ROLE OF MRI IN PERIANAL FISTULAS- A STUDY OF 30 PATIENTS

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ABSTRACT

BACKGROUND

We presented role of MRI in fistula-in-ano before the surgery. In our institute, we do preoperative MRI in all the patients presented with perianal discharge or external opening. MRI is very accurate for depiction of both the primary tract (sensitivity, 100%; specificity, 86%) and abscesses (sensitivity, 96%; specificity, 97%).

The aim of the study is to classify the perianal fistulas according to the St. James University Hospital (SJUH) grading scheme and Park's classification and to evaluate the different characteristics of the fistula-in-ano in clinically-diagnosed cases.

MATERIALS AND METHODS

1.5 Tesla MRI machine was used to scan the patients. 30 patients were taken from July 2013 to December 2015. All the patients underwent MRI study on the basis of inclusion and exclusion criteria. Following sequences used as imaging protocols, T2 TSE FS- COR/TRA/SAG, T2 TSE- COR/TRA, T1 TSE- COR/TRA/SAG, T1 TSE FS- COR/TRA/STIR and T1 TSE FS (PC)- COR/TRA. MR contrast was used as and when indicated to confirm the nature of disease.

RESULTS

In our study group, most of the cases (56%) were seen in patients of age group 41-50 years with predominant male population. In our study of 30 patients (36%) showed presence of associated ischiorectal or ischioanal abscesses on MRI. About 26% cases had intersphincteric collection/abscess. Horseshoe-shaped extension was found in 1 patient (3%). 16% patients showed presence of secondary tracts. Complex fistula with multiple tracts and openings was seen in 12 (40%) patients. Most of the patients (93%) in our study had low fistulae, other 6.6% patients showed a high fistula, which is important for the surgeons to know in order to avoid incontinence.

CONCLUSION

MR- Anal fistulogram is recommended in newly-diagnosed case as well as in recurrent and complex cases of fistula-in-ano as a method of preoperative evaluation to predict and hence reduce postoperative recurrences.

KEYWORDS

Perianal Fistula, Magnetic Resonance Imaging, Classification, Intersphincteric, Transsphincteric.

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BACKGROUND

A fistula[1] is defined as an abnormal communication between two epithelium lined surfaces. In case of a perianal fistula, the connection is between the mucosal layer of the anal canal and the perianal skin. It is a common condition usually simple to treat surgically if diagnosed correctly with proper knowledge of the extent of the primary, secondary tracts and the associated complications. It has male-to-female ratio of 2:1 predominantly affecting individuals of working age group.

Nowadays, MR imaging is considered the standard investigation of choice for preoperative evaluation of fistula in ano due to its ability to display the anatomy of the sphincter muscles with good contrast resolution.[2] MRI provides accurate delineation and classification of the primary track, the location of internal opening (radial site and the level), the presence of extensions (especially horseshoe extensions) and abscess formation that are critical parameters essential to be known preoperatively and otherwise would have been missed. It allows precise assessment of the relationship of the fistula track to the pelvic floor structures.[3]

Aims and Objectives

1. To classify the perianal fistulas according to the St. James University Hospital (SJUH) grading scheme and Park's classification.

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2. To evaluate the following criteria-
    - Internal opening.
    - High lying versus low lying fistulae.
    - Transsphincteric/extrasphincteric/supralevator extension.
    - Secondary fistulous tracts/branches/impending fistulae.
    - Ischioanal/ischiorectal abscesses/posterior horseshoe collections.
    - Active versus chronic fibrotic tracts.
3. Evaluation of perianal fistulas in clinically-diagnosed cases (with emphasis on secondary tracts and complications).
4. For detailed anatomic guidance to surgeons in both primary as well as postoperative recurrent cases.

MATERIALS AND METHODS

We carried out prospective study of 30 patients at Department of Radiodiagnosis, Civil Hospital and BJ Medical College, Ahmedabad, Gujarat, from July 2013 to December 2015. Patients source from the OPD and indoor cases of Department of Surgery of Civil Hospital.

MRI was performed on 1.5 Tesla, SIEMENS scanner with patient in prone position using body surface coil (phased array coil). A phased array surface coil was placed on the pelvis. A localiser in three directions was taken in order to align the T2W sequences axial and coronal to the anal canal. Transverse and coronal T2W spin echo and PD coronal sequences were applied with a small FOV; a STIR volume sequence was used to define the internal opening, which is occasional, missed on routine sequences due to interslice distance. Gadopentetate dimeglumine 0.1 mmol/kg was used as contrast administered intravenously by hand.

