

The Value of MRI in Preoperative assessment of Perianal fistula

¹Abdulmalik A.Qais, ¹Ibrahim A. Almahbashi, ²Mohammed A. Essa, ³WaheebAlqubati

1 Associate Professor, Radiology department, Faculty of medicine, Sana'a university

2 Associate Professor Surgical department, Faculty of medicine, Sana'a university

3 consultant surgeon, Althawra general modern hospital –Sana'a

Abstract

Back ground: perianal fistula is an important disorder that tends to recur if not accurately diagnosed preoperatively. Purpose: to discuss the MRI patterns, classifications and value in preoperative assessment of perianal fistulas in Yemeni patients in Althawrah General Hospital-Sanaa. Patients and methods: this prospective study included 74 Yemeni patients with clinically diagnosed perianal fistula underwent preoperative MRI assessment using 1.5T and body coil. Images were assessed for presence of fistulas, sepsis, extensions and classification and the result confirmed at surgery. Result: out of the 74 patients of perianal disease, 6 patients were diagnosed as sinuses and 4 as abscesses without internal opening. The remainder 64 patients were diagnosed at MRI to have 72 fistulas and classified as follows; 31(43%) grade 1, 13(18%) grade 2, 14(19%) grade3, 8(11%) grade 4 and 6(8%) grade 5. 15% of fistulas were horseshoe, 19% had secondary tracks and 11% had associated abscesses The majority of fistulas were primary and 24% of fistulas were recurrent after prior surgery .4cases had associated crohns disease ,3cases TB and 2cases rectal malignancy. The overall sensitivity was 100% and specificity 94%. Conclusion: MRI has great value in assessing perianal fistulas and is very helpful preoperative modality especially for complex fistulas which are relatively high in our study as compared to previous western studies

.Key words; perianal fistula ,MRI

INTRODUCTION:

Perianal fistula is an important disorder that has a tendency to recur despite seemingly appropriate surgery. Recurrence is usually caused by infection that was missed during surgery. In addition, complex fistulous track that have complicated course, with secondary extension, and horseshoe fistula or ischiorectal abscesses are often associated with recurrence(1). Thus, accurate preoperative assessment of anatomy, extension and classification of perianal fistulas is crucial for successful treatment.

The traditional contrast material-enhanced conventional fistulography has low accuracy of about 16%because mainly of two disadvantages. First, the primary tract and its extension do not fill with contrast if they are plugged with pus or debris and, second, the sphincteric muscle

anatomy is not imaged and thus relation between tract and internal-external sphincters is not depicted (2).

Transrectal US better shows fistula and its relation to the anal sphincteric muscles, but it has a limited field of view and absence of coronal planes of imaging (3).

CT fistulography usually fails to depict subtle fistulous tract because of similar attenuation values of fistulous tract, sphinctric muscles and fibrosis (4). However, the recent studies have reported that MRI can provide preoperative information of peri anal fistulas better than any diagnostic modality (5,6,7,8). In this study we will describe the value of MRI in preoperative assessment of the perianal fistulas regarding recent fistulous classifications in AlthawrahGeneral Hospital, Sanaa in an adequate number of Yemeni patients.

Classification of perianal fistula:

Parks et al (9) has classified the perianal fistulas into 4 grades(table 1) according to the course and relationship of perianal fistulas to the sphincter mechanism with reference to the anatomy landmarks at coronal plane. However the recent MRI imaging classification is based on St.James's University Hospital Classification (10) which consists of 5 grades(table2) related to the anatomy seen at MRI images in both axial and coronal planes.To fully understand the accurate classification of the perianal fistula,the radiologist should first consider the anatomy and function of the anal sphincter.

