

Perianal Fistula: Role of magnetic resonance imaging in classification, characterization and recurrence rate of fistulous disease

Dr. Mahak Sood¹, Dr. Hiral Hapani², Dr. Pinkesh Herma³, Dr. Anjana Trivedi⁴

¹Assistant Professor, Department of Radiodiagnosis PDU medical college & govt. hospital, Rajkot

²Assistant Professor, Department of Radiodiagnosis PDU medical college & govt. hospital, Rajkot

³Resident doctor, Department of Radiodiagnosis PDU medical college & govt. hospital, Rajkot

⁴Professor, Department of Radiodiagnosis PDU medical college & govt. hospital, Rajkot

Corresponding Author: Dr. Mahak Sood

Abstract: MRI evaluation of perianal fistula plays crucial role in diagnosis, classification and surgical management of fistulous disease. Perianal fistulisation is unusual condition but significantly contribute to gastrointestinal morbidity. By use of proper technique, we can accurately diagnose and classify perianal fistula with better depiction of fistulous track and secondary extensions. Our study aims to evaluate efficiency of MRI in detection and classification of perianal fistula. A total of 50 patients who were diagnosed during the study period June 2017 to June 2018 were included and MRI findings were reviewed, tabulated and analysed. MRI fistulography prove to be highly sensitive investigation for perianal fistula with 100% detection rate of fistulous track, its extension and relation to internal and external sphincter. MRI fistulography is highly sensitive and specific in diagnosing type and extent of perianal fistula. All of the fistula were correctly identified and confirmed on surgery.

Date of Submission: 18-06-2018

Date Of Acceptance: 03-07-2018

I. Introduction

A fistula is defined as an abnormal connection between two structures or organs or between an organ and the surface of the body. In perianal fistula abnormal connection exists between perineum and anal canal. Perianal fistulisation is less common but important morbid condition involving lower gastrointestinal tract mainly anal canal. Imaging evaluation of perianal fistula can be done by fistulography, contrast enhanced CT fistulography, anal endoanalsonography.

Majorities of fistula are simple linear track which can be easily identified and treated surgically but 15% of the fistulas are of complex variety as they are having more than one track called secondary tracks along with spread of disease through sphincter to ischirectal, ischioanal, and supralelevator space with abscess formation. Complex fistula always associated with high rate of recurrence and crohns disease and difficult to treat surgically. MRI fistulography plays a crucial role in management of complex fistula. MRI allows identification of secondary tracks and disease extension to perianal and supralelevator space that would otherwise remain undetected.

Contrast enhanced fistulography and CT scan fails to demonstrate subtle fistulous extension and abscess formation because of low resolution. Endoanalsonography provides better resolution and relation of fistula to sphincter but difficult to depict fistulous track because of limited field of view. MRI fistulography considered as a superior imaging modality as it provides excellent anatomical detail about fistulous track, its relation to sphincter and also gives idea about subtle extensions or secondary abscess formation, thereby allowing us to choose best surgical approach for the excision of fistula and significantly reduce the risk of recurrence and fecal incontinence secondary to surgery.

II. Material And Methods

This retrospective study was conducted in the department of radio-diagnosis and imaging, P.D.U. Medical College and Civil hospital, Rajkot, Gujarat over a period of one year from June 2017 to June 2018. Total 50 patients were included in study who was referred for MR examination of perianal region. Patients were evaluated by 1.5 Tesla GE MRI machine.

Study Design: retrospective observational study

Study Location: This was a tertiary care teaching hospital based study done in Department of radio-diagnosis, at P.D.U medical college and civil Hospital, Rajkot, Gujarat.

Study Duration: June 2017 to June 2018.

Sample size: 50 patients

Inclusion criteria:

- Suspected cases of perianal fistula or perianal abscess
- Cases with recurrence in previously surgically treated fistula
- Patients with complain of perianal discharge and swelling

Exclusion criteria:

- Patients with normal clinical examination
- Patients with cardiac pacemaker or implants where MRI is contraindicated
- Claustrophobic or uncooperative patients

Methodology:

Total 50 patients were analysed by MRI. Brief history regarding recent complains and previous surgery was taken. We follow ST. JAMES' university hospital MRI classification of perianal fistula to classify perianal fistula in this study. We classify type of fistulous disease and incidence of each type along with symptoms, age and gender wise incidence is also calculated. MRI protocol we followed for fistulogram listed below in the table.