For reporting, every perianal fistula was described with respect to-

- Position of the mucosal opening and the external opening on axial images (using the anal clock).
- Distance of the mucosal defect to the perianal skin on coronal images.
- Secondary branches.
- Intersphincteric, transsphincteric or extrasphincteric course.
- Low or high lying in position.
- Impending tracts and inflammations.
- Intersphincteric collections included horseshoe collections.
- Transsphincteric or suprasphincteric collections included ischioanal/ischiorectal abscesses or inflammation of the sphincter or air within tracts.

Symptoms[4] mainly comprise of pruritus ani, intermittent perianal discharge, pain and fever (if associated with abscess).

St. James University Classification- Depending on the relation of the fistulous tract with the sphincter and the presence or absence of associated intersphincteric or transsphincteric collections, perianal fistulae are classified into five grades as follows-

- **Grade 1**- Simple linear intersphincteric tract without any collection or extension.
- **Grade 2**- Intersphincteric tract with intersphincteric abscess or secondary extension.
- **Grade 3**- Transsphincteric tract without any collection or extension.
- **Grade 4**- Transsphincteric tract with abscess or secondary track within the ischiorectal fossa.
- **Grade 5**- Tract with supralevator and translevator extension.

RESULTS

The study was conducted in Department of Radiodiagnosis of Civil Hospital, Ahmedabad. During a period of 24 months, MRI with phased array coil was performed for evaluation of perianal fistulae in 30 patients and following observations were made.

Perianal fistula is considered one of the commonest cause for a persistent seropurulent discharge in otherwise healthy individuals that irritates the perianal skin and causes pain and discomfort. Its treatment requires complete excision of the main tract and its extensions. This requires accurate imaging prior to treatment. This imaging tool should be accurate, safe, simple, reproducible and cost effective.

- In our study group, most of the cases (56%) were seen in patients of age group 41-50 years.
- Our study showed more number of males than females with perianal fistulae. Mean age for females was lower than that of males.
- Out of 30 patients, both external and internal opening were visualised on MRI.
- In our study of 30 patients (36%) showed presence of associated ischiorectal or ischioanal abscesses on MRI.
- About 26% cases had intersphincteric collection/abscess. Location of the abscess determines the surgical approach.
- Horseshoe-shaped extension was found in 1 patient (3%).
- In our study, about 16% patients showed presence of secondary tracts, which is very important for the surgeons to know in order to prevent recurrence.
- In our study group, the most common type of fistula noted according to Park's classification was intersphincteric (63%) followed by transsphincteric (36%).
- The most common type of fistula according to St. James University Hospital Classification in our study was type 1 (36%) followed by type 4 (23%) and type 3 (20%).
- Complex fistula with multiple tracts and openings was seen in 12 (40%) patients. The treatment of complex anal fistulas is challenging for the surgeons with variable success rate reported indifferent trials and MR image-guided surgery helps reduce postoperative recurrence.
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- Most of the patients (93%) in our study had low fistulae, i.e. opening into the anal canal below the level of levator ani. Other 6.6% patients showed a high fistula, which is important for the surgeons to know in order to avoid incontinence.

