ORIGINAL RESEARCH ARTICLE

Evaluation of the Efficacy of MRI in Assessment and Diagnosis of Perianal Fistulae

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A B S T R A C T

Introduction: Perianal fistula is a tract lined by infected granulation tissue that connects the anal canal or rectum to the perianal skin. Perianal fistula is the result of chronic inflammation of tissues and its wall made of inflammatory granulation and fibrous tissue, which is usually caused by an abscess. The recurrence rate of the fistula is high due to the presence of secondary ramifications and undetected areas of sepsis. The objective of our study was to evaluate the role of MRI in the detection and characterization of perianal fistulae.

Material and methods: Our investigation was a prospective study in that total 50 patients were assessed and diagnosed as perianal fistula clinically. MRI was done on a 1.5T GE Signa Excite Scanner using pelvic phased-array torso coil. The primary pulse sequences included T1W & T2W sequences of the pelvis were acquired in axial, sagittal, and coronal planes and STIR axial, coronal images were obtained.

Results: Our study comprised of 50 patients with age ranged from 20 to 69 years. The most common type of the perianal fistula was intersphincteric, seen in 23 cases, followed by transsphincteric in 10 cases. The most common clock position of the internal opening is at 6' o clock position. The detection of the secondary ramifications was necessary to eradicate the perianal disease, as this is the most common cause of recurrence. In the study of all the cases, 14 patients have secondary tracts and the abscess was seen in 13 cases (26%).

Conclusion: MRI is the preferred imaging modality of choice in pre-operative imaging for evaluating the perianal fistula compared to the endoanal ultrasonography (EAUS) or computed tomography (CT). It has better soft-tissue resolution and provides needful information for the surgeons and helps in planning the management of the perianal fistula and reduce the recurrence, therefore decreasing the morbidity.

Keywords: Perianal Fistula, External Opening, Internal opening, MRI.

INTRODUCTION

Most of the perianal fistulas are idiopathic, which represent the chronic phase of intramuscular anal gland sepsis. It is known as cryptoglandular hypothesis[1]. Other causes include inflammatory conditions-like Crohn's disease, tuberculosis, diverticulitis, pelvic infection, ano-rectum cancer, iatrogenic, radiation, and trauma during childbirth.

As most of the glands are subepithelial, some may terminate in the intersphincteric space, close to the external sphincter. Primary pathology starts with obstruction of a superficial anal gland, leads to secondary abscess formation, and most likely to discharge into the anal canal.

The cryptoglandular hypothesis cannot explain the formation of fistulas in inflammatory processes like Crohn's disease. They lead to the formation of an abscess within the pelvis that can track down and reach the skin through the ischiorectal fossa, leading to extrasphincteric fistula formation. It doesn't involve the internal or external anal sphincters[2].

Imaging includes X-ray fistulography, endoanal ultrasonography, CT fistulogram, and MR fistulogram[3]. However, endoanal ultrasonography is the first imaging modality to describe the anal canal and sphincter complex's anatomy and their relationship with fistulous tracts. The disadvantages are it is inconvenient with the procedure, operator dependent, and provides a limited field of view.

MRI plays a superior role over endoanal ultrasonography and clinical digital rectal examination, providing additional diagnostic information, especially in the complicated disease[4] like fistulas associated with Crohn's disease, which are recurrent because of multiple branching tracts. Missed secondary tracts are often the common cause of recurrence[5].

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Parks et al[6] classified the perianal fistulas in the coronal plane based on the fistula's course and its relationship with the sphincter complex. It doesn't include the MRI findings.
MRI findings are not included in the classification of the Park's. MRI based classification was proposed, which relates the Park's surgical classification with MR anatomic detail in axial and coronal planes. The classification is St James University Hospital Classification, which has five grades. It is easy to use, based on anatomical landmarks and considers the main primary tract with secondary extensions and abscesses. In this view, our study was mainly focused to evaluate the role of MRI in the detection and characterization of perianal fistulae.