Imaging parameters performed during MR examination:						
Sequences	TR	TE	FOV	NSA	ST	MAT/REC
T2W TSE SAG FS	3000	90	400	3	5	768/768
T2W TSE OCOR FS	3000	90	400	3	5	768/768
T2W TSE OTRA FS	3000	90	400	3	5	768/768
T1W TSE OTRA	500	12	400	3	5	768/768
T1W TSE FS POST-CONTRAST -OTRA/COR	500	12	400	3	5	768/768

MR imaging protocol: T1W -T1 weighted, T2W - T2 weighted, FS - Fat Saturated, TSE- Turbo Spin Echo, OTRA- Oblique Transverse, OCOR- oblique Coronal, SAG – sagittal TR- Repetition Time, TE- Echo Time, FOV- Field of View, NSA- Number of Signal Averages, MAT-Matrix, REC-Reconstruction, ST: slice thickness

III. Results

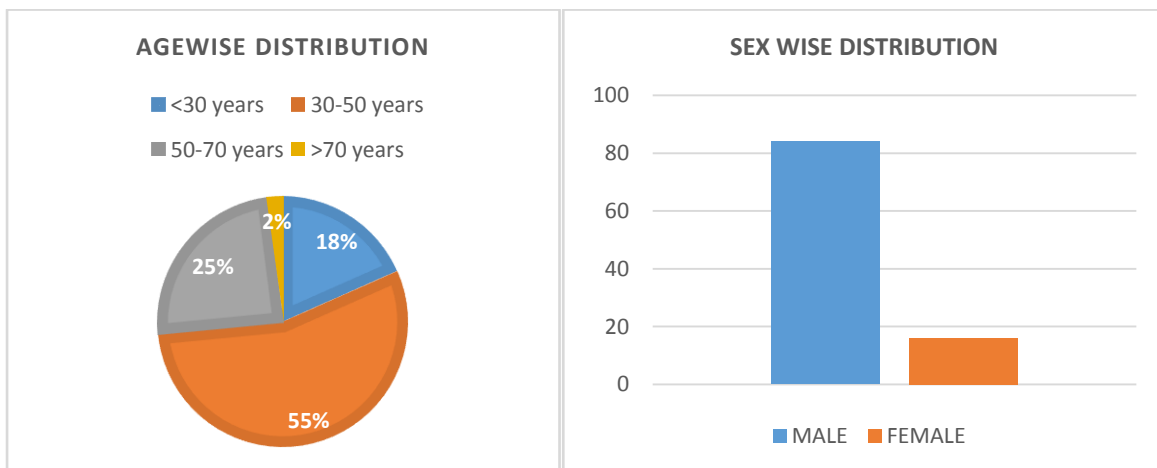
Total 50 cases were examined and diagnosed with perianal fistula formation. Occurrence of fistula in relation to age, sex, symptoms and variety of fistula is done to understand the incidence rate of perianal fistula.

Age wise distribution:

Age	Number of patients	Percentage
<30 years	9	18%
30-50 years	27	54 %
50-70 years	12	24%
>70 years	2	4%
TOTAL	50	100

Sex wise distribution:

