



COMPARATIVE STUDY OF MRI FISTULOGRAM WITH INTRAOPERATIVE FINDINGS IN FISTULA IN ANO

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ABSTRACT

Background: MRI is an important imaging modality which gives description of the fistula within the anal canal in relation to the sphincter complex, other pelvic floor structures and presence of an abscess.

Because of high soft tissue contrast, MRI was chosen as the imaging of choice for preoperative diagnosis and classification of perianal fistulas. The study's main aim was to evaluate the role of MR FISTULOGRAM in preoperative assessment of anorectal fistulas and to correlate MR findings with intra operative findings. **Methods:** This study was a hospital based prospective and descriptive study conducted from June, 2023 to July, 2024 at Department of Surgery, S.P Medical College and P.B.M. hospital, Bikaner. 60 patients who underwent surgery and had preoperative MRI were included in this study. **Results:** The sensitivity and specificity of MRI for St James grade I and II fistulas were 100%, 91% and 73%, 100% respectively. For grade III, IV and V the sensitivity and specificity were 100%. The most prevalent type of fistula was intersphincteric type in 32 patients. Commonest age group was 31 to 40 years and commonly seen in males. The operative findings were well correlating with the MRI findings with regard to the site of the openings. Identification of secondary tracts is essential for complete eradication of the disease.

Conclusion: MRI is key to demonstrate the relationship of sphincters with the fistulous tracks and for determination of secondary complications. MRI offer finer anatomic details of fistulae and also identifies secondary tracks and abscesses. Our study has concluded that MRI with contrast study is crucial for management, identify active inflammation of tracks and differentiate between scar and granulation tissue. Correct recognition of perianal fistulae and proper grading are necessary for ensuring best surgical result.

KEYWORDS : Contrast enhanced MRI, Fistula, Intersphincteric

INTRODUCTION

Fistula is a communicating tract between two epithelial surfaces and the track is lined by granulation tissue which is later on epithelialized. A fistula-in ano is a track that connecting the anal canal to the perianal skin [1]. In chronic stage a perianal abscess develops into a fistula-in-ano in 60% of cases. Fistulas can be classified as an anterior or posterior in relation to transverse anal line. Anterior fistulas have a radial track into the anal canal. Posterior fistulas have a horseshoe track and their external opening lies posterior to transverse anal line. The treatment of fistula in ano, is difficult to identify the internal opening and the course of the fistulous tract [2]. Fistula in ano has a tendency of chronicity and mainly affect quality of life. The major problem associated with fistula in ano include discomfort result from continuous drainage from fistula that leading to hygienic problems. Most anal fistulas form a good treatable benign condition of the rectum and anal canal. 90% or more of these cases are due to infections of the cryptoglandular epithelium [3]. Most of anal fistulae are easy to diagnose with a good source of light, a proctoscope and digital rectal examination. These anal fistulae is very difficult for two reasons. First being the affection of the disease with respect to the site. Secondly, significant percentage of these persists due to correct type of surgery is not done or when postoperative care is insufficient, or intra-operatively if the extensions are unnoticed [4,5]. Magnetic resonance imaging (MRI) is an important imaging modality which gives description of the fistula within the anal canal in relation to the sphincter complex and other pelvic floor structures as well as presence of an abscess. Because of high soft tissue contrast, MRI was chosen as the imaging of choice for preoperative diagnosis and classification of perianal fistulas [6]. Classification is based on both axial and

coronal imaging. On the basis of Park's classification, the fistulas can be divided into intersphincteric, transsphincteric, suprasphincteric and extrasphincteric depending on the fistulous tract and its relationship with anal sphincters [7] -

1. Intersphincteric - In it the fistulous tract lies in the intersphincteric space but does not traverse the external anal sphincter.
2. Transsphincteric - Here the fistulous tract traverses the external anal sphincter and then traverses through the ischioanal/ischiorectal fossa to open subcutaneously
3. Suprasphincteric - The fistulous tract traverses above in the intersphincteric space above the puborectalis muscle and then descends through the iliococcygeus muscle into the ischiorectal fossa.
4. Extrasphincteric - Fistulous tract traverses through the ischiorectal fossa, the levator anti sphincter complex and opens into the rectum in the supra levator region, that is, above the anal sphincter.

