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Detection of Complicated Anal Fistula in a Study Population

Authors
Dr Juniorsundresh, Dr G. M. Badhusha Mohideen Ibrahim
Department of General Surgery, Rajah Muthiah Medical College and Hospital, Annamalai University, Annamalai Nagar – 608002, India

Abstract
Aim and Objectives: *The objective of this study is to detect the complicated fistula with the help of MR fistulography in correlation with per-operative findings. To determine the associated risk factors.*
Materials and Methods: *A prospective study of 40 patients with suspected fistula in ano referred from Surgery OPD at RMMCH, Chidambaram between November 2015 to September 2017. All the patients were subjected to MR Fistulography, was performed using philips 1.5 tesla, using CP Spine Array coil.*
Results: *90% of study population presented with complicated fistula. Diabetes Mellitus and Tuberculosis were the two major associated risk factors.*
Conclusion: *MR fistulography is accurate for detection of perianal fistulas. It shows the surgical anatomy and extension in patient with complex fistula*
Keywords: *Perianal fistula, MR fistulography.*

Introduction

A fistula-in-ano, or anal fistula, is a chronic abnormal communication, usually lined to some degree by granulation tissue, which runs outwards from anorectal lumen (the internal opening)to an external opening on the skin of the perineum or buttock (or rarely, in women, to the vagina). Fistula in Ano is a commonly encountered surgical problem. Adults in their prime working age are most likely to develop a fistula, and are males are four times as likely as females to be affected. The importance of imaging and treatment of a fistula in ano is attributed to the complex pelvic floor anatomy and the fistula's notorious habit of recurrence despite at most care taken during and after its surgery.

The Crypto glandular Hypothesis

The anal gland, first described by chiari in 1878[(1)] are central to the crypto glandular hypothesis of fistula pathogenesis. These glands originate at the level of the dentate line (the squamo-columnar junction) in the mid anal canal and can penetrate the internal sphincter to reach the intersphincteric plane. Eisenhammer suggested that it was the infection of these glands results in an intersphincteric abscess which may extend in various directions: downwards towards the anal margin, upward into the anal wall, or laterally through the external sphincter into the ischiorectal fossa. Implicit in this hypothesis is the notion that acute anorectal sepsis and fistula in ano are one and the same disease, abscess being the acute phase and fistula the chronic. If an acute abscess

fails to heal then chronic intersphincteric infection will lead to a fistula that persistently discharges, exit externally via an external perineal opening. Inflammatory bowel diseases are through to be important aetiological factors affecting patients all over the world. Crohn's disease has been cited as the most important factor in western countries, especially in causing extra sphincteric and high trans- sphincteric fistulas.

However tuberculosis and diabetes mellitus have emerged as important aetiological causes in the Indian subcontinent, Crohn's disease being relatively uncommon in this part of the world. Anal disorders, pelvic sepsis, Anorectal malignancies, perineal injuries, anorectal agenesis are some of the rare causes.

Materials and Methods

A prospective study of 40 patients with suspected fistula in ano referred from Surgery OPD at RMMCH, Chidambaram between November 2015 to September 2017.All the patients were subjected to MR Fistulography, was performed using philips 1.5 tesla, using CP Spine Array coil

Inclusion Criteria

- Age >18 years
- Preoperative evaluation for proven fistula in ano
- Single/multiple discharging sinuses in the perianal region
- Recurrent fistulas and for detection of epithelialized tracts

Exclusion Criteria

- Age <18 years
- Patients with MR incompatible devices or implants
- Patients on life support systems.
- Patients with profound septicaemia with inability to lie down in supine position.

Data Analysis and Results

Table 1: Risk Factors

Risk Factors	Number	Percentage
None	16	40.0
T.B.	8	20.0
D.M.	14	35.0
Both	2	5.0
Total	40	100

The risk factors of the condition are presented in Table - 1. The majority (40%) of the patient have no predisposed risk factors. About 35% have Diabetes mellitus and 20% have tuberculosis. Only 5% has both Diabetes Mellitus and Tuberculosis.