Materials and methods

The study was performed in Althawrah general hospital-Sanaa(the largest referral hospital in Yemen) between February 2011 and January 2013. The patients with clinical diagnosis of perianal fistula who were prepared for surgery were included in our study.74 patients(52 male and 22 female)aged 8-75years (mean age of 40years)enrolled in this study.Informed consent was obtained from all patients . All patients underwent high resolution MRI at 1.5 Tesla ,Philips-intra ,using external phased surface array coils. The MR protocol used consists of T1WI (turbo spine echo), T2WI (fast spin echo)and STIR (short tau inversion recovery). Sequences in oblique axial and coronal views with the imaging planes oriented orthogonal and parallels to the anal sphincters respectively were conducted. T1 with intravenous Gadolinium is used when necessary to differentiate old fibrous track from active one (11) . T1WI provides excellent depiction of the anal sphincters complex, levator muscles and ischiorectal fossa. T2WI allows differentiation of fistulous track (appears hyperintense) from the surrounding muscles and sphincters complex.

The images were evaluated by two experienced radiologists for the presence and extent of fistulous track, site of internal and external openings and if any accessory extensions, abscess or horseshoe fistulas. The fistulas then classified according to the most recent widely used St

James,s University Hospital MR imaging Classification of Perianal fistulas(9)which is described in table 2 and the results confirmed at surgery. All patients underwent surgery by experienced surgeons and histopathology was performed when necessary.

Table 1 : Park's classification of fistulas(9)

CLASSIFICATION	DESCRIPTION
Intersphincteric	Confined to intersphincteric space
Trans-sphincteric fistulae	Extension of the track through the external sphincter
Supra-sphincteric	Similar to Trans-sphincteric but it loops over the puborectalis and levator ani,
Extra -sphincteric	Similar to Trans-sphincteric but it opens high in the rectum ,above the pelvic diaphragm

Results

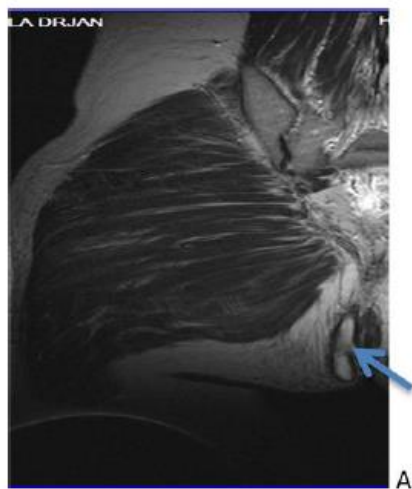
MRI findings and fistulous classifications in our study were summarized in Table 3.Out of 74 patients in our study, 4 cases were identified as having a perianal sinus and 6 cases had perianal abscess with no fistula extending to the anal canal. The remainder 64 patients had 72fistulsin-ano.Majority of the fistulas were simple low type (intersphincteric)which included grade 1(figure 1) and grade2 (figure 2) fistulas. Complex high grade fistulas found in about 39% of cases and represented by grade3 (figures 3,4), grade 4 (figure 5) and grade 5(figure 6)fistulas. Horseshoe fistulas were seen in 15% of all cases. 4 cases were wrongly diagnosed as fistulas track. The remainder of fistulas confirmed at surgery true positive.

Table 2: St Jame's University Hospital MR imaging classification of perianal fistulas (10)

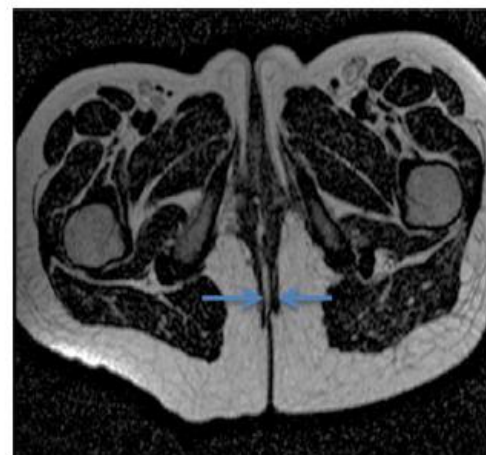
GRADE	DESCRIPTION
1	Simple linear intersphincteric fistula
2	Intersphincteric fistula with intersphincteric abscess or secondary fistula track
3	Trans-sphincteric fistula
4	Trans-sphincteric fistula with abscess or secondary track within the ischioanal or ischiorectal fossa
5	Supralevator and translevator disease

