International Journal of Multidisciplinary Research and Development

IJMRD 2015; 1(7): 491-493
www.allsubjectjournal.com
Received: 26-12-2014
Accepted: 12-01-2015
E-ISSN: 2349-4182
P-ISSN: 2349-5979
Impact factor: 3.762

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MRI findings to intraoperative findings in patients of fistula in ANO: A comparative study

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Abstract
Aim: The aim of the present study was to compare MRI findings to intraoperative findings in patients of Fistula in ANO.
Methods: The study was conducted over a period of 18 months in the Department of Surgery, Mamata Medical College, Khammam. All cases of Fistula in Ano confirmed by clinical and radiological parameters were admitted in Department of Surgery. 50 patients were included in the study. Prior to initiation of study institutional ethical committee approval and informed consent from the patient/legal guardian after the full explanation of research protocol were taken.
Results: Out of 60 patients admitted, position of external opening of fistula tract was anterior to transverse line in 42 (70%) patients. In 18 (30%) patients position of external opening was posterior to transverse line. Out of 60 patients admitted, position of external opening of fistula tract within 3cm distance from anal verge was seen in 48 (80%) patients. In 12 (20%) patients position of external opening was >3cm distance from anal verge. Out of 60 patients admitted, 54 (90%) patients had single external opening of fistula tract and 6 (10%) patients had multiple external openings of fistula tract. Out of 60 patients, in 46 patients correlation was seen between MRI finding and Intraoperative finding in Fistula in Ano. No correlation was seen between the MRI finding and Intraoperative finding in 14 patients.
Conclusion: MRI is a valuable and accurate preoperative investigation for evaluation of perianal fistula activity and abscess localization, so it can aid surgical decision making. Moreover, MRI allowed accurate fistula detection, internal opening identification, and evaluation of its relation to sphincters, so it can help surgical procedure planning. To summarise, evaluation of a Fistula in Ano by MRI, provides most of the details necessary for accurate evaluation.

Keywords: Fistula in Ano, MRI, fistulogram, fistulectomy, seton

Introduction
Perianal fistulas constitute a heterogenic group of pathologies of the terminal part of the gastrointestinal tract and perineal area, jointly termed as anorectal malformations [1]. These are canals filled with granulation tissue and surrounded by thick fibrous tissue. Most of the fistulas are of glandular origin – cryptogenic – and a relatively straight, slightly elliptical tract starting in the perianal area, with the internal orifice in the anal canal, at the level of the crypt. Very rarely fistulas develop in the course of colitis ulcerosa, Leśniowski-Crohn disease, or tuberculosis. The portals of infection may include anal fissure, postoperative wounds, anal injuries, and neoplasms of that area. Their course and natural history are frequently untypical. The main role in pathophysiology of fistula formation is played by the location and the number of perianal glands specific for that region, as well as the direction in which the infection spreads along anatomical planes [2-3]. More prone to complications are patients on immunosuppression, HIVinfected [4-6].
There are three main radiological imaging techniques in perianal fistulas which are essential in the evaluation of the fistula extent, type of tissues involved and presence of additional inflammatory or purulent foci, location of external and internal openings of the fistula, and the course of the main canal and potential additional branches. They include: contrast fistulography, endorectal ultrasonography and magnetic resonance imaging [7-9]. Each of these methods is related to some benefits, as well as limitations; they are used interchangeably in inconclusive cases. Diagnostic tests are extremely helpful in the evaluation of the precise extent of surgical procedure.
As the major cause of fistula-in-ano is cryptoglandular infection, abscess formation is not unusual. Proper manipulations, such as curettage and drainage of blind sinuses, abscess cavities, and accessory tracts, are the key for successful treatment. Physical examination alone may not be sufficient in detecting these features of the fistula, and imaging modalities play a very important complementary role [8]. Fistulography, computed tomography (CT), endoanal ultrasonography (EUS), and magnetic resonance imaging (MRI) may be used to delineate anal

Fistulas [10]. Fistulography has not gained popularity because of its very poor diagnostic accuracy [11]. Low soft tissue contrast and need for cannulating the fistula to increase the contrast are the main causes that decrease the utility of CT in the assessment of anal fistulas [12].

Traditionally been imaged by conventional fistulograms; the procedure involves cannulation of the external opening and injection of a water-soluble contrast into the fistula. This method has two main disadvantages: First, the primary tract and its extensions do not fill with contrast if they are plugged with pus or debris and, second, the sphincter muscle anatomy is not imaged and hence the relation between the tract, the internal/external sphincter, and the levator ani muscle is not revealed [9]. A successful outcome after fistula surgery requires an accurate assessment of the fistula and patient expectations (especially in terms of risk to incontinence) [13].

The aim of the present study was to compare MRI findings to intraoperative findings in patients of Fistula in ANO.

Materials and methods

The study was conducted over a period of 18 months in the Department of Surgery, Mamata Medical College, Khammam. All cases of Fistula in Ano confirmed by clinical and radiological parameters were admitted in Department of Surgery. 60 patients were included in the study. Prior to initiation of study institutional ethical committee approval and informed consent from the patient/legal guardian after the full explanation of research protocol were taken.

Inclusion Criteria:

The patients diagnosed as Fistula- in- Ano who underwent surgical intervention during the study period.

Exclusion Criteria:

- All congenital fistulas
- Malignancy
- Inflammatory bowel disease patients
- Incontinent patients
- Patients with rectovaginal fistula
- Cases unfit or refused for surgery

Study Planning

All the patients admitted were evaluated for fistula by history, clinical examination and investigation. Patients of Fistula in Ano were classified as anterior and posterior as per imaginary transverse line passing from the centre of anus, in lithotomy position. The position of external opening of fistula tract is described in o'clock position, where anterior midline position is taken as 12 o'clock and posterior midline is taken as 6 o'clock position.