Graph 1 Risk Factors

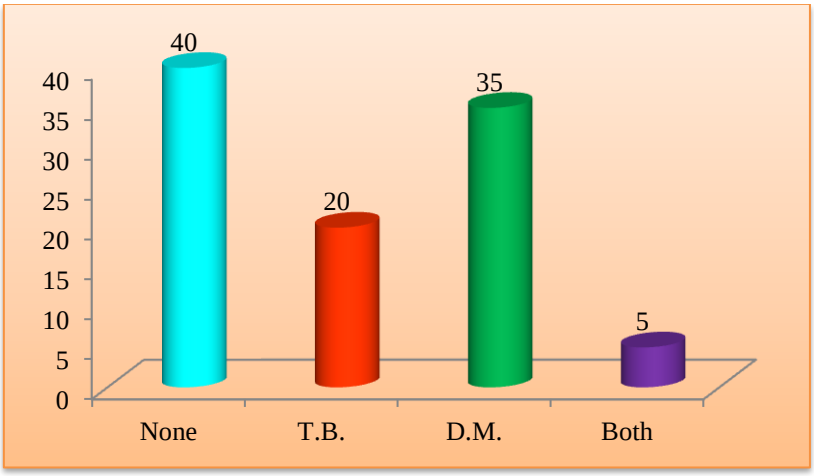

Table 2: Distribution of cases according to grades

	Clinical Grading		MR Grading		Per op Grading	
	N	%	N	%	N	%
Normal	-	-	1	2.5	-	-
Grade I	9	22.5	4	10.0	6	15.0
Grade II	4	10.0	8	20.0	7	17.5
Grade III	14	35.0	9	22.5	9	22.5
Grade IV	6	15.0	10	25.0	10	25.0
Grade V	2	5.0	5	12.5	5	12.5
Abscess	2	5.0	3	7.5	3	7.5
Sinus	3	7.5	-	-	-	-
Total	40	100	40	100	40	100

The distribution of cases according to grades is presented in Table– 2. The distribution with specific to clinical grading, MR grading and per-operative grading is presented. As per-op grading is superior to other grades, it is taken into account for interpretations. About 25.0% are in grade IV classifications and which is the common grading of fistula. Each of 20.0% and 22.5% has grade II and grade III classifications. About 12.5% have grade V classifications.

Table 3: Comparison of MR and Clinical Findings with Per-Operative Findings

MR Finding – Grade I				Clinical Grade I			
MR Finding	Per Operative		Total	Clinical	Per Operative		Total
	Present	Absent			Present	Absent	
Present	4	0	4	Present	4	5	9
Absent	2	34	36	Absent	2	29	31
Total	6	34	40		6	34	40

	MR	Clinical
Sensitivity	66.67	66.67
Specificity	100	85.29
Positive Predicted Value	100	44.44
Negative Predicted Value	94.44	93.55

The comparison of MR and clinical findings for grade I classification of fistula is analysed with per-operative findings. Per-operative findings are taken as gold standard method of classification of fistula. The sensitivity (Ability to rightly identifying true positive cases) of MR in diagnosing Grade I fistula is 66.67%. The sensitivity of clinical evaluation is also similar to MR that is 66.67%. But the specificity (ability of the test in rightly identifying the absence of disease) of MR is comparatively higher (100%) than clinical evaluation (85.29%).

The positive predicted values (the probability of getting positive results if test is positive) of MR is higher (ppv = 100%) than clinical findings (ppv = 44.44%). The negative predicted values (the probability of getting negative results when test result is negative) is again higher for MR (NPV = 94.44) when compared to clinical (NPV = 93.55). Hence the MR finding is more closely association with per-operative findings.

Table 4: Comparison of MR and Clinical Findings in Grade II Fistula with Per-operative findings

MR Finding – Grade II				Clinical Grade II			
MR Finding	Per Operative		Total	Clinical	Per Operative		Total
	Present	Absent			Present	Absent	
Present	7	1	8	Present	4	0	4
Absent	0	32	32	Absent	3	33	36
Total	7	33	40	Total	7	33	40

	MR	Clinical
Sensitivity	100%	57.14%
Specificity	96.97%	100%
Positive Predicted Value	87.50%	100%
Negative Predicted Value	100%	91.67%

The comparisons of grade II fistula by different methods in presented in Table – 4. The sensitivity is higher for MR (100%) than clinical method (57.14%). The speciality is higher (100%) for clinical than MR (96.97%) method. Therefore, both of the methods (MR and clinical) are closely associated with per-operative findings in detecting Grade II fistula.

