International Journal
of
Radiology and Diagnostic Imaging

E-ISSN: 2664-4444
P-ISSN: 2664-4436
www.radiologypaper.com
IJRDI 2022; 5(4): 30-38
Received: 18-08-2022
Accepted: 22-09-2022

Dr. Nikhil Israni
3rd year Resident Doctor,
Department of Radiodiagnosis
AMC Met Medical College
Narendra Modi Medical College
and LG Hospital, Maninagar,
Ahmedabad, Gujarat, India

Dr. Dipti A Shah
Professor and Head,
Department of Radiodiagnosis,
AMC Met Medical College
Narendra Modi Medical College
and LG Hospital, Maninagar,
Ahmedabad, Gujarat, India

Corresponding Author:
Dr. Nikhil Israni
3rd year Resident Doctor,
Department of Radiodiagnosis
AMC Met Medical College
Narendra Modi Medical College
and LG Hospital, Maninagar,
Ahmedabad, Gujarat, India

A study on magnetic resonance imaging in patients having perianal pathology

Dr. Nikhil Israni and Dr. Dipti A Shah

DOI: http://dx.doi.org/10.33545/26644436.2022.v5.i4a.283

Abstract
Introduction: Perianal region is a commonly affected area in the course of several inflammatory, infectious, and neoplastic diseases. Several imaging modalities are used in imaging evaluation of this area and magnetic resonance imaging (MRI) emerges as the imaging modality of choice due to its superb soft tissue resolution. MRI is not only useful for initial detection of perianal pathologies but also in the follow-up of these disorders.
Magnetic resonance imaging (MRI), with its superb soft tissue resolution, is the imaging modality of choice for anal and perianal abnormalities.
Pelvic phased array coils allow more comfortable and tolerable scans with higher signal-to-noise ratios and wider field of view. Parallel imaging techniques result in shorter scan durations
T2-weighted images obtained with and without fat saturation as well as postcontrast T1-weighted images with fat suppression are the most helpful sequences.
Postcontrast images are helpful, mainly for differentiating postoperative changes and chronic granulation or fibrotic tissue from active inflammation and abscess formation.
Axial and coronal oblique images of the anal canal should be acquired with proper and accurate multiplanar prescription in order to get ideal images which are perpendicular and coronal to the anal canal.
Materials and Methods
Inclusion criteria: Patients with perianal discharge, swelling, pain or pruritus & diagnosed of having perianal pathology by MRI study (1.5 T MRI).
Exclusion criteria: All patients referred to department of radiology, L G hospital, maninagar, Ahmedabad with rectal mass by MRI study (1.5 T MRI)
All patients with contraindications to MRI like patients with metallic implants, claustrophobia, pacemakers and patients with contrast allergy.
Study type: Retrospective study (record-based study). Consent not required for retrospective study.
Results and Conclusion
- In our study of 50 patients, out of which 42 were males & 8 were females, the most common affected age group were between 25-35 years (42%).
- The most common location of fistula in our study was at 6'O – 7'O clock (36%) position followed by 12- 1'O clock (28%) position.
- The most common type in our study being intersphincteric type (48%) according to PARK'S classification and the most common Grade in our study being grade 1 (simple intersphincteric fistula) (26%) according to St JAMES classification.
- Adequate understanding of relevant pelvic anatomy and fistula classification on MRI examination is essential in providing proper assessment of perianal fistulas.
- Evaluation of clinically undetectable disease has significant bearing on guiding medical & surgical therapy & can help minimize recurrence & better predict outcome compared to surgical exploration.

Keywords: MRI, perianal, fistula, dentate line, Intersphincteric

Introduction

Perianal region is a commonly affected area in the course of several inflammatory, infectious, and neoplastic diseases. Several imaging modalities are used in imaging evaluation of this area and magnetic resonance imaging (MRI) emerges as the imaging modality of choice due to its superb soft tissue resolution. MRI is not only useful for initial detection of perianal pathologies but also in the follow-up of these disorders.
Magnetic resonance imaging (MRI), with its superb soft tissue resolution, is the imaging

modality of choice for anal and perianal abnormalities.
Pelvic phased array coils allow more comfortable and tolerable scans with higher signal-to-noise ratios and wider field of view. Parallel imaging techniques result in shorter scan durations.
T2-weighted images obtained with and without fat saturation as well as postcontrast T1-weighted images with fat suppression are the most helpful sequences.
Postcontrast images are helpful, mainly for differentiating postoperative changes and chronic granulation or fibrotic tissue from active inflammation and abscess formation.
Axial and coronal oblique images of the anal canal should be acquired with proper and accurate multiplanar prescription in order to get ideal images which are perpendicular and coronal to the anal canal.
Levator ani muscles and supralevator planes should also be included in the field of view as these anatomic sites may also be affected in the clinical course of perianal disorders.

