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Spectrum of MRI Imaging Findings of Peri-Anal Fistulas in 20 Cases

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Original Research Article

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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 modalites. 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

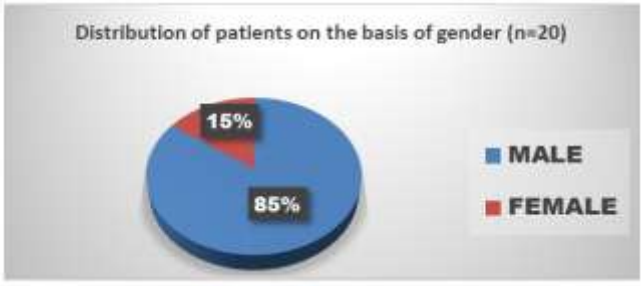
The study population comprised 20 patients referred from surgery department whose MRI studies were evaluated retrospectively in the Dept of Radiodiagnosis, Sri Aurobindo Institute of Medical Sciences & PG College from October 2016 and January 2018.

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

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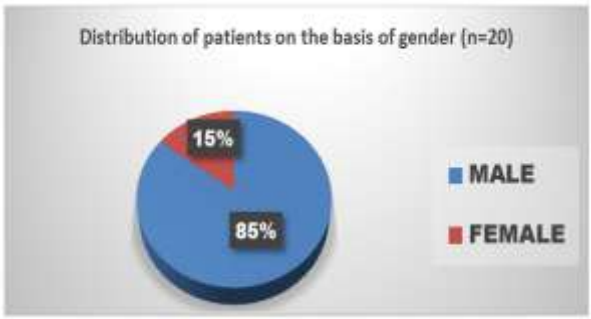

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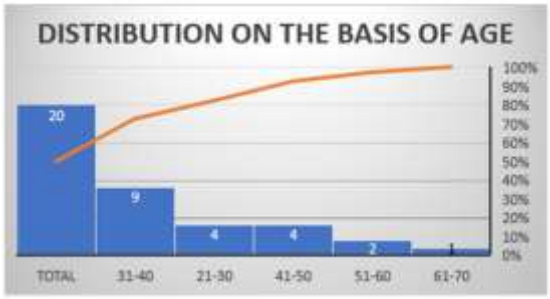
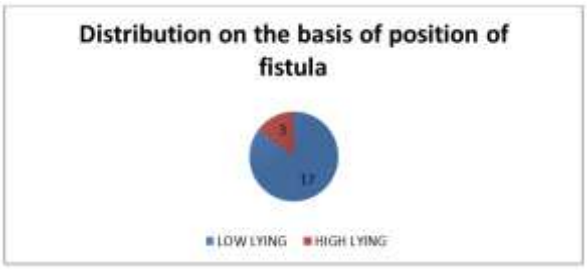


Graph-2: Mean age of patients in our study was 34 yrs with majority of patients being in the age group of 31-40 yrs (45%)

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

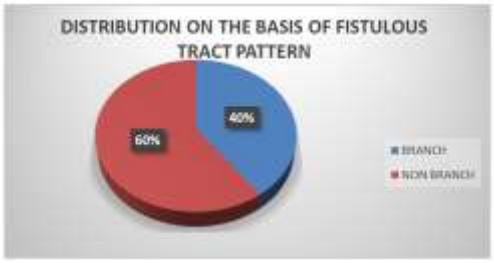
	Number	%
Low lying	17	85
High lying	03	15
Total	20	100



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

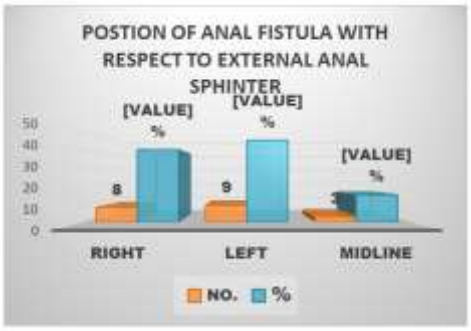
	Number	%
Branch	08	40
Non branch	12	60
Total	20	100



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 parasaggital 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 supralevator 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.

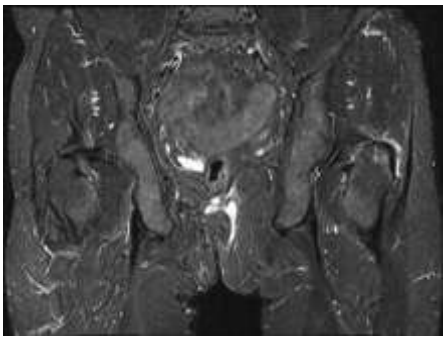


Image-1:T2 Fat Sat Coronal Internal And external Opening forming a horse shoe shaped.

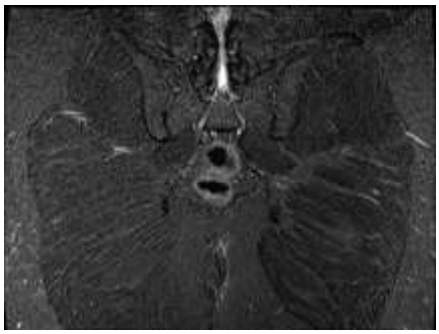


Image-2: Coronal stir showing Left parasitgal transshincteric fistula

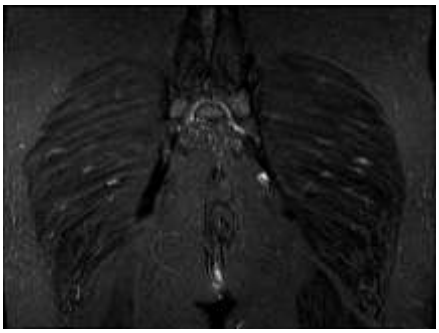


Image-3: T2 trim coronal low lying intersphinteric anocutanoeus fistula

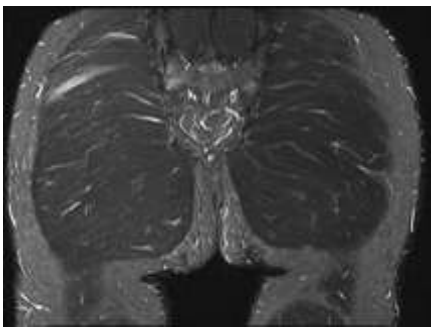


Image-4:T2 coronal stir sequence shows a soliatary infralevator fistulous tract on left side

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