ORIGINAL RESEARCH PAPER

Radiodiagnosis

KEY WORDS:

A STUDY OF MRI IN THE EVALUATION OF PERIANAL FISTULA

Dr. M. Vijayakumari Professor & HOD Dept. Of Radiology OMC

Dr. Sunil Kumar Pushtey* Assistant professor Dept. Of Radiology OMC *Corresponding Author

INTRODUCTION

"More is missed by not looking, than by not knowing "by Thomas Mc Rae.

Fistula-in-ano form a good majority of treatable benign lesions of the rectum and anal canal. 90% or so of these cases are end results of crypto glandular infections. The vast majority of these infections are acute but significant minority is contributed by chronic, low-grade infections, hence pointing to varying etiology.

The importance of imaging and treatment of a fistula in ano, is attributed to the complex pelvic floor anatomy and the fistula's notorious reputation of recurrence despite utmost care taken during and after its surgery.

Surgery can be extremely demanding, especially if the fistula is complex. The objectives are to eradicate the tract and drain associated sepsis whilst simultaneously preserving continence.

Over the years, many imaging modalities have been tried, to achieve those objectives. These are conventional fistulography, anal endosonography, computed tomography and most recently, MR fistulography.

Contrast fistulography is the most traditional radiological technique used to define fistula anatomy. It involves catheterization of the external opening and injection of water soluble contrast media which defines the fistulous tract.

Anal endosonography (AES), developed at St. Mark's hospital Northwick Park, Harrow, UK was the first technique to directly visualize the anal sphincter complex in detail. Modern 10 MHz rectal endoprobes are used to identify and study the sphincter complex.

Computed tomography has also been utilised to evaluate fistula in ano. However its ability to image in axial planes only and poor soft tissue differentiation limits its ability to classify fistulae with sufficient accuracy.

Magnetic resonance imaging is a recently devised modality to study fistula – in – ano. Imaging is done in axial, coronal and sagittal planes using T1, T2, STIR and FATSAT sequences. Various coils, namely, spine array, body array and special endorectal coils may be used.

The following study involves detailed evaluation of fistula in ano, its complications and pelvic floor anatomy using MR fistulography.

AIMS OF THE STUDY

To study the different modes of presentation of the fistula-in-ano

OBJECTIVES OF THE STUDY

To evaluate the role of MR imaging as a pre – operative evaluation modality for perianal fistula. This has been done by analysing its ability to delineate :-

primary tract
Secondary tracts and its ramifications.
Abscess / Source of persistent infection.
Relation of the tract to the sphincter complex.
Relation of the tract to levator ani.

PATIENTS AND METHODS

A prospective study of 40 patients with suspected fistula in ano, primary or recurrent, presenting to the Dept. Of General Surgery ,Osmania General Hospital, Hyderabad between August 2016 to August 2018. All the 40 patients examined clinically and later subjected to MR Fistulography.

MR Fistulography performed using GE 1.5 T HDX using PA coils.

METHOD:

MR Technique Used:

Patient is placed in supine position in MR gantry and is done with abdominal coil.[7,8,9,10,11,12,13]

A scout sagittal section is obtained through the anal canal region which will be used for planning of coronal, sagittal and axial views. Following sequences are used.

T2 FATSAT	-	CORONAL
T2	-	CORONAL
T2	-	SAGITTAL
T1	-	AXIAL
T2	-	AXIAL
T2 FAT SAT		AXIAL

These sections are taken extending from perianal region to above the level of the levator ani muscle.

Inclusion Criteria

All the patients included in the study are those presented to the surgery department for any of the following indications.

Age group from 20 to 70 years.
Preoperative evaluation for idiopathic clinically proven fistula in ano.
Single / Multiple discharging sinuses in the perianal region.
Recurrent perianal abscess for detection of undetected tracks.

Exclusion Criteria

Patients with MR incompatible devices or implant.
Patients with profound septicemia with inability to lie down in supine position.
Patients with claustrophobia.

