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Original Research Article

A prospective study of fistula in ano with reference to clinicopathology, imaging and management

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ABSTRACT

Background: The aim was to study and review clinical presentation, pathological aspects & prevalent modalities of investigation and treatment for fistula in ano.
Methods: A prospective study of 90 patients of fistula in ano admitted from March 2015 to December 2016 was done. Fistulography was done as a preliminary investigation in 72 cases and MR Fistulography was done for complex and recurrent fistula (16 cases). Patients were operated and histopathology of fistula tract was done. In patients with clinical suspicion of tuberculosis smear examination of pus with ziehl neelsen staining for acid fast bacilli (AFB) and Cartridge Based Nucleic Acid Amplification Test (CBNAAT) on pus/slide was used to find out tuberculosis in patients of anal fistula. The clinical presentation, operation performed, pathological findings were recorded & a descriptive analysis was done.
Results: A prospective study of 90 patients of fistula in ano admitted from March 2015 to December 2016 was done. Fistulography was done as a preliminary investigation in 72 cases and MR Fistulography was done for complex and recurrent fistula (16 cases). Patients were operated and histopathology of fistula tract was done. In patients with clinical suspicion of tuberculosis smear examination of pus with ziehl neelsen staining for acid fast bacilli (AFB) and Cartridge Based Nucleic Acid Amplification Test (CBNAAT) on pus/slide was used to find out tuberculosis in patients of anal fistula. The clinical presentation, operation performed, pathological findings were recorded & a descriptive analysis was done.
Conclusions: With careful clinical evaluation, appropriate imaging studies and conventional surgical techniques anal fistula can be treated effectively with less morbidity, incontinence and recurrence.

Keywords: Fistula in ano, Fistula surgery, Recurrent fistula, Complex fistula, Fistulography. MRI fistulography, Tuberculosis in fistula

INTRODUCTION

Fistula-in ano is a chronic abnormal tract lined by granulation tissue between the epithelial surface of the anal canal and the perianal skin. It is a chronic suppurative disease which is well-known for chronic perianal pus discharge, frequent exacerbations, and recurrences after treatment. The most accepted etiologic factor for causation of Fistula-in-ano is infection beginning in the anal crypt glands.[1-4] The anal crypt gland penetrates the internal anal sphincter to varying degrees. Once obstructed the suppuration follows the path of least resistant. This determines the location of the abscess (perianal, inter-sphincteric or ischiorectal) and the type of fistula. Thus ano rectal abscess is an acute inflammatory process that often is the initial manifestation of anal fistula. While fistula in ano is the continuation of the chronic suppurative condition which follows drainage of

the abscess. Secondary tracts may arise and ramify leading to recurrent abscesses & multiple perianal external openings.

Treatment of fistula in ano aims to eradicate the septic process by addressing the internal opening and fistula tract while avoiding injury to sphincter mechanism and preventing recurrence. To decrease the morbidity associated with the disease & to achieve better outcomes a wide range of surgical options have been tried with variable results. Frequent exacerbation and recurrences after surgery warn us about the complexity of the disease.[1,2,4] Therefore, understanding the clinical presentation, pathology, anatomy of fistula tract in relation to anal canal & sphincters is essential to manage this disease. Because of chronic suppurative nature of the disease with morbidity and recurrence despite different surgical interventions and confounding data & controversies about prevalent practices we initiated this study with the objective of studying clinical presentation, pathology, imaging and management of anal fistula disease in our region.

METHODS

In this prospective study all adult patients (>12 years) operated in the Department of Surgery, Gandhi Medical College, Bhopal from March 2015 to Dec 2016 were included. A total number of 90 patients (78 males & 12 females) operated for fistula in ano were studied. The patients were not randomized for any special investigations, imaging modality or surgical procedures. Clinical presentation, detailed history including the past history of tuberculosis, anorectal abscess and previous fistula surgery was taken. The findings on clinical examination (digital examination and proctoscopy) were recorded. A preliminary preoperative workup was done & pus was sent for cultures and sensitivity. In imaging studies fistulography was done in 72 patients while MRI was done in 16 patients with complex & recurrent fistula. In patients suspicious to have tuberculosis on clinical evaluation x-ray chest, sputum for AFB, abdominal Ultrasonography, serum ADA and other relevant specific investigations were done to confirm tuberculosis.

