Grades II and III were observed in 13.33% (4 participants each), while Grades IV and V were the least common, each comprising 10.00% (3 participants). This distribution suggests that lower-grade fistulae were more prevalent, while complex and higher-grade fistulae were less frequently encountered in our study population. [Table 2]

Table 2: MRI findings according to St. James University Hospital Classification of Fistulae in ano

Grades	Number	Percentage
Grade - I	16	53.33%
Grade - II	4	13.33%
Grade - III	4	13.33%
Grade - IV	3	10.00%
Grade - V	3	10.00%

We found that the MRI findings based on the St. James University Hospital Classification of Fistulae in Ano showed that Grade I was the most common, observed in 53.33% (16 participants), whereas surgical findings confirmed it in 50.00% (15 participants). Grades II and III were each noted in 13.33% (4 participants) on MRI, while surgical findings showed a slightly higher occurrence at 16.67% (5 participants each). Grade IV was identified in 10.00% (3 participants) on MRI but was confirmed in only 6.67% (2 participants) surgically. Grade V was seen in 10.00% (3 participants) in both MRI and surgical findings. This comparison highlights a close correlation between MRI and surgical findings, with minor variations in the distribution across different grades. [Table 3]

Table 3: Surgical correlation in relation to MRI findings according to St. James University Hospital Classification of Fistulae in ano

Grades	MRI Findings	Percentage	Surgical Findings	Percentage
Grade - I	16	53.33%	15	50.00%
Grade - II	4	13.33%	5	16.67%
Grade - III	4	13.33%	5	16.67%
Grade - IV	3	10.00%	2	6.67%
Grade - V	3	10.00%	3	10.00%

The kappa value for the agreement between MRI findings and surgical findings is 0.90, indicating an almost perfect agreement between the two methods.

Table 4: Other study parameters and Surgical correlation in relation to MRI findings

Clinical Findings	MRI Findings	Percentage	Surgical Findings	Percentage
Internal Opening Present	30	100%	30	100%
No Internal opening	0	0%	0	0%
External Opening Present	30	100%	30	100%
No External opening	0	0%	0	0%
Secondary Tract Present	29	96.67%	30	100%
Secondary Tract Absent	1	3.33%	0	0%
Abscess Present	28	93.33%	29	96.67%
No Abscess	2	6.67%	1	3.33%

We compared the MRI findings with intraoperative surgical findings for various characteristics of fistula in ano. Internal and external openings were detected in all 30 cases (100%) by both MRI and surgical findings, showing complete agreement. Secondary tracts were identified in 29 cases (96.67%) on MRI, while surgical exploration confirmed their presence in all 30 cases, indicating a minor discrepancy. Similarly, abscesses were detected in 28 cases (93.33%) on MRI, whereas surgical findings revealed abscesses in 29 cases (96.67%), showing a slight underestimation by MRI. The overall agreement between MRI and surgical findings was high, confirming the reliability of MRI in preoperative evaluation. The Kappa statistics showed almost perfect agreement in all findings with the value of 1. [Table 4]
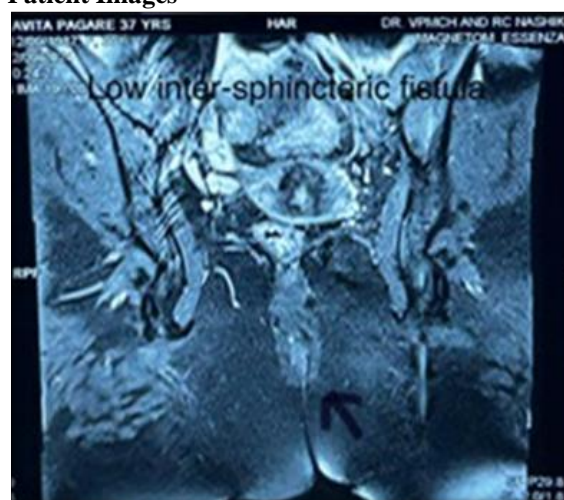
Patient Images

Image 1: Low inter-sphincteric fistula

Image 2: Grade 3 trans-sphincteric fistula

Image 3: Intraoperative Photograph showing fistula probe entering external opening and coming out from internal opening

Image 4: Intraoperative Photograph showing fistulous tract being laid open over fistula probe

DISCUSSION

Fistula in ano is a common anorectal condition characterized by an abnormal communication between the anal canal and perianal skin, often arising from cryptoglandular infections.[1] Accurate preoperative assessment of fistulous tracts is crucial for effective surgical planning and prevention of recurrence. Clinical examination alone often falls short in delineating the full extent of fistulous pathways, secondary tracts, and associated abscesses. Magnetic Resonance Imaging (MRI) has emerged as a gold standard modality in evaluating perianal fistulas due to its superior soft tissue resolution and multiplanar capability.[6] Our study aimed to assess the correlation between clinical findings, MR fistulogram features, and intraoperative findings in 30 patients with fistula in ano. Using the St. James University Hospital classification, MRI findings were compared with surgical exploration to evaluate diagnostic accuracy.[17,18] The study also analyzed the sensitivity of MRI in detecting fistula characteristics such as internal/external openings, secondary tracts, and abscesses, emphasizing its role in improving surgical outcomes.

