

**Spectrum of MRI Imaging Findings of Peri-Anal Fistulas in 20 Cases**Dr. Anshu Agarwal<sup>1\*</sup>, Dr. Manu Gupta<sup>2</sup>, Dr. Manish Bhagat<sup>3</sup><sup>1</sup>Postgraduate Student, Department of Radiodiagnosis, Sri Aurobindo Medical College & PG Institute, Indore (M.P.), India<sup>2</sup>Postgraduate Student, Department of Radiodiagnosis, Sri Aurobindo Medical College & PG Institute, Indore (M.P.), India<sup>3</sup>Associate Professor, Department of Radiodiagnosis, Sri Aurobindo Medical College & PG Institute, Indore (M.P.), India**Original Research Article****\*Corresponding author**

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**Abstract:** An abnormal connection between two structures or organs or between an organ and the surface of the body is defined as a fistula. In perianal fistula, there is a connection between the anal canal and the skin of the perineum. Perianal fistulation is an infrequent process, with a prevalence of 0.01%, although it is associated with significant morbidity. It is now increasingly recognized that imaging techniques, especially magnetic resonance (MR) imaging, may play a crucial role. MR imaging allows identification of infected tracks and abscesses that would otherwise remain undetected by other modalities. Furthermore MRI also provide detailed anatomic descriptions of the relationship between the fistula and the anal sphincter complex, thus allowing surgeons to choose the best surgical treatment, drastically reducing recurrence of the disease or possible secondary effects of surgery, such as fecal incontinence (4,5). We also highlight key details that radiologists should provide to surgeons to ensure effective treatment and improve therapeutic outcome. The study population comprised 20 patients referred from surgery department whose MRI studies were evaluated retrospectively in the Dept of Radiodiagnosis, Sri Aurobindo Institute of Medical Sciences & PG College from October 2016 and January 2018. All MRI studies were carried out on a 1.5-T MRI system (Seimens 1.5T) using an 8-channel phased-array coil. The sequences evaluated were: Axial T1 TSE; Axial fat-suppressed T2W; Axial post-contrast T1W [post injection of 10 ml of gadodiamide (Gd-DTPA-BMA); Coronal T1W TSE; Coronal T2W fat-suppressed and coronal post-contrast T1W. To summaries, a male preponderance is seen mostly in young adults with low lying type of fistulas being the most common, evaluation of an enhanced T1W image, in conjunction with a fat-suppressed T2W image, provides most of the details necessary for accurate evaluation of perianal fistulae.

**Keywords:** All MRI studies were carried out on a 1.5-T MRI system (Seimens 1.5T) using an 8-channel phased-array coil. The sequences evaluated were: Axial T1 TSE; Axial fat-suppressed T2W; Axial post-contrast T1W [post injection of 10 ml of gadodiamide (Gd-DTPA-BMA); Coronal T1W TSE; Coronal T2W fat-suppressed and coronal post-contrast T1W.

**INTRODUCTION**

An abnormal connection between two structures or organs or between an organ and the surface of the body is defined as a fistula. In perianal fistula, there is a connection between the anal canal and the skin of the perineum. Perianal fistulation is an infrequent process, with a prevalence of 0.01%, although it is associated with significant morbidity. It predominantly a disease of young males, with a male-to-female ratio of 2:1. The most common presenting symptom is discharge, but in many patients local pain due to inflammation is also commonly seen [1]. Surgery is the treatment of fistulas which is successful in most

cases, but it is associated with significant chances of recurrence [2]. Accurate preoperative assessment of the course of the primary fistulous track and the site of any secondary extension or abscesses aids in successful surgical management of anal fistulas requires [3]. It is now increasingly recognized that imaging techniques, especially magnetic resonance (MR) imaging, may play a crucial role. MR imaging allows identification of infected tracks and abscesses that would otherwise remain undetected by other modalities. Furthermore MRI also provide detailed anatomic descriptions of the relationship between the fistula and the anal sphincter complex, thus allowing surgeons to choose the best

surgical treatment, drastically reducing recurrence of the disease or possible secondary effects of surgery, such as fecal incontinence [4,5]. In this study, we review the etiology and prevalence of perianal fistulas. We also discuss the role of imaging techniques in evaluation of perianal fistulas, the protocol applied at our institution to assess perianal fistulas, and recent advances in MR imaging evaluation of perianal fistulas. We then describe location of anal fistulas and the two main classification systems for perianal fistula: the Parks and the St James’s University Hospital classifications. Finally, we show the MR imaging findings of perianal fistulas, and discuss the usefulness of MR imaging in management of perianal fistulas[6,7]. We also highlight key details that radiologists should provide to surgeons to ensure effective treatment and improve therapeutic outcome.