Fistula-in-ano was graded on the basis of St Jame's University Hospital classification [8]-

- Grade 1- It is the simplest type, that is, simple linear intersphincteric perianal fistulous tract.
- Grade 2- Intersphincteric fistulous tract associated with secondary tract/ramification or abscess cavity.
- Grade 3- Transsphincteric fistulous tract without any secondary tract or abscess.
- Grade 4- Transsphincteric fistulous tract along with presence of secondary tract or ramification and/or abscess.
- Grade 5- Any fistulous tract with supralevator or translevator extension.

The present study is aimed to compare MRI fistulogram with intraoperative findings.

Methods

This study is a prospective study of patients admitted from June, 2023 to July, 2024. 60 patients who underwent fistulectomy and had preoperative MRI fistulogram during this period were included in the study.

Inclusion Criteria

All patients with clinically diagnosis of perianal fistula and ≥ 14 years of age and of both genders

Exclusion Criteria

Patients with prior history of surgery in the anorectal region fistula in ano, with rectal malignancies/ Crohn's disease/tuberculosis/ recurrent fistula in ano were excluded. Patients not giving consent. Patients having contraindications to MR Imaging such as cardiac pacemaker, aneurysmal clips, metallic implants not compatible with MR Imaging.

Patients suffering from anorectal fistulas were included in this study. After obtaining permission from medical research ethics committee and informed consent from the patients, they were subjected to MR fistulogram. The following were assessed: type of fistula, position of internal opening, grading of fistula MRI Classification and the accuracy of MRI findings was correlated with intra operative findings. The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel) and appropriate tests were applied. For all tests, confidence level and level of significance were set at 95% and 5% respectively.

RESULTS

This study was conducted in Dept. of general surgery, SP Medical college and PBM hospital, Bikaner (Rajasthan) from June 2023 to July, 2024. All the data was collected from the patients in our General surgery department and the results were compiled.

The age group of the patients included in the study > 14 years. There were 7 patients below 30 years (11.68%). There were 20 patients in the age group of 31- 40 years (33.33%). There were 19 patients in the age group of 41- 50 years (31.66%). There were 8 patients in the age group of 51- 60 years (13.33%). There were 6 patients aged more than 60 years (10%). Total 60 patients were included in the study, 39 patients were males (65%) and 21 patients were females (35%).

Table1: External Opening Of Different Fistulas

EXTERNAL OPENING	NO OF PATIENTS	PERCENTAGE
SINGLE	52	86.67%
MULTIPLE	8	13.33%

When the fistulous tracts were analysed, majority of the patients (52 out of 60) had a single external opening (86.67%). Multiple external openings were seen in 8 patients (13.33%).

Table 2: Position Of External Openings

SINGLE EXTERNAL OPENING (N=52)		
CLOCK POSITION	NO OF PATIENTS	PERCENTAGE
1° - 3°	6	11.5%
4°-6°	30	57.7%
7°-9°	10	19.3%
10° - 12°	6	11.5%

Most commonly the opening was found between 4 and 6'o clock position in 57.7 % patients (30 out of 60), between 1 and 3'o clock position in 11.5% patients, between 7 and 9'o clock position in 19.3% patients and between 10 and 12'o clock position in 11.5% patients.

Table 3: Different Positions Of Internal Opening

SINGLE INTERNAL OPENING (N=51)		
CLOCK POSITION	NO OF PATIENTS	PERCENTAGE
1°-3°	13	24.00%
4° - 6°	22	40.00%

7° -9°	12	10.00%
10° -12°	4	26%

Internal opening was found between 4 and 6'o clock position in 22 22 patients (40%), between 1 and 3'o clock position in 13 (11.5%) patients, between 7 and 9'o clock position in 12 (19.3%) patients and between 10 and 12'o clock position in 4 (11.5%) patients.

Table 4: Patients With Secondary Track

Secondary track	No. of patients Based on MRI findings	No. of patients based on surgical findings	MRI- surgery concordance
PRESENT	16	20	Sensitivity- 80%
ABSENT	44	40	Specificity- 100%

In our study, 16 out of 60 patients (26.70%) had secondary tracts. Abscesses were identified in 11 out of 60 patients (18.33%). 6 patients had simple abscess (54.54%), 4 patients had horse shoe abscess (36.36%). One patient had abscess in ischiorectal fossa. Contrast enhancement was present in 28 patients (46.67%).

