

Original Article**MR IMAGING EVALUATION OF PERIANAL FISTULAE**

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ABSTRACT**Background**

Perianal fistula is a troublesome condition both for patient and surgeon with significant morbidity and challenging treatment. MRI is considered as the technique of choice for preoperative evaluation of perianal fistulae, as it provides accurate anatomical information for appropriate surgical treatment, decreasing the incidence of recurrence and allowing side effects such as fecal incontinence to be avoided. The study aimed to describe the role of magnetic resonance imaging (MRI) in the diagnosis and classification of perianal fistulae.

Methods

This retrospective study looked at 52 patients referred to the radiology department with a clinical diagnosis of perianal fistula. MRI grading of anal fistula done according to St. James's University Hospital classification.


Results

The MRI showed 46 internal openings in 44 patients; two patients had more than one. The internal opening was mostly at the 6 o'clock position in 59.9% patients, followed by 7 o'clock and 5 o'clock position in 11.3% of patients. According to the St. James's University Hospital classification, 21 (47.7%) patients had grade 1, 11 (25%) patients had grade 2, 2 (4.5%) had grade 3, 7 (15.9%) had grade 4, and 4 (9%) had grade 5 fistulae. Twenty-five patients had associated abscesses. The most common location of the abscess was in the perianal region (8 patients).

Conclusion

MR imaging examinations is a highly accurate imaging method for preoperative evaluation perianal fistula. It provides precise information of the fistulous track, along with its relationship to pelvic structures and plays crucial role for surgical planning.

Keywords: Perianal fistula, MRI

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Citation

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INTRODUCTION

Perianal fistula is a connection between the anorectal canal and the perianal area that causes significant morbidity in patients and is difficult to repair. According to the crypto glandular hypothesis perianal fistulas are thought to develop as a result of poor anal gland drainage.^{1, 3, 5} This condition can also be associated with inflammatory bowel disease, tuberculosis, cancer, and radiotherapy^{1,2}. The incidence of perianal fistula varies between 1 and 2 per 10,000 people, with a male to female ratio of approximately 2:1³⁻⁵.

Because there are so many medical and surgical treatment options, imaging is critical for precisely identifying perianal fistulae and planning treatment strategies. The imaging modalities include conventional fistulography, computed tomography (CT), endorectal ultrasound(US), and magnetic resonance imaging (MRI). Because treatment options are decided based on the type of perianal fistula and the degree of involvement of surrounding pelvic tissues, MRI provides a larger field of view (FOV) and is crucial for the effective treatment of perianal fistulas. An accurate and comprehensive assessment to detect primary tracts, associated secondary tracks or ramifications, and abscess formation is critical in determining surgical success and reducing sequelae including fecal incontinence and recurrence⁶⁻⁹.

The aim of this study is to evaluate the role of MRI in the diagnosis and classification of perianal fistula, and to provide additional information for further management.

METHODS

This retrospective study was done in the B & C Teaching Hospital, Birtamod, Nepal in accordance with the institution's ethical committee's guidelines (IRC.0032022). Informed consent for all patients was obtained prior to MRI examination.

The MR images of the patients with suspected perianal fistula from April 2016 to April 2021 were reviewed. MR examinations were performed on 1.5T (Philips A series) MR system using a phased array surface coil with 16 channels. No bowel preparation was required. MRI of the pelvis was performed without the use of endorectal coil and intravenous gadolinium contrast. The following image sequences were obtained: T2 weighted spin-echo (T2WI), T1 weighted spin-echo (T1WI), and fat-suppressed T2 WI (T2-SPAIR, STIR). Sequences were done on oblique transverse, coronal, and sagittal planes

oriented orthogonal and parallel relative to the anal canal using a midline sagittal image.

The following imaging characteristics were assessed for the perianal fistula:

- The site of internal and external openings
- The location of primary tracks
- The presence of secondary tracks
- Classification of the fistula according to St. James's University Hospital classification

RESULTS

52 patients with clinical diagnosis of perianal fistula were evaluated by MRI. The mean age of patients 40.2 years (range: 12 to 68 years). There were 42 males and 10 females, with a male to female ratio of 4.2:1. Eight patients had a normal MRI study and no fistulous tract was detected. Fistulous tracts were demonstrated in the other 44 patients.

An external opening was identified in all ($n=44$) patients. Four patients had multiple external openings, and 93.1% of external openings were within 4 cm of the anal verge (Table 1).

We detected 46 internal openings in 44 patients; two patients had more than one. The internal openings were mostly at the 6 o'clock position (59.9%), followed by 7 o'clock and 5 o'clock positions in 11.3% of patients (Table 2).

