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Original Research

Assessment of Clinical, MRI and Intraoperative Findings in Cases of Fistula in Ano

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Abstract-
Objective- To investigate the different technique of confirmation of fistula Ano in surgical procedure.
Method- A total of 30 patients with clinically diagnosed fistula in ano were included in the study. Clinical examination of all the patients include in the study presenting with local pain and discharge or associated abscess was done by digital rectal examination and proctoscopy, pelvic magnetic resonance imaging without any bowel preparation. History for various contraindications for MRI was elicited before the MRI examination by explaining the evaluation of the individual risk.
Result- The most common location of external opening was 3o'clock position seen in 20% of the patients. Internal opening was demonstrated in MRI in all the 30 patients (100%). The most common location of internal opening in my study was at 6 o'clock seen in 8 (26.66%) patients. MRI showed that 19(63.33%) cases had simple linear track while 11(36.66%) cases had complex tracks. It was found that 17 (56.66%) patients had simple linear track while 13 (43.33%) patients had complex track during surgery. out of 30 patients who had perianal fistulas, simple non branching tracks were observed in 17 (56.66%) patients complex tracts were seen in 13(43.33%) out of which abscess in 5 (38.46%) patients, secondary tracks in 4 patients (30.76%), horseshoe extension in 3 patients (23.07%) and supralevator extension in 1 patient (7.66%) intraoperatively.
Conclusion- The use of MRI for the diagnosis and classification of peri-anal fistula can provide reliable information which has both preoperative and prognostic value but intra-operative findings at the time of surgery is the only confirmatory procedure to define the diagnostic accuracy of MRI. In recurrent fistula in ano, preoperative MRI has a therapeutic impact with decreased recurrence rates.
Keywords- Fistula in Ano, Fistulectomy, Recurrent fistula in ano.

Introduction-
A fistula is defined as an abnormal communication between two epithelium lined surfaces. Perianal and anal fistulas are abnormal connections between the epithelialized surface of the skin and anal canal and usually in continuity with one or more external opening in the perianal skin.
Perianal fistulas have been studied since ancient times. The first to describe the diagnosis and treatment of anal fistula was Sushruta around 600 BC. Around 430 BC, Hippocrates (460-370 BC) described perianal fistulas in more detail [(1)]. It is remarkable that some of his guidelines carry worldwide popularity up to today. The incidence of perianal fistula ranges from approximately 1-2 per 10,000 individuals with an approximate 2:1 male to female predominance. The maximum incidence is between the third and fourth decades of life [(2-4)]. Perianal fistulas account

for a substantial discomfort and morbidity to the patient thus affective productive man hours and quality of life. Although many fistulas are easily recognized and treated, others can be complex and difficult to treat.
The definite treatment of perianal and anal fistulas is surgery. Though this is successful in most cases, it is also associated with a significant prevalence of recurrence [(5)]. For successful surgical management of anal fistulas accurate preoperative assessment of the course of primary fistulous track and the site of any secondary extension or abscesses is required [(6)].
Although imaging techniques played a limited role in evaluation of perianal fistulas in the past, it is now increasingly recognized that imaging techniques, especially magnetic resonance imaging (MRI), may play a crucial role. MR imaging allows identification of infected tracks and abscesses that would otherwise remain undetected. Furthermore, radiologists can provide detailed anatomic descriptions of the relationship between the fistula and the anal sphincter complex, thereby allowing surgeons to choose the best surgical treatment; it reduces recurrence of the disease or possible secondary effects of surgery, such as fecal incontinence [(7, 8)].

Aims and objective-
The main objective of the present study to investigate the different technique of confirmation of fistula Ano in surgical procedure.

Methods-
This prospective study was performed in the department of general surgery and radio diagnosis in Pt. JNM Medical College and Dr. BRAMH Raipur during April 2018 to September 2019. Approval for the study was given by the Ethical Committee of the Institution. A total of 30 patients with clinically diagnosed fistula in ano were included in the study. Prior written and informed consent of patients were taken for inclusion ii the study. Clinical history was obtained in all the patients. Clinical examination included Digital rectal examination and proctoscopy.

Sample inclusion criteria:
The present study has done in some important criterion were follows that the utilization and fulfilment of purpose of the study, the patients with a proven diagnosis of fistula in ano who underwent surgery, adult patients 18/>18 years of age and who gave consent to participate in the study.

