# DIAGNOSTIC ACCURACY OF MAGNETIC RESONANCE IMAGING IN PERIANAL FISTULA

Kalsoom Nawab[1], Mahnoor Rehman Khan[1], Anwar Ul Haq[3], Abdur Rehman Khan[2]

## ABSTRACT

**Objective:** To evaluate the diagnostic accuracy of magnetic resonance Imaging in pre-operative evaluation of fistula-in-ano.

**Material and Methods:** The study was conducted in the department of Radiology Khyber Teaching Hospital MTI Peshawar from June, 2014 to June, 2016. A total of 50 patients with symptomatic fistula-in-ano referred for MRI pelvis and meeting the inclusion criteria were included in the study. Informed consent was taken for MRI pelvis. All patients had body coil MR Imaging examinations including the following sequences for anatomic and pathological information: T2 sagittal, T1 axial oblique, T2 axial oblique, oblique axial and oblique coronal fat suppressed T1 with gadolinium based contrast medium. Surgical findings were accepted as gold standard. MR Imaging findings were compared with surgical findings using Park's Classification and St. James University Hospital classification. The data were entered and analysed into SPSS (version 21).

**Results:** In our study of 50 patients 44 patients were reported to have correct MRI assessment (88%) confirmed on peroperative findings. 30 (68 %) cases had intersphincteric primary tract , 9 (20%) patients had trans sphinteric primary tract, 4 cases(9%) suprasphincteric and 1(2.2%) had extrasphincteric primary tract according to Park's classification. Primary tracts were correctly identified in all patients. In 40 out of 44 patients internal opening were identified while remaining 4 patients showed diffuse trans mural signal abnormality .In 35patients (80%) external opening were correctly identified. 26 patients(60%) had low fistula in Ano, 11(26%) had high anal fistula and in 3 (6%) patients low rectal fistula was identified.4 patients had complex fistula. The sensitivity, specificity, positive predictive value, negative predictive value and accuracy were 91.6%, 85.7%, 97.7%, 60% and 90.9% respectively.

**Conclusion:** MR imaging provides precise definition of the fistulous track, along with its relationship to pelvic structures, and allows identification of secondary fistulas or abscesses. Accordingly, MR imaging provides accurate information for appropriate surgical treatment, decreasing the incidence of recurrence and allowing side effects such as fecal incontinence to be avoided.

**Key Words:** Perianal fistula, diagnostic accuracy, MRI.

## INTRODUCTION

Perianal fistula is a connection between anal canal and skin of perineum[1]. Its prevelance is 10 individuals in 100,000 [2]. It is uncommon process however it causes significant morbidity. Male to female predominance is 2:1[3].Fistula- in- ano is treated by surgery but there is high rate of recurrence[4]. Accurate assessment of the fistulous tract is essential for adequate surgical management[5].

[1] Department of Radiology Khyber Teaching Hospital, Peshawar, Pakistan.
[2] Department of Medicine Hayatabad Medical Complex Peshawar Pakistan.
[3] Department of Radiology Naseer Teaching Hospital, Peshawar, Pakistan.

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**Address for correspondence:**
**Dr. Kalsoom Nawab**
Assistant Professor
Department of Radiology, MTI, Khyber Teaching Hospital, Peshawar, Pakistan.
Cell: 03239597987
Email: kalsoomnawab@gmail.com

There are two main classification systems for perianal fistulas; the Park's classification and the St James University Hospital classification. According to Park's classification fistula were classified into four groups: intersphincteric, transphincteric, suprasphincteric and extrasphincteric[6]. The St James university Hospital classification relates MR Imaging findings in axial and coronal planes to Park's surgical classification. According to this classification fistula is graded into five groups: grade 1, simple linear intersphincteric fistula; grade 2, intersphincteric fistula with an abscess or secondary tract; grade 3, transphincteric; grade 4, transphincteric with abscess or secondary tract in ischiorectal or ischioanal fossa; grade 5, supralevator and translevator[2]. The anal canal is tilted approximately 45 degree in sagittal plane. Therefore it is necessary to obtain oblique axial and coronal images. Sagittal T2 weighted sequence should initially be performed. This is followed by obtaining true axial and coronal planes along the long axis of anal canal[1].