OBSERVATION AND RESULTS

DISTRIBUTION OF CASES BY AGE AND SEX

40 cases underwent MR Fistulography for fistula in ano.

Table – 1 Age Distribution in Patient with Fistula in Ano

Age Group (Years)	No of Cases	Percentage
21-30	03	7.5
31-40	09	22.5
41-50	11	27.5
51-60	10	25
61-70	07	17.5
Total	40	100

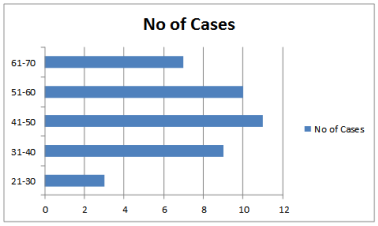

Figure 19. Distribution By Age

Most of the patients were in the age group of 31-60 .

Table – 2 Sex Incidence of 40 Patients with Fistula In Ano.

Sex	No. of cases	%
Male	30	75
Female	10	25

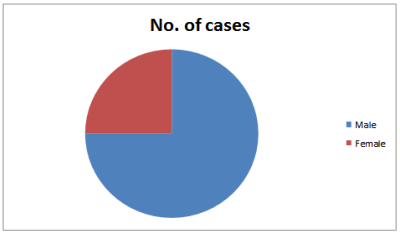

Figure 20. Distribution By Sex

There were 10 females in the age group 21-70 years. The number of male patients are significantly higher when compared to females with a ratio of 3:1.

Table – 3 Incidence of Primary and Recurrent fistulas in 40 patients

Types	No.of Cases	Table N %
Primary	24	60.0%
Recurrent	16	40.0%

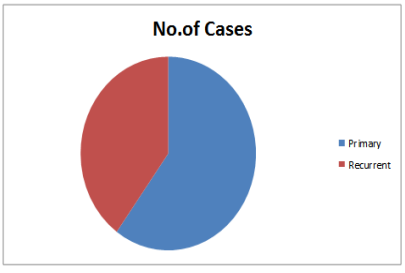

Figure 21.

In our study 40% of the cases reviewed for MRFG had recurrent fistulas because ours is a tertiary referral centre.

Table - 4 Distribution of Cases According to Various MRI Grades of Fistula in Ano

Grade	No. of cases	Percentage
1	06	15
2	08	20
3	10	25
4	12	30
5	04	10

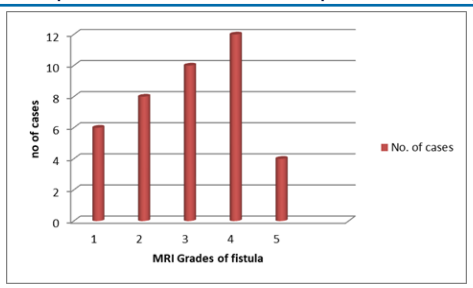

Figure 22

Most of the Patients (85%) were found to have complicated fistula i.e. grade II and above.

Table – 5 Number of Cases with Abscess collection in relation to the various sphincteric planes (IS/ES/SL) as seen on MRFG

Collection plane	No. of cases	%
ES	05	12.5%
ES+SL	01	2.5%
IS	05	12.5%
IS+SL	01	2.5%
Nil	27	67.5%
SL	01	2.5%

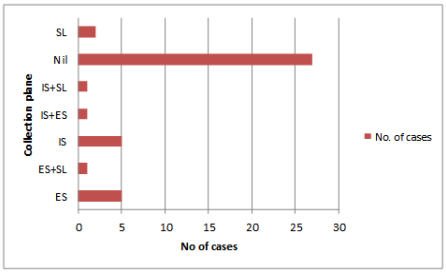

Figure 23

Nearly 33% of the patients evaluated by MRFG were found to have abscess collections in various sphincteric planes. It was observed that in 7.5% of the patients, abscess collections occurred in multiple planes, the detection of which has significant implications on the outcome of the surgery. Just

Table–6.Distribution of Abscess Collection by Type of Presentation (Primary/Recurrent)