Sample exclusion criteria
Samples were excluded that not maintain the criterion of study such as patients with MR incompatible devices or implants, patients on life support systems, unstable or uncooperative patients and claustrophobic.

Procedure of the research-
An official permission to carry out the study was obtained from the local medical research ethics committee. Clinical examination of all the patients include in the study presenting with local pain and discharge or associated abscess was done by digital rectal examination and proctoscopy, pelvic magnetic resonance imaging without any bowel preparation. History for various contraindications for MRI was elicited before the MRI examination by explaining the evaluation of the individual risk.
MR imaging was performed using Siemens 1.0 T with a phase array coil. The patients were placed in supine position during image acquisition. The imaging volume was planned to incorporate the distal rectum and subcutaneous tissue with inclusion of anal canal, the sphincter muscles, the ischiorectal fossa, the levator muscle and the supralevator space.

Preoperative considerations-
Rectal irrigation with enemas should be performed on the morning of the operation**,** Urethral catheterisation, Anaesthesia can be general, local with intravenous sedation, or a regional block, administer preoperative antibiotics, Injection tetanus toxoid, xylocaine sensitivity test and with informed consent.

Intra-operative procedures-
After all preoperative preparations – with informed consent, parts preparation, injection tetanus toxoid and xylocaine sensitivity test patient was shifted to operation theatre, Patient was kept in lithotomy position in operating table, Meticulous painting and draping was done, Anal inspection was done to look for external opening whether single or multiple and digital rectal examination was done to feel the internal opening. Examination of the patient under spinal anaesthesia was done to confirm the extent of the fistula with the help of, proctoscope anoscope. Fistula track was delineated with the help of methylene blue dye and identified with the help of olive pointed probe.

Figure 1: Olive pointed probe

Figure 2: Fistulotomy

After proper identification of internal opening we proceeded with corresponding surgical procedure- Fistulotomy (Lay open) to open the track and fistulectomy to completely excise the track for low anal fistula. Fistulectomy with seton tightening was done for high anal fistula.

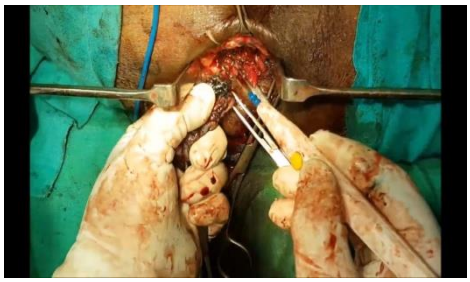

Figure 3: Fistulectomy

After completion of the surgical procedure insertion of anal pack was done and aseptic dressing with T bandage application was done.

Statistical analysis-

Clinical findings, MRI findings and surgical findings were recorded on a predesigned Performa and was managed using Microsoft Excel 2007 (Microsoft Corp, Redmond, WA). Sensitivity (how accurate the test is in positive cases), specificity (how accurate the test is in negative cases), positive predictive value (how accurate the test is when it gives a positive result) and negative predictive value (how accurate the test is when it gives a negative result) of MRI in detecting internal opening, abscess, secondary tracks, horse shoe extension, supralevator extension were assessed.

Result-

In this study all 30 patients during study period from April 2018- October 2019 with the diagnosis of fistula in ano are corroborated as per clinical examination MRI and intra operative findings. All the patients were from Pt.JNM Medical College, Raipur (C.G). The results of the study are as follows:

Table 1: The distribution on gender and age group of sample population

Gender of patients		
	Number of patients	**Percentage (%)**
Male	26	86.66
Female	4	13.33
Total	30	100
Age group of patients		
18-20		
21-30		
31-40		
41-50		
51-60		
61-70		
Total		

Reveal the table no.1 out of 30 patients 26 (86.66%) were males and 4(13.33%) were females. It was found that in current study the sample were distributed with age group 18 years and above. The mean of age is 35.6 years with most common age distribution between 31-40 years.

Table 2: the location of external opening on clinical examination in study population

location of external opening	**Frequency**	**Percent**
Not visualized	0	00
1 o'clock	1	3.33
2 o'clock	1	3.33
3 o'clock	6	20
4 o'clock	3	10
5 o'clock	2	6.66
6 o'clock	3	10
7o'clock	3	10
8 o'clock	3	10
9 o'clock	2	6.66
11 o'clock	1	3.33
12 o'clock	3	10
Multiple	2(at 3, 12'oclock and 2,5o'clock)	6.66
Total	30	100

Table no. 2 shows the all 30 cases presented with external opening. The most common location of external opening was 3o'clock position seen in 20% of the patients.