The overall sensitivity was 100% while the specificity was about 94%. Most of the patients (54 patients) presented with primary fistulas, of those, 15 patients had undergone previous perianal abscess drainage. 17 patients had undergone previous fistulas surgery and presented with recurrent fistula. 4 patients associated with Crohn's disease, 2 patients with TB, 2 patients with malignancy, 1 patient post radiation and 1 patient post trauma. Clinically, most of the patients presented with perianal pain, recurrent discharge from perianal external opening, swelling and pruritus or fever and the clinical findings were suggestive of presence of fistula in all patients

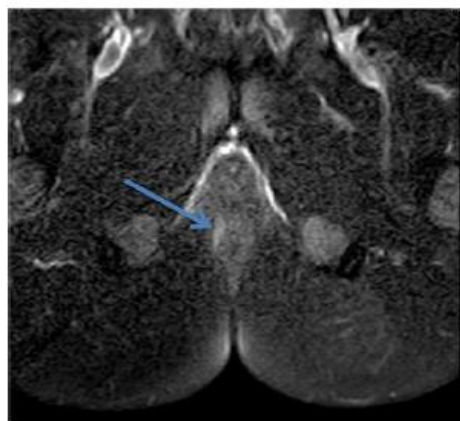
Figure 1 (a-d). Grade I simple intersphincteric fistula (A) coronal image showing linear fistula runs in right intersphincteric space posteriorly (B) axial STAIR demonstrating the internal opening of intersphincteric fistula, (c,d) in another patient (arrowed) illustrate the internal and external openings of intersphincteric fistula.



A



B

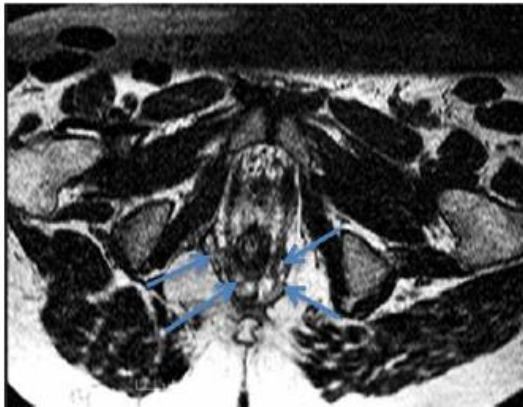


C

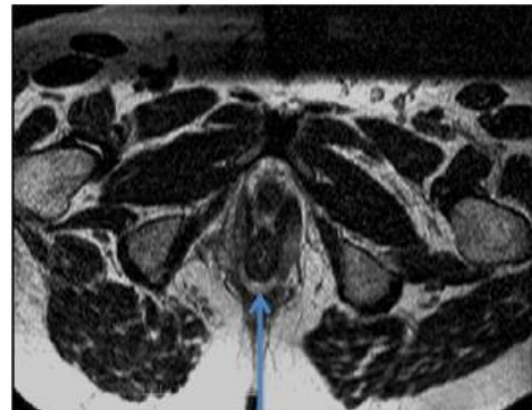


D

Figure 2.(A and B): grade 2 (Complicated intersphincteric fistula). A. Multiple intersphincteric secondary tracks involving both sides (arrows)with horseshoe . (B) T2 axial image depict posterior horseshoe intersphincteric fistula(arrowed).