MATERIAL AND METHODS

This was a descriptive prospective study conducted from August 2017 to October 2019 in the Department of Radio-Diagnosis and Imaging in NRI Academy of medical sciences, Chinakakani, this study was approved by the institutional ethics committee.
A total of 50 patients were assessed in the study and diagnosed as perianal fistula clinically. All participants were briefed adequately in the local language, and their written informed, voluntary consent was obtained. All the enrolled subjects were subjected to a careful history, general physical examination. Patients suffering from the perianal fistula referred to the Department of the radio-diagnosis were included in the study. Patients who underwent an MRI fistulogram with the clinical history of discharging sinus from the perianal region are studied.MRI was done on a 1.5T GE Signa Excite Scanner (General electrical medical systems) using pelvic phased-array torso coil.
MRI-protocol: Axial, coronal T1W images, T2W images of the pelvis were acquired in axial, sagittal, coronal planes, and STIR axial, coronal images were obtained using 512 × 256 matrix, 24 cm FOV, 4 mm slice thickness, 3 mm interslice gap, and 2 NEX.
Statistical Analysis: All this consolidated data were analyzed using SPSS software. The chi-square test was used to compare the differences. The p-value of <0.05 was taken to be statistically significant.

RESULTS

Our study comprised of 50 patients with ages ranged from 20 to 69 years with a mean age of 40 years. There were 37 males and 13 females. Of all 50 cases, 43 patients were with perianal fistula, 3 cases were with perianal sinus, and 3 were with perianal abscess, and one case was of anal fissure (Figure 1).
Based on external opening, a single external opening is found in 42 patients (86%) and multiple external openings in 7 patients (14%). Based on the internal opening, a single internal opening is found in 39 patients (78%) and multiple internal openings in 4 patients (14%), and others in 7 patients (8%).
(Table 1).
Based on the clock position of single internal opening (n- 39), 7 patients belong to 1-3 o'clock position, 25 patients belong to 4-6 o'clock, 1 patient belong to 7-9 o'clock position, and six patients to 10-12 o'clock position (Figure 2).
The majority of the cases (64.1%) were seen with the internal

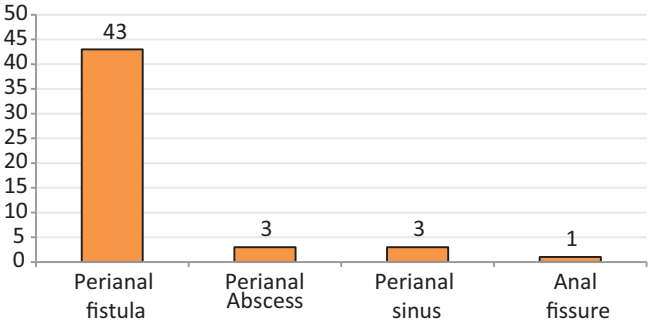

Figure-1: Characterizations of Patient as per Perianal Disease

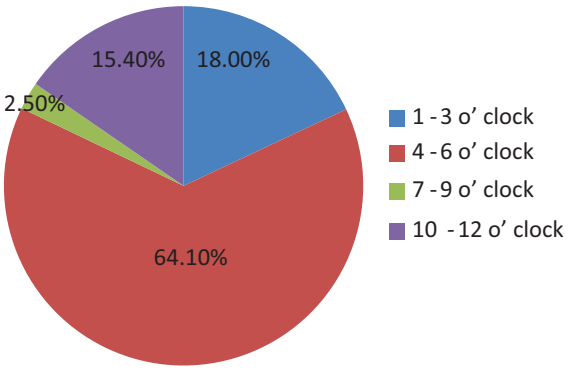

Figure-2: Patient's characterizations based on clock position of internal opening

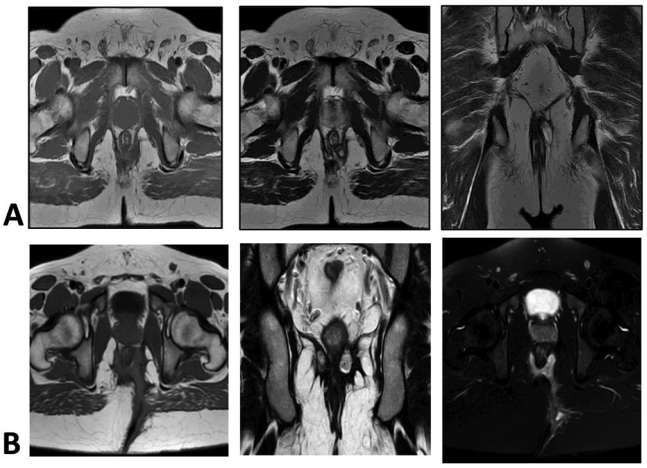

Figure-3: a) Grade- IV Transphincteric fistula with secondary ramification in left ischioanal fossa. b) Presence of abscess - Horseshoe abscess.

