



“MR IMAGING EVALUATION OF PERIANAL FISTULAS”

Radio Diagnosis

Dr. Karicherla Vishnu Harika

Final year Postgraduate Student, Department of Radiodiagnosis, Santhiram Medical College and General Hospital, Nandyal

Dr. B.E. Panil Kumar

MDRD, Professor and HOD, Department of Radiodiagnosis, Santhiram Medical College and General Hospital, Nandyal.

Dr. Lalitha Kumari

MDRD, Professor, Department of Radiodiagnosis, Santhiram Medical College and General Hospital, Nandyal

KEYWORDS

INTRODUCTION

A fistula is defined as an abnormal connection between two structures or organs or between an organ and the surface of the body. Here, it's an abnormal connection between anal canal and skin of the perineum. They are thought to be a result of anal gland obstruction, with secondary abscess formation and external rupture of the abscess(1). It has a male predominance and is more common in young males. The most common presenting symptom is discharge, but local pain due to inflammation is also common(2).

MR imaging allows identification of infected tracks and abscesses that would otherwise remain undetected. MR imaging gives detailed anatomic descriptions of relationship between the fistula and anal sphincter complex(3), thus give adequate information to choose the optimal surgical management option, and significantly reduce the recurrence (4) of disease or possible secondary effects of surgery, like fecal incontinence (5).

AIMS AND OBJECTIVES

- To describe the main MR imaging features and classification of perianal fistulas.
- To discuss the MR imaging features of complications of perianal fistulas.

MATERIALS AND METHODS

Type Of Study:

It is a hospital based cross sectional and observational study.

Source Of Data:

Department of Radiodiagnosis at Santhiram medical college and general hospital, Nandyal, Andhra Pradesh.

Period Of Study: October 2022 to December 2022

Sample Size: Approximate sample size is 30 and the sampling method is simple random sampling.

Sampling Criteria

Inclusion Criteria:

- Patient willing to participate in the study and willing to give written and informed consent.
- Patients with suspected perianal fistulas/abscess.
- Patients with no contraindications to IV Gadolinium & MRI.
- Patients with age between 18-70.

Exclusion Criteria:

- Patients not willing to participate in the study and not willing to give written and informed consent.
- Patients with contraindications to IV Gadolinium & MRI.
- Patients who are under age 18.

Equipment:

Patients will undergo MR imaging examination under a 1.5 T SIEMENS MAGNETOM_ESSENZA, sygno version- sygno VH₂₁ASL₃₆P₄₃ machine TIM+DOT System.

The following sequences were performed:

- T2 weighted imaging (T2 WI),
- T1 weighted imaging (T1 WI),
- Coronal short τ wave inversion recovery (STIR) sequence of region of interest,
- T1 fat saturation (FS).

RESULTS

A total of 30 patients who were referred for MRI fistulogram to Santhiram medical college hospital were studied with MR fistulogram. Of the total 30 patients included in the study, 20 patients were males (66.6%) and 10 patients were females (33.3%).

The most prevalent type of fistula was intersphincteric type which was seen in 16 of the patients (53.33%). Trans sphincteric type of fistula accounted to about 40% which was seen in 12 patients. Extra sphincteric type of fistula was seen in 2 patients which accounted for about 6.6%. The age group of patients included in the study ranged from 20 to 70 years. Highest incidence is seen in age group of 31-40 years(40%).

In our study, when the fistulous tracts were analysed, majority of the patients (27 out of 30) had a single external opening (90%). Multiple external openings were seen in 3 patients (10%). When analysing the internal opening, it was single in 90% of patients (27 out of 30) and multiple in about 3 patients (10%). Most commonly, the internal opening was found in 4'o clock to 6'o clock position in 11 patients. The operative findings.

In our study, 9 out of 30 patients (30%) had secondary tracts. Abscesses are identified in 6 out of 30 patients(20%).

In our study, 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 1 - Age wise distribution of cases in the study