Aims and Objectives
Evaluation of role of magnetic resonance imaging in patients having perianal pathology

Methodology
Inclusion criteria
Patients with perianal discharge, swelling, pain or pruritus & diagnosed of having perianal pathology by MRI study (1.5 T MRI).

Exclusion criteria
All patients referred to department of radiology, L G hospital, maninagar, Ahmedabad with rectal mass by MRI study (1.5 T MRI)
All patients with contraindications to MRI like patients with metallic implants, claustrophobia, pacemakers and patients with contrast allergy.

Study type: Retrospective study (record-based study). Consent not required for retrospective study.

Study time: January 2022 to June 2022. (6 months)

A total of 50 cases with perianal discharge, swelling, pain or pruritus & diagnosed of having perianal pathology by MRI study (1.5 T MRI), at the department of Radiodiagnosis, AMC MET Medical College, Maninagar, Ahmedabad were included in this study.
MRI was carried out on Siemens magnetom essenza 1.5 T MRI, axial and coronal images were obtained.

Anatomy at MRI: perianal pelvic region
Knowledge of the anatomy of the anal canal and its relationship to the surrounding structures is important in the understanding of the disease process and the imaging interpretation of perianal fistulae. The anal canal is a cylindrical structure surrounded by two muscular sphincters, the internal and external anal sphincters, which are composed of smooth and striated muscle, respectively, with an intervening Intersphincteric space. Surgical importance of the sphincter complex lies in the fact that the division of internal sphincter would not cause incontinence whereas disproportionate division of external sphincter can lead to incontinence, a major challenge in fistula surgery. The two sphincters are separated by intersphincteric space, which is a potential fat-containing space with additional extension from the rectal smooth muscle in the form of longitudinal muscle. The role of longitudinal muscle in continence is limited.

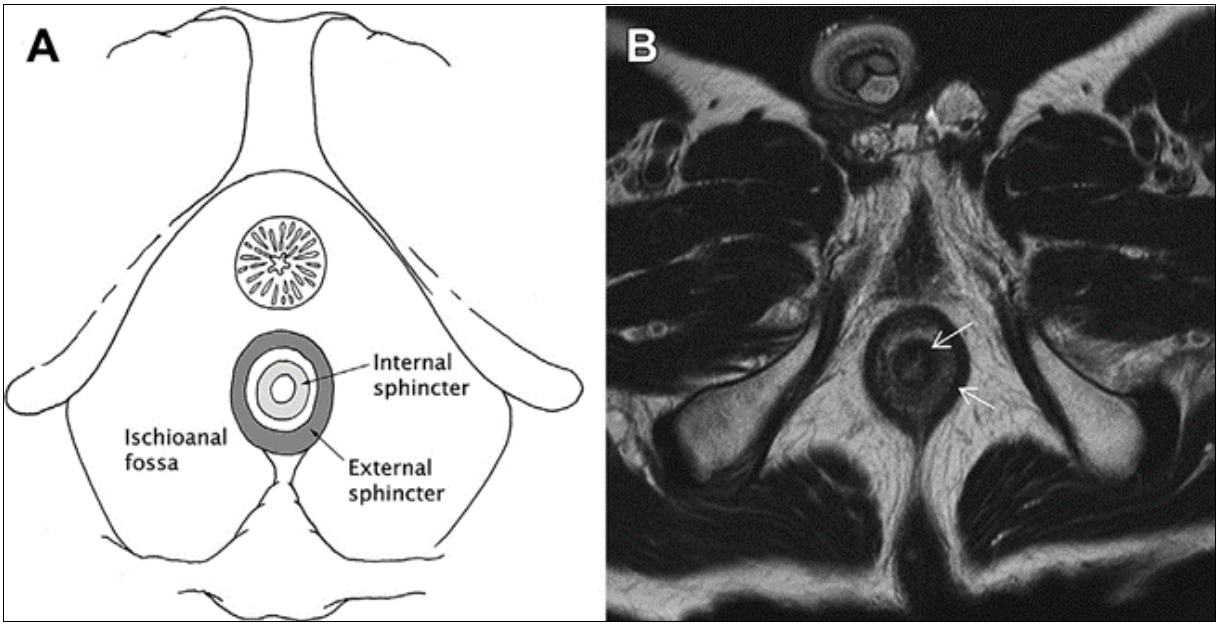


Fig 1: Drawing (A) and axial T2-weighted MR image (B) show the normal anatomy of the perianal region (at the level of the mid-anal canal). Arrows indicate internal and external sphincter.