**Classification of perianal fistulae**

Depending on the location and course of the primary tract, perianal fistulae have been classified into four types [8]. Intersphincteric (incidence 60-70%): [9]. The infection starts from an anal gland and develops in the inter sphincteric plane, lying between the internal and external sphincters, without penetrating the external sphincter. It eventually ruptures onto the skin, thereby creating the fistula.

- Transsphincteric (incidence 20-30%): [9]. This occurs when the intersphincteric infection

penetrates the external sphincter to reach the ischioanal fossa and, eventually, the perianal skin.

- Suprasphincteric (uncommon): These fistulae extend superiorly in the intersphincteric plane to reach above the levator plane and then penetrate inferiorly through the ischioanal fossa.
- Extrasphincteric (uncommon): These result from extension of primary pelvic disease (e.g., Crohn’s disease, diverticulitis, radiation proctitis) down through the levator plate.

**MATERIALS AND METHODS**

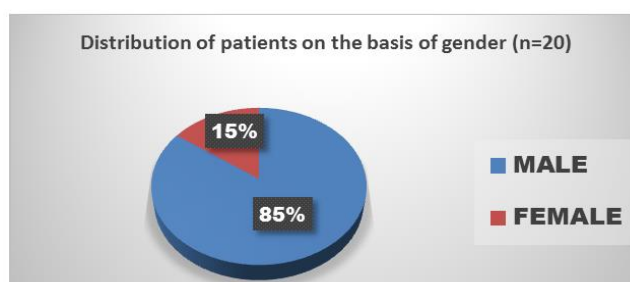
The study population comprised 20 patients referred from surgery department whose MRI studies were evaluated retrospectively in the Dept of Radiodiagnosis, Sri Aurobindo Institute of Medical Sciences & PG College from October 2016 and January 2018.

All the relevant clinical data and radiological findings were noted in the performa and subsequently followed upon. All MRI studies were carried out on a 1.5-T MRI system (Seimens 1.5T) using an 8-channel phased-array coil. The sequences evaluated were: Axial T1 TSE; Axial fat-suppressed T2W; Axial post-contrast T1W [post injection of 10 ml of gadodiamide (Gd-DTPA-BMA); Coronal T1W TSE; Coronal T2W fat-suppressed and coronal post-contrast T1W.

**OBSERVATIONS AND RESULTS**

**Table-1: Distribution of patients on the basis of gender**

(n=20)		
Sex	Number	Percentage
Male	17	85
Female	3	15
Total	20	100



**Graph-1: Male predilection was observed in our study with 85% of patients being male and 15 % female**

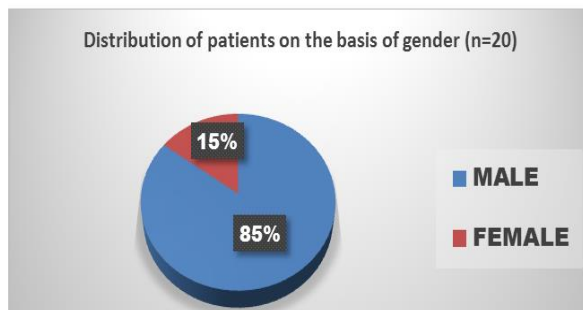
**Table-2: Distribution of cases on the basis of age**

(n=20)			
S.No	Age	Number	Percentage
1	21-30	4	20.0
2	31-40	9	45.0
3	41-50	4	20.0
4	51-60	2	10.0
5	61-70	1	5.0
	Total	20	100

Observations and Results

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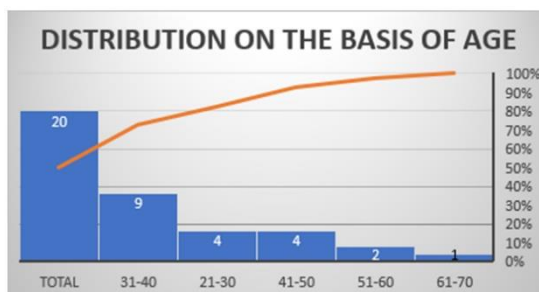
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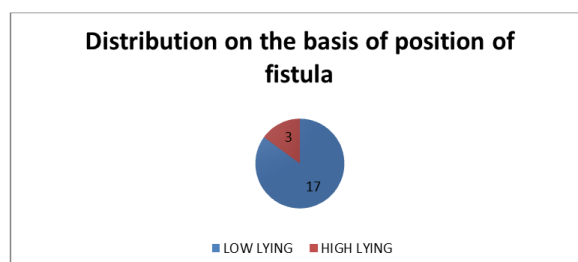
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3	41-50	4	20.0
4	51-60	2	10.0
5	61-70	1	5.0
	Total	20	100