Sex	Frequency	Percentage
Male	42	84%
Female	8	16%
TOTAL	50	100

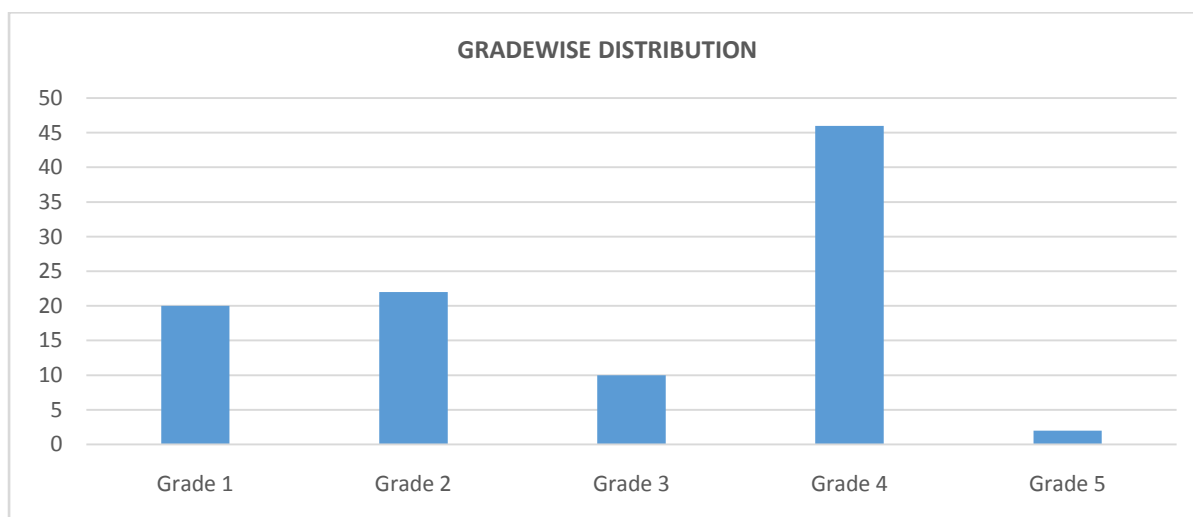


Distribution of perianal fistulas as per ST. JAMES' university hospital MRI classification:

St. James' university hospital MRI classification of perianal fistula		Number of patients	Percentage
Grade 1	Simple linear intersphincteric fistula	10	20%
Grade 2	Intersphincteric fistula with intersphincteric abscess or secondary fistulous track	11	22%
Grade 3	Trans-sphincteric fistula	5	10%
Grade 4	Trans-sphincteric fistula with abscess or secondary track within the ischioanal or ischiorectal fossa	23	46%
Grade 5	Supralelevator and translevator disease	1	2%
Total		50	100

Symptoms wise distribution:

Symptoms	Number of patients	Percentage
Pain	38	76%
Discharge	46	92%
Swelling	13	26%
Fever	19	38%
Pruritis	8	16%



IV. Discussion

MRI fistulography provides anatomy of fistulous track in multiple planes and gives good idea about the extent of disease. Multiple studies have shown that there is significant concordance between the MRI findings and surgical findings. MRI is beneficial in case of crohns disease with multiple and recurrent fistulous track.

Anatomical Knowledge is necessary for imaging evaluation of perianal fistula. Preoperative MRI evaluation gives idea about location and anatomy of fistulous track, location of internal and external opening, location of deep abscesses, state of anorectal wall and perirectal space, and damage to sphincter.