AGE (IN YEARS)	NUMBER OF PATIENTS	PERCENTAGE
<30	3	10%
31-40	12	40%
41-50	9	30%
51-60	4	13.3%
>60	2	6.7%

Table 2 - Sex distribution of cases in the study

SEX	NUMBER OF PATIENTS	PERCENTAGE
MALE	20	66.6%
FEMALE	10	33.7%

Table 3 - External opening of perianal fistula

EXTERNAL OPENING	NUMBER OF PATIENTS	PERCENTAGE
SINGLE	27	90%
MULTIPLE	3	10%

Table 4 – Internal opening of perianal fistula

INTERNAL OPENING	NUMBER OF PATIENTS	PERCENTAGE
SINGLE	27	90%
MULTIPLE	3	10%

Table 5 – Clock position of single internal opening of perianal fistula

CLOCK POSITION	NUMBER OF PATIENTS	PERCENTAGE
1 - 3	6	22.2%
4 - 6	11	40.8%
7 - 9	7	25.9%
10 - 12	3	11.1%

Table 6 – Secondary tracks

SECONDARY TRACK	NUMBER OF PATIENTS	PERCENTAGE
PRESENT	9	30%
ABSENT	21	70%

Table 7 – Abscesses

ABSCESSSES	NUMBER OF PATIENTS	PERCENTAGE
PRESENT	6	20%
ABSENT	24	80%

Table 8 - St James Grading

ST JAMES GRADE	NUMBER OF PATIENTS	PERCENTAGE
I	11	36.6%
II	5	16.6%
III	8	26.6%
IV	4	13.3%
V	2	3.3%



Image 1: MRI, coronal T2-weighted STIR image. Right-sided intersphincteric fistula. Linear inter - sphincteric fistulous tract with its internal opening into anal canal at 6'o clock position and external opening into perianal region on right side.

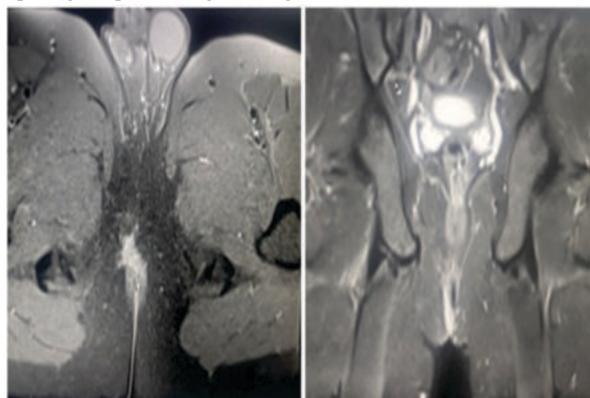


Image 2- Axial and Coronal T2-weighted STIR Images show 'Transphincteric' fistulous tract with internal opening into anal canal at 11'O clock position, with its external opening in the perianal region on right side

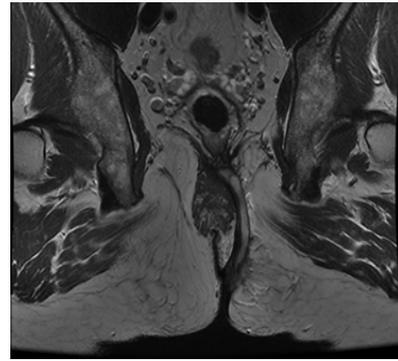


Image 3- Coronal T2 weighted image shows 'Supra sphincteric fistula' with its internal opening into anal canal at 5'o clock position and external opening in the perianal region on left side



Image 4- Coronal T2 weighted STIR image shows 'Extra sphincteric fistula' with its internal opening into anal canal at 8'o clock position

DISCUSSION

Normal MRI anatomy of the anal sphincter :

The external anal sphincter which is a striated muscle is clearly appreciated on MRI. It is hypo intense on T1W, T2W, and fat-suppressed T2W images. It is outlined laterally by the fat in the ischioanal fossa .

The internal sphincter which is a smooth muscle is hypo intense on T1W and T2W images and is relatively hyper intense on fat-suppressed T2W images and shows enhancement on post contrast T1W images.

The coronal images depict the levator ani muscle. Its identification is needed to distinguish supra levator from infra levator infections.

The puborectalis ring is seen as a thickening of the superior fibers of external sphincter(6). Puborectalis merges with the levator ani superiorly (7).

Goodsall's rule:

Goodsall described relationship of cutaneous opening to the site of enteric opening. The rule states that cutaneous openings anterior to transverse anal line is associated with direct radial fistulous tracts into anal canal whereas openings posterior to the line have tracts that enter the canal in the midline posteriorly.

Park's Classification of Perianal Fistulas :

Depending on the location and course of the primary tract (8) perianal fistulae have been classified into four types.

1. Intersphincteric type : 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, creating the fistula.
2. Transsphincteric type : This occurs when the intersphincteric infection penetrates the external sphincter to reach the ischioanal fossa and, eventually, the perianal skin.
3. Suprasphincteric type : These fistulae extend superiorly in the intersphincteric plane to reach above the levator plane and penetrate inferiorly through the ischioanal fossa.
4. Extrasphincteric type : These result from extension of primary

pelvic disease (e.g., Crohn's disease, diverticulitis) down through the levator plate.

St James University Hospital Classification, which is an MR imaging-based classification was proposed that relates the Parks surgical classification to anatomic MR imaging findings in the axial and coronal planes. This classification was proposed on the basis of imaging findings and does not represent an official surgical reference(9).

St James University Hospital Classification classification is simple to apply as it uses anatomic landmarks in the axial plane familiar to radiologists. Furthermore, the classification considers the primary fistulous track as well as secondary extensions and abscesses to evaluate and classify fistulas.

