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ORIGINAL RESEARCH

Preoperative evaluation of perianal fistulas using mr fistulography and ultrasonography and correlation with operative findings

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ABSTRACT

Background: Surgery is the treatment of choice for perianal fistulas aiming to avoid recurrence and preserve anal sphincter function. Successful surgical management requires accurate preoperative assessment of the course of primary fistulous track and the site of any secondary extension or abscesses. Imaging played limited role in the past when conventional fistulography was used, which has low diagnostic accuracy (~16%). Perineal/endo-anal ultrasonography is the first imaging technique that provides anatomical details of anal canal, and can identify primary fistulous tracts and internal openings with good accuracy. However, the limited field of view is an inherent limitation, discounting its value to evaluate secondary tracts or supralevator extensions. With the advent of MR fistulography, imaging now plays a crucial role, providing detailed anatomic descriptions of the fistula along with its relationship with anal sphincter complex.

Materials and Methods: Single-centre, descriptive study was carried out in 96 patients who had clinically diagnosed perianal fistula, using MR fistulography and ultrasonography, were followed up and correlated with surgical findings

Results: Out of the total 96 patients, 78 were males and 18 were females. Majority of patients (34) belonged to 30-40 years age group (35.4%). Maximum patients were showing inter-sphincteric type (41.6%) according to Parks classification, and grade 1 (31.2%) as per St. James University Hospital classification. For secondary track assessment sensitivity, specificity, accuracy of MRI and USG were 94%, 100%, 98% and 59%, 100%, 85% respectively. For detecting abscesses, sensitivity, specificity, accuracy of MRI and USG were 100%, 100%, 100% and 67%, 100%, 96% respectively. In localisation of internal opening, sensitivity, specificity, accuracy of MRI and USG were 87%, 100%, 89.5% and 90%, 100%, 92% respectively.

Conclusion: MR fistulography is the imaging modality of choice for preoperative evaluation of perianal fistulas with good accuracy. Perineal/endo-anal ultrasonography represent excellent first line imaging tool, especially for simple perianal fistulas.

Keywords: Perianal fistula, MR fistulography, Perineal/endo-anal ultrasonography, anal sphincter complex

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INTRODUCTION

A perianal fistula is defined as an abnormal connection between the anal canal and the skin of the perineum. Although is an uncommon process, with a prevalence of 0.01%, it causes significant morbidity. It predominantly affects young males, with a male-to-female ratio of 2:1. Most common presenting symptom is discharge (65% of cases); local pain and pruritus can also be seen. It is usually a sequela of infection and poorly managed perianal abscess; but are also seen associated with tuberculosis, iatrogenic: post-surgical complication, inflammatory bowel disease, pelvic malignancies, post-radiotherapy.

This study was aimed to assess the role of MRI and USG in pre-operative evaluation of perianal fistulas, to illustrate the imaging findings using these modalities along with their classification/grading and to correlate imaging findings with operative findings.

MATERIALS AND METHODS

A descriptive study was carried out in the Department of Radiodiagnosis at Gandhi Medical College and Hospital, Secunderabad, Telangana State, India. Study duration was of 1 year (January 2022 to December 2022). Ethical committee clearance for this study was granted.

Inclusion Criteria: Patients who were clinically diagnosed cases of perianal fistula and referred to the department for imaging.

Exclusion Criteria: Any contraindications to MR imaging – patients with metallic implants, cardiac pacemakers, aneurysmal clips, cochlear implants, claustrophobia. Contraindications for use of contrast agents, whenever required.

Informed consent was taken from each participant prior to enrolment in the study. MRI was performed using GE SIGNA 1.5T scanner. All patients were scanned in supine position, and typical protocols were done (sagittal, oblique axial and coronal T1, T2 weighted FSE along with fat suppressed sequences, 3D T2 weighted TSE, DWI, T1 FS with contrast whenever needed). USG was performed using SONOSCAPE S12 machine with linear and endo-cavitary probes. Patients were followed up and surgical findings were collected for correlation. The recorded data was analysed using appropriate statistical methods.

Results & Observations

Out of 96 patients included in the study, 78 were males and 18 were females. Majority number of patients (34) belonged to the 30-40 years age group (35.4%).