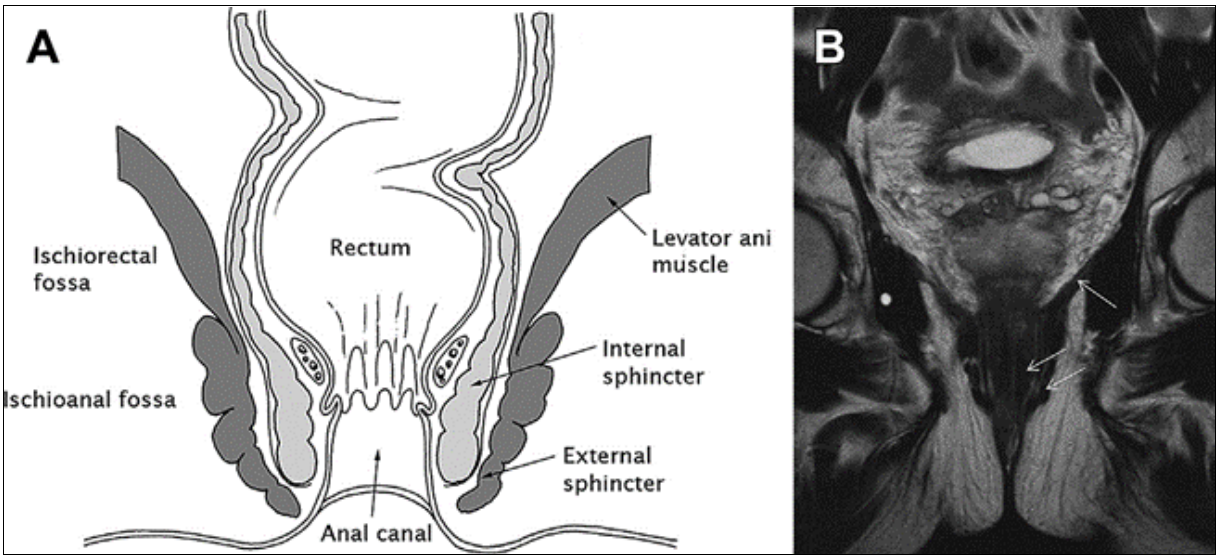


Fig 2: Schematic diagram (A) and T2-weighted image (B) show the normal anatomy of the perianal region in the coronal plane. Arrows in the given image indicates internal and external sphincter.

The epithelial lining of anal canal is columnar in the proximal half and the distal half is lined by the advancing squamous epithelium of the perineal skin. There are longitudinal folds in the proximal anal canal, which are joined side to side by anal folds. The dentate line, which demarcates the site of squamo-columnar junction and also delineates the inferior margin of semilunar folds in the mucosa of the mid- to upper anus, is an important landmark in the pathophysiology of perianal fistulae as it is the site of opening of the deep-seated anal glands, which initiates fistulae formation (Fig 1b). The dentate line is not visualized directly at MRI, it is located approximately 2 cm above the anal verge.