Cases

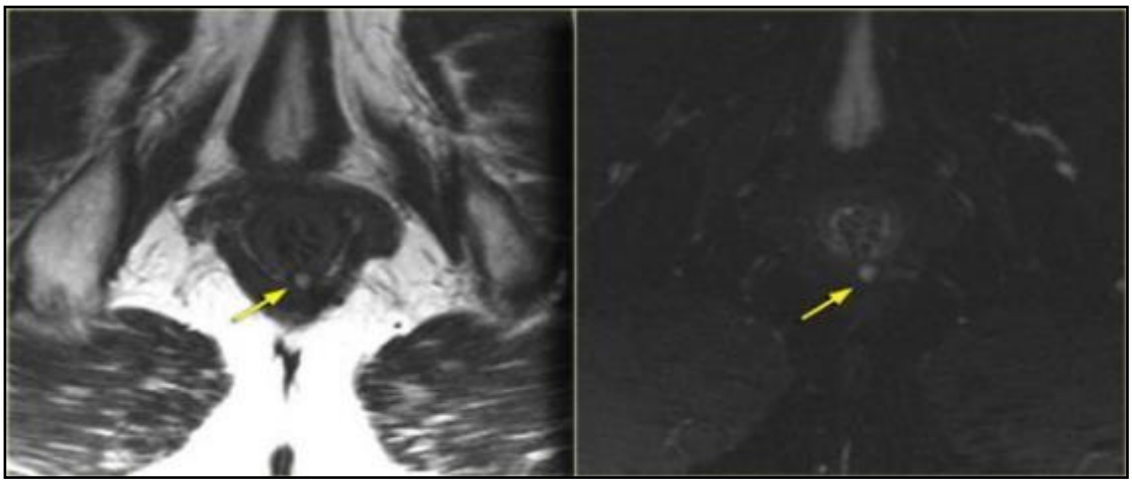

Figure 1. Axial T2W with and without Fat Saturation - Intersphincteric Fistula at 6 o'clock (Internal Opening), Grade I Simple Intersphincteric Fistula

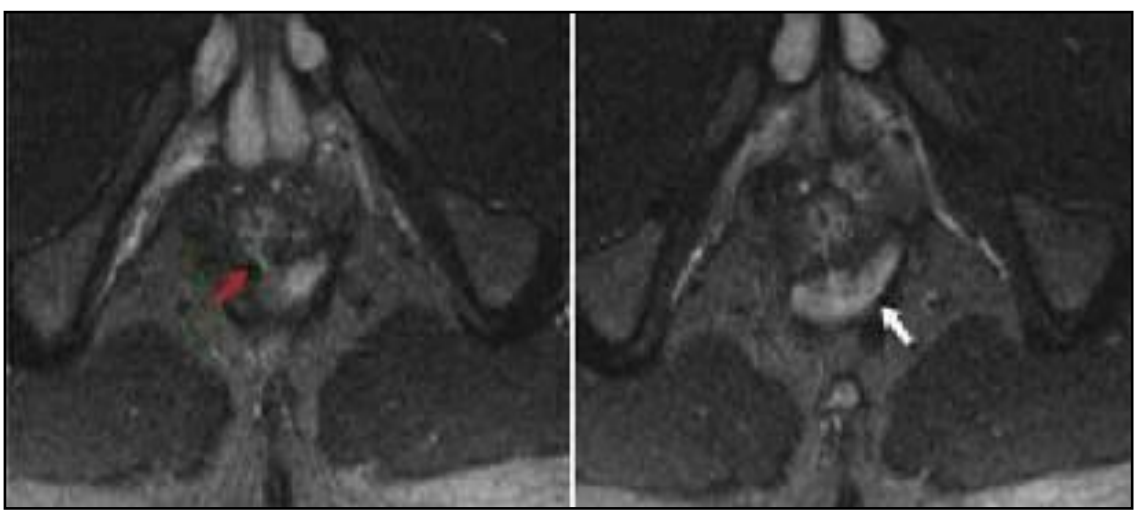

Figure 2. T2 SPAIR Axial- Internal Opening at 4 o'clock Position with Associated Intersphincteric Abscess (Grade II Intersphincteric Fistula with Abscess)