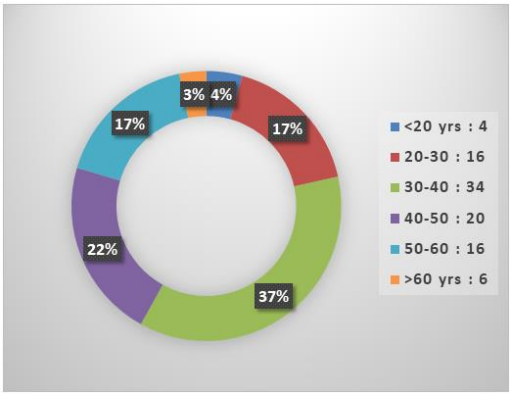

Figure 1

Prevalence of perianal fistula was more in the middle age group and less in the extremes of age.

According to Parks classification, maximum patients were showing inter-sphincteric type (41.6%), followed by trans-sphincteric type (31.3%).

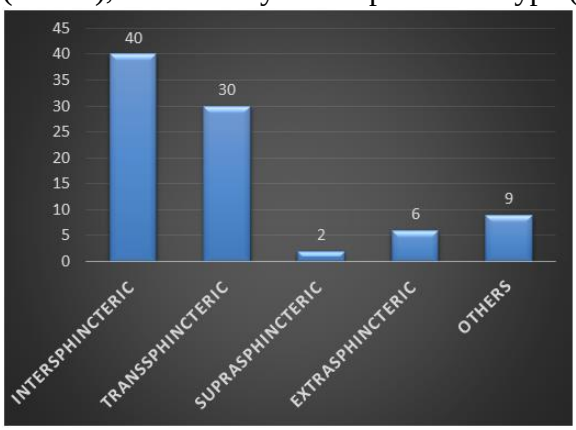

Figure 2

As per the St. James University hospital grading system, majority patients were showing Grade 1 (31.2%), followed by Grade 3 (23%).

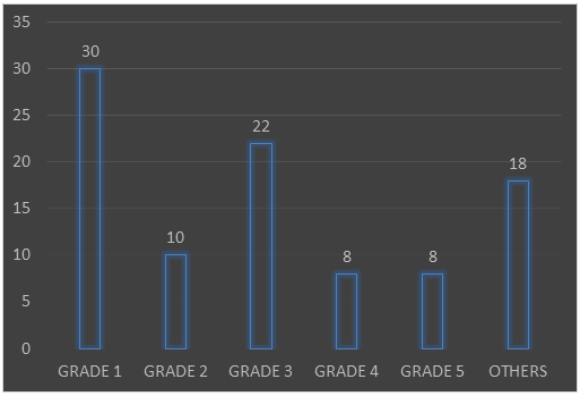

Figure 3

Others comprise of 14 patients who only had sinus tract and 8 patients who had abscess only.

SECONDARY TRACKS:

Table 1

	No. of patients based on MRI	**No. of patients based on USG**	**No. of patients based on operative findings**
PRESENT	32	20	34
ABSENT	64	76	62

Table 2

	Sensitivity	**Specificity**	**Accuracy**
MRI	94%	100%	98%
USG	59%	100%	85%

ABSCESSES:

Table 3

	No. of patients based on MRI	**No. of patients based on USG**	**No. of patients based on operative findings**
PRESENT	12	8	12
ABSENT	84	88	84

Table 4

	Sensitivity	**Specificity**	**Accuracy**
MRI	100%	100%	100%
USG	67%	100%	96%

LOCALISATION OF INTERNAL OPENING:

Table 5

	Based on MRI	**Based on USG**
No. of patients with surgical concordance	68	70

Table 6

	Sensitivity	**Specificity**	**Accuracy**
MRI	87%	100%	89.5%
USG	90%	100%	92%

18 patients had no internal opening.

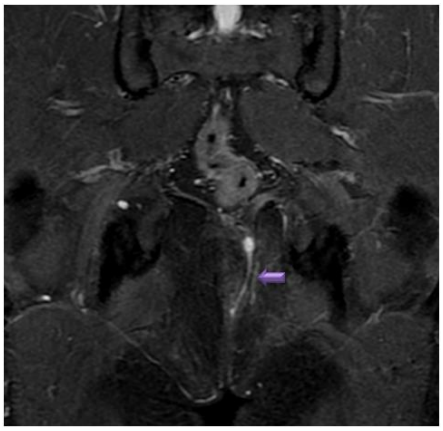

Figure 4: Coronal T2 weighted FS MR image showing simple linear inter-sphincteric fistula on left side - GRADE 1