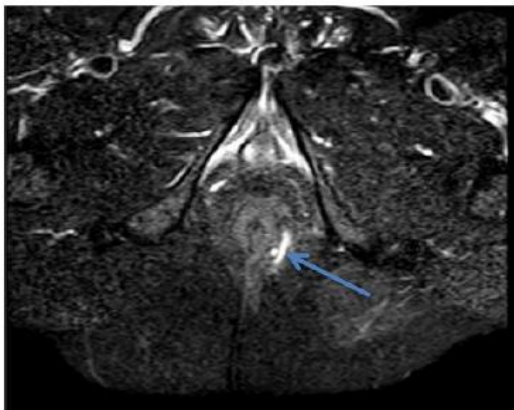


A

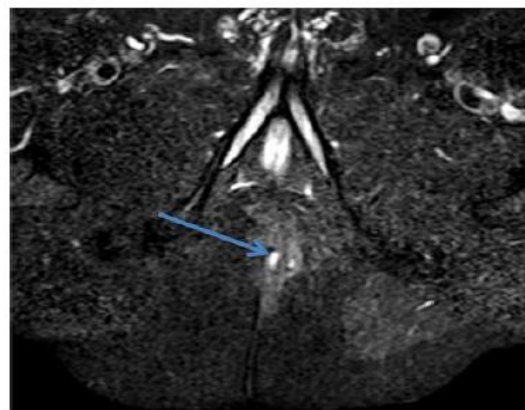


B

Figure 3. Grade 3(trans-sphincteric fistula) . MRI axial STAIR (on right) demonstrates left trans-sphincteric fistula(arrowed) and the internal opening clearly seen (arrowed)on the left image

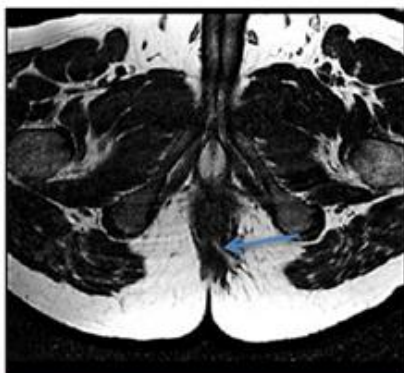


A

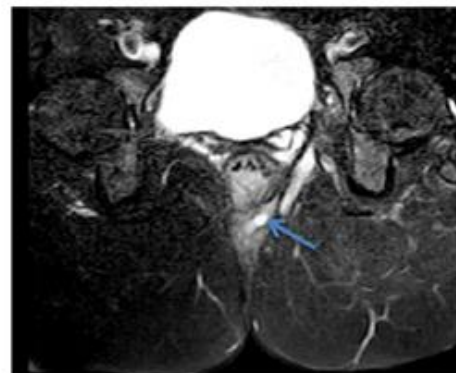


B

Figure 4. (A-B) : grade 3(trans-sphincteric fistula). (A)the fistula seen traversing the left texternal sphincter posteriorly (arrowed) and on (B) enhanced image shows traversing the sphincter anteriorly