Results

Table 1: Position of external opening of fistula tract (as per transverse line)

Position of external opening of fistula tract	No. Of patients	Percentage
Anterior to transverse line	42	70
Posterior to transverse line	18	30
Total	60	100

Out of 60 patients admitted, position of external opening of fistula tract was anterior to transverse line in 42 (70%) patients. In 18 (30%) patients position of external opening was posterior to transverse line.

Table 2: Position of external opening of fistula tract (distance from anal verge

Position of external opening of fistula tract	No. Of patients	Percentage
</= TO 3CM	48	80
>3CM	12	20
TOTAL	60	100

Out of 50 patients admitted, position of external opening of fistula tract within 3cm distance from anal verge was seen in 48 (80%) patients. In 12 (20%) patients position of external opening was >3cm distance from anal verge.

Table 3: Number of external opening of fistula tract

Number of external opening of fistula tract	No. of patients	Percentage
Single	54	90
Multiple	6	10
Total	60	100

Out of 60 patients admitted, 54 (90%) patients had single external opening of fistula tract and 6 (10%) patients had multiple external openings of fistula tract.

Table 4: MRI finding correlating with intraoperative finding

	No. of patients	Percentage
Both correlate	46	76.66
Do not correlate	14	23.34
Total	60	100

Out of 60 patients, in 46 patients correlation was seen between MRI finding and Intraoperative finding in Fistula in Ano. No correlation was seen between the MRI finding and Intraoperative finding in 14 patients.

Discussion

The improved surgical techniques have rendered steep fall in recurrence rate. With better training in colorectal surgery over recent decades and more experience in surgery of the anal sphincters, surgeons now have the confidence to try new methods for the treatment of an anal fistula to preserve the external sphincter [13]. The external anal sphincter (a striated muscle) is clearly visualized on MRI. It is hypointense on T1W, T2W, and fat-suppressed T2W images, and is bordered laterally by the fat in the ischioanal fossa. The coronal images depict the levator ani muscle (levator plane), the identification of which is important to distinguish supralevator from infralevator infection [14].

In that initial report, MRI showed 87.5% concordance with the surgery. MRI has the ability to differentiate soft tissues, identify tracts outside the anal canal, and demonstrate the images compatible with the surgically relevant plane [15, 16]. The Association of Coloproctology of Great Britain and Ireland [17] defined MRI as an imaging technique with high sensitivity and specificity for the diagnosis of the primary fistula tract and recommended this technique for imaging assessment of the complex or recurrent fistulas. Owing to high soft tissue resolution of MRI, localization of the site of internal opening of anal fistula, definition of the primary and secondary tracts and their relationships with the sphincter muscles, and presence of horseshoe fistulas and abscesses can be more accurately depicted preoperatively compared with physical examination [18].

Out of 60 patients admitted, position of external opening of fistula tract was anterior to transverse line in 42 (70%) patients. In 18 (30%) patients position of external opening was posterior to transverse line. Out of 60 patients admitted, position of external opening of fistula tract within 3cm

distance from anal verge was seen in 48 (80%) patients. In 12 (20%) patients position of external opening was >3cm distance from anal verge. Out of 60 patients admitted, 54 (90%) patients had single external opening of fistula tract and 6 (10%) patients had multiple external openings of fistula tract. Out of 60 patients, in 46 patients correlation was seen between MRI finding and Intraoperative finding in Fistula in Ano. No correlation was seen between the MRI finding and Intraoperative finding in 14 patients. In a study done by Alexander *et al*, in 92.5% patients of Fistula in Ano, the position of external opening of fistula tract was < 3cm in distance from anal verge and in 11% patients, the position of external opening of fistula tract was >3cm in distance from the anal verge [19].

Frequently, the internal orifice is narrowed, small or periodically closed. If the internal orifice with an infected intersphincteric gland is not removed, and if all additional canals of the fistula are not found and properly drained or also removed, then the probability of recurrence is high. Many failures of surgical treatment are related to insufficient identification of the fistula course, or failure in finding all of the branches or internal orifices. Additionally, difficult anatomical conditions limit aggressive diagnostics and treatment before and during surgery, due to the concern of sphincter injury and subsequent fecal incontinence. The least frequently used method – fistulography – is helpful only in visualization of the main canal of the fistula; the sensitivity of that method, according to different authors, ranges from 24% to 50%. Additional branches, frequently filled with granulation tissue, are not accessible for a contrast agent administered during that test [20-22]. In support of the efficacy of MRI for perianal fistula evaluation, Lee *et al* [23]. used MRI as a comparative gold standard and found transperitoneal US corresponded with MRI findings with sensitivity and PPV of 76.3% and 84.2% for fistula detection and 56.3% and 90.0% for diagnosis of abscess cavity, while colonoscopy corresponded with MRI findings with sensitivity and PPV of 67.8% and 89.9%, respectively, for fistula detection and 43.8% and 48.8% for abscess detection.

Conclusion

MRI is a valuable and accurate preoperative investigation for evaluation of perianal fistula activity and abscess localization, so it can aid surgical decision making. Moreover, MRI allowed accurate fistula detection, internal opening identification, and evaluation of its relation to sphincters, so it can help surgical procedure planning. To summarise, evaluation of a Fistula in Ano by MRI, provides most of the details necessary for accurate evaluation.

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