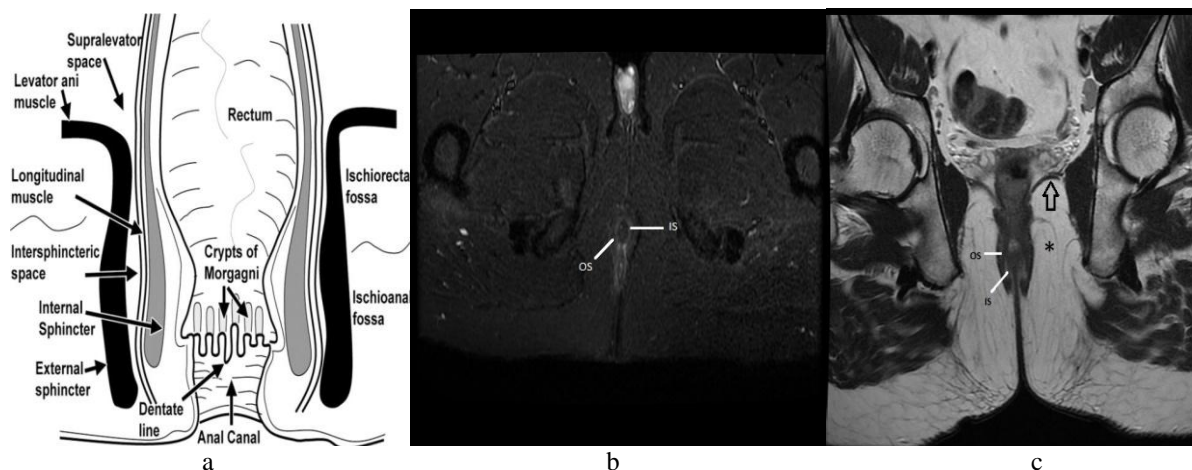


Figure 1: Anatomy of Perianal region. Figure (a) showing diagrammatic representation of orientation of sphincters in relation to anal canal. (b) Axial STIR image showing internal and external sphincters. (c) coronal T2 weighted images shows levator ani muscle (black arrow), Ischio-rectal fossa (star).

The external anal sphincter appears hypointense on T1W, T2W, and fatsuppressedT2W images, and is bordered laterally by the fat in the ischioanal fossa. The internal sphincter appears hypointense on T1W and T2W TSE images and is relatively hyperintense on fat-suppressed T2W images. It shows enhancement on post gadolinium T1W images. Coronal reformatted images are helpful to locate levator ani muscle, which plays crucial role to differentiate between suprlevator and infrlevator disease.

Our study shows that 30-50year age group is more commonly affected with mean age of 41 years, higher incidence among male than females with increased risk when associated with comorbidities like diabetes, crohns disease. Incidence of trans-sphincteric fistula is most common amongst all variety.

In our MRI protocol both coronal and axial planes found to be important in complete evaluation. Charles et al. stated that T2W images (TSE and fat-suppressed) provide a good contrast between the hyperintense fluid in the tract and the hypointense fibrous wall of the fistula, while providing a good delineation of the layers of the anal sphincter. He also found gadolinium-enhanced T1W images are useful to differentiate a fluid-filled tract from an area of inflammation. This agrees with our study, axial T2W fat-suppressed images were the most useful for locating the fistulous tract and after Gd injection the tract wall enhances, whereas the central portion is hypointense. Fibrous tracts & Abscesses are also very well depicted on post-gadolinium images. Routine use of T2W TSE FS and occasional post-contrast T1W TSE FS images in previously operated perianal fistulae, are correctly detecting and providing similar information regarding primary tracts, abscesses, secondary tracts, horseshoeing and internal openings. Active fistula tract appears as a hypointense linear structure on T1-weighted imaging and hyperintense on T2-weighted imaging (best visualized with fat saturation) relative to muscle and enhances with IV contrast agent. Inactive tracts are also hypointense on T1-weighted imaging but lack the associated T2-weighted imaging hyperintensity and contrast enhancement. Savoye-Collet et al suggested that a loss of T2-weighted imaging hyperintense signal precedes lack of enhancement and proposed a predictable stepwise response to therapy.

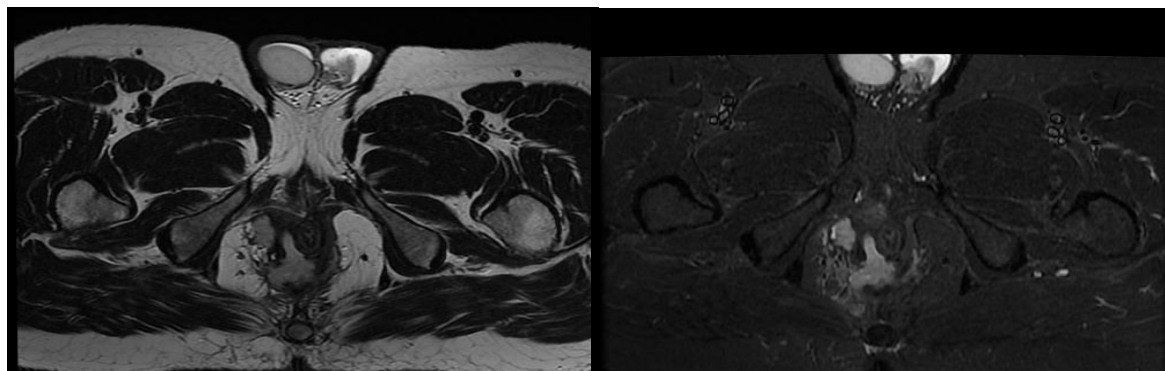


Figure 2: Axial T2 weighted and STIR images shows horseshoe shape complex fistula involving external and internal sphincter (transsphincteric extension).