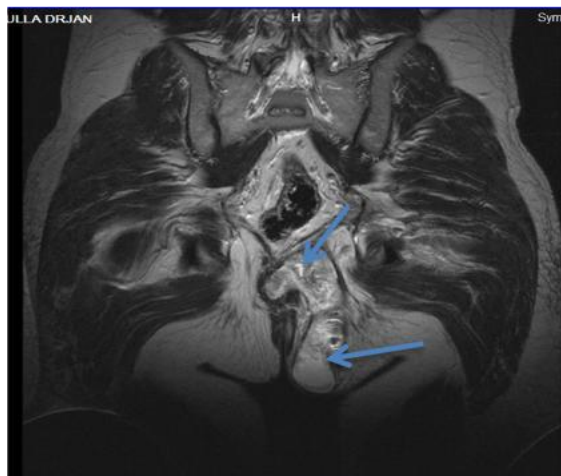


A

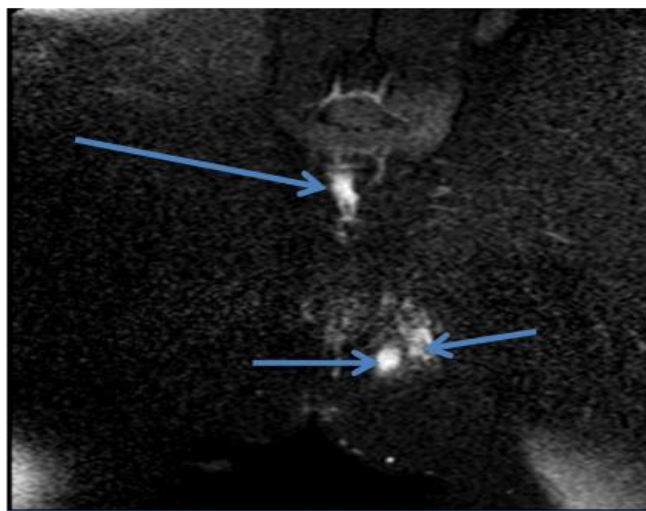


B

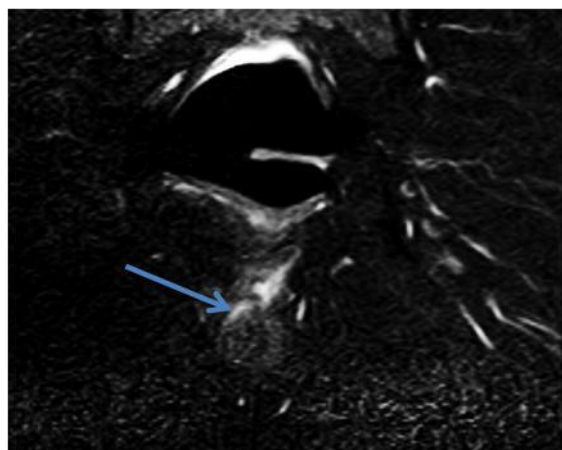
Figure 5 (A-D)