Demographics

In our study, we found that the majority of patients with fistula in ano belonged to the 21–40 years age group, comprising 43.3% of the total cases, with a clear male predominance (90%). This observation is consistent with the study conducted by NA Khan et al., where the average age was 44.5 years and males accounted for 77.8% of the cases.[19] Similarly, R. A. Aly et al. reported a mean age of 41 years, with males comprising 85.2% of the cohort.[6] These findings indicate that fistula in ano is more prevalent among middle-aged males, potentially due to higher exposure to risk factors such as local infection, poor hygiene, and higher rates of anorectal abscesses in our study findings.

Grading of Fistulae by MRI (St. James Classification)

In our study, MRI-based classification showed that the majority of cases were Grade I (53.33%), followed by Grades II and III (each 13.33%), and Grades IV and V (each 10%). These findings suggest that simple, low-grade fistulae were more common, which could be attributed to early detection and referral. Our results are in partial agreement with the findings of R. A. Aly et al., where Grade I was also the most common at 34.4%, though they noted a higher proportion of Grade IV cases (16.4%).[6] In contrast, H. R. Jat et al. reported Grade II as the most prevalent (32%).[20] The variation in grade distribution across studies could be due to differences in referral patterns, patient demographics, and chronicity of disease at presentation.

Correlation of MRI with Surgical Findings

In our study, MRI and surgical findings showed excellent correlation in terms of grade classification, with Grade I identified in 53.33% of MRI cases and confirmed surgically in 50%. Minor discrepancies were observed in Grades II–IV, but both MRI and surgical findings agreed completely for Grade V (10%). The kappa value of 0.90 indicates an almost perfect agreement. This aligns with the study by NA Khan et al., where MR fistulography matched 17 out of 18 intraoperative findings, reinforcing its

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reliability.[19] Similarly, P. Garg et al. demonstrated very high sensitivity (98.8%) and specificity (99.7%) of MRI for fistula tract identification and 97.7% sensitivity for internal opening detection.[21] R. A. Aly et al. also reported high diagnostic performance with an overall accuracy of 98.36%.[6]

Assessment of Fistula Characteristics – Internal Opening, Secondary Tracts, Abscess

In our study, internal and external openings were detected with 100% agreement between MRI and surgery. Secondary tracts were noted in 96.67% by MRI and 100% surgically, while abscesses were slightly underestimated by MRI (93.33%) compared to surgical findings (96.67%). The kappa value for all findings was 1, indicating almost perfect agreement. These findings are strongly supported by P. Garg et al., who emphasized that MRI added significant value in detecting complex features such as secondary tracts (66.3%), horseshoe tracts (58.8%), supralevator extensions (14.9%), and unsuspected abscesses (10.3%), which altered the surgical plan in many cases.[21] Similarly, H. R. Jat et al. reported MRI detection of secondary tracts in 56% and abscesses in 12% of cases, highlighting its utility in preoperative mapping.[20]

Clinical Relevance and Surgical Implications

The high concordance between MRI and intraoperative findings in our study emphasizes the critical role of MRI in preoperative planning. Accurate identification of tracts, internal openings, and associated abscesses is essential to reduce recurrence and avoid damage to sphincteric structures. R. A. Aly et al. highlighted that MRI helps delineate fistulous anatomy, thereby aiding in predicting postoperative continence and guiding tailored surgical approaches.[6] This is particularly important in higher-grade or complex fistulae, which may otherwise be underestimated on clinical examination alone.

Comparative Insights and Recommendation

Our study's findings mirror the observations of large-scale studies like that of P. Garg et al., where MRI significantly changed the classification of fistulae from simple to complex in 34.6% of presumed simple cases and 52.5% of already suspected complex fistulae.[21] Given the detailed anatomical evaluation and high diagnostic accuracy, MRI should be considered an essential part of the preoperative assessment protocol in fistula in ano cases. As supported by NA Khan et al. and other studies, it enables surgeons to plan definitive, sphincter-sparing procedures, thereby improving outcomes and reducing recurrence.[19]

CONCLUSION

In conclusion, our study demonstrated a strong correlation between MRI findings and intraoperative surgical observations in cases of fistula in ano. Grade I fistulae were the most observed type, accounting for 53.33% on MRI and 50.00% during surgery, indicating that simple fistulae predominated in our study population. The near-identical classification of fistulae between MRI and surgical findings, supported by a high kappa value of 0.90, confirms the diagnostic reliability of MRI. Additionally, detection of internal and external openings showed 100% agreement, while secondary tracts and abscesses were nearly matched with minimal discrepancies. The findings affirm that MRI, particularly when interpreted using the St. James University Hospital classification, serves as a highly accurate and non-invasive modality for preoperative assessment. This enables precise surgical planning, potentially reducing recurrence and improving outcomes. Therefore, MRI can be considered a dependable imaging tool for evaluating the extent and complexity of fistula in ano.

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