Patients were operated after an informed consent & fistulotomy, fistulectomy, seton placement & ligation of intersphincteric tract were the operations performed. Excised tissue was sent for histopathological study. Microscopy (Ziehl Neelsen staining) of pus for mycobacterium tuberculosis was done in patients suspected of having tuberculosis. Cartridge Based Nucleic Acid Amplification Test (CBNAAT) on pus/tissue was done in four cases where tuberculosis was clinically suspected due to abdominal symptoms, multiple external opening and recurrent fistula.

Postoperatively the patients were advised sitz bath and self-care for their wounds by cleansing with tap water and betadine solution. Oral antibiotics were prescribed for 1-4 weeks based on culture sensitivity reports. All the patients were followed up clinically weekly till fistula healed and assessed for incontinence and recurrence of local sepsis. Later on patients were called for clinical evaluation at six monthly intervals till 1-2 years. The clinical data was collected & recorded in excel sheet and a descriptive analysis of collected data was done. Quantitative data was expressed as median and range, while qualitative variables as number (proportions,%). Z score calculator for paired sample proportions and two tailed hypothesis was used for comparative analysis and p value of <0.05 was considered significant.

RESULTS

Age and gender distribution

In our study maximum 54 (60%) patients were in age group 21 – 40 yr and 29 (32.2%) patients were in age group 41-60 yr (Table 1). The disease predominantly affected males (86.6%) and Male: Female was 6.5:1.

Table 1: Age and gender distribution (n=90).

Age in years	Gender Male	Female	Total no. of patient s
	N (%)	N (%)	
<20	03 (3.3)		03
20-40	46 (51.11)	08 (8.89)	54
40-60	25 (27.78)	04 (4.44)	29
>60	04 (4.44)		04
Total	78 (86.6)	12 (13.3)	90

Table 2: Clinical presentation (n=90).

	No of patients	Percentage (%)
Symptom/ clinical findings		
Pus discharge	82	91.1
Pain	74	82.2
Swelling	28	31.1
Bleeding per rectum	8	8.8
Skin excoriation	11	12.2
Pruritis	21	23.3
Local examination findings		
External opening seen	85	94.4
Multiple external openings	13	14.4
External opening in relation to transverse line through centre of anal canal.		
Anterior	19	22.3
Posterior	66	77.6
Internal opening		
Midline posteriorly	65	72.2
Anteriorly	18	20
Lateral	04	4.4
Not seen or felt	03	3.3

Clinical presentation

Clinically the patients presented with complains of perianal pus discharging wound, pain in perianal region, bleeding per rectum, skin excoriation, perianal pruritis etc. A history of abdominal pain, loss of weight, altered bowel habits, tenesmus, bleeding per rectum, tuberculosis, HIV, Crohn's disease, diverticulitis, pelvic radiation therapy may suggest complex fistula. In our study the presenting complains (Table 2) were perianal discharge in 82 (91.1%) patients, pain in 74 (90%) patients & swelling in perianal region in 28 (31.1%). Other complains were bleeding per rectum, skin excoriation & pruritis.

Local examination

Clinical examination was most important aspect of fistula management. Patients were examined for external opening, pus discharge, inflammation or abscess, palpable fibrous fistula tract or indurations, internal opening, sphincters and abdominal findings. On digital rectal examination the internal opening which is usually in midline posteriorly may be palpable as a pit like depression just above the dentate line in most of the cases. The course of the fibrous fistula tract was palpated bimanually with one finger in the anal canal and thumb outside up to the external opening. Intersphincteric high tracts were palpable as fibrous tender tracts on digital examination. Note was made of anal sphincter tone, squeeze pressure & relationship of fistula tract to the anorectal ring. Proctoscopy was done to confirm the internal opening site and presence of inflamed hemorrhoids or other anorectal pathology.

We could make a good diagrammatic representation of the internal opening, course of fistula tract in relation to the sphincters and the external openings. On clinical examination (Table 2) external opening was found in 85(94.4%) patients & was not seen in 5 patients. Internal opening was seen most frequently in midline posterior position in 65(72.2%) patients. Internal opening was anterior in 18 (20%) patients. In three patients the internal opening was in anterolateral and in one patient it was on posterolateral aspect of anal canal. Internal opening was not seen or felt on per rectal examination in 3 patients (3.3%).

