

Perianal MRI: As a Diagnostic Tool in Preoperative Evaluation of Fistula-in-Ano

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Abstract: *Background:* *Fistula-in-ano is an abnormal tract lined by epithelium or by the granulation tissue between anal canal and skin of the perineum. Nowadays the trend of using imaging techniques before planning the surgery is increasing, especially the use of MRI as it provides more precise information about the tract. Our prospective study correlated the MRI, clinical and intra-operative findings and calculated the sensitivity and specificity in detecting various features about the fistulous tract. Method:* *An institutional based prospective and observational study was performed in Department of General Surgery at MGH & MDM Hospital affiliated with Dr S. N. Medical College, Jodhpur, Rajasthan, India. Patients were selected and then subjected to perianal MRI before surgery and the data was collected and compared. Results:* *Sensitivity and specificity of perianal MRI in detecting internal opening and complicated fistulous tract was found to be (100%, 40%) and (100%, 84.62%) respectively. Conclusion:* *It was concluded from our study that MRI of the perianal region is the preferred modality for the diagnosis of fistula-in-ano and its complications preoperatively. It also aids in delineation of tract pathway and its relation to the anal sphincter complex and thus is helpful in preventing the injury to sphincter and resulting fecal incontinence.*

Keywords: Fistula-in-ano, perianal MRI, St. James's grading, Goodsall, complicated fistulous tract

1. Introduction

Fistula-in-ano is an abnormal tract lined by epithelium or by the granulation tissue between anal canal and skin of the perineum. Incidence is about 10 out of 100000 persons with a male predominance with a ratio of 2: 1 [1]. Young men in 3rd and 4th decade are most affected. In 25-37% of cases, anal fistulae are formed completely following drainage of perianal abscess, as there is no external opening prior to drainage. Antibiotic therapy does not have any effect on the development of fistula following abscess drainage. The work in perianal fistulae classification and stratification of treatment based on types started with contributions from Goodsall and Parks. Infected perianal gland being the most common underlying cause, other causes comprise of Crohn's disease, Tuberculosis, trauma during childbirth, following hemorrhoidectomy, foreign body perforation etc [2]. As this disease dates back to historic times so is its treatment, like in Ayurvedic medicine, Sushruta (b~800 BC) described fistulotomy, fistulectomy as well as chemical seton using Kshara sutra [3]. Hippocrates (b~460BC) used horsehair (seta) in the treatment of anal fistulae. In the past, imaging techniques played a limited role, but nowadays the trend of using imaging techniques before planning the surgery is increasing, especially the use of MRI as it provides more precise information on the anatomy of canal, sphincter complex, and relationship of fistula to the pelvic floor structures. MRI allows identification of primary and secondary tracks, complications like abscesses. Parks' and St James University Hospital classification are used for the classification of fistula-in ano of which the latter gives better

details of perianal fistulae. In this study we reviewed the clinical and intra-operative findings of fistula-in-ano patients. We then correlated the MRI, clinical and intra-operative findings and calculated the sensitivity and specificity of MRI of Perianal region in detecting various features like course of tract, internal & external opening, and complications such as branching or abscess.

Aims & objectives

The aim of our study was to correlate the clinical and intra operative findings with pre-operative perianal MRI findings and to determine the sensitivity, specificity and diagnostic accuracy of perianal MRI in detecting the primary fistulous tract and complications in patients with clinical diagnosis of fistula-in-ano.

2. Materials & Methods

An institutional based prospective and observational study was performed in Department of General Surgery at MGH & MDM Hospital affiliated with Dr S. N. Medical College, Jodhpur, Rajasthan, India. The study period was from Jan 2022 to Sept 2022. Sample size of our study was 40.

Patients were selected into our study based on the inclusion criterion. Patients were then subjected to perianal MRI with gadolinium as contrasting agent. The following points were assessed: type of fistula, position of internal & external opening, grading of fistula by St. James's University Hospital MRI Classification and the accuracy of MRI findings were correlated with clinical and intra operative

findings. After that sensitivity and specificity of the perianal MRI was calculated with the collected data.

3. Observation & Results

Total no. of patients included in this study was 40 and all of them were randomly selected. Out of these 40 patients, 37 were males and 3 were females (fig.1). In our study 95% (38) patients had only single external opening and only 5% (2) patients had multiple external opening i. e., 2 or more than 2 (fig.2). Majority of the patients 60.53% (23 out of 38 patients) had external opening posterior to the transverse anal line and rest of the patients 39.47% (15 out of 38 patients) had opening anterior to the transverse anal line (fig.3). Based on St James’s University Hospital classification, maximum no. of patients 37.50% (15 patients) belongs to grade I, 2nd maximum belongs to grade IV (27.50%), 15% belongs to grade II, 17.50% from grade III and only 2.50% (1 patient) belongs to grade V (fig.4). The concordance of the MRI and Surgical findings in detecting internal opening was calculated and sensitivity found to be 100% and specificity was 40% (P value = 0.002) (Table I). Also, after the combined co-relation of all the complications in MRI and surgical findings, sensitivity of MRI found to be 100% and specificity was 84.62% (P value-0.0001) (Table II).

