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PERIANAL FISTULA;
EVALUATION OF THE PERIANAL FISTULA BY MRI: OUR EXPERIENCE

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ABSTRACT: MRI is increasingly used nowadays in the evaluation and management of Perianal Fistula. **Objectives**: To assess the role of MRI in the detection and classification of Perianal Fistula and correlation of preoperative MRI findings with the findings on surgery. **Study Design**: Prospective study. **Setting:** Department of Radiology King Khalid Civilian Hospital Tabuk Kingdom of Saudi Arabia. **Study Period:** Two years between February 2013 and February 2015. **Material and Methods:** 60 patients were referred from surgical department for evaluation of Perianal fistula by MRI during the above mentioned period. MRI was performed in 48 Patients. (42 males and 6 Females) using variety of MRI sequences. Fistulas were classified according to SJUH (St James's University Hospital classification MR imaging based grading system) and MRI findings of individual MRI sequence used were correlated with operative findings. **Results**: Most common fistula was Grade 1 (37.5%).In majority of the cases internal opening was found at 6 O clock position. Post intravenous contrast enhanced Axial and coronal oblique (CE FST1WFSE) Fat suppressed T1 weighted Fast spin echo and Axial and coronal Fat suppressed T2W FSE sequence (FST2WFSE) showed the highest Accuracies 98.13% and 97.06% respectively in diagnosis of anorectal fistulae. **Conclusion:** MRI should be used as a first line imaging modality in the preoperative assessment of Perianal fistula. Findings on Axial and coronal oblique CE FST1WFSE, axial and coronal oblique FST2WFSE showed the excellent agreement with the surgical findings. By using MRI as the first line imaging modality in the evaluation of Perianal Fistula one can percept best possible surgical management resulting in prevention of residual/ recurrence disease and complications such as fecal incontinence.

Key words: Perianal fistula, Fistula in ano, MRI perianal Fistula

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INTRODUCTION

The primary goal of surgery in the Perianal fistula is to excise the primary opening, any associated tracts, ramifications, and any secondary openings without loss of continence.[1] The external opening is visible on clinical examination, and to detect the internal opening by probing is not practiced now a days. Imaging is used to delineate the course of the tract between these openings so that the appropriate surgical option can be used. Surgical treatment of Fistula-in-ano is associated with high recurrence rates. The successful surgical management of Fistula-in-ano depends upon accurate preoperative assessment of the course of the primary fistulous tract, the presence and site of any secondary ramifications or abscesses.[1]

MRI has appeared to be an important modality in the diagnosis, Preoperative assessment of Perianal fistulas and in detecting their complications. Perianal anatomy, anal sphincters, Levator plate and ishchiorectal fossa can be accurately evaluated by MRI[2]

Before MR imaging was used in the classification of Perianal fistulas the surgical approach was determined from the combination of digital rectal examination, Proctosigmoidoscopy and surgical exploration performed with anesthesia with or without probing.[3] various imaging techniques have failed to excel the accuracy of the clinical examination. Fistulography is the most unreliable and difficult to interpret.[4]

Anal endosonography while promising much has also proved inferior to expert clinical assessment.[5]

The sphincter mechanism and intersphincteric plane are usually well visualized with endosonography but the external sphincter can be difficult to access in some individuals. In addition infection cannot be distinguished from fibrosis with this technique and insufficient depth penetration results in a failure to identify secondary ramifications and more distant sepsis.[5]

The aim of our study was to assess the role of MRI in the detection and classification of Perianal Fistula and correlation of preoperative MRI findings with the findings on surgery

Our experience in MRI evaluation of perianal fistulas

MATERIAL AND METHODS

Sixty patients with clinical suspicion of Perianal fistula were referred to Radiology department from surgical out patient department, Emergency room and indoor departments during February 2013 and February 2015. Majority of the patients presented with Perianal pain, Perianal sepsis, Perianal abscess and external opening with discharge.

Exclusion criteria

Patients having no external opening, history of previous surgery for Perianal fistula, recurrent fistulas, autoimmune diseases were excluded from the study.

MRI was performed in 48 patients.12 patients were excluded from the study. MRI of Perianal region was performed in 48 patients (42 males and 6 females) mean age 40 years between February 2013 and February 2015.

MRI was performed in our department on 1.5 T Philips MRI. (Achieva)

MRI Technique

In our institution we initially perform a sagittal FSE T2w sequence as a reference images it shows us the correct orientation of anal canal then we take Coronal oblique images parallel to the walls of the anal canal ,then we perform Axial oblique images perpendicular to the coronal planes.