Location of external opening

The Goodsall's rule helps to anticipate the anatomy of a fistula tract. In our study anterior anal fistulae were seen in 24 (26.6%) patients and posterior anal fistulae were present in 66 (73.3%) patients. Most of the fistula tracts were in accordance with Goodsall's rule, however in two of our 24 patient despite an anterior external opening within three cm from the anal verge the primary tract had a curved course going posteriorly. In three patients with anterior external opening and one patient with posterior external opening the primary tract had a straight course with internal opening on slightly lateral aspect of anal canal.

Imaging studies are helpful to substantiate the clinical assessment, identify the internal opening, delineate the course of fistula tract, look for secondary tracts, see the relationship of tract to the sphincters, and find out collections & other rectal pathology.

Table 3: Summary of imaging studies done.

Imaging study	No of patients	Remarks
Fistulography	72	Done as initial evaluation of fistula. Suggested abscess cavity & complex fistula in 8 patients. Limitation: Course of fistula tract & relationship with sphincters cannot be ascertained.
MRI fistulography	16	Done in complex fistula to see course of fistula tract, ramifications, abscess cavity and relationship of tract to sphincters. Helped identifying high fistula (4), suprasphincteric extension (2), rectal wall thickening (1) & unsuspected intersphincteric abscess (2). Helped identifying probable internal opening in 12 (75%) with clinical correlation.
CT scan abdomen & pelvis	02	Done for evaluation of abdominal complains, pararectal collections (1) & rectal pathology (1).

Fistulography was done as a preliminary study in 72 patients by injection of contrast via the internal or external opening and taking anteroposterior, lateral, and oblique radiographic images to outline the course of the fistula tract. Fistulography fails to visualize the sphincters and the levator sling thus the relationship of the fistula tract with these cannot be ascertained. Due to lack of proper filling secondary tracts cannot be assessed accurately. We found fistulography to be useful in identifying simple fistula and delineating abscess in relation to fistula or suspecting complex fistula. It is a simple, easy to perform and cost effective investigation for preliminary evaluation of anal fistula. Magnetic resonance Imaging (MRI) fistulography (Figure 1 and 2) was done in 16 patients, when clinical evaluation or fistulography was felt insufficient and in complex or recurrent fistula. The results of imaging studies are summarized in Table 3.

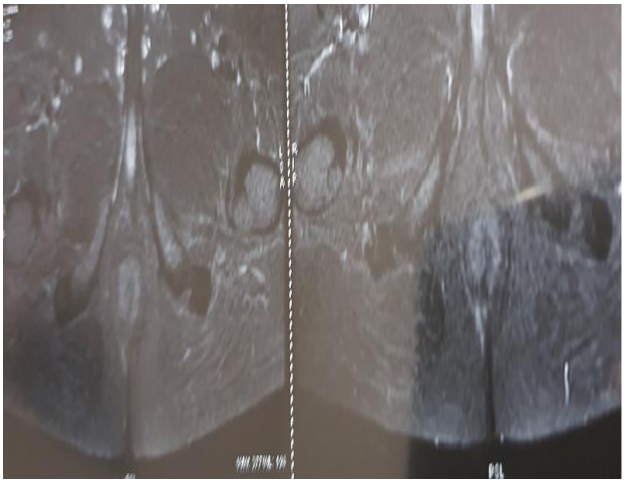

Figure 1: MRI T-2 phase showing low trans-sphincteric fistula.

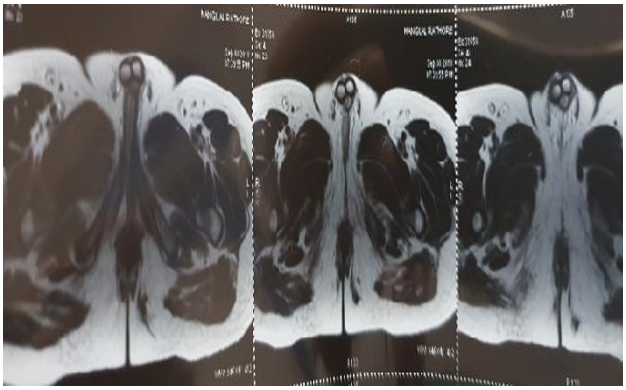

Figure 2: MRI, T-1 phase, bilateral horse shoe fistula.