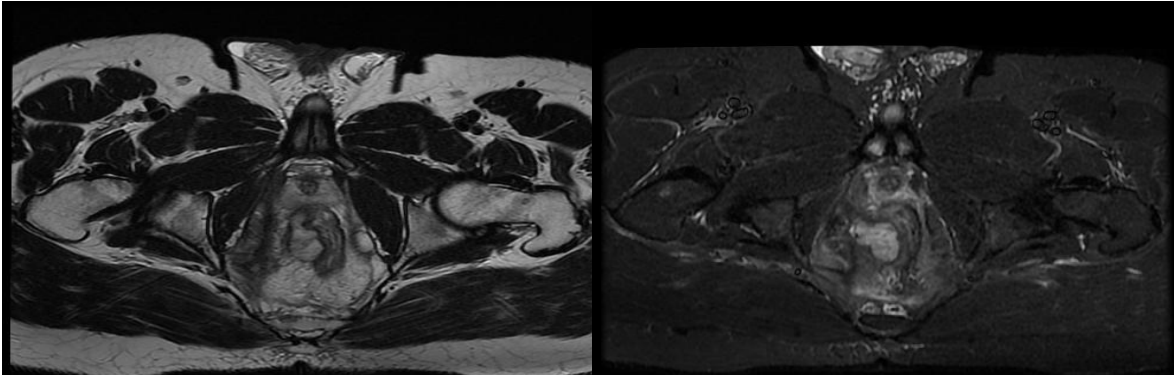


Figure 3: Axial T2 weighted and STIR images shows extensive perirectal collection with secondary extension in to Ischio-rectal fossa.

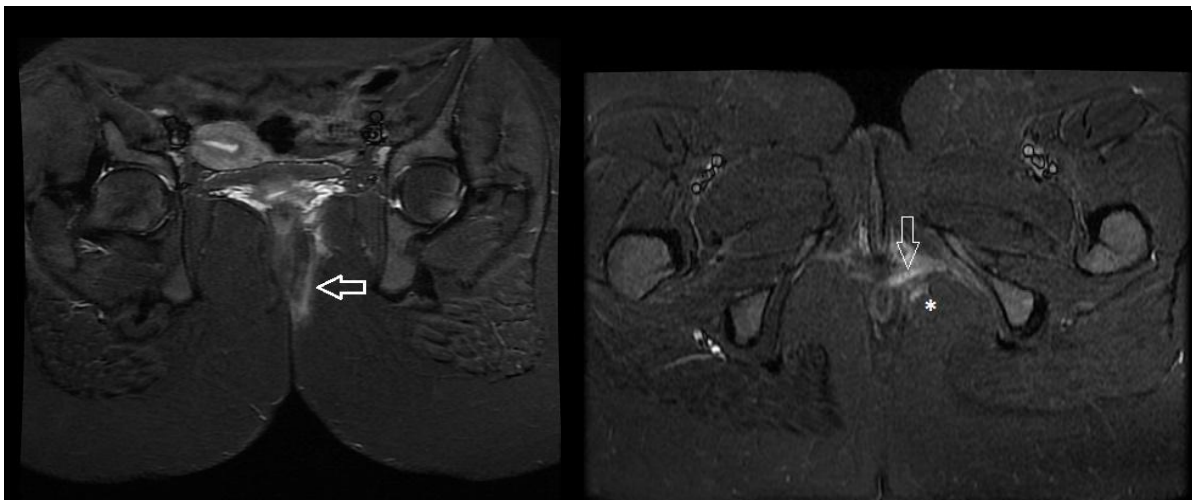


Figure 4: coronal STIR images shows linear extrasphincteric fistula (white arrow) and Axial STIR images of same patient shows two linear hyperintensity at 1 & 3 o'clock position. Transsphincteric fistula demonstrated by white arrow and extrasphincteric fistula demonstrated by star.