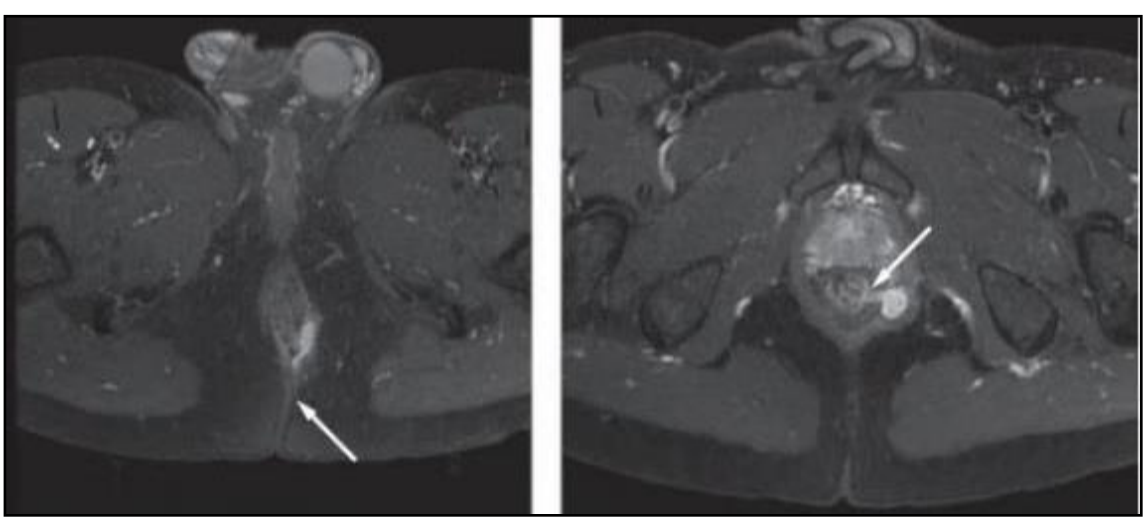

Figure 3. T2 SPAIR Axial - Transsphincteric Fistula with Secondary Abscess (Grade IV)