MRI PROTOCOL

(A)PLAIN /NON CONTRAST SEQUENCES

1. T1W FSE (Axial oblique and Coronal Oblique).
2. T2W FSE (Sagittal, Axial oblique and coronal oblique)
3. T1WFSE Fat suppressed (FS) Axial oblique and Coronal oblique
4. T2W FSE FS Axial oblique and coronal oblique

POST CONTRAST SEQUENCES

T1W FSE FS WITH MAGNEVIST Axial oblique and coronal oblique

Contrat agent: 0.1mmol/kg of Magnevist (Gd-DTPA) (Gadolinium diethylenetriaminepentaacetic acid) as contrast agent by manual injection.

MRI scans were interpreted in the light of following key features:

1. Primary fistulous tract
1 Secondary tracts / ramifications
2. Horse shoe feature / component
3. Abscess
4. Supralevator extension
5. Internal opening visualized or not

Site of the internal opening was decided with reference to the anal clock in the axial plane (6 O clock posterior 12 O clock anterior).

Classification of the fistulas was done according to the St James's University Hospital imaging classification.

Grade 0: Reference to normal appearing anal canal.

Grade 1: Represents a simple linear inter-sphincteric fistula.[1]

Grade 2: Represents an intersphincteric Fistula with a secondary tract or abscess. No violation of External sphincter.[1]

Grade 3: Fistula refers to transphincteric Fistula with violation of external sphincter.[1]

Grade 4: More complicated transphincteric Fistula with a secondary tract or abscess in the ischiorectal fossa.

Grade 5: Supralevator or translevator disease.[1]

Horse shoe feature; when the fistulous tract crosses the mid line horizontally to reach the contralateral side.

Supralevator: When fistulour tract crosses the levator plate and reaches superior and medial to this was labeled as supralevator.

Fluid filled structure more than 10mm, Peripheral enhancement and presence of gas foci were considered criterion for an abscess.

MRI findings of each sequence in our study were correlated with surgical findings.

STATISTICAL ANALYSIS

Following package methods were used.

SPSS (Statistical package for social sciences) for windows version 18.0(SPSS Inc., Chicago IL).

Chi-Square and Fisher"s exact tests were used to compare the qualitative data.
P<0.001 was considered statistically highly significant.

RESULTS

This study comprises of 48 Patients with suspected perianal fistula on clinical grounds.
42males and 6 females.
Age ranges 25 to 55 years. (Mean age 40years).
Results are given in table forms.

Location of internal opening	Number of patients	Percent
At 6 O clock	25	53.91%
12 O clock	10	21.27%
8 O clock	4	8.51%
5 O clock	4	8.51%
3 O clock	4	8.51%

Table-I. Location of internal opening on MRI. Internal opening was seen in 47 patients on MRI.

Types of fistula	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Total number of patients
No of patients & percentage	18 (37.5%)	6(12.5%)	6(12.5%)	10(20.8%)	8(16.7%)	48
Primary fistulous tract	18	0	6	0	5	29
Secondary tracts/ ramifications	0	4	0	5	2	11
Horse shoe component	0	3	0	4	0	4
Anal abscess	0	1	0	2	1	8
Supralevator extension	0	0	0	0	8	8

Table-II. Different grades & features of perianal fistulae in 48 patients on MRI

	Internal opening seen	Primary fistulous tract	Secondary tracts/ ramifications	Abscess	Horse shoe component	Supralevator extension	Overall % accuracy
T1WFSE Axial and coronal oblique	39/48 81.25%	24/29 82.75%	5/11 45.45%	5/8 62.5%	6/7 85.71%	6/8 85.71%	72.72%
T2WFSE Axial, coronal,	43/48 89.58%	28/29 96.55%	7/11 63.63%	7/8 87.5%	6/7 85.71%	8/8 100%	87.61%
T2WFSE sagittal	39/48 81.25%	26/29 89.65%	5/11 45.45%	5/8 62.5%	4/7 57.14%	5/8 62.5%	66.41%
Fat suppressed T1WFSE Plain, Axial and coronal	42/48 87.5%	28/29 96.55%	7/11 63.63%	6/8 75%	6/7 85.71%	7/8 87.5%	82.95%
T2WFSFSE Axial and coronal	45/48 93.95%	29/29 100%	10/11 90.90%	8/8 100%	7/7 100%	8/8 100%	97.06%
T1WFSFSE Post contrast coronal and axial	47/48% 97.91%	29/29 100%	10/11 90.90%	8/8 100%	7/7 100%	8/8 100%	98.13%

Table-III. Showing correlation of findings on MRI sequences vs surgical data in 48 patients.