Table 3: The location of internal opening on MRI in study population

Location of internal opening	**Frequency**	**Percent**
Not visualized	0	00
1 o'clock	2	6.66
2 o'clock	2	6.66
3 o'clock	0	00
4 o'clock	1	3.33
5 o' clock	0	00
6 o'clock	8	26.66
7o'clock	3	10

8 o'clock	0	00
9 o'clock	1	3.33
10 o'clock	2	6.66
11 o'clock	3	10
12 o'clock	3	10
Total	30	100

In our study internal opening was demonstrated in MRI in all the 30 patients (100%). The most common location of internal opening in my study was at 6 o'clock seen in 8 (26.66%) patients.

Table 4: Type of tracts, confirmed in intra-operatively condition in MRI

Type of Tracts	Number of patients	Percentage (%)
Simple	19	63.33
Complex	11	36.66
Total	30	100.00
Confirmed type of tracts		
Simple	17	56.66
Complex	13	43.34
Total	30	100.00

In our study it was found on MRI that 19(63.33%) cases had simple linear track while 11(36.66%) cases had complex tracks. In my study it was found that 17 (56.66%) patients had simple linear track while 13 (43.33%) patients had complex track during surgery.

Table 5: The secondary tract, Abscess, Horse shoe extension and supra levator extension confirmed intraoperatively

Complex fistula in Ano	Frequency	Percent
Secondary tract	**4**	**30.76**
Horseshoe extension	**3**	**23.07**
Abscess	**5**	**38.46**
Supralevator extension	**1**	**7.6**
Total	**13**	**100**

In my study out of 30 patients who had perianal fistulas, simple non branching tracks were observed in 17 (56.66%) patients complex tracts were seen in 13(43.33%) out of which abscess in 5 (38.46%) patients, secondary tracks in 4 patients (30.76%), horseshoe extension in 3 patients (23.07%) and supralevator extension in 1 patient (7.66%) intraoperatively.

Discussion-

Most of our patients presented with a complaint of pain and discharge in perianal region and most common clinical diagnosis was primary fistula in ano in 100 %. The present study had assessing of clinical MRI and intra-operative findings in the cases of fistula in ano.

Findings of the present study patients had 26(86.66%) were males and 4(13.33%) were females and their age ranged from 18 to 70 years with a mean age of 35.6 years (table 1 & table 2) This was in agreement with Halligan et al, [39] who stated that the disease predominantly strikes young adults and men are more commonly affected.

2. Most common age group was 31-40 years with mean age of 35.6 years (table 2) . In a study by H AI P

Baddar [54], the average age was 28 years and the oldest was 42 years while the youngest was 10 years old.

3. 28 cases (93.33%) had single external opening, 2 cases (6.66%) had multiple external opening at the time of clinical examination.

4. In 26 cases (86.66%) internal opening was felt while in 4 cases(13.33%) internal opening was not felt at the time of clinical examination.

5. 25 cases (83.33%) had single internal opening, 5 cases(16.66%) had multiple internal opening on MRI.

6. The most common clockwise position of internal opening on MRI was at 6o'clock position seen in 8 patients (26.66%).

Rania E et al [57] in their study found 6 o'clock location of internal opening as most common and seen in 50% of study group.

In a study done to evaluate the role of MRI in preoperative assessment of ano-rectal fistula in 24 patients, Rania E et al[57] have found 37.5 % Grade 1 fistulas, 12.5 % Grade 2 fistulas, 12.5 % Grade 3 fistulas, 20.8 % Grade 4 fistulas and 16.7 % Grade 5 fistulas. Grade 1 was the commonest type recognized in 9 patients.

9) In our study out of 30 patients who undergone surgery, MRI showed agreement with surgical findings with respect to internal opening in 26 patients (86.66%). In the remaining 4 (13.33%) patients, different internal opening were seen at surgery.

Beets-Tan RG et al [49] found that MR imaging is 96 % sensitive, 90% specific with 90% positive predictive value and 96% negative predictive value in detecting internal opening. Demonstration of level of the internal opening at MRI is important since this will determine the extent of sphincter division during fistulotomy. Stoker et al [59] stated that the internal opening was successfully depicted by T2WI and STIR images and were in agreement with the surgical findings.