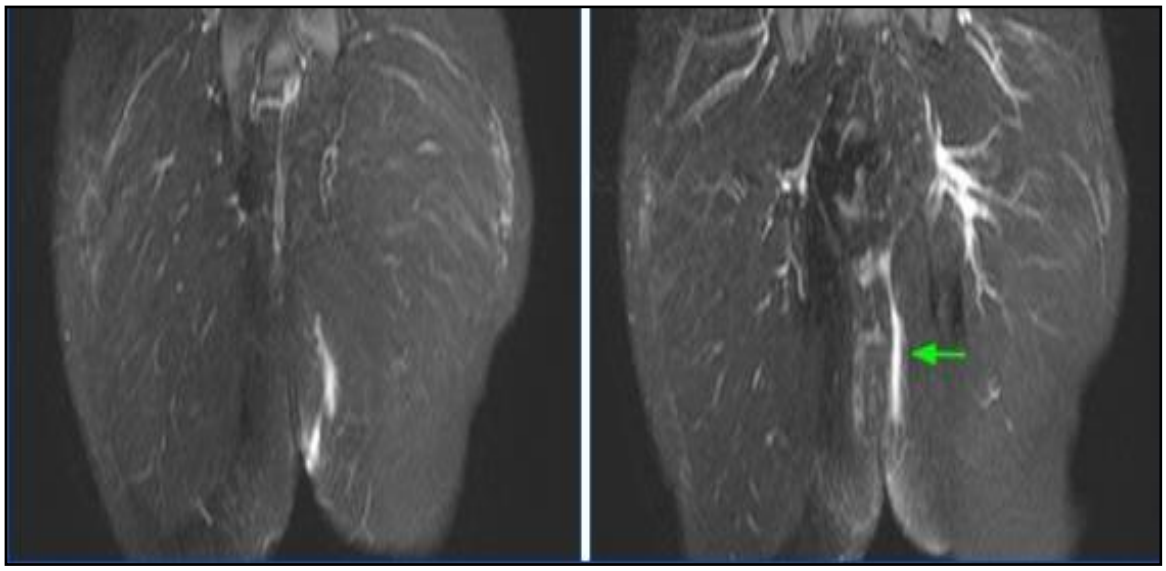

Figure 4. T2 FLAIR Coronal - Transsphincteric Fistula Grade III

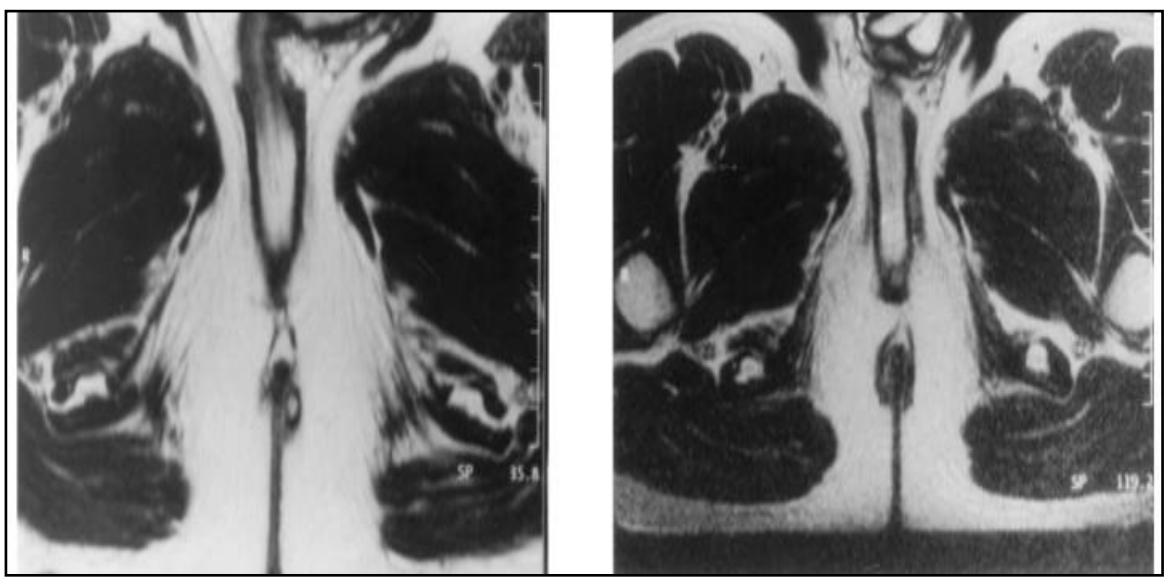

Figure 5. T1W Axial- Intersphincteric Fistula with External Opening at 5 o'clock Position (Grade I Intersphincteric Fistula)

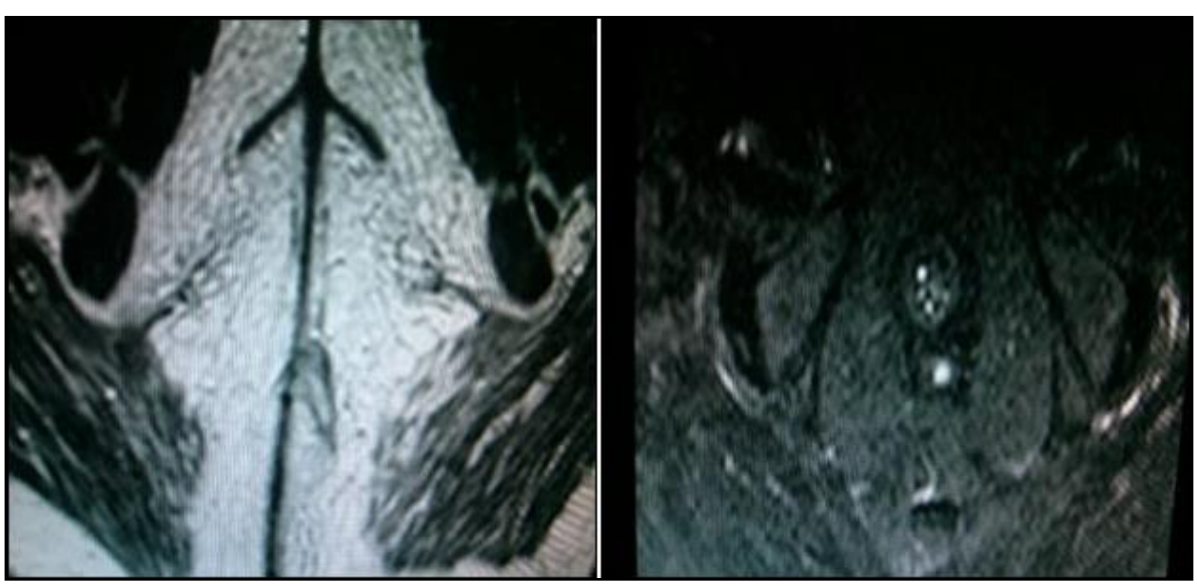

Figure 6. T1W Axial-External Opening (Left Paramedian) and T2 SPAIR Axial - Internal Opening at 6 o'clock (Transsphincteric Fistula with Secondary Abscess, Grade IV)