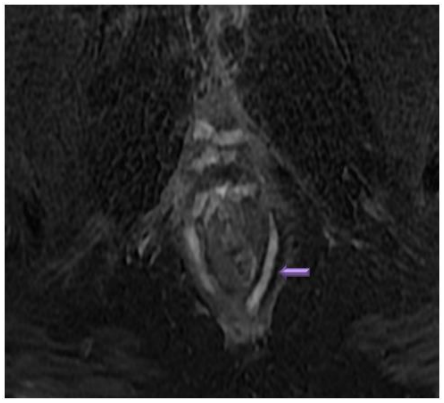

Figure 5: Axial T2 weighted FS MR image showing inter-sphincteric fistula with high signal intensity fluid collection in the inter-sphincteric space – GRADE 2

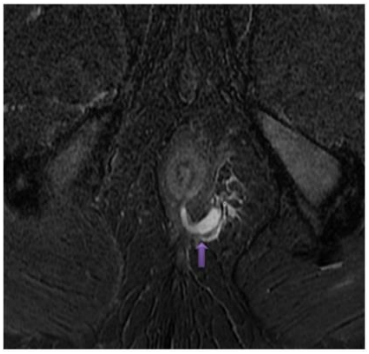

Figure 6: Axial T2 weighted FS MR image showing posterior trans-sphincteric fistula with internal opening at 6 o' clock position - GRADE 3

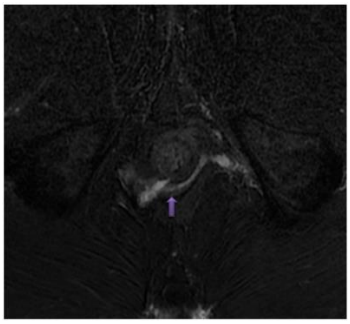

Figure 7: Axial T2 weighted FS MR image showing trans-sphincteric fistula with horse-shoe inter-sphincteric space collection and secondary track – GRADE 4

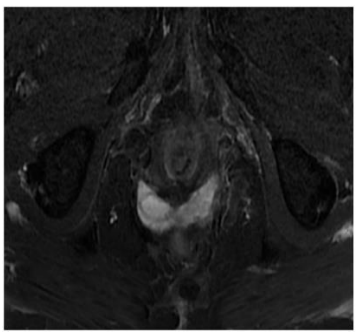

Figure 8: Axial T2 weighted FS MR image showing posterior horse-shoe abscess involving bilateral ischiorectal/anal fossae

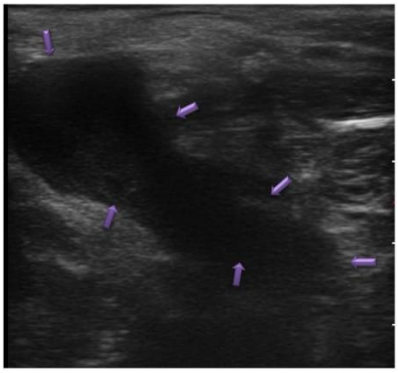

Figure 9: Trans-perineal USG showing abscess in the ischio-anal fossa

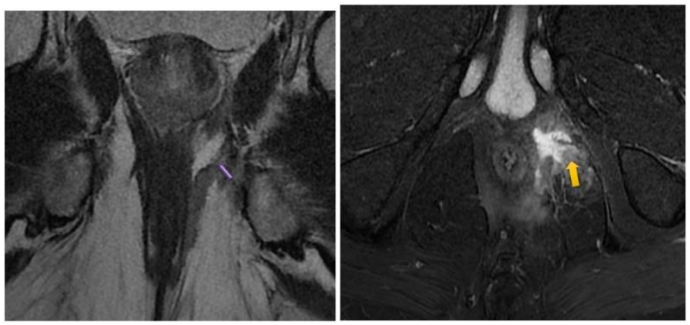

Figure 10: Coronal T2 weighted (A) and axial T2 weighted (B) FS MR images showing supralevator abscess with translevator fistula – GRADE 5