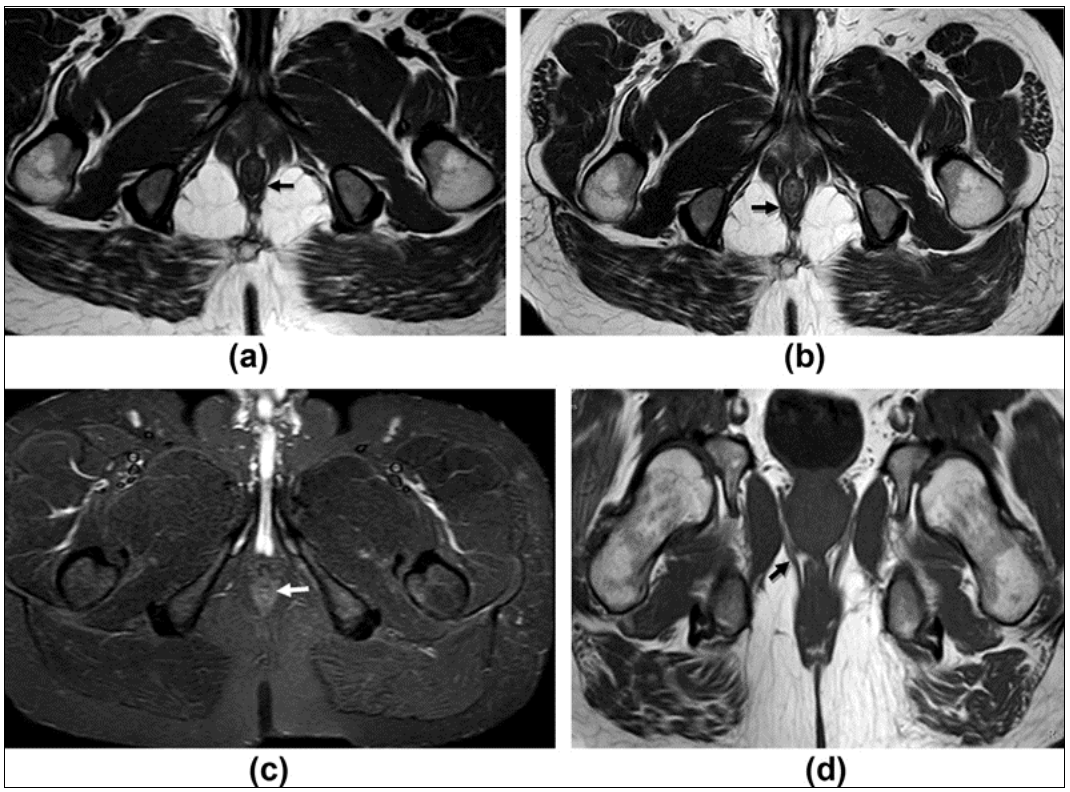


Fig 3: Images showing MRI anatomy of perianal region. The anal sphincter complex appears as muscular rings bounded laterally by ischioanal fat on both sides. The outer/external sphincter muscle appears hypointense on T1W (a) and T2W images (b). The inner/internal sphincter muscle appears hyperintense on T2W and (b) and fat-saturated images (c). The levator ani muscle forms the superior border of the ischio-anal fossa and merges inferiorly with puborectalis, which continues as the external sphincter muscle (d).

The outer layer of the sphincter complex, which is formed by the external sphincter, appears hypointense on T1-weighted (W), T2W, and on T2W fat-suppressed images (Fig 2a & b). The internal sphincter appears relatively hyperintense on T2W images (Fig 2c) and enhances following contrast medium administration.

The external sphincter muscle merges proximally with the puborectalis, which continues as the levator ani muscle.

Coronal MRI depicts the levator plate well, and thus, is able to differentiate between the infra levator tracts from the supralevator one (Fig 2d).

MRI technique

Different MRI techniques have been utilised in the imaging of perianal fistula. All of them provide multiplanar high-resolution images of the perianal region in surgically relevant planes. Thus, the most important aspect of image acquisition is related to obtaining axial and coronal oblique images, which are orthogonal and parallel to the anal canal as the anal canal is oriented at an angle of about 45° anteriorly in the sagittal plane. To achieve such orthogonal orientation of the anal canal, sagittal fast spin-echo (FSE) T2W sequences should be performed as a localiser scan, which provides an overview of the pelvis and displaying the correct axis of imaging. The localiser sequence is used to derive oblique axial (a) and coronal (b) images along the long axis of the anal canal and enabling appropriate assessment of perianal fistulas in the surgically relevant planes. Evaluation of the levator plate and the entire perineum should be included to identify areas of sepsis and infected tracks that may lead to recurrence.