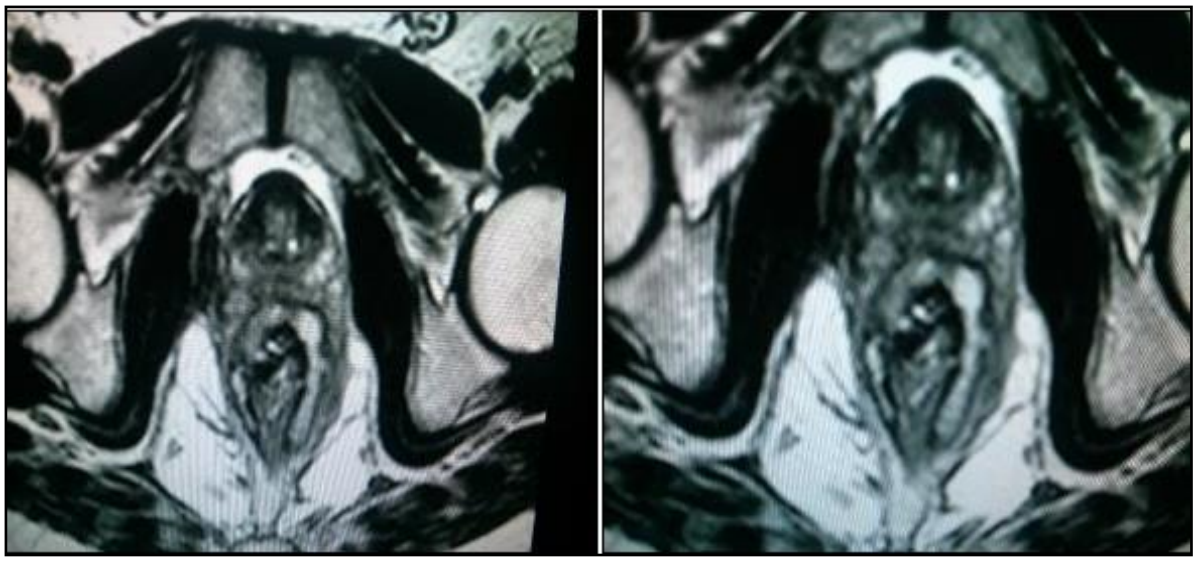

Figure 7. T1W Axial Images- Showing Horseshoe-Shaped Intersphincteric Tract at 12 o'clock Position, Left-Sided Component having Internal Opening at 4 o'clock Position. Right-Sided Component Ramifies Craniocaudally, Caudal Opening seen at 7 o'clock Position (Horseshoe-Shaped Intersphincteric Fistula)

Complex Transsphincteric Fistula with Ischiorectal Abscess

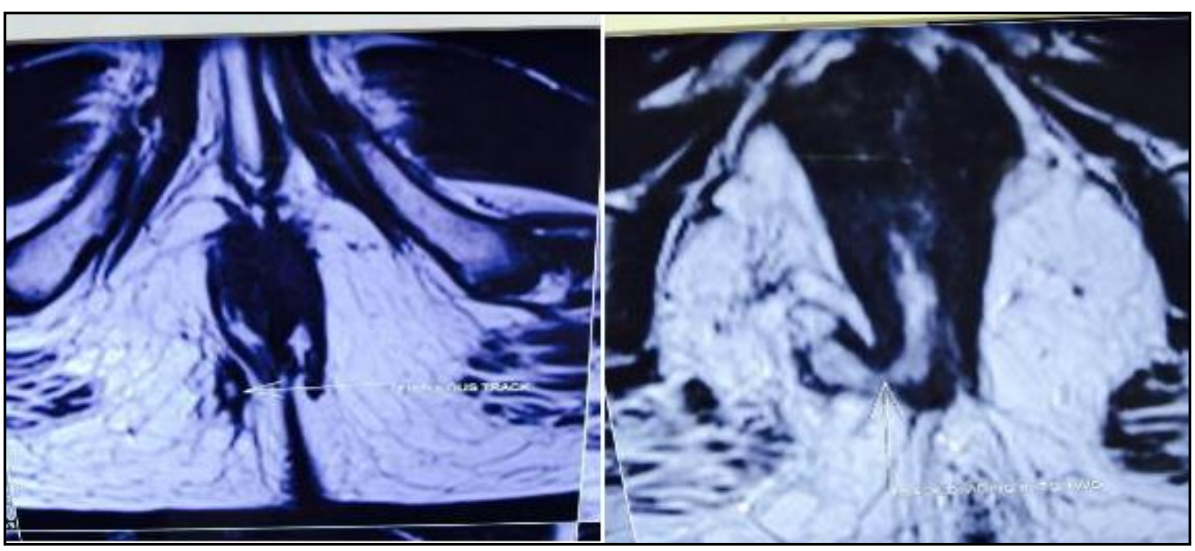

Figure 8. T1W Axial - External Opening (7 o'clock) with Tract Crossing Both External and Internal Sphincters (Transsphincteric) and Further Dividing into 2 Ramifications. Left Ramification Ends at 6 o'clock Position at Anal Mucosa (Internal Opening)