We classified perianal fistulas on the basis of St James's University Hospital Classification. This revealed that grade I fistulas were the commonest which was found in 20 patients (33.33%). The second most common type is grade III fistulas which was found in 16 patients (26.66%). Grade II fistulas were found in 11 patients (18.33%). Grade IV and grade V fistulas are relatively uncommon and were found in 8 patients (13.33%) and 5 patients (8.35%) respectively.

Table 5: Correlation During Surgery

CORRELATION IN SURGERY	NO. OF PATIENTS	PERCENTAGE
DONE	52	86.65%
NOT DONE	3	5%
OTHER	5	8.35%

Correlation in surgery done in 52 patients (86.65%), no surgical procedure was attempted in 3 patients (5%) and abscess drainage was done in 5 patients (8.35%). Correlation between surgical and MRI findings was significant in our study with a "p value" of 0.008. In males, the most common grades were grade I and III which was seen in 13 patients and 12 patients respectively. Among females, the most common grades were grade I and II which were recorded in 7 patients and 6 patients. Patient with secondary track contrast enhancement present in 16 patients and absent in 12 patients. This correlation was significant with a "p value" of 0.001. Among 28 patients with contrast enhancement, abscess is present in 11 cases and absent in 17 cases. No abscess was seen in patients who did not show any enhancement.

Table 6: MRI Grading and Surgical Concordance

St James grade category	No. of patients graded as per MRI	No. of patients with concordant surgical findings	No. of patients not operated	MRI- surgical concordance
I	20	15 (4 patients preoperatively categorized as grade II)	1	Sensitivity- 100% Specificity- 91.66%
II	11	11	-	Sensitivity- 100% Specificity- 100%
III	16	15	1	Sensitivity - 100% Specificity- 100%

IV	8	8	-	Sensitivity - 100% Specificity- 100%
V	5	4	1	Sensitivity - 100% Specificity- 100%

St James's University Hospital MRI grading according to which patients were classified was compared with that of the per operative findings, it was observed that 16 patients were reported with grade III, 8 patients with grade IV and 5 patients with grade V fistulas. It was also found in our study that only 16 out of 20 patients who were classified as grade I had this type of fistula. The remaining 4 patients belonged to grade II based on the per operative finding. On analysis, all these 4 patients were found to have secondary tracts as an additional per operative finding. The sensitivity and specificity of MRI for grade I and II fistulas were in the order of 100%, 91.66% and 78.94%, 100% respectively. For other grades, the sensitivity and specificity were 100% and 100%.

DISCUSSION

A total of 60 patients who were referred for MRI fistulogram to SP Medical college & AG of hospitals were studied with Iohexol enhanced MR fistulogram. They were followed upto surgery and the operative findings were correlated with the preoperative MRI findings.

Of the total 60 patients included in the study, 39 patients were males (65%). And 21 patients were females (35%). Among the 60 patients included in the study group, the most prevalent type of fistula was intersphincteric type followed by trans sphincteric type. This was correlated with the results of study done by Parks et al (1976) who also reported intersphincteric type of fistula to be the commonest in their study [9]. The results were also consistent with the study done by Morris et al. who in their study mentioned that about 70% of all perianal fistulas were intersphincteric fistulas, while transsphincteric fistulas constituted 20% of the total [10].

The age group of the patients included in the study was > 14 years. Most of them were in the age group of 30-50 years.

In our study, when the fistulous tracts were analysed, majority of the patients (52 out of 60) had a single external opening. Most commonly the opening was found between 4 and 6 o'clock position. The next common location being 7 to 9 o'clock position.

When analysing the internal opening, it was single in majority of patients (51 out of 60). Most commonly, the internal opening was found in 6 o'clock position. The operative findings were well correlating with the study with regard to the site of the openings.

We classified perianal fistulas on the basis of St James's University Hospital Classification. This revealed that grade I fistulas were the commonest which was found in 20 patients. The second most common type is grade III fistulas which was found in 16 patients. This is in accordance with the study done by Ozdil Baskan et al [11].