	ES		ES+SL		IS		IS+ES+SL		IS+SL		SL	
	No	%	No	%	No	%	No	%	No	%	NO	%
Primary	01	2.5	00	00	03	7.5	00	0%	01	2.5	00	0%
Recurrent	04	10	01	2.5	02	05	00	0%	00	0%	01	2.5

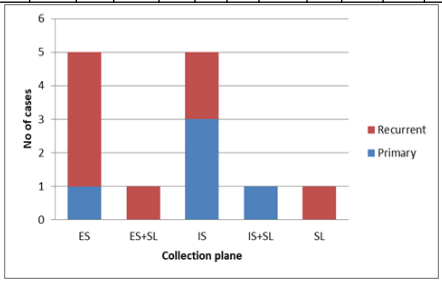

Figure 24

There are 12.5% of the primary cases were found to have abscess collection and 15% of the recurrent cases were found to have abscess collection in various planes. Distribution of abscess collection with regard to type of presentation does not appear to be significantly different.

Table – 7 Distribution of Secondary Tracts

Types	Absent		Present	
Primary	15	37.5%	09	22.5%
Recurrent	03	7.5%	13	32.5%

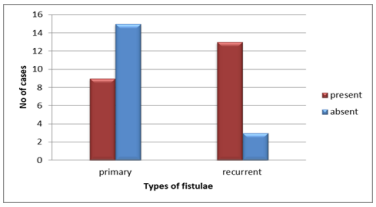

Figure25. Distribution of various grades of Fistula in primary and recurrent cases.

It was observed that the more than half of the patients (55%) who underwent MRFG were found to have secondary tracts which have utmost importance in surgical planning.

Table – 8. Distribution of Secondary Tracts in various grades of fistula

MR Grade	Secondary Tract			
	Primary		Recurrent	
	No of cases	Percentage	No of cases	Percentage
1	0	0	0	0
2	5	12.5	3	7.5
3	0	0	0	0
4	4	10	8	20
5	0	0	2	5

Figure 26

It was observed that the occurence of secondary tracts was significantly higher in recurrent cases which was almost 33% . So it is important to look for secondary tracts in recurrent cases.

Table – 9. Percentage of Primary and Recurrent fistulas with Supralevator Collection

Type	No.of Cases	Percentage (%)
Primary	1	2.5%
Recurrent	3	7.5%

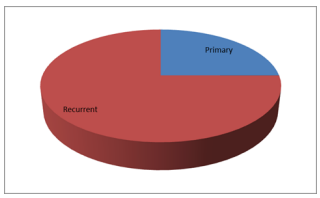

Figure 27

10% of the cases found to have supralevator collection and among the supralevator collection 75% had recurrent fistulas.

Table – 10. Table showing detection of Internal Opening of Fistula by MRFG

	INTERNAL OPENING			
	Absent		present	
	No of cases	Percentage	No of cases	Percentage
Primary	02	05%	22	55%
Recurrent	02	05%	14	35%

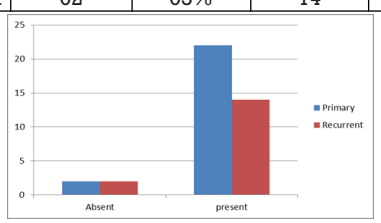

Figure 28.

In 10% of cases, MRI is unable to detect the internal opening in which half of the cases were primary and another half were recurrent.

DISCUSSION

MR fistulography was performed on 40 patients for the confirmation and grading of fistula in ano. Out of the 40 patients, 30 (75%) were male patients and 10 (25%) were female patients with a Male : Female ratio – 3 : 1

Male preponderance may be related to an increased number of anal glands, which also tend to be more cystic and ramified when compared with women[2,3]

These patients were in the age groups ranging from 21 to 70 years. Out of the 30 males, 13 (50%) were in the age group 41-60 years.

Broadly, the patients fell into two groups, i.e, primary and recurrent. Patients in the primary group were those who had a fistula in ano for the first time and had never been operated for the same. Patients in the recurrent group were those whose fistulae had been operated upon atleast once previously.