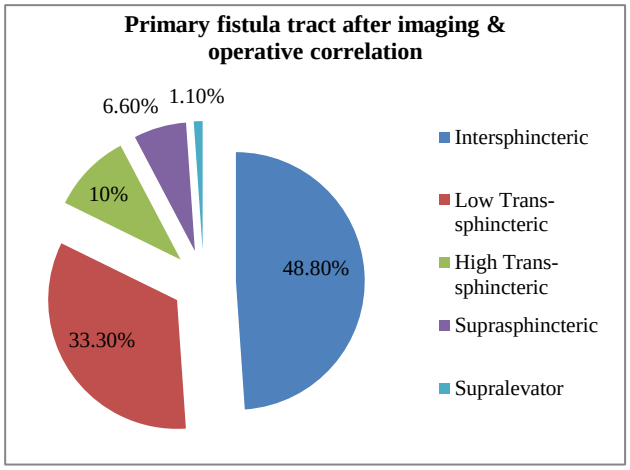

Figure 3: Fistula tract.

Pus culture

In our study pus culture & sensitivity was done in 48 patients. It revealed polymicrobial organisms in 18 (37.5%) patients. The most common organism were from gut flora mainly *Escherichia coli (45%)* followed by *Bacteroides fragilis (23%)*. Other microorganisms reported were *Enterococcus faecalis (17.7%), Coagulase-negative Staphylococci, Staphylococcus aureus* and *Klebsiella pneumonia.* Culture was sterile in 11%.

Operative findings and surgery performed

Type of fistula: In our study intersphincteric fistula was most common 44(48.8%) (Figure 3) and low trans-sphincteric fistula was seen in 30 (33.3%) patients. High transphincteric fistula was seen in nine (10%) patients.

Table 4: Operation and outcomes.

Operation	No of patients	Incontinence	Recurrence
	N (%)	N (%)	N (%)
Fistulotomy	46 (51.1)	1 (2.17)	1 (2.17)
Fistulectomy	28 (31.1)	2 (7.14)	1 (3.57)
Seton (cutting)	12 (13.3)	5 (41.66)	3 (25)
LIFT	04 (4.4)		Nil

On comparing between fistulotomy & fistulectomy incontinence was observed more often after fistulectomy (7.14% vs 2.17%) (Table 4). However the p value was 0.29372 & the result was not statistically significant at $p<0.05$.

Recurrence was seen in 3.57% cases after fistulectomy and 2.1% after fistulotomy and this was also not statistically significant (p=0.7188).

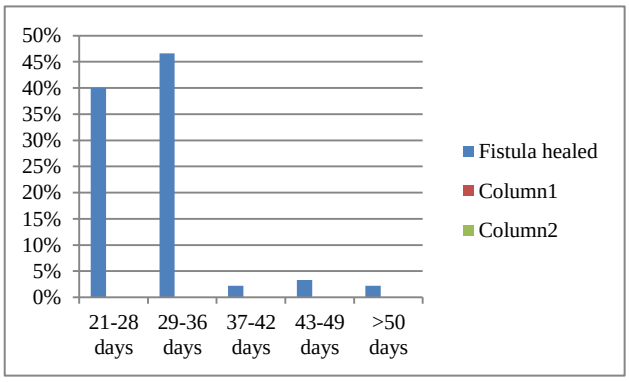

Figure 4: Fistula healing time.

All patients were followed up for time taken for healing of wound after surgery. Healing of wound was seen in 21-28 days in 36(40%) patients, 29-35 days in 42(46.6%) patients, 36-42 days in 2(2.2%) patients, 43-49 days in 3(3.3%) patients, and 50-60 days in 2 (12.9%) patients. (Figure 4, 5)

In our study five (5.5%) patients had persistence or recurrence of purulent discharge & pain in perianal region & physical examination findings consistent with recurrent fistula. In two patients the wound didn't healed and there was persistent pus discharge indicating

treatment failure. In three patients after initial healing of the wound there was recurrent infection followed by pus discharge suggestive of recurrence. Of the five recurrences one each was in fistulotomy & fistulectomy group. Three recurrences were in seton group. In follow-up eight (8.8%) patients reported incontinence for flatus or stools which improved gradually on healing of the wounds.