On correlating St James's University Hospital Grading with the sex of the patients under study, it was found that among both males and females, intersphincteric fistulas are the commonest followed by trans sphincteric type. Inter sphincteric and trans sphincteric fistulas are common in the age group of 30-50 years. Extrasphincteric fistulas secondary to other etiologies are common in age group above 40 years.

On correlating the St James's University Hospital MRI grading

with the sex distribution, it was found that among males, the most common grades were grade I and III. Among females, the most common grades were grade I and II.

16 out of 60 patients had secondary tracts. Identification of all these tracts is essential for complete eradication of the disease. Failure of preoperative identification of secondary tracts is the most common cause for recurrence of the disease [12]. As already known, active fistulous tracts enhance well with gadolinium contrast. This helps in better delineation of fistulous tracts. On contrast study for the demonstration of secondary tracts, it was observed that on the whole, of the 16 patients who had secondary tracts, all of them showed contrast enhancement for demonstration of secondary tracts. So, it could be concluded that contrast study is indispensable for management. This is in concordance with the study done by Dariusz et al. [13] Also it was observed that enhancement was greater for grades II and IV.

Abscesses were identified in 11 out of 60 patients. Among them, 6 patients had simple abscess, 4 patients had horse shoe abscess. One patient had abscess in ischiorectal fossa. Contrast study revealed that all the 11 patients showed contrast enhancement that helped in demonstrating the extent of the abscess. Hence, it could be concluded that contrast study is absolutely necessary for assessing the complications arising due to perianal fistulas. This is superior to the result given by Maier et al in his study [14] who showed a 84% sensitivity of MRI for the identification of perianal fistulas and abscesses. His study gave 15% false positive results which were eliminated in our study. The better results of our study may be attributed to the use of contrast enhanced imaging. So, contrast enhanced imaging should be routinely included in MRI protocols of anal fistula examination, even with no abscess or collection seen at the precontrast images. This was in correlation with the study done by M.E. Agha et al. [15].

28 patients out of 60 showed contrast enhancement of secondary tracts and abscesses and that majority of them (21 patients) were in the age group of 31- 50 years in whom the incidence of complications due to perianal fistula was also high. Thus, it could be concluded that all the middle age group patients need contrast study as the prevalence of complications is high. Also it was noted that contrast enhanced fat suppressed 3D T1 sequence detected almost all the fistulous and branch tracts.

There was significant correlation between the fistulous tracts identified on MRI and the surgical findings. Fistulotomy was done in 52 out of 60 patients preoperative findings correlated well with the MRI findings for grades 3 to 5. Grade 1 and 2 fistulas showed discrepancies in identification of tracts. MRI in our study, could not delineate the secondary tracts in grade 2 intersphincteric type which was missed in 4 patients and wrongly classified as grade 1. Abscess drainage was also done in 5 patients which were also in accordance with MRI findings. The result obtained (86.78%) was comparable with the result obtained from the previous study conducted by Lunniss et al which reported a concordance rate of 86- 88% between MRI and surgical findings [7]. In another study by Beets- Tan et al, who compared the results of MRI with that intraoperative findings, the sensitivity and specificity were 100% and 86% respectively. For a horse shoe fistula sensitivity and specificity were 100% and 100% and for internal openings, 96% and 90% respectively [6]. Active fistulous tracts show enhancement. The enhancement was greater for grades II and IV types of fistulas. Thus, it could be concluded that contrast study is indispensable for demonstration of abscess and secondary fistulous tracts.

CONCLUSION

Perianal fistula, though an uncommon problem may be

chronic and recurrent. It may present with numerous complications like secondary tracks and abscess cavities. Incomplete evaluation of these complications can result in residual and recurrent disease. So, complete preoperative evaluation of perianal fistulas is warranted. Also to prevent the injury to external sphincter and resultant fecal incontinence, it is necessary to establish the relationship of sphincter with the fistulous tracks. MRI satisfies all these needs of surgeons and helps in planning of surgery. MRI provides finer anatomic details of fistula and also identifies secondary tracks and abscesses. Contrast enhanced MRI can identify active inflammation of tracks. It can also distinguish between scar and granulation tissue. Correct identification of perianal fistulae and proper grading of fistulae are necessary for ensuring optimum surgical outcome. Funding: No funding sources

Ethical Approval: The study was approved by the Institutional Ethics Committee

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