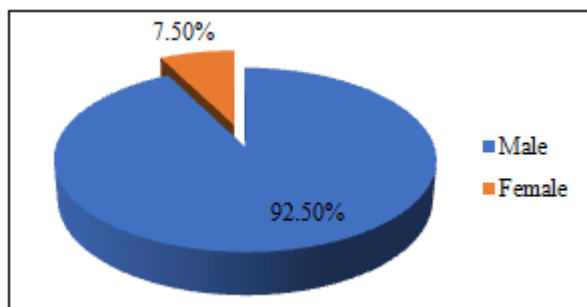


Figure 1: Gender Distribution

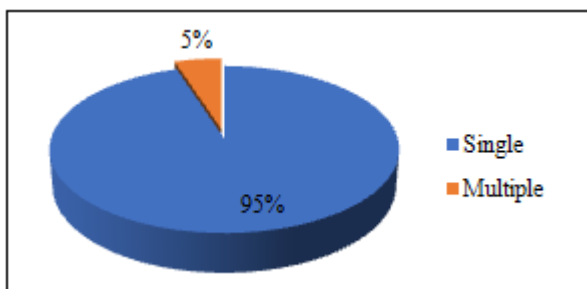


Figure 2: No. of ext. opening

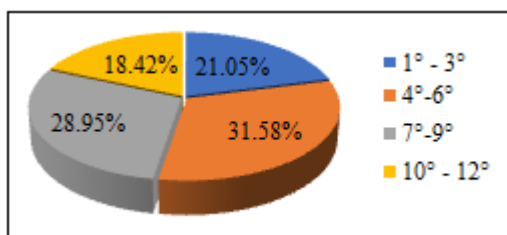


Figure 3: Clockwise distribution of external opening

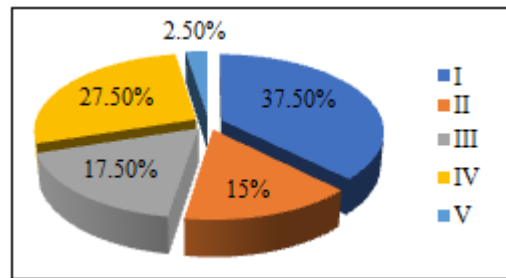


Figure 4: St. James Grading

Table I: Correlation of MRI V/S surgical findings in detecting internal opening

MRI findings (Internal opening)	Surgical findings				Total	
	Same as MRI		Other than MRI			
	N	%	N	%	N	%
Present	30	100.00	6	60.00	36	90.00
Absent	0	0.00	4	40.00	4	10.00
Total	30	100.00	10	100.00	40	100.00

{P value 0.002 (S)}

Table II: Combined Concordance of all Complications in MRI with Surgical Findings

MRI findings (Complications)	Surgical findings				Total	
	Present		Absent			
	N	%	N	%	N	%
Present	14	100.00	4	15.38	18	45.00
Absent	0	0.00	22	84.62	22	55.00
Total	14	100.00	26	100.00	40	100.00

{P value <0.0001 (S)}

4. Discussion

In our study, out of 40 patients, 92.50% (37) of the subjects were males & 7.50% (3) were females with a Male to female ratio of ~ 12: 1. In a study conducted by Philip H Gorden et al [4] (2002), a male to female ratio of 5.66: 1 was noted. In another study done by Kulvinder Singh et al [5] (2014) 45 patients (90%) were males out of 50 cases.

In present study 95% (38) patients had only single external opening of the fistulous tract and only 5% (2) patients had multiple external opening i. e., 2 or more than 2, while Choen et al [6] (1991) observed single external opening in 82.67% & multiple external opening in 17.33% of the patients. Buchanan G et al [7] (2002) observed single and multiple external openings in 89.78% & 10.12% respectively.

In our study majority of the patients 60.53% (23 out of 38 patients) had external opening posterior to the transverse anal line. Sukhlecha AG et al [8] (2019) reported that 84% of external opening lie posterior to the transverse anal line and remaining 16% lie anterior to it.

In our study St. James Grading showed maximum prevalence of grade I (37.50%), followed by grade IV (27.50%) & least was of grade V i. e., 2.50%. Chauhan et al [9] (2016) in his study reported that 15 patients (30%) had grade 1 fistulae, 6 patients (12%) grade 2 fistulae, 10 patients (20%) grade 3 fistulae, 17 patients (34%) grade 4 fistulae and 2 patients (4%) grade 5 fistulae. In a study by Shaha P et al [10] (2016), 40% had grade 1 fistulae, 23.33%

grade 2 fistulae, 13.33% grade 3 fistulae, 20% grade 4 fistulae and 3.33% grade 5 fistulae.

In present study internal opening localization with MRI had sensitivity 100% and specificity was 40% (P value = 0.002). In line with these findings, Algazzar et. Al [11] (2019) reported that MRI could detect internal opening of perianal fistula by rate of 95.4% with 100% PPV. Duc vo et [12] (2019) all reported that the positive predictive value in correct localization of internal opening was 99% compared to 83.33% in our study.

In our study, the overall detection of all complications of fistula-in-ano by MRI had sensitivity of 100%, specificity was 84.62% with a positive predictive value (PPV) of 77.78% (P value < 0.0001). Maier et al in his study [13] showed an 84% sensitivity of MRI for the identification of perianal fistulae and abscesses. His study gave 15% false positive results which were comparatively less in our study (3.13%). In another study by Beets-Tan et al [14], who compared the results of MRI with those intraoperative findings, the sensitivity and specificity were 100% and 86% respectively for the complications of fistula in ano. The study of Chouhan et al [9] (2016) reported that 93.7% sensitivity and 96.7% PPV for detection of complicated fistulous tract.

5. Conclusion

Fistula-in-ano, though an uncommon problem but have a propensity for chronic and recurrent course due to its various complications. Therefore, it is necessary to evaluate patient for these conditions preoperatively so that complications kept in mind and surgical proceedings will be according to them. MRI of the perianal region is the preferred modality for the diagnosis of fistula-in-ano and its complications preoperatively. It also aids in delineation of tract pathway and its relation to the anal sphincter complex and thus helpful in preventing the injury to sphincter and resulting fecal incontinence.

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