		Number of patients
External opening	Single	42 (86%)
	Multiple	7 (14%)
Internal opening	Single	39 (78%)
	Multiple	4 (14%)
	Others	7 (8%)

Table-1: Distribution of Patients Based on the external opening and internal opening

opening in the 4-6 o'clock position, as most of the anal glands are noted in this position.

Secondary tracts - Based on secondary ramifications, they were seen in 14 cases out of 50 (Figure 3).

Axial T1, T2, Coronal T2 & STIR images- showing T1 hypointense, T2 & STIR hyperintense fistulous tract piercing the external and internal sphincters and opening into the anal canal at 5'O clock position with secondary tract seen extending along the external sphincter and ending as a blind end below the levator ani muscle.

Based on the presence and types of an abscess, they were seen in 13 cases out of 50 and the type of abscess, the simple abscess is seen in 10 patients, and horseshoe type is seen in 3 patients (Figure 3).

Axial T1, Coronal T2 & axial STIR images - showing T1 hypointense, T2 & STIR hyperintense tract showing horseshoe extension (from 11 to 2' O clock position) in the intersphincteric space piercing the external sphincter and opening into perianal skin of left gluteal region.

According to park's classification, intersphincteric fistula is seen in 23 patients, the transphincteric type is seen in 10 cases, suprasphincteric type is seen in 5 patients, and zero cases of extrasphincteric type. Based on St. James' university hospital classification, Grade-I Fistula is seen in 15 patients, Grade-II in 8 patients, Grade-III in 8 patients, Grade-IV in 2 cases, and Grade-V in 5 patients.

DISCUSSION

In this prospective study we evaluated the efficacy of MRI in patients with the perianal disease, which helps identify the fistulous tracts, secondary ramifications, and the fistula's relationship with the sphincter complex.

A total of 50 cases of the perianal disease was evaluated in this study. The discharge was the most common presentation with which the patients presented in this study. The detection of the secondary ramifications is necessary to eradicate the perianal disease, as there is the most common cause of recurrence. In the study of all the cases, 14 patients have secondary tracts. The abscess was seen in 13 cases (26%).

A study by Lunnisset al[7] has a concordance rate of 86%-88% between MRI and surgical findings.

According to St. James university hospital classification, Varghese et al[8]., among 100 cases of perianal fistulae, 49 cases were of Grade I > 28 cases followed by Grade II > 11 cases were of Grade IV > 7 cases were Grade III > 5 cases were Grade V.

According to Khan S et al[9], of 18 cases, nine belong to Grade-I, 3 cases belong to Grade-II, 2 cases belong to Grade-III, three belong to Grade- IV, and 1 case to Grade-V.

In our study, the most common type of fistula is Grade-I (15 cases) > Grade II (8 cases) = Grade III (8 cases) > Grade V (5 cases) > Grade IV (2 cases).

As St James University Hospital classification was based on MRI findings, the grading of perianal fistulas was significantly associated with outcome. Grades 1 and 2 were associated with satisfactory outcome (no further surgery is needed), whereas grades 3 to 5 were associated with unsatisfactory outcomes (further surgery is needed).

Approximately 5% of the perianal fistulas have branched and complex course crossing the puborectalis muscle above. The internal sphincter and anal mucosa were not clearly distinguished on MRI; therefore, the internal opening site was inferred by the proximity of the tract within the intersphincteric space[10].

CONCLUSION

Perianal fistula, which is not an uncommon pathology, has significant patient morbidity. Even the medical and surgical options exist, the pre-operative imaging plays a critical role in characterizing the perianal fistula and individualizing the treatment.

Clinical examination is difficult due to the presence of induration and inflammation. The complexity of the fistulous tract, previous surgery, failure in identifying an internal opening, and missed secondary extensions are associated with poor outcome after surgery[11]. MRI is the preferred imaging modality of choice in pre-operative imaging for evaluating the perianal fistula compared to the endoanal ultrasonography (EAUS) or computed tomography (CT). It has better soft-tissue resolution and provides needful information for the surgeons, and helps plan the management of the perianal fistula and reduce the recurrence, therefore decreasing morbidity.

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