According to the St. James's University Hospital classification, 21 (47.7%) patients had grade 1, 11 (25%) had grade 2, 2 (4.5%) had grade 3, 7 (15.9%) had grade 4, and 4 (9%) had grade 5 fistulae (Table 3). Figure (1,2)

More than half (25 patients) had associated abscesses. The most common location of the abscess was in the perianal region in 8 patients. (Table 4). Figure (3)

In one patient the fistulous tract was not detected, however there was an abscess in the ischioanal fossa.

Table 1: Distance between external opening and anal verge

Fistula	<2 cm	2-4 cm	>4 cm
Intersphincteric	23	8	1
Transsphincteric	3	4	2
Suprasphincteric	1	0	0
Extrasphincteric	1	1	0
Total	28	13	3
	(63.6%)	(29.5%)	(6.8%)

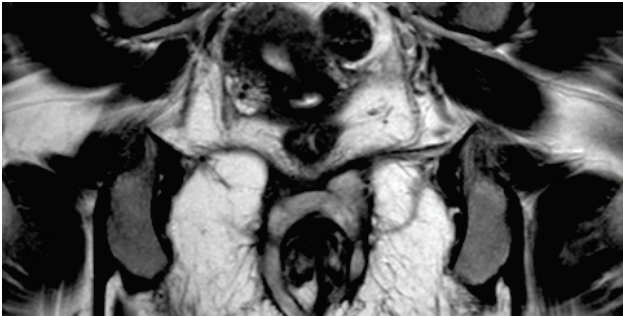
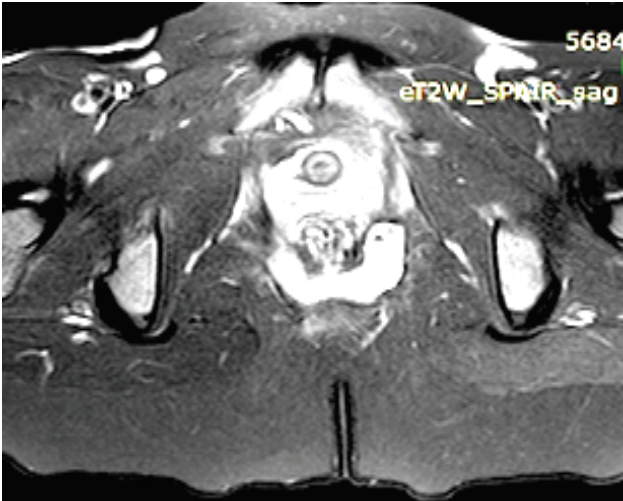


Figure 1: a, b. Intersphincteric horseshoe abscess. T2-SPAIR and coronal T2WI images show horseshoe abscess with high signal intensity and thin peripheral hypointense wall.

Table 2: Location of fistula (clock position)

Location	1	2	3	4	5	6	7	8	9	10	11	12
Number of patients	2	0	1	1	5	26	5	0	1	0	3	1
	4.5%		2.2%	2.2%	11.3%	59.9%	11.3%		2.2%		6.8%	2.2%



Figure 2: St. James's classification grade I fistula. T2-SPAIR axial image shows intersphincteric fistula at the 7 o'clock position

Table 3: MRI grading of anal fistulae according to St James's University Hospital classification

Grade	No. of patients
Grade 1	21 (47.7%)
Grade 2	11 (25%)
Grade 3	2 (4.5%)
Grade 4	7 (15.9%)
Grade 5	3 (6.8%)

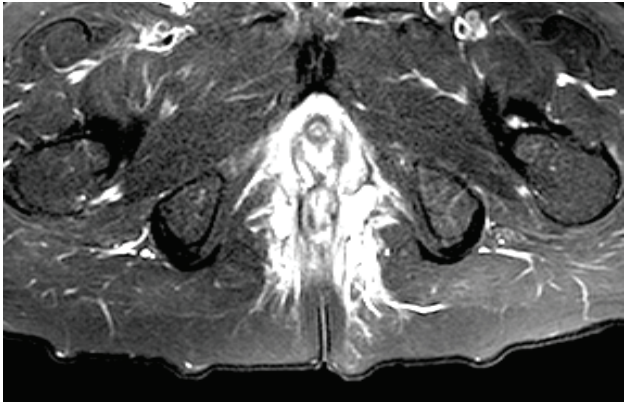


Figure 3: T2-SPAIR axial image shows multiple fistulous tracts with ischioanal

Table 4: Abscesses identified by MRI according to location

Items	No.
Perianal	8
Ischioanal	5
Horseshoe	4
Intersphincteric	3
Ischiorectal	3
Supralevator	2