**Graph-2: Mean age of patients in our study was 34 yrs with majority of patients being in the age group of 31-40 yrs (45%)**

**Table-3: Distribution of cases on the basis of position of fistula**

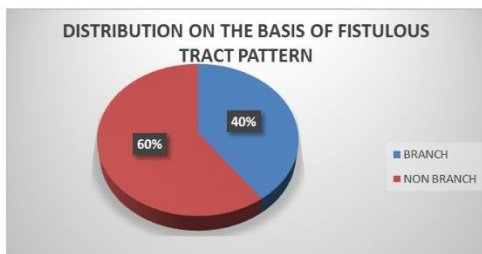
	Number	%
Low lying	17	85
High lying	03	15
Total	20	100



**Graph-3: Most commonly seen is low lying fistula in 85% of the patients**

**Table-4: Distribution of cases on the basis of type of sinus tract**

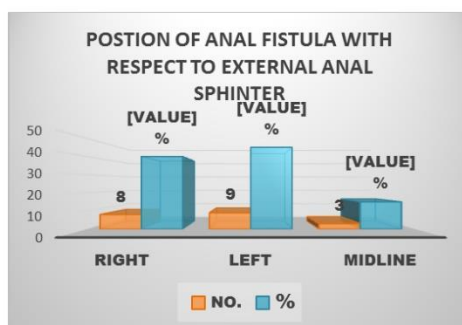
	Number	%
Branch	08	40
Non branch	12	60
Total	20	100



**Graph-4: The most commonly seen in our study group was non branch type of fistulous tract**

**Table-5: Distribution on the basis of external opening in respect to external anal sphincter**

	No.	%
Right	8	40
Left	9	45
Midline	3	15
Total	20	100



**Graph-5: Out of total 20 cases majority were in left parasagittal position in respect to external anal sphincter**

### DISCUSSION AND CONCLUSION

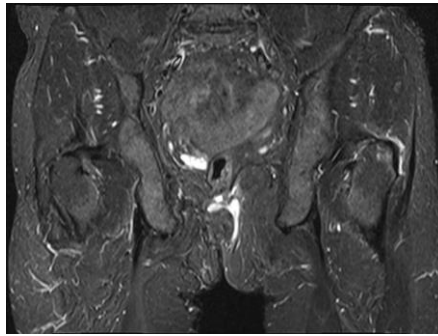
MRI imaging of perianal fistulae relies on the inherent high soft tissue contrast resolution and the multiplanar display of anatomy by this modality. In one of the early studies on MRI fistulography, Lunniss *et al.* reported a concordance rate of 86-88% between MRI and surgical findings [10]. In our study there was a young male preponderance was seen with 85% of the total cases which was also noted in the study done by Dabbis n *et al.* [11]. We also classified the fistulas as high or low variety and there was a marked prevalence of low variety noted along with nonbranching pattern in about 60% of the patients. According to the Park's classification, 9 intersphincteric, 8 transsphincteric, 1 suprasphincteric and 2 extrasphincteric fistulas were seen in the present study. Good contrast between the hyperintense fluid in the tract and the hypointense fibrous wall of the fistula was seen in T2W images (TSE and fat-suppressed) also showing good delineation of the layers of the anal sphincter [6, 14]. In our experience of 20 cases also, axial T2W fat-suppressed images were the most useful for locating the

fistulous tract. To differentiate a fluid-filled tract from an area of inflammation Gadolinium-enhanced T1W images were found to be very helpful [14]. The central portion is hypointense, whereas the tract wall enhances. On axial images the exact location of the primary tract (ischioanal or inter sphincteric) is most easily visualized; the presence of disruption of the external anal sphincter differentiates a transsphincteric fistula from an intersphincteric one. The internal opening of the fistula is also best seen in this plane.

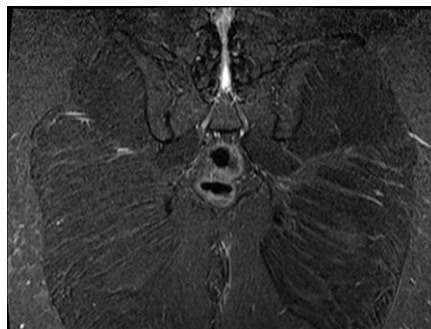
The levator plane is best depicted in coronal images, thereby allowing differentiation of supralelevator from infralevator infection. Therefore a combination of an axial and a longitudinal series (coronal, sagittal, or radial) will provide all the necessary details [14].