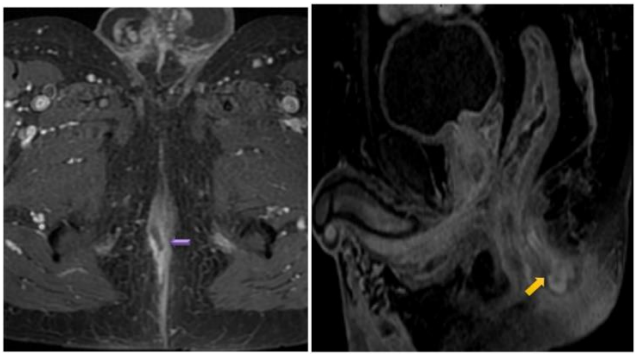

Figure 11: Post contrast T1 weighted fat suppressed coronal (A) and sagittal (B) images showing enhancing fistulous track

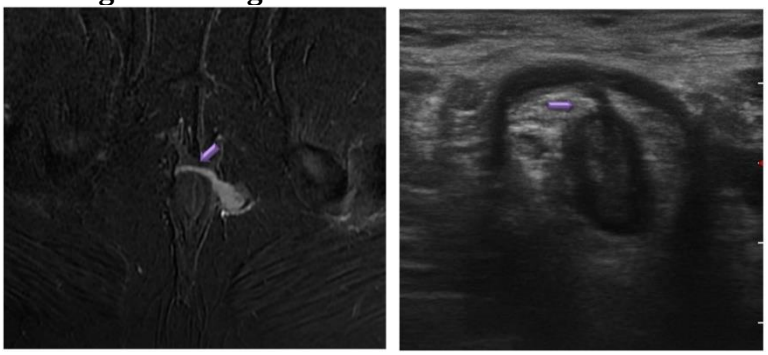

Figure 12: Axial T2 weighted FS MR (A) and trans-perineal USG (B) images (of the same patient), showing Grade 4 trans-sphincteric fistula with anterior horse-shoe collection and internal opening at 12 o' clock position, which is better appreciated in USG compared to MR

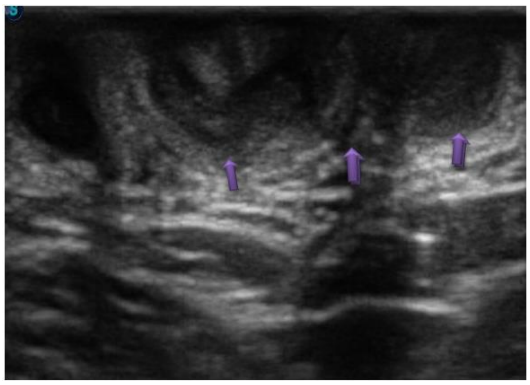

Figure 13: Trans-perineal USG image showing multiple interconnecting tracts in the ischio-anal fossa

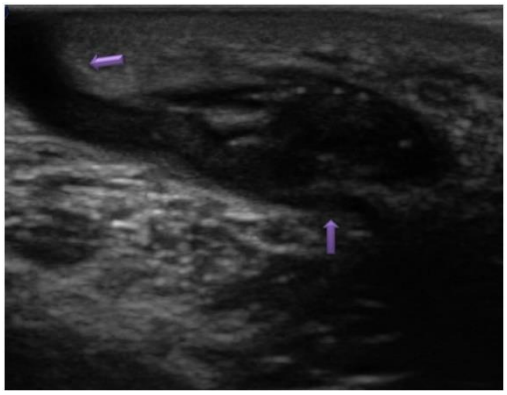

Figure 14: Trans-perineal USG image showing a sinus tract ending in a collection in the ischio-anal fossa

DISCUSSION

Our study showed perfect agreement between MR fistulography and operative findings both in terms of the type and the grade of fistula. In comparison with perineal/endo-anal ultrasonography, MRI showed higher accuracy in the evaluation of complex/high perianal fistulas and detection of secondary extensions/complications, whereas no significant difference was found in simple/low perianal fistulas. Perineal/endo-anal ultrasonography was slightly more accurate than MRI in localisation of internal opening.

CONCLUSION

MR fistulography is the imaging modality of choice for preoperative evaluation of perianal fistula with excellent soft tissue resolution and with added advantage of being non-invasive and allowing better identification of secondary tracks along with other associated complications and diseases.

Perineal/endo-anal ultrasonography represent excellent first line imaging tool, especially for simple perianal fistulas, being more economical technique that can also be used in patients who cannot undergo MRI because of claustrophobia or metallic implants (such as pacemakers).

Hence both USG and MRI have crucial role in the evaluation of perianal fistulas, and are complementary to each other for optimal diagnosis, thereby allowing surgeons to choose the best surgical treatment and significantly reduce recurrence of the disease or possible secondary effects of surgery, such as fecal incontinence.

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