Our study we found that 1.5 Tesla MRI has a 100% sensitivity, specificity and positive predictive value for correctly detecting & grading of primary tract. In our study, it was assumed that fluid collection larger than 10 mm in diameter is an abscess; whereas a fluid filled tubular structure with a diameter smaller than 10 mm is a fistula. Post-contrast study correctly identified abscess and secondary tracks in 34 cases with correct establishment of their relation to levator ani and puborectalis muscles.

Parks classification used to classify perianal fistulae is basically a surgical classification. To easily report all the relevant imaging findings St. James's University Hospital MR Imaging Classification of Perianal Fistulae was proposed by radiologists. Being a simple classification to apply and remember it helps in better describing the disease so that surgeons can understand the relevant findings.

V. Conclusion

This study evaluated role of MRI in evaluation of Perianal Fistula. Magnetic resonance imaging (MRI) is clearly a highly sensitive non-invasive patient friendly diagnostic modality of choice for detecting anal fistulas and is recommended in their preoperative work-up. It has high accuracy for identification and classification of perianal fistulas and their complications. MRI has highest possible diagnostic accuracy aiding successful surgical interventions, aiming to reduce complications and recurrences. MR imaging accurately reveals surgical anatomy, can be an excellent diagnostic guide for successful surgical interventions and used to make better predictions regarding patient outcome.

References

- [1]. Morris J, Spencer JA, Ambrose NS. MR imaging classification of perianal fistulas and its implications for patient management. *RadioGraphics* 2000;20(3):623–635; discussion 635–637
- [2]. Goodsall DH, Miles WE. *Diseases of the anus and rectum*. London, England: Longmans, Green, 1900.
- [3]. Sainio P. Fistula-in-ano in a defined population: incidence and epidemiological aspects. *Ann Chir Gynaecol* 1984;73(4):219–224.

- [4]. Seow C, Phillips RK. Insights gained from the management of problematical anal fistulae at St Mark's Hospital, 1984–88. *Br J Surg* 1991; 78:539-541.
- [5]. Choen S, Burnett S, Bartram CI, Nicholls RJ. Comparison between anal endosonography and digital examination in the evaluation of anal fistulae. *Br J Surg* 1991; 78:445-447.
- [6]. Parks AG. Pathogenesis and treatment of fistula-in-ano. *BMJ* 1961;1(5224):463–469.
- [7]. Szurowska E, Wypych J, Izycka-Swieszewska E. Perianal fistulas in Crohn's disease: MRI diagnosis and surgical planning. *Abdom Imaging* 2007; 32:705–718
- [8]. Gunawardhana PA, Deen KI. Comparison of hydrogen peroxide instillation with Goodsall's rule for fistula-in-ano. *Aust N Z J Surg.* 2001 Aug;71(8):472-474.
- [9]. Lindsey I, Humphreys MM, George BD, Mortensen NM. The role of anal ultrasound in the management of anal fistulas. *Colorectal Dis* 2002; 4: 118–122.
- [10]. Orsoni P, Barthet M, Portier F, Panuel M, Desjeux A, Grimaud JC. Prospective comparison of endosonography, magnetic resonance imaging and surgical findings in anorectal fistula and abscess complicating Crohn's disease. *Br J Surg* 1999; 86: 360–364.
- [11]. Buchanan GN, Halligan S, Bartram CI, Williams AB, Tarroni D, Cohen CRG. Clinical examination, endosonography, and MR imaging in preoperative assessment of fistula in ano: comparison with outcome-based reference standard. *Radiology* 2004; 233(3): 674–681
- [12]. Villa C, Pompili G, Franceschelli G, et al. Role of magnetic resonance imaging in evaluation of the activity of perianal Crohn's disease. *Eur J Radiol* 2011
- [13]. Halligan S, Stoker J. Imaging of fistula in ano. *Radiology* 2006;239(1):18–33.

Dr. Mahak Sood "Perianal Fistula: Role of magnetic resonance imaging in classification, characterization and recurrence rate of fistulous disease." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, vol. 17, no. 6, 2018, pp 58-63.