Figure 5: Fistulectomy.

Figure 6: Healing at 4th week.

In our study, histopathological report (Table 5 and 6) of fistulous tract of 89 patients showed nonspecific infection. Only one patient showed granuloma with epitheloid cell. CB NAAT on slide done in this patient was negative. However the patient was put on anti-tubercular treatment in DOTS. The wound healed within three months of initiating ATT.

Microscopy (ZN staining) for mycobacterium tuberculosis was done in six patients suspected of having tuberculosis. It was negative for AFB in all. CBNAAT in tissue/ pus was done in 4 cases where tuberculosis was suspected due to clinical symptoms, multiple external opening or recurrent fistula. It came positive in one case and patient was put on DOTS therapy. Surgery was performed after 3 months where due to high trans-sphincteric tract, ligation of intersphincteric tract (LIFT) was done. Histopathology of the tract in this case showed chronic inflammatory tract without tubercular granuloma. Thus in our study tuberculosis was seen in only two (2.2%) cases of fistula in ano.

Table 5: Histopathology.

Histopathology	No of patients	Percentage (%)
Squamous epithelium lined tract with polymorphs.	41	45.55
Squamous or columnar lined tract with lymphocyte predominance	37	41.11
Squamous lined tract with granuloma with lymphocytes	11	12.22
Granuloma with epitheliod cells (no caseation)	01	1.11

Table 6: Prevalence of tuberculosis in fistula in ano.

Investigations for tuberculosis	No of patients	Tuberculosis confirmed
Pus for AFB	6	Nil
CB NAAT on pus/tissue	4	1
Histopathology	90	1
Total		2 (2.2%)

DISCUSSION

Demography

The age and sex distribution in our study were similar to other studies on anal fistula. Maximum 54 (60%) patients were in age group 21 – 40 years and the disease predominantly affected males (86.66%) and Male: Female was 6.5:1. Khadia et al in their study on 45 patients of fistula in ano observed maximum or peak incidence of fistula-in-ano was in the age group 41–50 years.[5] The median age was 46 (range 29–65) years. The male to female ratio was 4:1. Saino reported that in a large study of 458 cases the mean age of incidence was 38.3 years.[6] Vasilevsky et al and Bruhl reported that most patients with fistula in ano presented in third and fourth decade of life.[7,8] Ani and Solanke reported male: female of 8:1.[9]

Clinical presentation

In our study also pus discharge, pain and perianal swelling were the more common symptoms. In a clinical study of 199 patients with fistula in ano, Saino P also reported that discharge from the external opening & pain were the most common complaints among the patients.[6]

External opening

Posterior fistulas (73.3%) were more common in our study. In five patients there was no external opening. Intersphincteric tract going upwards was palpable as a

tender cord in anal canal of these patients and MRI fistulography was useful in confirming the diagnosis. There were 13 patients with multiple external openings in our study. But none of these patients were found to have tuberculosis on clinical and histological evaluation. Thus in our study we could not establish the common belief that tuberculosis should be suspected in patients of fistula with multiple external openings. The two patients where tuberculosis was confirmed in our study had only a single external opening.

Nigel Barwood[10] in a prospective study of 107 patients observed that Goodsall's law was more accurate for posterior fistula. In our study we found that in 2 of our 24 patient despite an anterior external opening within 3 cm from the anal verge the primary tract had a curved course going posteriorly.

Internal opening

In our study internal opening was most commonly seen midline posteriorly (65 patients, 72.2%). This has also been reported to be a common observation in other studies. We could find a second internal opening high in anal canal in one patient of intersphincteric fistula. In three patients (3.3%) we did not find any internal opening on clinical evaluation or imaging studies.