MR Imaging has become the standard for imaging evaluation of perianal fistula due to its excellent soft tissue on contrast[7]. MR Imaging provides detailed anatomical relationship between the anal sphincter and

the anal fistula. This aids the surgeon in choosing the best surgical treatment and preventing recurrence[1]. MR Imaging helps in identifying hidden areas of sepsis and secondary extensions[5]. Therefor this study is conducted to determine the diagnostic accuracy of MR Imaging in pre-operative evaluation of fistula-in-ano.

## MATERIALS AND METHOD

The study was conducted in the department of Radiology Khyber Teaching Hospital MTI Peshawar over a period of two years from June, 2014 to June 2016. This was a cross-sectional comparative study and non-probability convenient sampling procedure was adopted. A total of 50 patients with age ranging from 20 to 50 years, complaining of purulent rectal discharge and symptomatic fistula-in-ano referred for MRI pelvis were included in the study. While all post operative cases were excluded. Informed consent was taken for MRI pelvis. All patients had body coil MR Imaging examinations including the following sequences for anatomic and pathological information: T2 sagittal, T1 axial oblique, T2 axial oblique, oblique axial and oblique coronal fat suppressed T1 with gadolinium based contrast medium (Table No.1). Surgical findings were accepted as gold standard. MR Imaging findings were compared with surgical findings using Park's Classification and St. James University Hospital classification. The data were entered and analysed into SPSS (version 21).

## RESULTS

In our study of 50 patients 44 patients were reported to have correct MRI assessment (88%). The sensitivity, specificity, positive predictive value, negative predictive value and accuracy were 91.6%, 85.7%, 97.7%, 60% and 90.9% respectively. 30 (68 %) cases had intersphincteric primary tract (Fig no. 1), 9 (20%) patients had trans sphinteric primary tract (Fig no. 2), 4 cases (9%) suprasphincteric and 1(2.2%) had extrasphincteric primary tract according to Park's classification. Primary tracts were correctly identified in all patients. In 40 out of 44 patients internal opening were identified while remaining 4 patients showed diffusetrans mural signal abnormality. In 35patients (80%) external opening were correctly identified. 26 patients (60%) had low fistula in Ano, 11(26%) had high
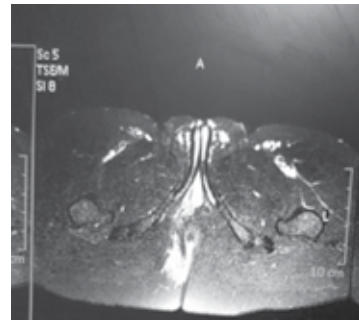


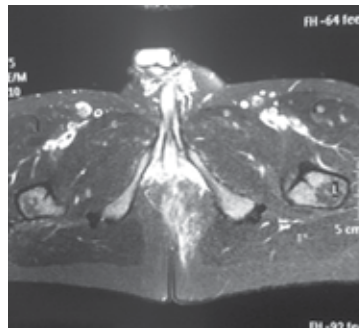Fig 1: Axial T2W FAT SAT showing right peri-anal inter-sphincteric fistula with peri-anal abscess.



Fig No. 2 Axial T2W FAT SAT revealing left perianal trans-sphinteric fistula.



Fig No.3: Axial T2W FAT SAT showing complex peri-anal fistula with both inter-sphincteric and trans-sphincteric components along with abscess in the left ischioanal fossa.