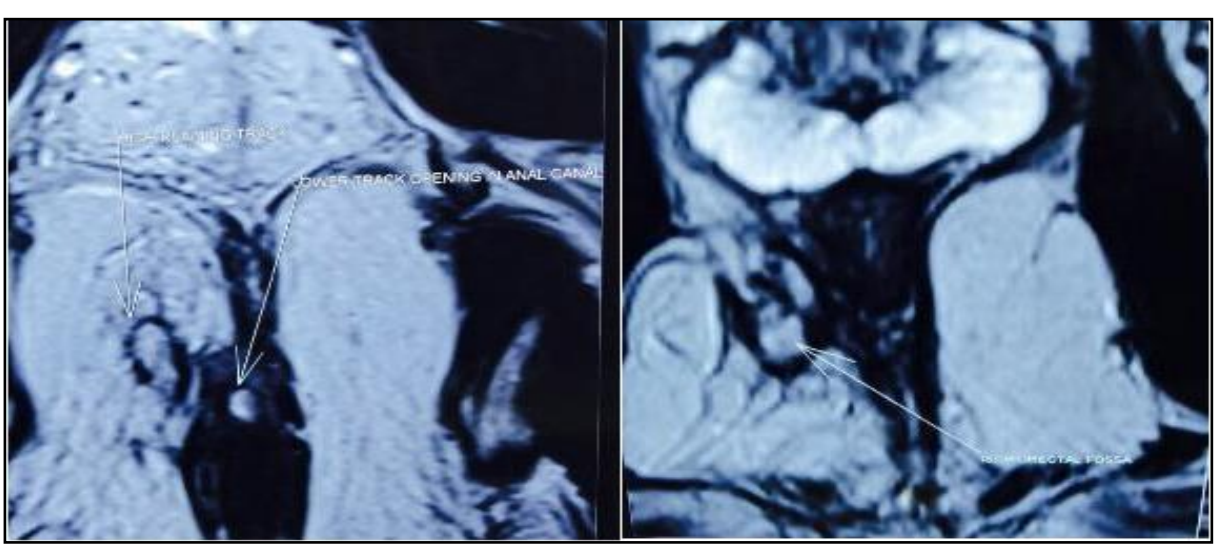

Figure 9. T1W Axial- Right-Sided Ramification Runs Higher Up Till Ischiorectal Fossa Forming an Abscess

DISCUSSION

In our study, the most common age group suffering from this condition was found to be between 41-50 years. It was observed that this age group was predominant for both males and females.

In a study conducted by Amar Mallouhi, MD et al in 2004,[5] a total of 87 patients were studied of which 54 were males and 33 were females. Their mean age was 45 ± 15 years with a range of 16-90 years, 54% of cases were in 40-50 years of age group. In a study conducted by Manar T Alaat El Essawy in 2013,[6] out of 56 patients included in the study with mean age 39, 3 years ± 11, 44 SD (range between 14-56 years) was found. In a study conducted by Kulvinder Singh et al in 2014,[7] it was observed that amongst the 50 patients studied, the mean age was 42 years. As with other studies, our study also showed that most of the afflicted patients were in the working age group, which is in concordance with previous studies.

There were 90% (28) males and 10% (2) females in this study. In a study conducted by Kulvinder Singh et al in 2014,[7] it was observed that amongst the 50 patients studied, 45 patients (90%) were males and 5 (10%) patients were females. It was observed in our study that perianal fistula is a condition largely common in males than in females, which corroborates with the previously done studies.

Number of Primary Cases- Out of 30 patients in this study, 86% were primary cases, i.e. presenting with complaints and undergoing MRI for fistula-in-ano for the first time, whereas 13% cases presented with recurrence of fistula-in-ano postoperatively. In a study conducted by Manar T Alaat El Essawy in 2013,[6] primary fistulae were recorded in 40 cases (71.4%) and 16 cases (28.6%) were recurrent.

The intersphincteric collections/abscess on MRI- These collections showed communication with one or more fistulous tracts and most of them drained into the internal anal sphincter. We detected intersphincteric collections in 8 patients (26%) out of 30 patients. Overall, out of 30 patients, 11 (36%) patients showed various abscesses associated with fistulous tracts. In a study conducted by Manar T Alaat El Essawy[6] on 56 patients, 20 (35.7%) revealed to have associated abscesses, which is similar to our study.