In our study, nearly half of the patients, (40%), had recurrent fistulas. This was probably due to the high incidence of recurrence of fistulae in ano.

After per rectal examination of the 40 patients they were subjected to MRFG and each patient was evaluated by scrutinizing the coronal, axial and saggital sections.

According to the presence and position of the primary tracts, secondary tracts, presence and absence of collections and their locations, each fistula was graded according to the St. James University Hospital classification.The distribution of cases according to various MRI grades has been depicted in fig 21.

About 33% of the patients evaluated by MRFG were found to have abscess collections in various sphincteric planes. It was observed that in 5% of the patients, abscess collections occurred in multiple planes, the detection of which has significant implications on the outcome of the surgery.

It was observed that the majority of the cases, i.e 85%, had a complicated fistula. Grades II and above were designated as complicated because of the presence of secondary tracts or abscess collections and / or involvement of the planes other than the intersphincteric plane. In the study conducted by Beets – Tan et al,1 the percentage of complex fistulas was 57% and in the study by Spencer et al4 40% of patients had complex fistulas.

It was felt that the higher percentage of complex fistulas in our study was due to our institute being a tertiary care centre, more number of complex and recurrent cases tend to be referred.

The correct location of internal opening of the fistula, can be diagnosed. Though, the exact opening was not seen in all the cases, it was inferred according to the course and plane of the primary tract.

An internal opening was considered as correctly identified when it was at the correct level in the anal canal and was with in the correct quadrant.

Among the 40 patients diagnosed to have primary tracts by MRFG, the diagnosis for internal opening was found 36 patients corresponding to 90% sensitivity, compared to 96% sensitivity obtained in the study by Beets – Tan et al.1

With regard to the detection of primary tracts, we found the primary tracts in 100% of the cases, in comparison to a sensitivity of 100% and specificity 86% in the study of Beet – Tan et al.1

As the detection of secondary tracts has significant implications on the prognosis and outcome of surgery for fistulae in ano, their detection by MRFG is crucial.

If not identified and properly eradicated, these extensions and tracts may lead to recurrences. Results of the study by Lunniss et al22,23 suggested that MR imaging could depict more extensions than could surgical exploration. In the study by Beets – Tan et al,2 they concluded that pre-operative MR imaging was 100% accurate in detection of secondary extensions.

Secondary tracts are ramifications from the primary tract. Because the presence of horseshoe tracts greatly alters the surgical approach and its outcome, they have to be separately mentioned in the report.

55% of the patients in our study were found to have secondary tracts. Comparitively in a study of 56 patients by Beets – Tan et al,1 39% of the cases had secondary tracts.

It was observed that the occurrence of secondary tracts was significantly higher in recurrent cases as compared to the primary cases which was almost 35%. So it is important to look for secondary tracts in recurrent cases.

It was also observed that 33% of the cases with secondary tracts were those who had recurrent fistulas. It was felt that secondary tracts were more common in recurrent cases.

Abscess collections were found in 33 % of the cases evaluated. The presence of collections was divided according to their location in relation to the various sphincteric planes. These planes were intersphincteric, extrasphincteric, and the supra levator planes. It was observed that in 5% of the patients, the abscess collections occurred in multiple planes (i.e in combination). The detection of these collections, especially those present in multiple planes, has significant implication on the outcome of the surgery for complete eradication of the disease process.

The other most important additional finding for which MRFG was evaluated, was for the detection of supralevator collections or extensions. Those cases in which there is supralevator collection or tract fall into the grade V. This has very high surgical significance, as it alters the surgical approach and also it has serious implications on the outcome of the surgery. In our study, 4 cases were found to have supralevator component by MRFG.

On clinical exam, the presence of supralevator collection was suspected in only one patient. MRFG gave a diagnosis of supralevator extension in an additional 4 patients.

Among the supralevator collections/tracts 75% of the cases were seen in the recurrent cases and 25% of the cases were seen in the primary.

MR fistulography was performed in 40 patients for pre operative evaluation of fistula in ano . Male to female ratio was 3:1. The patients belonged to age groups ranges from 21- 70.