Primary fistula tract

In the Park's[11] classification based on the course of fistula tract four groups of anal fistula resulting from crypto glandular infections were: intershincteric (70%), transsphincteric (25%), suprashincteric (5%) and extrasphincteric (1%). The Parks classification[11] system does not include the subcutaneous fistula which is not of cryptoglandular origin but are caused by unhealed anal fissures or anorectal procedures. Besides infection of anal crypt glands fistula may also arise secondary to trauma (ano rectal) anal fissures, inflamed hemorrhoids, tuberculosis, lymphogranuloma venereum, actinomycoses, Crohn disease, carcinoma & radiation therapy.

In our study also intersphincteric fistula was most common (48.88%) and low trans-sphincteric fistula was seen in 30 (33.3%) patients. High transphincteric fistula was seen in nine (10%) patients. Khadia et al in their study of 45 patients also reported Intersphincteric fistula tract in 21 patients (46.6%), transsphincteric tract in 19 patients (42.2%) and suprasphincteric tract in 5 patients (11.1%).

Extra sphincteric fistulae (1%) remain completely outside the sphincter mechanism. They usually arise as a result of tuberculosis, pelvic inflammatory disease or colo-rectal pathology like Crohn's disease, diverticulitis, and carcinoma or radiation therapy. The fistula tract of extra sphincteric fistula courses through the levator ani to the ischiorectal fossa and open in the perianal region.

Complex fistula

Complex fistula is a term used for high transsphincteric, suprasphincteric, extrasphincteric, multiple tracts or abscess, recurrent, rectovaginal, rectourethral & pouch related fistula.[12,13] In our study there were 24 cases of complex fistula (9 high trans-sphincteric, 6 supra sphincteric, 1 extrasphincteric and 8 recurrent fistula).

Imaging studies

Although fistulography is done for initial assessment of fistula, further imaging studies are required for complete evaluation of fistula tract, side branching, abscesses and internal opening.

Endoanal or endorectal ultrasonography using a 7 or 10 - MHz ultrasound transducer through the anal canal can help to identify internal opening, define the sphincter anatomy, differentiate intersphincteric from transsphincteric fistulae and facilitate evaluation of any suprasphincteric extension. The addition of hydrogen peroxide through the external opening can help in delineating course of the fistula tract. However anal endosonography has a limited field of view causes inconvenience and is operator dependent. Endosonography may be used for postoperative assessment of sphincters for incontinence. We did not do endosonography in our study, but we found MRI fistulography to be useful in evaluating complex & recurrent fistula. Presently MRI fistulography is an investigation of choice for imaging of complex and recurrent fistulae. It can delineate the course of the fistula tract, various ramifications of tract, intersphincteric tracts and relationship of the fistula tract to sphincter complex, presence of abscess in ischiorectal fossa, pararectal collections, internal opening & other pathology in rectum. Waniczek et al in their study on preoperative MRI fistulography found that the proportion of fistula tracks correctly classified was 61% with digital examination, 81% with anal endosonography, and 91% with MR imaging.[14] Internal opening was correctly identified in 91% patients on endosonography versus 97% by MR fistulography. MR fistulography show 80-90% concordance with operative findings in fistula surgery. Surgery guided by MR imaging has shown to reduce recurrence and complications like incontinence due to inaccurate surgical assessment of fistula.[14,15]

Enteroclysis /Barium enema or CT Scan of abdomen & pelvis may be required in patients with multiple or recurrent fistula if there is history of abdominal pain to evaluate for tuberculosis, Crohn's disease or colorectal pathology. CT scan may demonstrate rectal inflammatory process, carcinoma or perirectal collections. However, the attenuation values for the sphincters, levator ani, fibrotic fistulous tracks, and active fistulas are very similar and it is difficult to distinctly characterize and differentiate these structures.

Anal manometry may be required for assessment of patients with weak sphincter tone, recurrent fistulae and female patients with anterior fistulae with history of obstetrical trauma. Rigid sigmoidoscopy should be performed for extrasphincteric fistulae or if there is suspicion of associated disease process in the rectum.