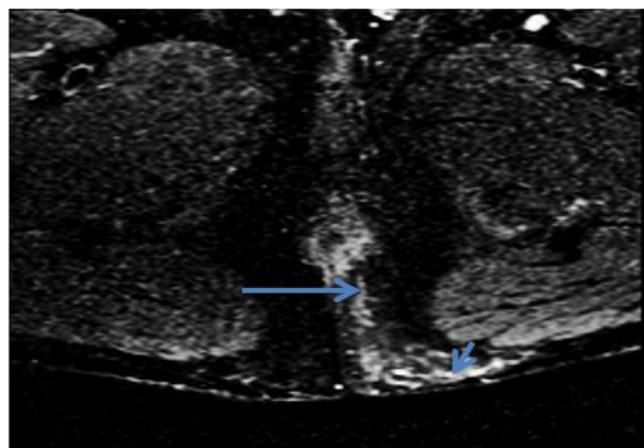
A



B



C



D

Figure 6 ,A-D

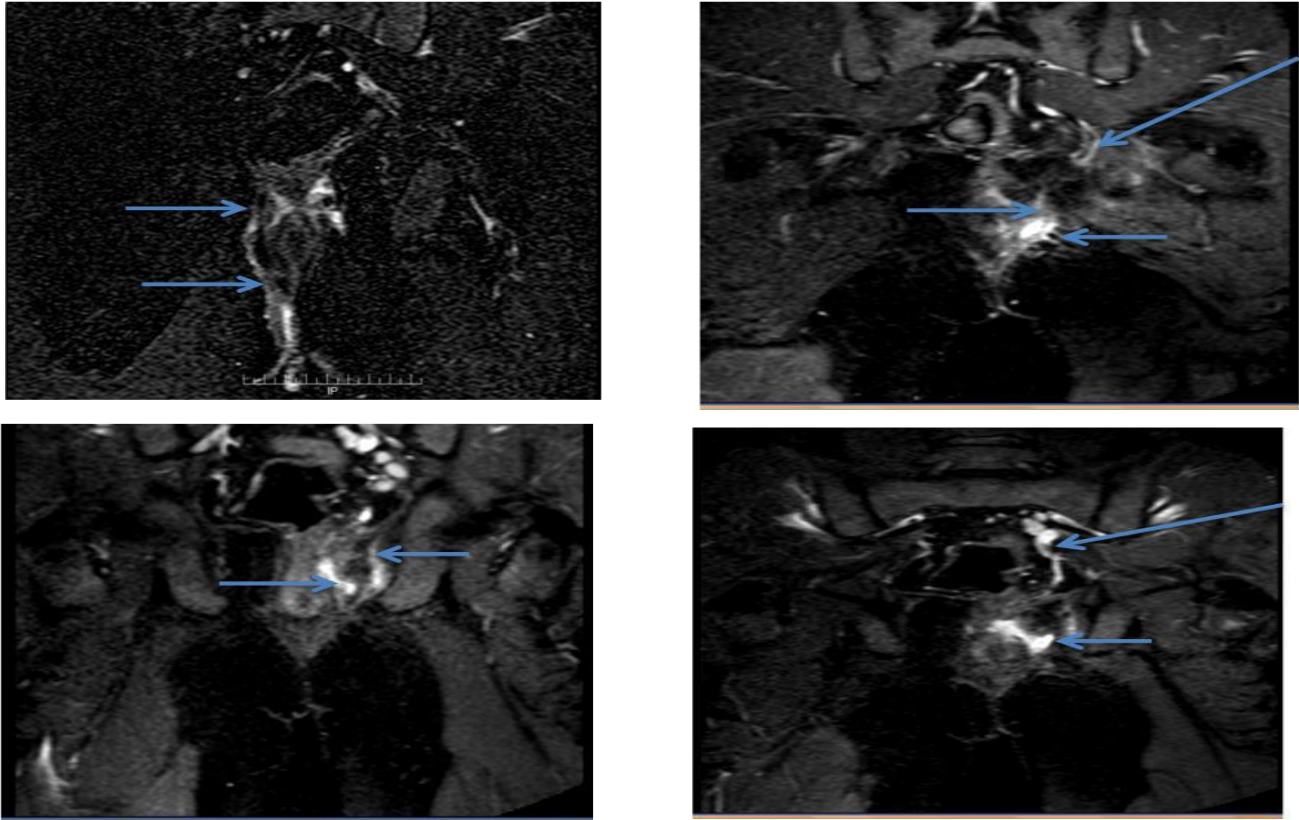


Table 3: MR imaging findings in patients with perianal disease in Al Thawrah Hospital Sana'a

Detected abnormality	n (%)	MR grading
Simple linear intersphincteric fistula	31(43)	I
Complicated Intersphincteric fistula	13 (18)	II
With secondary track	6(8)	
With Horseshoe	4(6)	
With abscess	3(4)	
Trans-sphincteric fistula	14(19)	III
Complicated Trans-sphencteric fistula	8 (11)	IV
With secondary track	3(4)	
With horse shoe track	3(4)	
With abscess	2(3)	
Supralevator fistula	2(3)	V
Translevator fistula	4(6)	
Sinus without fistula	4(6)	
Abscess without fistula	6(8)	

Discussion

A perianal fistula is an abnormal connection between the established surface of the anal canal and the skin. Obstruction of the anal glands which leads to stasis and infection with abscess formation is known to be the most common cause(12). Secondary causes included inflammatory bowels disease (crohn's disease more than ulcerative colitis), infections, malignancy and iatrogenic (13). The key of successful management of fistulas in ano lies in correctly identifying the full extent of disease and its relationship to sphincter complex. Some fistulas recur because distal sepsis has gone unsuspected resulting in incomplete treatment; this is particularly the case if there is supralelevator extension. If surgeon can define the fistulous tract from the external to the internal opening with a probe, the fistula can be cured by fistulotomy(14). The complex fistulas with extensive extensions are often difficult to evaluate during surgery and thus leads to recurrence. In general, the diagnostic imaging of perianal fistula was disappointing until the introduction of MRI. The role of MRI in the diagnosis of perianal fistula is increasing. The accuracy of MRI for fistula classification was not generally appreciated until the prospective study by Lunniset al who examined 16 patients of fistula in ano and agreed with operative findings in 14 patients (13). They concluded that MRI was superior to all previous methods of fistulas assessment. This work was confirmed by others working in this field and was subsequently elaborated on(6,7,8,14,15). Previously, MR classification of perianal fistula was based on Parks classification (table 1). In our study we used The recent MR imaging-based classification (St. James's University Hospital classification) (table 2) because it deals not only with the demonstration of the primary fistulous track but also with the secondary ramifications and associated abscesses(10). In this study most of the patients seen in the MRI department of our academic referral hospital with fistula in ano have been referred because of uncertainties of classification and complexities or because of recurrence