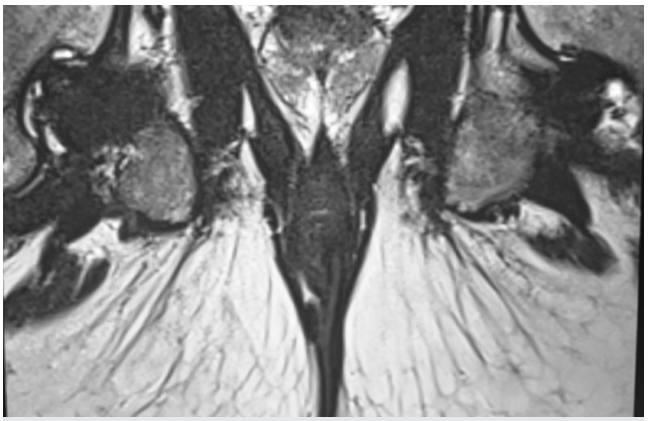

Fig-1. Corornal oblique T2 WFSE showing left Grade 1 left intersphincteric fistula an example from our study

Fig-2. Axial Oblique T2w image shows right Intersphincteric fistula (Grade 1) From our study, Fistula appears as dot like slightly bright signal between the internal and external sphincter to the right of mid line. Present at about 7 O clock position.

Fig-3. Coronal Oblique T2W image An example of the left transphincteric fistula (Grade 3) from our study.

In our study contrast enhanced axial and coronal fat suppressed post contrast (T1WFSFSE) showed the highest accuracy (98.13%), T2WFSFSE Axial and coronal reveal accuracy of 97.06%.T2WFSE Sagittal showed an accuracy of 66.41%.

We correlated the Findings of MRI sequences with surgical findings by using the Chi-square and Fishers exact tests.

Both Contrast enhanced axial and coronal fat suppressed post contrast (T1WFSFSE) and Axial and coronal T2WFSFSE sequences showed a highly significant correlation with findings on surgery. ($P<0.001$)

DISCUSSION

Many studies have been done to evaluate the role of MRI in the detection of Perianal fistula.

Buckingham et al compared digital rectal examination, dynamic contrast enhanced MRI and surgical exploration in forty two patients and reported a sensitivity of 97% and specificity of 100%for detection of fistulas by dynamic contrast enhanced MRI.[6]

In primary Fistula in ano Preoperative MRI was shown to have a therapeutic impact in 10% of cases in a prospective study of 30 patients.[7]

In recurrent Fistulas in ano Preoperative MR was shown to have a therapeutic impact with decreased recurrence rates in 75% of cases in a study of 71 patients.[8]

Simple sub mucosal intersphincteric or low transsphincteric tracts affecting the distal third of the anal canal can be treated with fistulotomy without significant effect on continence. In cases of higher or complex fistulas retention of continence is a problem. Finally MR imaging guided surgery of anal fistula is feasible. Use of MRI imaging prevents incomplete procedures and prevent resurgery. MR imaging may become particularly useful in surgery of recurrent or complex anal fistulas and my lead to few recurrences.

MRI classification of Perianal Fistulae has been significantly associated with clinical outcome. MRI grades vary between satisfactory and unsatisfactory outcomes. Morris et al reported that in their clinical experience using the St.

James University Hospital classification MR imaging Grades 1 and 2 were associated with satisfactory outcome and no further surgery was needed. Grades 3, Grade 4 and Grade 5 were associated with unsatisfactory outcome (i.e. surgery needed).[15,3]

In complicated diseases additional diagnostic information can be obtained by preoperative MRI.[10]

Treatment outcomes are better when it was decided by pretreatment MRI as compared to anal endosonography and preoperative digital rectal examination.[11] There was improved outcome for the surgical treatment of the primary and recurrent disease.

Beets –Tan et al[10] reported that preoperative MR imaging provided important additional information in 12 of 56 patients with anal fistulas. This was further subdivided as 4 of 17 patients with recurrent fistulas (benefit in 24%) and 6 of 15 patients with crohns disease (benefit of 40%).

In our study showed that both axial and coronal planes were found important in the complete work up for fistulas.

Supralevator disease was better visualized with coronal planes, while evaluation of primary tract internal opening, intersphincteric abscesses, intersphincteric vs transphincteric fistula was better visualized on axial planes. Unenhanced T1W images provide an excellent anatomic over view of the sphincter complex, levator plate and ischiorectal fossa. Active fistulous tracts, extensions and abscesses appears as high signal on T2W.Sphincter complex and muscles reveal low signal on T1w images. Chronic fistulas and scar do not enhance with Gadolinium and reveal low signal on T1w and T2w images.