Table 5: Comparison of Grade III Fistula

MR Finding – Grade III				Clinical Grade III			
MR Finding	Per Operative		Total	Clinical	Per Operative		Total
	Present	Absent			Present	Absent	
Present	9	0	9	Present	9	5	14
Absent	0	31	31	Absent	0	26	26
Total	9	31	40	Total	9	31	40

	MR-Grading	Clinical
Sensitivity	100%	70.57%
Specificity	100%	83.87%
Positive Predicted Value	100%	64.29%
Negative Predicted Value	100%	100%

The sensitivity, specificity, PPV and NPV are almost 100% for MR in predicting grade III fistula. The sensitivity and specificity are only 70.57% and 83.87% respectively for clinical findings.

Table 6: Comparison of Grade IV Fistula

MR Finding – Grade IV				Clinical Grade IV			
MR Finding	Per Operative		Total	Clinical	Per Operative		Total
	Present	Absent			Present	Absent	
Present	10	0	10	Present	6	0	6
Absent	0	30	30	Absent	8	26	34
Total	10	30	40	Total	14	26	40

	MR-Grading	Clinical
Sensitivity	100%	42.86%
Specificity	100%	100%
Positive Predicted Value	100%	100%
Negative Predicted Value	100%	76.47%

The sensitivity of clinical methods in estimating grade IV fistula is comparatively lower (42.86%) than MR method (100%). Therefore negative prediction value for clinical is less (NPV = 76.47%).

Table 7: Comparative of Grade V Fistula

MR Finding – Grade V				Clinical Grade V			
MR Finding	Per Operative Grading		Total	Clinical	Per Operative Grading		Total
	Present	Absent			Present	Absent	
Present	5	0	5	Present	5	0	0
Absent	0	35	35	Absent	3	32	35
Total	5	35	40	Total	8	32	40

	MR-Grading	Clinical
Sensitivity	100%	62.50%
Specificity	100%	100%
Positive Predicted Value	100%	100%
Negative Predicted Value	100%	91.43%

The sensitivity of MR is much higher (100%) than clinical method (62.50%). The negative predicted value for clinical method is 91.43% which is quite lower than MR method (NPR = 100%).

Table 8: Association of Mode of Presentation with Type of Fistula

Mode of Presentation	COLL-IS		COLL-ES		COLL-SL		SECOND TRA		HOR-SHOE		Total
	Present	Absent	Present	Absent	Present	Absent	Present	Absent	Present	Absent	
Primary	4	12	3	13	0	16	8	8	6	10	16
Recurrence	1	23	9	15	1	23	10	14	4	20	24
Total	5	35	12	28	1	39	18	22	10	30	40

The association of mode of presentation with type of fistula is presented in Table– 8. There is no statistical association is observed between mode of presentation and fistula types.

Discussion

In the studies conducted by Beets-tan et al[(2)] and others, crohn's disease, was found to be the major risk factor. The reason being, that these studies were conducted in the western countries. It is observed that the majority of cases i.e.90% had a complicated fistula. Grade 2 and above were designated as complicated fistula. Tuberculosis and diabetes mellitus were the two major associated risk factors and were found to be important contributory factors for recurrence of the lesion. MRFG was extremely useful in identifying the internal opening of the fistula (97.14% sensitivity), presence of secondary and horseshoe tracts (100% sensitivity), detecting abscess collections in multiple planes and in visualizing supralevator extension of the lesion (100% sensitivity). MRFG Significantly altered the surgical approach due to its ability to demonstrate clinically undetected abscess and secondary tracts and acts as a road map for the surgeon before the operation. Therefore it acts as ideal modality for grading of fistula in ano.

Conclusion

High spatial resolution MR imaging with CP spine Array coil is accurate for the detecting of perianal fistulas. The largest value from preoperative MRFG was obtained in patients with complex fistulas in patients with T.B. and D.M. and in patients with recurrances. Our study showed that the surgical approach and procedure was drastically affected by MR findings of additional tracts and abscess. Finally we conclude that high-spatial-resolution MR imaging fistulogram is rapid, well tolerated and accurate for detecting anal fistulas with excellent surgical correlation and is therefore an ideal and more

References

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