The classification grades fistulas into five groups:

Grade 1: Simple linear intersphincteric fistula

Grade 2: Intersphincteric with abscess or secondary track

Grade 3: Transsphincteric fistula

Grade 4: Transsphincteric fistula with abscess or secondary track in ischioanal or ischioanal fossa.

Grade 5: Supralelevator and translevator fistula.

Grade 1:

Simple Linear Intersphincteric Fistula- Here, the track extends from the anal canal through the intersphincteric space to reach the skin of the perineum or natal cleft. No extensions or abscesses are found in the intersphincteric space or the ischioanal and ischioanal fossae. The fistulous track is always observed in the intersphincteric space and is entirely confined by the external sphincter.

Grade 2:

Intersphincteric Fistula with an Abscess or Secondary Track.—In a grade 2 fistula, the primary track and a secondary track or abscess occur in the intersphincteric space. They are always confined by the external sphincter, which is never crossed. Extensions and abscesses may be of horseshoe type, crossing the midline, or may branch in the ipsilateral intersphincteric plane.

Grade 3:

Transsphincteric Fistula.—It pierces both layers of the sphincter complex and takes a downward course through the ischioanal and ischioanal fossae before reaching the perineal skin. It may provoke inflammatory changes in the fat of the ischioanal and ischioanal fossae, although it is not complicated by secondary tracks or abscesses in these areas. A transsphincteric fistula is distinguished by location of the enteric entry point in the middle third of the anal canal, at the level of the dentate line, which is best evaluated in the coronal plane.

Grade 4:

Transsphincteric Fistula with an abscess or secondary Track in the Ischioanal or Ischioanal Fossa.—In this, the track crosses the external sphincter to reach the ischioanal and ischioanal fossae, where it is complicated by an abscess or extension.

Grade 5:

Supralelevator and Translevator Disease.—In rare cases, perianal fistulous disease extends above the insertion point of the levator ani muscle. In translevator disease, the fistulous track extends directly from its origin in the pelvis to the perineal skin through the ischioanal and ischioanal fossae, with no involvement of the anal canal.

MR imaging has a critical role in helping determine the proper treatment of perianal fistulas because treatment strategies must be individualized according to the type of perianal fistula and the degree of involvement of surrounding pelvic structures.

At MR imaging, identification and localization of the entire cryptoglandular fistula, including the external opening, the primary track, secondary tracks, abscesses, and the internal opening, are essential for fistula classification and treatment. Inadequate assessment of the fistula may result in a simple fistula developing into a complex fistula, and failure to recognize secondary extensions can result in recurrent sepsis and an unnecessarily protracted clinical course.

To preserve continence, accurate presurgical definition of the

relationship of the fistulous track to the anal sphincters is of great importance before performance of any sphincter-interrupting procedure. The information obtained with MR imaging appears to be a more powerful predictor of postoperative outcome than the information gained from surgical exploration(6).

MR imaging-guided surgery of anal fistulas is feasible. Preoperative and intraoperative MR imaging techniques can be used to identify extension of the fistula track and septic foci and ensure the adequacy of the surgical procedure. Use of MR imaging can thus prevent incomplete procedures and the necessity for second surgeries. MR imaging may become particularly useful in surgery of recurrent or complex anal fistulas and may lead to fewer recurrences(4).

MRI imaging of perianal fistulae relies on the inherent high soft tissue contrast resolution and the multiplanar display of anatomy by this modality. Lunniss et al. reported a concordance rate of 86-88% between MRI and surgical findings(7).

T2W images (TSE and fat-suppressed) provide good contrast between the hyperintense fluid in the tract and the hypointense fibrous wall of the fistula, while providing good delineation of the layers of the anal sphincter.

Gadolinium-enhanced T1W images are useful to differentiate a fluid-filled tract from an area of inflammation. The tract wall enhances, whereas the central portion is hypointense. Abscesses are also very well depicted on post-gadolinium images.

The exact location of the primary tract (ischioanal or intersphincteric) is most easily visualized on axial images; 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.

Buchanan et al.(3) in their study showed that MR increases the accuracy of diagnosis by 10% in comparison to EAUS. There was a threefold decrease in recurrence rate after surgical interventions based on appropriate diagnostics with the use of MR only.

As mentioned earlier, coronal images depict the levator plane, thereby allowing differentiation of supralelevator from infralevator infection. A combination of an axial and a longitudinal series (coronal, sagittal, or radial) will provide all the necessary details (9).

CONCLUSION

MR imaging has emerged as the imaging modality of choice for preoperative evaluation of perianal fistulas, providing an accurate, rapid, and noninvasive means of performing pre operative assessment. MR imaging provides precise delineation of the fistulous track, along with its relationship to the pelvic structures, and allows the identification of any secondary fistulas or abscesses of present. Accordingly, MR imaging provides accurate information for appropriate surgical treatment, decreasing the incidence of recurrence. 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.

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