despite seemingly adequate surgery. The sensitivity and specificity of preoperative high resolution MRI for the detection of fistulous track, horseshoe fistula and abscess are, generally, in agreement with those in other studies. However, complex high grade fistulas (grades 3-5) were relatively more frequent in our study (about 39%) in contrast to 22-30% in western studies and we could find different complex fistulous grades in one patient (figure 6 b,c,d). This may be attributed to the negligence and social tradition of the Yemeni patients , specially women. The detection of primary track was high (100%) but specificity was about 94%. Most of the false positive prediction was found at surgery to be fibrotic tracks which lack the hyper intense signal of fluid inside the hypointense fistula track. Although use of intravenous contrast (Gadolinium) can help differentiating granulation tissues from active enhancing fistulous contents but patients with multiple previous operations for recurrent fistulas still have tendency for false positive diagnosis

Conclusions:

MRI has high accuracy in assessing perianal fistulas and is very helpful preoperative modality especially in identification of ramified or complex fistulas, horseshoe fistulas and supralelevator abscess. Complex, high grade fistulas were relatively high in our study as compared to the previous western studies which could be attributed to negligence and tradition of Yemeni patients specially women.

Recommendation

MRI can be preserved for assessment of complex fistulas that could not be assessed by other less expensive and readily available means such as US especially in poor countries such as Yemen.

References:

1. Seow-Choen F, Philips RKS. Insight gained from the management of problematical anal fistula at Marks Hospital. 1984-88 Br J Surg 1991;78:539-41
2. Kuijpers HC, Schulpen T. Fistulography for fistula in ano. Is it useful? Dis Colon Rectum 1985; 28:103-4.

3. Choen S, Burnett S, Bartram CI, Nicolls RG. Comparison between anal endosonography and digital examination in the evaluation of anal fistulae. *Br J Surg* 1991;78:445-7.
4. Guillaumin E, Jeffery RB, Shea WJ, Asing CW, Goldberg HI. Perirectal inflammatory disease: CT findings. *Radiology* 1986;161:153-5.
5. Spencer JA, Chapple K, Wilson D, Ward J, Windsor AC, Ambrose NS. Outcome after surgery for perianal fistula: Predictive value of MR imaging. *AJR Am J Roentgenol*. 1998;171:403–6.
6. Beets-Tan RG, Beets GL, van der Hoop AG, Kessels AG, Vliegen RF, Baeten CG, et al. Pre operative MR imaging of anal fistulas: Does it really help the surgeon. *Radiology*. 2001;218:75–84.]
7. Bhaya AK, Kumar N. MRI with MR fistulogram for perianal fistula: A successful combination. *Clin Gastrointest Magnetom*. 2007;1:56–9.
8. Uttan G, Amandeen S, Shubbra R. MRI in evaluation of perianal fistula. *Journal of Medical imaging and Radiation Oncology* 2011;55:391-400
9. Park AG, Gordon PH, Hardcastle JD. A classification of fistula-in-ano. *Br J Surg*. 1976;63:1–12.
10. Morris J, Spencer JA, Ambrose NS. MR imaging classification of perianal fistulas and its implications for patient management. *Radographics*. 2000;20:623–35.
11. Spencer JA, Ward J, Beckingham IJ, Adams C, Ambrose NS. Dynamic contrast enhanced MR imaging of perianal fistulas. *AJR Am J Roentgenol*. 1996;167:735–41.
12. Barker PG, Lunniss PJ, Armstrong P, Reznick RH, Cottam K, Phillips RK. Magnetic resonance imaging of fistula-in-ano: Technique, interpretation and accuracy. *Clin Radiol*. 1994;49:7–13.]
13. Lunniss PJ, Armstrong P, Barker PG, Reznick RH, Phillips RK. MR imaging of the anal fistulae. *Lancet*. 1992;340:394–6.
14. Halligan Steve, Jaap Stoker. Imaging of fistula in ano. *Radiology*. 2006;239:18–33.]
15. Jaime de Miguel, Laura G, Patricia F, Luis F, Leicia G ,et al. MR Imaging Evaluation of Perianal Fistulas: Spectrum of Imaging Features