In nearly half (40%) of the 40 patients were patients with recurrent fistula in ano.

85% of the patients had a complicated fistula (i.e. ≥ grade II).MRFG was extremely useful in identifying the internal opening of the fistula (90% of cases), presence of secondary tracts, detecting abscess collection in multiple planes and in visualising supralevator extensions of the lesion.

MRFG significantly altered the surgical approach due to its ability to demonstrate clinically undetectable abscesses and secondary tracts.

CONCLUSION

Clinical examination is less accurate to detect internal opening while MR fistulogram could detect most of the internal openings.

High spatial resolution MR imaging with PA coils is accurate for the detection of perianal fistulas. It shows the surgical anatomy and maps out the perianal fistulas accurately and provides additional information on secondary extensions in patients with complex fistulas.

The largest additional value from preoperative MRFG was obtained in patients with complex fistulas and in patients with recurrences. Our study showed that the surgical approach and procedure was drastically affected by MR findings of additional tracts and abscess.

Long term follow up is required to evaluate the impact of MRFG in patients with recurrent fistulas. But our study clearly showed that preoperative MRFG led to more aggressive surgery for the removal of complex tracts which may have a significantly long term effect.

Finally we conclude that MRFG is a rapid, well tolerated accurate technique with clinical assessment and is therefore an ideal pre-operative imaging modality for Fistula in Ano.

REFERENCES

1. Hallingans.s..imaging fistula in Ano.clinical Radiology,1998;53;85-95
2. Beets – Tan et al. Preoperative MR imaging of Anal fistulas : Does it help Radiology,January 2001;75-84.
3. Lilius HG, Investigation of human fetal anal ducts and intermuscular glands and a clinical study of 150 patients. Acta Chirugica Scandinavia. 1968, suppl; 383 : 1-88
4. Lunnis PJ, Amstrong P ,Barker PG,Reznek RH,Philips PK .MR Imaging of Anal fistula .Lancet 1992;340:394-396.
5. Lunnis PJ, Barker PG, Sultan AH et al. MRI of fistula in Ano. Diseases of the colonal and rectum. 1994;37 :708-718.
6. Spencer JA, Chapple K, Wilson D, Ward J, Windsor or ACJ, Ambrose NS. Outcome after surgery for perianal fistula : Prediction valve of MR imaging. American Journal of Roentgenology 1998; 171 :403-406
7. Karmiris K, Bielen D, Vanbeckevoort D, et al. Long-term monitoring of infliximab therapy for perianal fistulizing Crohn's disease by using magneticresonance imaging. Clin Gastroenterol Hepatol 2011;9 (2):130–136.
8. Van Assche G,Vanbeckevoort D, Bielen D, et al. Magnetic resonance imaging of the effects of infliximab on perianal fistulizing Crohn's disease. Am J Gastroenterol 2003;98(2):332–339.
9. Beckingham IJ, Spencer JA, Ward J, Dyke GW, Adams C, Ambrose NS. Prospective evaluation of dynamic contrast enhanced magnetic resonance imaging in the evaluation of fistula in ano.Br J Surg 1996;83(10):1396–1398.
10. Beckingham IJ, Spencer JA, Ward J, Dyke GW, Adams C, Ambrose NS. Prospective evaluation of dynamic contrast enhanced magnetic resonance imaging in the evaluation of fistula in ano. Br J Surg 1996;83(10):1396–1398.
11. Sahni VA, Ahmad R, Burling D. Which method is best for imaging of Perianal fistula? Abdomen Imaging 2008;33(1):26–30.
12. deSouza NM, Puni R, Gilderdale DJ, Bydder GM. Magnetic resonance imaging of the anal sphincter using an internal coil. Magn Reson Q 1995;11(1):45–56.
13. deSouza NM, Gilderdale DJ, Coutts GA, Puni R, Steiner RE. MRI of fistula-in-ano: a comparison of endoanal coil with external phased array coil techniques. J Comput Assist Tomogr 1998;22(3):357–363.