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Original Research Article

A Retrospective Assessment of MR Imaging Evaluation of Perianal Fistula: A Retrospective Study

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Abstract

Aim: This study investigates the role of MRI in diagnosing, classifying, and assessing the additional clinical value of preoperative imaging for surgeons.

Material and Methods: This retrospective study included 70 patients presenting with perianal discharge, referred to the Department of Radiodiagnosis at Patna Medical College and Hospital, Patna, Bihar, India for one year. MRI examinations were conducted using a 1.5 Tesla MRI system (GE Signa 1.5T), employing multiplanar T1-weighted, T2-weighted, and fat-suppressed T2-weighted sequences.

Results: Among the 70 patients studied, the findings were categorized as follows: 23 cases (32.8%) were grade 1 (simple linear inter sphincter fistula), 10 cases (14.3%) were grade 2 (inter sphincteric with abscess or secondary tract), 4 cases (5.7%) were grade 3 (trans sphincteric), 21 cases (30%) were grade 4 (trans sphincteric with abscess or secondary tract in ischiorectal or isochronal fossa), and 2 cases (2.9%) were grade 5 (supra levator and trans levator). Additionally, 10 patients had perianal sinuses identified.

Conclusion: MRI proves valuable in the effective management of perianal fistulas by accurately assessing the extent of disease and its relationship to the sphincter complex.

Introduction

A perianal fistula is a passage that forms between the anal canal or rectum and the skin surrounding the anus. Abscesses and fistulas in the perianal region are part of the same disease process but represent different stages. An abscess is the acute stage, characterized by a collection of pus, while a fistula is a chronic condition involving a persistent tract [1-3].

Anorectal sepsis and perianal fistulas are common conditions. The incidence rate of perianal fistulas is approximately 1 in 1000 individuals, with a higher prevalence among adult males, peaking in the third to fifth decades of life [4-6].

Although fistulas may seem straightforward, both the disease itself and inadequate treatment can lead to considerable morbidity [7]. Perianal fistulous disease is typically categorized into two groups:

1. **Nonspecific:** This group, which accounts for about 90% of cases, is related to infections originating from anal glands.
2. **Secondary to pelvic pathology:** This group comprises a smaller proportion of cases and is associated with underlying pelvic conditions.

Cryptoglandular disease, the most common type, is typically managed surgically by closing the fistula tract and addressing the infection directly. In contrast, the less common secondary type often requires medical management aimed at achieving disease remission [8, 9].

Successful management of fistulas relies heavily on precise preoperative anatomical mapping, facilitated by imaging techniques. The three main methods used for this purpose include contrast fistula graphs, endoanal ultrasonography, and magnetic resonance imaging (MRI). Each imaging modality offers unique advantages and has its limitations. The choice of which technique to use depends on which one can provide the most accurate information for the specific clinical scenario.

Contrast Fistula graphic provides direct visualization of the fistulous tract using contrast material. It can accurately depict the course and extent of the fistula but may be limited by its inability to visualize soft tissue details and discomfort associated with the procedure.

Endoanal Ultrasonography offers real-time imaging of the anal sphincters and surrounding structures. It is particularly useful for evaluating fistula tracks and identifying internal openings, but it may have limitations in visualizing higher anatomical regions and is operator-dependent.

Magnetic Resonance Imaging (MRI) provides excellent soft tissue contrast resolution and multiplanar imaging capabilities. MRI is advantageous for accurately delineating complex anatomical structures, identifying secondary extensions, and assessing the relationship of the fistula to surrounding tissues. It is non-invasive but may be less accessible and more expensive than other modalities.

In selecting the appropriate imaging modality, consideration should also be given to minimizing radiation exposure, adhering to the ALARA (As Low as Reasonably Achievable) principle, especially in patients requiring repeated imaging [10-12].

MR imaging plays a crucial role in the identification and characterization of infected tracks and abscesses associated with perianal fistulas, which might otherwise go unnoticed. Additionally, radiologists can provide detailed anatomical descriptions of how the fistula relates to the anal sphincter complex. This information enables surgeons to make informed decisions regarding the most appropriate surgical approach, thereby reducing the likelihood of disease recurrence and minimizing potential complications such as fecal incontinence [7, 8].