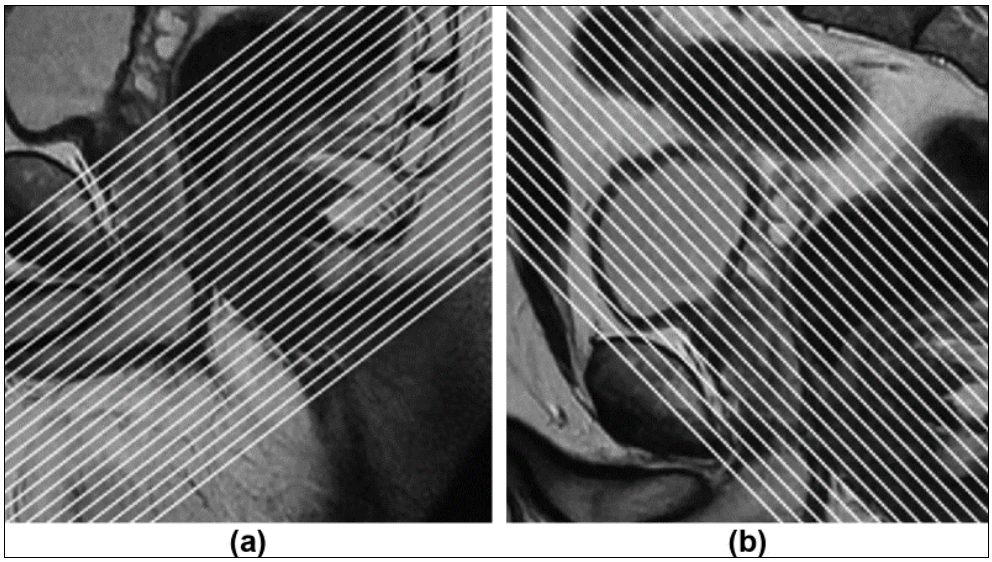


Fig 4: Sagittal FSE T2W image of the pelvis showing the planning for acquisition of oblique axial (a) and oblique coronal (b) scans at an angle of 45° to the midline such that the images are orthogonal and parallel to the anal canal.

Unenhanced T1W images provide an excellent anatomic overview of sphincter complex, levator plate & ischiorectal fossa. Fistulous tract, inflammation however appear as areas of low signal intensity & cannot be distinguished from normal structures. However, T1W images are useful to discriminate between postoperative haemorrhages from residual tract, as the former will appear hyperintense on unenhanced T1W images

On T2W & STIR images, fistulous tract, inflammation & abscess appear as areas of high signal intensity & can clearly be distinguished from normal tissue, which appear hypointense.

Park's classification

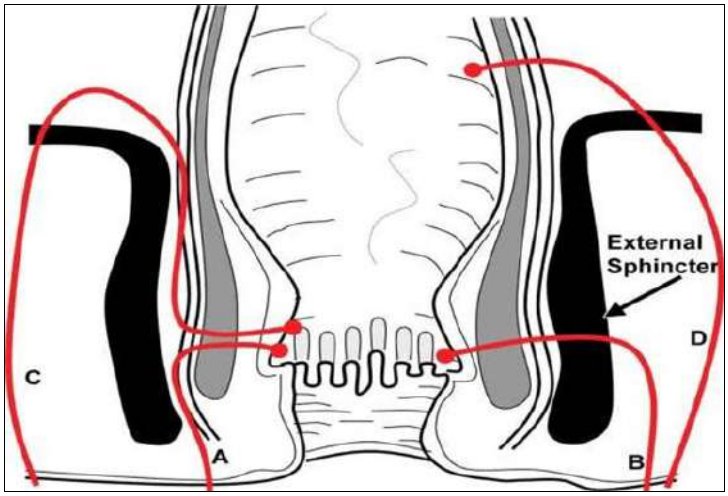
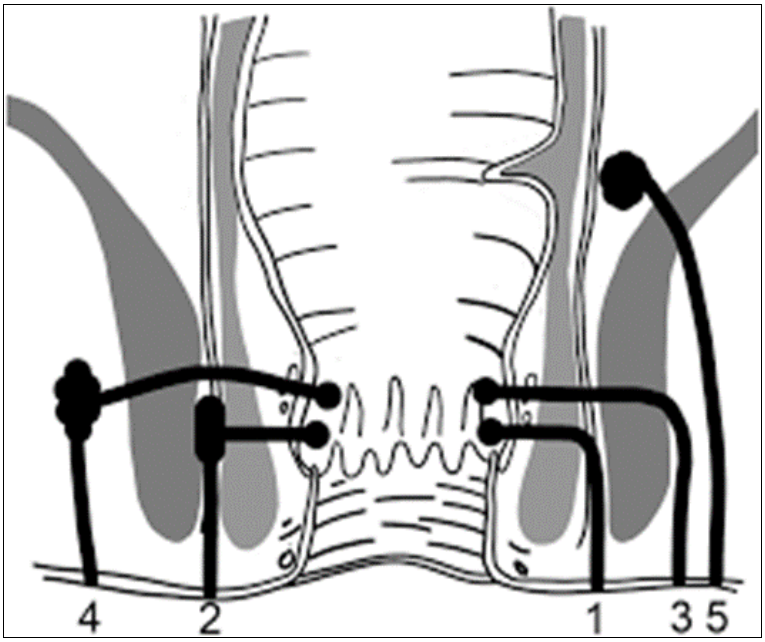