## Table 1: MR imaging protocol for peri anal fistula

| Parameters | T2WFSE | T1WFSE | T2WFSE | FST1WFSE | FST1WFSE |
|---|---|---|---|---|---|
| Imaging plane | Sagittal | Oblique axial | Oblique axial | Olique coronal | Oblique coronal |
| TR/TE (msec) | 400/110 | 400/12 | 400/110 | 400/12 | 400/12 |
| FOV (cm) | 29x29 | 26x26 | 26x26 | 26x26 | 24x24 |
| Section thickness(mm) | 2.5 | 4.0 | 4.0 | 4.0 | 4.0 |
| Intersection gap(mm) | 0 | 1 | 1 | 1 | 1 |
| Matrix | 320x256 | 384x224 | 320x250 | 384x224 | 512x224 |

anal fistula and in 3 (6%) patients low rectal fistula was identified.4 patients had complex fistula (Fig no. 3).

## DISCUSSION

Fistula-in-ano is an uncommon but important condition of the gastrointestinal tract that causes significant morbidity[2]. It has prevalence of 10 in 100,000[1-6]. Idiopathic fistulas are a result of chronic intramuscular anal gland sepsis (Cryptoglandular hypothesis). Other causes of anal fistula include crohn disease, tuberculosis and trauma during child birth, pelvic infection, pelvic malignancy and radiation therapy[2]. Parks et al[6] describes the course of the fistula and its relationship to the coronal plane. According to this classification fistulas were described as: intersphincteric, transphincteric, suprasphincteric and extrasphincteric. In our study out 44 patients 30 (68 %) cases had intersphincteric primary tract, [9] (20%) patients had trans sphinteric primary tract, 4 cases (9%) suprasphincteric and 1(2.2%) had extrasphincteric primary tract according to Park's classification. Our results are comparable to the similar study done by Waniczek et al[8]. Primary tracts were correctly identified in all patients. In 40 out of 44 patients internal opening were identified while remaining 4 patients showed diffuse trans mural signal abnormality. In 35patients (80%) external opening were correctly identified. 26 patients (60%) had low fistula in Ano, 11(26%) had high anal fistula and in 3 (6%) patients low rectal fistula was identified. 4 patients had complex fistula. The treatment of perianal fistula is based on its type and the degree of involvement of the surrounding structures of pelvis. So MR Imaging plays an important role in determining the proper treatment of perianal fistulas.Before the introduction of MR imaging for these purposes, several other imaging techniques were used, with disappointing results. Fistulography was inaccurate and unreliable owing inability to assess secondary extensions and inability to visualize the anal sphincters and hence determine their relationship to the fistula[9]. CT usually fails to define subtle fistulas and abscesses owing to poor resolution of soft tissue[10]. Anal endosonography provides excellent imaging of the rectal wall and anal sphincter and of intersphincteric fistulas and their relationship to the anal sphincters[11]. However, the limited field of view is a considerable inconvenience with this approach, precluding use of endosonography to assess primary superficial, suprasphincteric, and extrasphincteric tracks or secondary extensions. The MR imaging appearance of this condition shows greater concordance with surgical findings than does any other imaging evaluation[12]. Oblique axial and coronal images oriented orthogonal and parallel to the anal canal accurately demonstrates fistulous tracts in relation to anal sphincter complex, levator plate and ischiorectal fossa.

In our study of 50 patients 44 patients were reported to have correct MRI assessment (88%). The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and accuracy were 91.6%, 85.7 %, 97.7%,60% and 90.9% respectively. Similar study was done by Ishfaq et al[13] who found that sensitivity of MRI in diagnosing peri anal fistula taking surgical finding as gold standard was 92.94%, the specificity was 91.76%, the PPV value was 91.86%, the NPV value was 92.86% and the diagnostic accuracy was 92.35%. Their results are almost similar to our study.

## CONCLUSION

MR imaging provides precise definition of the fistulous track, along with its relationship to pelvic structures, and allows identification of secondary fistulas or abscesses. Accordingly, MR imaging provides accurate information for appropriate surgical treatment, decreasing the incidence of recurrence and allowing side effects such as fecal incontinence to be avoided.

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