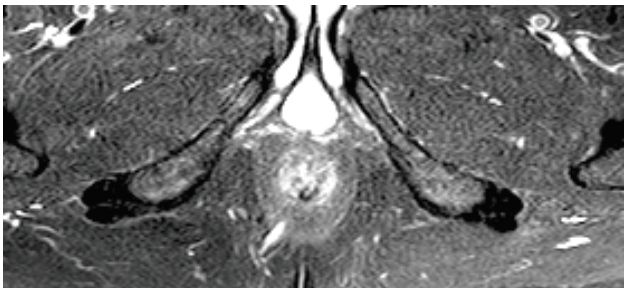


Figure 4: a,b. Transsphincteric fistula at 5 o'clock and 7 o'clock positions

DISCUSSION

MRI with its wide FOV, multiplanar reformations and high resolution provides an accurate information about fistulae in great anatomic detail with respect to secondary tracks and abscesses as well as the surrounding pelvic organs. MRI evaluations of perianal fistulae have revealed additional diagnostic information in the preoperative setting, especially for complicated disease¹⁰. It has shown better result in treatment outcomes over endorectal ultrasound and preoperative digital rectal examination¹¹ and has improved

outcomes for the surgical treatment of primary¹² and recurrent disease¹³.

In our study the male to female ratio was 4.2:1.0, similar to other studies^{14,15}. The mean age of patients in our study was 40.2 years, in accordance to a study, where the perianal fistula was found to affect men in their fourth decade¹⁶. Men are 2 to 4 times more likely to be affected, thought to be partially due to a higher abundance of anal glands¹⁷.

Intersphincteric fistulae penetrate the internal sphincter and are the most common perianal fistula, accounting for 54% of patients in a major referral center¹⁸. Transsphincteric fistulae penetrate both internal and external sphincters before exiting and are less common than the intersphincteric variety, accounting for approximately 21% of patients¹⁸.

In our study, intersphincteric fistulae were the most common, found in 69.5% of patients, followed by transsphincteric fistulae in 23%, suprasphincteric in 8.6%, and extrasphincteric in one patient (2.1%). The results were comparable with the findings in other studies^{19,20}. Few other studies have found trans- and intra-sphincteric fistulae as the most common types^{2,21}.

The majority of the fistulae in this study (63.6%) had their external opening near the anal verge (<2 cm), which is comparable with the another study²².

MRI grading of anal fistulae according to St James's University Hospital classification in our study revealed grade 1 as the most common, followed by grades 2, 4, 5, and 3 (Table 3). One of the study had similar result²³, yet grade 3 fistulae were the most common (42.2%), followed by grade 1 (24%), and grade 4 (22.8%)²².

MRI has the advantage of high resolution and a large field of view, where a multichannel phased array coil is combined with a high field strength of 1.5 Tesla. The diameter-based criteria, proposed by a study, classifies fluid collection, i.e. round fluid collection >10 mm is considered an abscess while an elongated fluid collection <10 mm is a fistula.²⁴ STIR imaging is inferior to dynamic contrast enhanced MRI, as it has a tendency to show spurious high signal in old healed and inactive fibrotic tracts²⁵.

In our study, a combination of different spin echo sequences (T2WI, T1WI) and fat-suppressed sequences (STIR, T2 SPAIR) were used at different planes, which provided adequate anatomic details of the primary and secondary fistulous tracts (Figures 1-4). Axial images have the advantage of showing the exact location of the primary tract and internal openings and can differentiate intersphincteric from transsphincteric fistula. Oblique coronal images differentiate supralelevator and extrasphincteric types of fistulae.

T2-SPAIR and STIR show high signal intensity fluid in the fistulous tract and low signal intensity in the

fibrous wall, which provides a good contrast and delineates the layers of the anal sphincter^{26,27}.

Gadolinium-enhanced T1W MR images and subtraction contrast MR fistulography are useful to detect abscesses and active inflammation. STIR and diffusion weighted imaging are additional sequences for patients in which contrast is contraindicated^{6,28}. A limitation of our study is that all of the cases were evaluated without gadolinium contrast, which would have shown better active inflammation of the lesions and delineation of the abscess. However, Singh et al. concluded that both T2TSE and post-contrast T1W TSE sequences were comparable for assessing abscess and horseshoeing²⁹.

CONCLUSION

MR imaging examinations is well tolerated by patient and is a highly accurate imaging method for preoperative evaluation perianal fistula. It provides precise information of the fistulous track, along with its relationship to pelvic structures and plays crucial role for surgical planning.

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Conflict of interest: None

Ethical approval: Yes

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