Treatment and outcomes

Treatment of fistula-in-ano remains challenging. No definitive medical therapy is available for this condition. In our study there was no statistically significant difference between fistulotomy and fistulectomy in terms of incontinence and recurrence. We did primary repair of external sphincter in patients with high transphincteric fistula. Fistulectomy was associated with a higher incidence of incontinence as compared to fistulotomy but the difference was not statistically significant (7.14% vs. 2.17%; p=0.29). The incontinence following fistulectomy was transient and mainly for flatus with occasional soiling of pads. It improved over few weeks. However no clinically significant difference was noted in terms of recurrence in our study for fistulotomy or fistulectomy (2.17% vs 3.57%; p=0.71). In our experience the effectiveness & safety of commonly performed surgical procedures for fistula in ano depend on identifying & addressing the internal opening, proper drainage of abscesses, addressing primary & secondary tracts & preserving sphincter functions. Failure to detect and eradicate the secondary tract may lead to recurrence and treatment failure. Secondary tracks or ramifications may be seen in the intersphincteric plane, the ischiorectal fossa, or the supralevator space. Horseshoe tracks may pass circumferentially in these planes and may cross the midline and be associated with multiple external opening along the course of the tracts. Sangwan et al in their study had a recurrence rate of 6.5% after surgery for simple perianal fistula. Treatment failure was usually related to the inability to find the internal opening of the fistula, secondary tracts not addressed at surgery, horseshoe fistula and premature wound closure after fistulotomy.

Because of complexity of the fistula tract surgeon's faced the problems of potential adverse effects on continence arising from division of the involved anal sphincter and there were recurrences in many cases. A variety of surgical interventions gradually evolved with the objective of eradicating sepsis to definitively cure the disease without effecting continence and having minimum recurrence. With the aim to have minimum morbidity, early wound healing & to maintain continence, many new therapeutic alternatives to fistulotomy and fistulectomy have been described. Ligation of the intersphincteric fistula tract (LIFT) is alternative minimally invasive surgical option for complex trans-sphincteric fistulas first described in 2007 by Arun Rojansakul.[16,17] It is performed by entering the intersphincteric plane, identifying the fistula tract and hooking it out to ligate and divide the tract with the intention to securely close the internal opening and excise the infected cryptoglandular tissue. The distal tract is curetted and the incision may be left open to drain. We performed LIFT in four patients with high trans-sphincteric fistula with favorable outcomes in all. We added fistulectomy up to external sphincters in all of our cases of LIFT for high trans-sphincteric fistula. We did not observe recurrence in our cases of LIFT. The reported recurrence rate for LIFT ranges from 8 – 28% for complex fistula and is comparable to advancement flap repair (1- 17%) for complex fistula.[18]

In our study in seton group (12 cases) recurrence occurred in three (25%) and incontinence was seen in five (41.66%). Seton placement has been found useful in complex fistulas (i.e., high transsphincteric, suprasphincteric, extrasphincteric), multiple fistulas, recurrent fistulas, anterior fistulas in female patients and in patients with poor sphincter pressures. Setons are to use to drain pus, to bit by bit cut through the remaining sphincters over few weeks and simultaneously promote fibrosis, and healing of sphincters thereby curing the fistula without causing incontinence. Setons used commonly are no-1 proline or nylon suture or silastic vessel markers. The success rates for cutting setons varies from 82-100%. Recurrence rate after seton placement in various studies are up to 17% and incontinence rates can be more than 30%.[19]

Video assisted anal fistula treatment (VAAFT) described by Piercarlo Meinero is done by rigid fistuloscope.[20] The fistula tract is first irrigated to observe the tract, branches and internal opening. Then the fistula tract and its branches are electro cauterized under direct vision and all necrotic material is removed by perfusion. Finally the internal opening is closed by suture, stapler or mucosal advancement flaps. The limitations are inadequate exploration and identification of curved tracts, side branches and internal opening. Collateral thermal damage to adjacent normal tissue can also occur.

Treating complex fistula still remains a challenge for the surgeons. Endoanal advancement flaps and fecal diversion may be required in patients with perineal necrotizing fasciitis, severe anorectal Crohn disease, rectovaginal fistulas, and radiation induced fistulas.[20]

Keeping in view the high recurrence rates and problem of incontinence associated with complex fistula alternative treatments for fistula were investigated. Advances in biotechnology led to the development of tissue adhesives and biomaterials used as fistula plugs. These less invasive therapies have decreased postoperative morbidity and risk of incontinence, but long-term data about recurrence needs to be validated. Addressing the internal opening by these less invasive methods include use of suture, cautery, fistula plugs (fibrin glue, acellular dermal matrix, biosorbable Gore BioA fistula plug) Nitinol clips etc.[21-23]

These new alternative treatments like use of fibrin glue, fistula plugs derived from porcine submucosa, VAAFT and advancement flaps are being increasing reported with varying success rates but claimed to have low

incontinence rates and lesser morbidity. There is a need for evaluating these alternative treatment modalities by well powered, well conducted randomized controlled trials. The long term results of these modern methods are yet to be ascertained, unpredictable and not reproducible. The varieties of new procedures that have been used to treat anal fistulae testify to the complexity of anal fistula.