To summaries, a male preponderance is seen mostly in young adults with low lying type of fistulas being the most common, evaluation of an enhanced T1W image, in conjunction with a fat-suppressed T2W

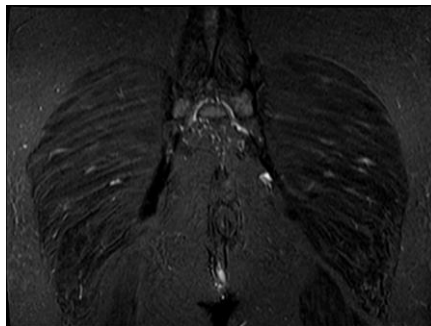
image, provides most of the details necessary for accurate evaluation of perianal fistulae.



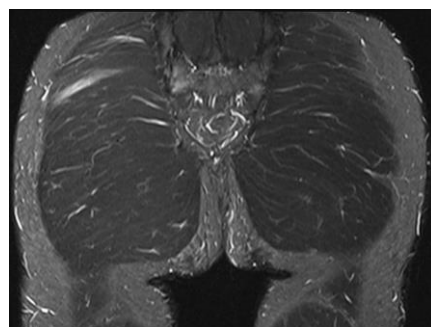
**Image-1:**T2 Fat Sat Coronal Internal And external Opening forming a horse shoe shaped.



**Image-2:** Coronal stir showing Left parasitgal transshincteric fistula



**Image-3:** T2 trim coronal low lying intersphincteric anocutaneous fistula



**Image-4:**T2 coronal stir sequence shows a solitary infralevator fistulous tract on left side

#### REFERENCES

1. Sainio P. Fistula-in-ano in a defined population. Incidence and epidemiological aspects. In *Annales chirurgiae et gynaecologiae* 1984 (Vol. 73, No. 4, pp. 219-224).
2. Lilius HG. Fistula-in-ano, an investigation of human foetal anal ducts and intramuscular glands and a clinical study of 150 patients. *Acta Chir Scand Suppl* 1968;383:7-88.
3. Seow-Choen, Phillips RK. Insights gained from the management of problematical anal fistulae at St. Mark's Hospital, 1984-88. *Br J Surg* 1991;78(5): 539-541.

4. Beckingham IJ, Spencer JA, Ward J, Dyke GW, Adams C, Ambrose NS. Prospective evaluation of dynamic contrast enhanced magnetic resonance imaging in the evaluation of fistula in ano. *Br J Surg* 1996;83(10):1396–1398.
5. Buchanan G, Halligan S, Williams A, Cohen CR, Tarroni D, Phillips RK, Bartram CI. Effect of MRI on clinical outcome of recurrent fistula-in-ano. *The Lancet*. 2002 Nov 23;360(9346):1661-2.
6. Park AG, Gordon PH, Hardcastle JD. A classification of fistula-in-ano. *Br J Surg*. 1976;63:1–12.
7. Morris J, Spencer JA, Ambrose NS. MR imaging classification of perianal fistulas and its implications for patient management. *Radographics*. 2000;20:623–35.
8. Beets-Tan RG, Beets GL, van der Hoop AG, Kessels AG, Vliegen RF, Baeten CG, van Engelshoven JM. Preoperative MR imaging of anal fistulas: does it really help the surgeon?. *Radiology*. 2001 Jan;218(1):75-84.
9. Spencer JA, Chapple K, Wilson D, Ward J, Windsor AC, Ambrose NS. Outcome after surgery for perianal fistula: Predictive value of MR imaging. *AJR Am J Roentgenol*. 1998;171:403–6.
10. Lunnis PJ, Armstrong P, Barker PG, Reznick RH, Phillips RK. MR imaging of the anal fistulae. *Lancet*. 1992;340:394–6.
11. Daabis N, El Shafey R, Zakaria Y, Elkhadrawy O. Magnetic resonance imaging evaluation of perianal fistula. *The Egyptian Journal of Radiology and Nuclear Medicine*. 2013 Dec 1;44(4):705-11.
12. Chauhan NS, Sood D, Shukla A. Magnetic resonance imaging (MRI) characterization of perianal fistulous disease in a rural based tertiary hospital of North India. *Polish journal of radiology*. 2016;81:611.
13. Sharma G, Khandige G, Mohan M. Magnetic resonance imaging in perianal fistulas—A pictorial atlas. *Indian Journal of Gastroenterology*. 2016 Sep 1;35(5):337-42.
14. Maier AG, Funovics MA, Kreuzer SH, Herbst F, Wunderlich M, Teleky BK, Mittlböck M, Schima W, Lechner GL. Evaluation of perianal sepsis: comparison of anal endosonography and magnetic resonance imaging. *Journal of magnetic resonance imaging*. 2001 Sep 1;14(3):254-60.