10) In our study out of 30 patients who had perianal fistulas following findings were noted:

A) In our study out of 19 patients who showed simple linear tracks on MRI , 17 (56.66%) patients were confirmed intra-operatively and corroborating with MRI findings and 2 patients (10.52%) varied, 1 patient with complex trans sphincteric abscess and 1 with complex trans sphincteric horse shoe extension intra-operatively. The sensitivity, specificity, positive predictive value and negative predictive value of MRI in detecting simple tracks were 100%, 84.6 % 89.4% and 100% respectively.

Beets –Tan RG et al [49] in their study fund that MR imaging is 100 % sensitive, 86% specific with 88% positive predictive value and 100% negative predictive value in detecting simple tracks.

Villa C et al[60] in their study stated that MRI is 100% sensitive and 86 % specific for depiction of simple tracks. Our study findings are in agreement with these two studies.

B) Complex tracks in 13 (43.33%) patients intra-operatively. The sensitivity, specificity, positive predictive value and negative predictive value of MRI in detecting complex tracks were 100%, 89.47 %, 100% and 84.61% respectively.

C)Secondary tracks were noticed in 4 patients (30.76%) intraoperatively .The sensitivity, specificity, positive predictive value and negative predictive value of MRI in detecting secondary tracks were 75%, 88.8 %, 75% and 88.88% respectively.

1 out 4 of patients in whom MRI showed complex trans sphincteric secondary tracks did not agree with surgical findings and showed complex extra sphincteric horse shoe extension intra-operatively.

D) Abscess in 5 patients (38.46%) intra-operatively. The sensitivity, specificity, positive predictive value and negative predictive value of MRI in detecting abscess were 80%, 100 %, 100% and 88.8% respectively.

Beets –Tan RG et al [49] in their study found that MR imaging is 96 % sensitive, 97% specific with 89% positive predictive value and 99% negative predictive value in detecting abscess.

Villa C et al [60] in their study stated that MRI is 96% sensitive and 97 % specific for depiction of abscess.

E) Horseshoe extension in 3 patients (23.07%) intra-operatively. The sensitivity, specificity, positive predictive value and negative predictive value of MRI in detecting horse shoe extension were 33.33%, 90 %, 50% and 81.8% respectively.

1 out 3 of patients in whom MRI showed complex extra sphincteric horse shoe extension did not agree with surgical findings and showed complex Trans sphincteric secondary track.

Beets-Tan RG et al [49] also found similar result in their study in detecting horseshoe abscesses. They also stated that the greatest additional value of MRI is its ability to detect horse shoe abscesses.

F) Supralevator extension in 1patiens (7.66%)intraoperatively. The sensitivity andnegative predictive value of MRI in detecting supralevator extension were 100% and 100% respectively.

In Ranai E. Mohamed[57] study, simple non branching tracks were observed in 79.2% patients, secondary tracks in 20.8% patients, abscess in 20.8%, and horseshoe abscess in 16.4% and supralevator extension in 20.8% patients.

A prospective study by Gordon N et al [64] summarized that MR imaging is the most accurate pre operative technique for classification of fistula in ano and performs best in the evaluation of the primary track and any secondary extension.

Darius W et al [65] concluded that MRI is accurate in assessment of the perianal fistulous tracts in soft tissue and thus recommended it as diagnostic method of choice which should be improved and applied more commonly in this pathology.

Conclusion-

MRI is a highly accurate, rapid and non-invasive tool in pre-operative evaluation of the peri-anal and anal fistulas. It provides high resolution images of the anatomy of the ano-rectal region with precise definition of the fistulous tracts, their associated secondary tracts and abscesses. Also, MRI evaluation and classification of peri-anal fistulae has a high degree of diagnostic accuracy, but intra-operative findings at the time of surgery are the only confirmatory procedure to define the diagnostic accuracy of MRI.

The use of MRI for the diagnosis and classification of peri-anal fistula can provide reliable information which has both preoperative and prognostic value but intra-operative findings at the time of surgery is the only confirmatory procedure to define the diagnostic accuracy of MRI.

In recurrent fistula in ano, preoperative MRI has a therapeutic impact with decreased recurrence rates.

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