The number of patients with secondary tracts- In a study conducted by Kulvinder Singh et al[7] it was observed that amongst the 50 patients studied, 16 (32%) had secondary tracts. In a study conducted by Pushpinder Singh Khera, Hesham Badwai and Ahmed Afifi,[2] out of a total of 44 fistulae in 35 patients, twenty seven fistulae (61%) were simple, whereas 17 (39%) showed complications (abscess formation, branching course, inflammatory tissue, etc.). In our study, MRI showed secondary tracts in 5 (16%) patients. Our study proved to be in concordance with above studies.

Number of horseshoe-shaped extensions- Out of 30 patients, 1 (3.3%) case showed presence of horseshoe-shaped[8] extensions on 1.5T MRI. This was similar to a study conducted by Manar T Alaat El Essawy in 2013[6] in which horseshoe extensions were detected in 5 (8.9%) cases. In a study conducted by Kulvinder Singh et al,[7] it was observed that amongst the 50 patients studied, 8 (16%) had horseshoe abscess.

Number of complex fistulae- MR image-guided surgery helps reduce postoperative recurrence by 75% in patients with complex disease highlighting its importance in suspected complex disease. In study conducted by Spencer[9] JA, Ward J, Beckingham IJ, Adams C and Ambrose NS in 42 patients, 22 (52.4%) revealed to have complex fistulas.

In our study, out of 30 patients, 12 (40%) patients revealed presence of complex fistulae, which included presence of multiple fistulous tracts with multiple internal and/or external openings with or without associated abscesses. Out of 30 patients with fistulous tracts, 2 (6.6%) had high-lying tracts and 28 (93.3%) had low-lying tracts.

Distribution of cases with respect to the type of tracts- Hoda Salah Darwish et al[10] conducted a study on patients whose MRI studies were done from 2012 to 2013. MRI revealed a total number of 38 fistulae in 35 (60%) patients, while 13 (22%) patients had only perianal sinuses. Out of total 38 fistulae seen in these 35 patients, 11 (29%) were transsphincteric, 24 (63%) were intersphincteric and 2 (5%) were suprasphincteric. Only 1 (3%) case was extrasphincteric fistula.

In our study, 19 (63%) cases with intersphincteric tracts were identified on MRI. Remaining 11 (36%) cases had transsphincteric tracts. In 2 patients (2.5%), both inter and transsphincteric tracts were identified. Inter and transsphincteric tracts formed the bulk of findings. All the above studies are in corroboration with our study with intersphincteric and transsphincteric tracts forming the bulk of disease and suprasphincteric and extrasphincteric tracts found in minority of patients.

Grade Wise Distribution of Cases- In our study, 30 patients were evaluated. According to Saint James University Hospital Classification, the most common type diagnosed were those of grade I (36%), followed by grade II and III (20%) each followed by type IV (7%). It reveals simple tracts without associated abscess/secondary tract from the bulk of disease.

This does not corroborate with the study done by Jaime de Miguel Criado et al[11] on 178 patients, which revealed, i.e. 44 (24.7%) had a grade 1 or simple linear intersphincteric fistula; 33 (18.5%) had a grade 2 or intersphincteric fistula with an abscess or secondary track; 43 (24.2%) had a grade III or transsphincteric fistula; 45 (25.3%) had a grade IV or transsphincteric fistula with an abscess or secondary tract in the ischiorectal or ischioanal fossa and 13 (7.3%) had grade V or supralevator and translevator disease. Thus, maximum number of patients (25.3%) were grade 4 disease.

St. James' University Hospital MR imaging-based grading system has excellent applicability and reproducibility.[12] Morris et al[12] found excellent correlation between preoperative St. James University Classification and ensuing surgical findings. It was also predictive of which patients may require secondary surgeries, which is an important consideration when counseling patients undergoing surgery for anorectal sepsis or fistula-in-ano.

CONCLUSION

Magnetic Resonance Imaging (MRI) is an accurate, safe, simple, noninvasive and essential imaging method in the evaluation of fistula in ano and the multiplanar images acquisition has been demonstrated to be extremely useful in the surgical planning. This guides the surgical approach and helps in successful treatment of disease. As MR imaging provides most of the details necessary for accurate evaluation of perianal fistulae, it is therefore recommended in the preoperative workup of patients with fistula-in-ano especially those with recurrent and suspected complex disease.

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