Fig 5: Parks classification. Drawing of the anal canal in the coronal plane shows the Parks classification of perianal fistulas. *A*- intersphincteric, *B*- transsphincteric, *C*- suprasphincteric, *D*- extrasphincteric. The external sphincter is the keystone of the Parks classification.

St. james classification



Grade 1: Single Intersphincteric Fistula
Grade 2: Single or Multibranched Intersphincteric Fistula with Abscess
Grade 3: Unbranched Transsphincteric Fistula
Grade 4: Transsphincteric Fistula with Abscess or Secondary Track within the Ischiorectal or Ischioanal Fossa
Grade 5: supra or Extrasphincteric Fistula

Results

In the study out of total 50 patients, 42 patients were males & 8 were females.

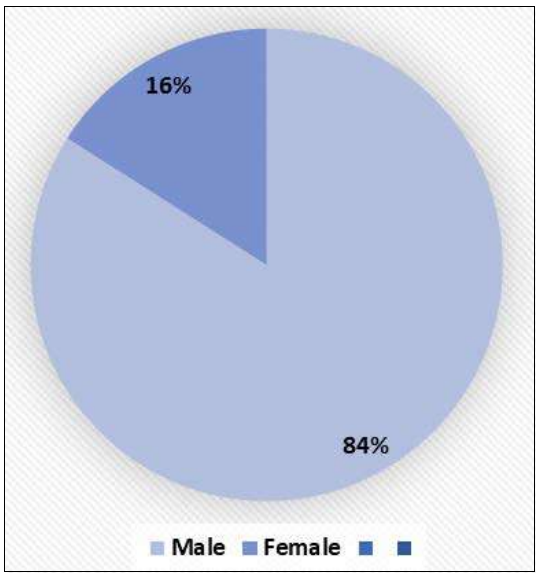


Fig 6: Gender wise distribution

Table 1: The most common affected age group affected were between 25-35 years.

Age group(years)	No. of persons affected	Percentage
5-15	0	0%
15-25	15	30%
25-35	21	42%
35-45	8	16%
45-55	4	8%
55-65	2	4%
Total	50	100%

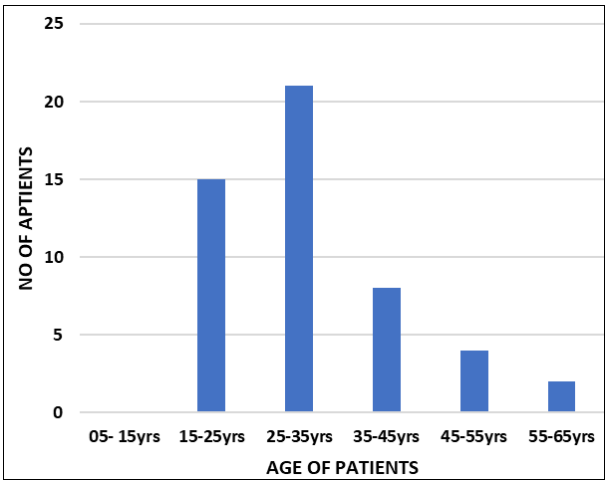


Fig 7: Age Wise Distribution

Table 2: The most common location of fistula in our study is at 6'O – 7'O clock position followed by 12- 1'Oclock position.

Location of fistula	Number of persons affected	Percentage
12'0 – 1'0 clock	14	28%
1'0 – 2'0 clock	3	6%
2'0 – 3'0 clock	2	4%
3'0 – 4'0 clock	2	4%
4'0 – 5'0 clock	0	0
5'0 – 6'0 clock	8	16%
6'0 – 7'0 clock	18	36%
8'0 – 9'0 clock	0	0%
9'0 – 10'0 clock	0	0%
10'0 – 11'0 clock	2	4%
11'0 – 12'0 clock	1	2%
Total	50	100%

The most common type in our study being intersphincteric type.