In our study Grade 1(intersphincteric fistula) was the most common type. Morris et al[3] noted in his study that 70% of all patients were of intersphincteric type, while transsphincteric fistulas contributed 20% of the total. In another study de Miguel Criado et al[8] noted that most common fistulas were transsphincteric. Ozdil Baskan et al[12] concluded in his retrospective study that 69.9% of all Perianal fistulas were of intersphincteric type. Results of our study were consistent with Morris et al and Ozdil Baskan et al.

It is important to find the exact site of internal opening otherwise there will be inadequate treatment and rate of recurrence of fistula would be high. In our study, the most common location of internal opening was at 6 O Clock position, which is comparable to many studies.[13,14,15,16] In our study MRI detected internal opening in 47 out of 48 patients. Coronal and axial T2WFSFSE showed an accuracy of 93.95% and axial and coronal post contrast T1WFSFSE showed the highest accuracy of 97.91% in detection of internal opening. Beets-Tan et al[10] reported MRI sensitivity of 96% and Specificity of 90% in detection of internal opening. Study done by Barker et al[17] reported a sensitivity of 80% in this regard. Stoker et al[18] concluded in their study that internal opening was successfully seen by FS-CE-T1W, T2W and STIR images this was in good correlation with surgical findings. Other studies[14] showed that Post contrast T1WFSFSE showed an accuracy of 100% in detection of internal opening.

MRI detected Secondary tracts/Ramifications in 11 patients but on surgery these were present in 12 patients. MRI failed to detect these tracts in one patient preoperatively. It was later found on review MRI in the light of surgical notes. It was partly healed tract and reveal less bright signal on T2w and less enhancement on post contrast study. T2WFSFSE Axial and coronal and post contrast T1WFSFSE showed highest accuracy of 90.90% in detection of secondary tracts. The results of our study was in close agreement with many previous studies.[13,14,15,19]

In evaluation of Abscess, T2WFSFSE Axial and coronal and post contrast T1WFSFSE revealed accuracy of 100% in detection of abscess. Axial planes of each sequence used in our work reveal intersphincteric abscess well as compared to that

of coronal planes. While coronal planes were better in detection and evaluation of full extent of ischioanal and ischiorectal abscesses. Study done by kulvinder singh et al.[13] MRI in one patient MRI showed an abscess later on it was found negative on surgery. MRI correctly identified the abscess in seven out of eight cases in his study. Our study was comparable to other studies in this regard.[10,14,15,19]

Coronal and axial T2WFSFSE and coronal and axial Post contrast T1WFSFSE both showed an accuracy of 100% in detection of horse shoe component. Beets-Tan et al[10] reported sensitivity and specificity of 100%. Barker et al[17] showed a sensitivity of 97%. Study done by Rania E. Mohamed et al[14] showed 100% accuracy of axial and coronal post contrast T1WFSFSE in the detection of Horse shoe feature. While Coronal and axial T2WFSFSE revealed an accuracy of 95.83% in horse shoe and 100% in the supralevator extension. In our study both Coronal and axial T2WFSFSE and axial and coronal post contrast T1WFSFSE showed an accuracy of 100% in diagnosis of horse shoe extension and supralevator extension. In Multiple previous studies[20,21,22,14] coronal and axial contrast enhanced T1WFSFSE showed an accuracy of 100%.

LIMITATION

We did not include patients with prior surgery of Perianal fistula and in recurrent disease.

MRI sequences such as diffusion weighted MRI, MIP (maximum intensity projection) was not used in our study due to limited availability and time constraints. So further studies by using these techniques are recommended from our work for further studies.

CONCLUSION

Excellent agreement of preoperative MRI findings with operative findings was seen in our study. Axial and coronal post contrast T1WFSFSE and axial and coronal T2WFSFSE showed almost comparable accuracy in this regard.

Recommendation

MRI should be used as a first line imaging modality in the preoperative evaluation of Perianal Fisula as it can reliably diagnose fistulas and classify Perianal fistula, which helps in better management of patients. Complications such as recurrence and fecal incontinence, can be prevented and also the need for second surgery can be decreased.

Use of intravenous contrast is not important in assessment of uncomplicated primary Perianal fistula and in patients with no history of previous surgery for anal fistula. Especially in cases of risk of contrast allergy non-contrast MRI sequences can provide similar information so in such cases use of intravenous contrast may be safely omitted.

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"Success is not final,
failure is not fatal:
it is the courage to continue that counts."

Winston Churchill

AUTHORSHIP AND CONTRIBUTION DECLARATION

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