Prevalence of tuberculosis in fistula in ano

Anoperineal tuberculosis is reported rarely but may coexist with anal fistula. It has been reported in about 5-10% of cases of fistula in ano. Tuberculous fistulae-in-ano have been reported in India, France, Africa, Japan, Australia, Germany, Turkey, and the United Kingdom.[24] Unfortunately, there is no clinical sign or preferred site that allows a tuberculous fistula to be distinguished from a crypto glandular fistula. It should be suspected in patients with constitutional symptoms, lesions with caseous discharge, undermined edges, fistula not responding to conventional treatment, recurrent, multiple or complex fistulae and patients with anorectal strictures & inguinal lymphadenopathy. Histopathological examination of fistula tract should be done in these cases to avoid delay in treatment. Incidence of TB in complex fistulae is reported to be above 60%.

Demonstration of TB in pus by direct examination (Ziehl Nielsen stain) or culture are specific tests used for confirming tuberculosis, although, diagnostic yield is low. In histopathological examination tubercle granulomas with or without caseation surrounded by epitheliod and giant cell can be demonstrated in biopsies. Culture is positive in only 36% of patients with rectal TB.[24] In a study by Shukla et al on 122 patients with fistulae-in-ano operated upon in a 5 year period, 15.6% were found to have tubercular fistulae on histopathological examination.[25] Real time polymerase chain reaction (RT-PCR) for pus or fistula tissue has also been used to detect tuberculosis in suspected cases. RT-PCR is a rapid test and has high sensitivity in detecting Mycobacteria. In a study by Garg et al comparing sensitivity of RT-PCR, histopathology, and AFB smear in detecting MTB in fistula-in-ano RT-PCR was significantly more sensitive than histopathology and AFB smear in detecting MTB in fistula-in-ano.[26] In our study only 2 (2.22%) patients had tubercular fistula and none of these patient had active pulmonary or abdominal tuberculosis. This finding is similar to that reported by Jehoram et al from King Fahd hospital, Saudi Arabia (0.9%) and that reported by Marks et al of St. Mark's Hospital (London) who found a decrease in the incidence of tuberculosis as a cause of anal fistula from 16% to less than 1% at over a 50-year period.[27,28]

CONCLUSION

This study gives an insight into the clinical presentation of anal fistula and the various investigative and conventional treatment modalities which can be offered to the patients. A digital anorectal examination and Proctoscopy were sufficient to establish the diagnosis in approximately 90% of the patients. MRI is advisable in cases of complex and recurrent fistulas. Fistulotomy and fistulectomy were most commonly performed operations and had comparable and acceptable rates of fistula healing & recurrence. Seton insertion is useful in high trans-sphincteric fistula and suprasphinteric fistula. Most of the post operative wounds healed in 21 – 60 days. We observed incontinence in 8.8% patients and recurrence of fistula in our study was 5.5%. We found tuberculosis in only 2 (2.2%) of our patients presenting with fistula in ano. The incidence of tuberculosis in fistula in ano has also been found to be very low in various other recent studies.

We relied largely on conventional surgical procedures and had acceptable outcomes in terms of healing rate, incontinence and recurrence. Thus we infer that resorting to fundamental principles of careful clinical evaluation, control of sepsis, identification of fistula tracts, secondary extensions and adequate drainage of the wound can improve the healing rates with minimal morbidity and recurrence. However the limitations of our study were less number of complex fistula included and non availability of newer methods for fistula treatment. There is a need for evaluating the new alternative treatment modalities like fibrin glue, fistula plug, VAAFT and mucosal advancement flaps by well powered, well conducted randomized controlled trials.

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