Aims and Objectives:

1. To study various types and grades of all clinically suspected perianal fistula cases.

2. To study MRI findings in all clinically suspected perianal fistula cases.

Methodology

We studied 70 patients referred to Department of Radio diagnosis at Patna Medical College and Hospital, Patna, Bihar India, for one year. We studied MRI images of 40 patients with different types of perianal fistulas. MR imaging were performed on 1.5-T magnet MR system (GE Signa MRI). Imaging was performed with multiplanar T1-weighted, T2-weighted and T2 fat suppressed (STIR) sequences.

Results

Total 70 patients with perianal discharge referred for MR imaging of perianal fistula were included in study. 59 were males and 11 were females (M:F = 5:1) 23 (32.8%) cases showed grade 1 (simple linear inter sphincteric fistula), 10(14.3%) cases showed grade 2 (inter sphincteric with abscess or secondary tract), 04 (5.7%) cases showed grade 3 (trans sphincteric), 21 (30%) cases showed grade 4 (trans sphincteric with abscess or secondary tract in ischiorectal or isochronal fossa) and 02(2.9%) cases showed grade 5 (supra levator and trans levator).

Table 1: Gender distribution

Gender	Number	%
Male	59	84.3
Female	11	15.7

Table: Distribution according to grade of perianal fistula

Grade	Number	%
1	23	32.8
2	10	14.3
3	04	5.7
4	21	30
5	02	2.9

Discussion:

Perianal fistulas typically result from non-specific cryptoglandular inflammation, although they can also stem from specific secondary causes [13]. Magnetic resonance imaging (MRI) offers a comprehensive view of the anal sphincter anatomy, particularly with high-resolution imaging

techniques [14, 15]. Conventional fistula graphic has two primary limitations: (a) It often struggles to accurately assess secondary extensions due to inadequate filling with contrast material. (b) It lacks the capability to visualize the anal sphincters, which is crucial for determining their relationship to the fistula [16].

MRI has become the preferred method for preoperative assessment of perianal fistulas due to its ability to enhance patient outcomes. Its significance lies in revealing concealed areas of infection and secondary extensions, factors often linked to the frequent recurrence of the condition post-surgery. Additionally, MRI can accurately map the anatomical connections of the fistula, thereby predicting the potential for postoperative faecal incontinence [17, 18]. MRI imaging of perianal fistulas benefits from its intrinsic ability to provide high soft tissue contrast resolution. This capability allows for detailed visualization of the anatomy in multiple planes, enhancing diagnostic accuracy and surgical planning [16,19].

At our institution, the preferred protocol for evaluating perianal fistulas includes the following sequences: T1-weighted Fast Spin Echo (FSE), T2-weighted FSE, and T2-weighted fat-suppressed (STIR) sequences. Each sequence provides specific insights into the characteristics of perianal fistulas and abscesses.

On T1-weighted imaging, fistulous tracks, inflammation, and abscesses typically appear as areas with low to intermediate signal intensity. Active fistulous tracks and extensions exhibit high signal intensity on T2-weighted images, while the anal sphincters appear with low signal intensity. Chronic fistulous tracks or scars appear hypointense on both T1- and T2-weighted images. Abscesses are particularly notable on T2-weighted images due to their hyperintense appearance, reflecting the presence of pus and fluid within the cavity [20].

Fat-suppressed T2-weighted sequences, such as short inversion time inversion-recovery (STIR) or frequency-selective fat-saturated T2-weighted Fast Spin Echo (FSE), are employed to enhance the visibility of fluid-containing tracks or abscesses [21]. MR imaging is considered the optimal technique for distinguishing between complex and simple perianal fistulas [22]. This imaging modality provides detailed characterization of fistulous tracks, abscesses, and associated inflammation, aiding in accurate diagnosis and treatment planning.

Conclusion:

MRI plays a crucial role in the diagnosis and treatment of perianal fistulas by providing a detailed roadmap of the perianal region's anatomy. This imaging modality is instrumental in accurately assessing the extent of the disease and its relationship to the sphincter complex, which is essential for successful management. Based on present study, the most prevalent type was Grade I fistula (32.8%), followed by Grade IV (30%) and Grade II (14.3%) fistulas. Grade III (5.7%) and Grade V (2.9%) fistulas were least common. The observation of delayed presentation with Grade IV fistulas in our study population underscores societal taboos that hinder timely medical intervention and underscores the need for increased clinical awareness.

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