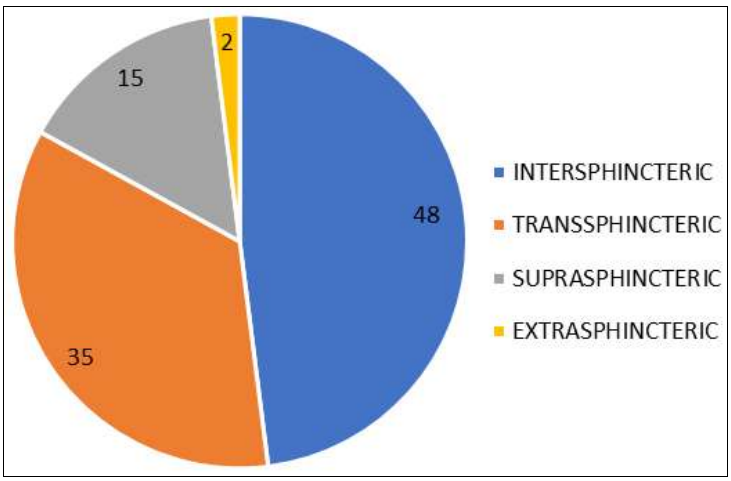


Fig 7: Distribution according to park's classification

The most common Grade in our study being grade 1 (simple intersphincteric fistula)

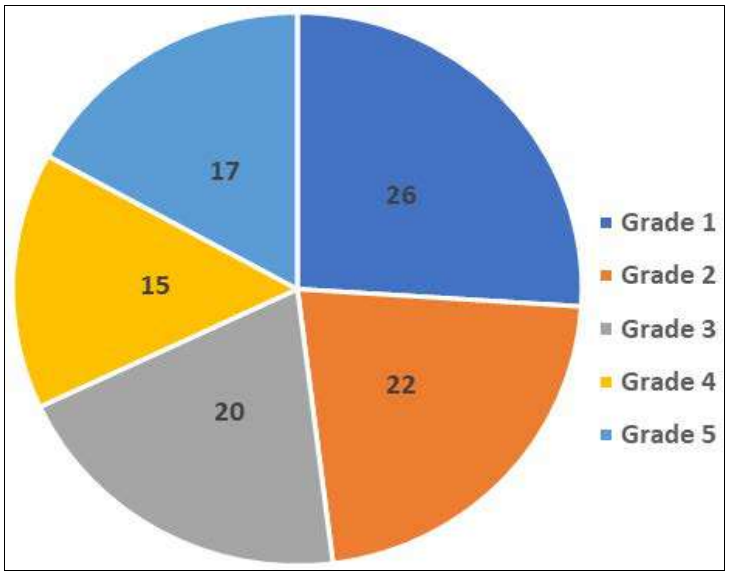


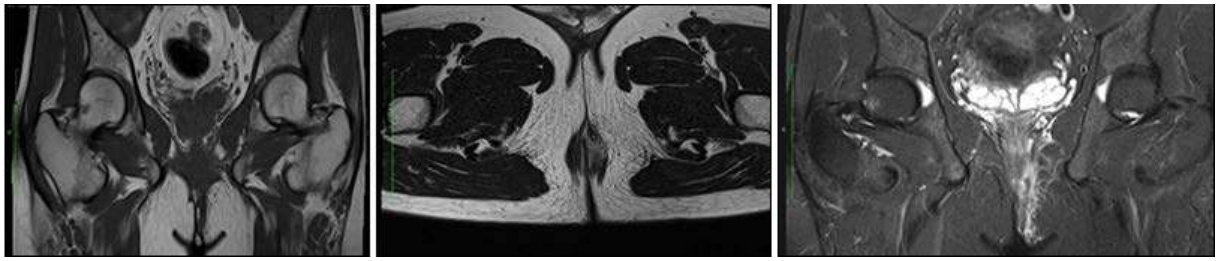
Fig 8: Distribution according to ST James Classification

Discussion

The study includes 50 patients, out of which 42 were males & 8 were females. The most common affected age group affected were between 25-35 years.

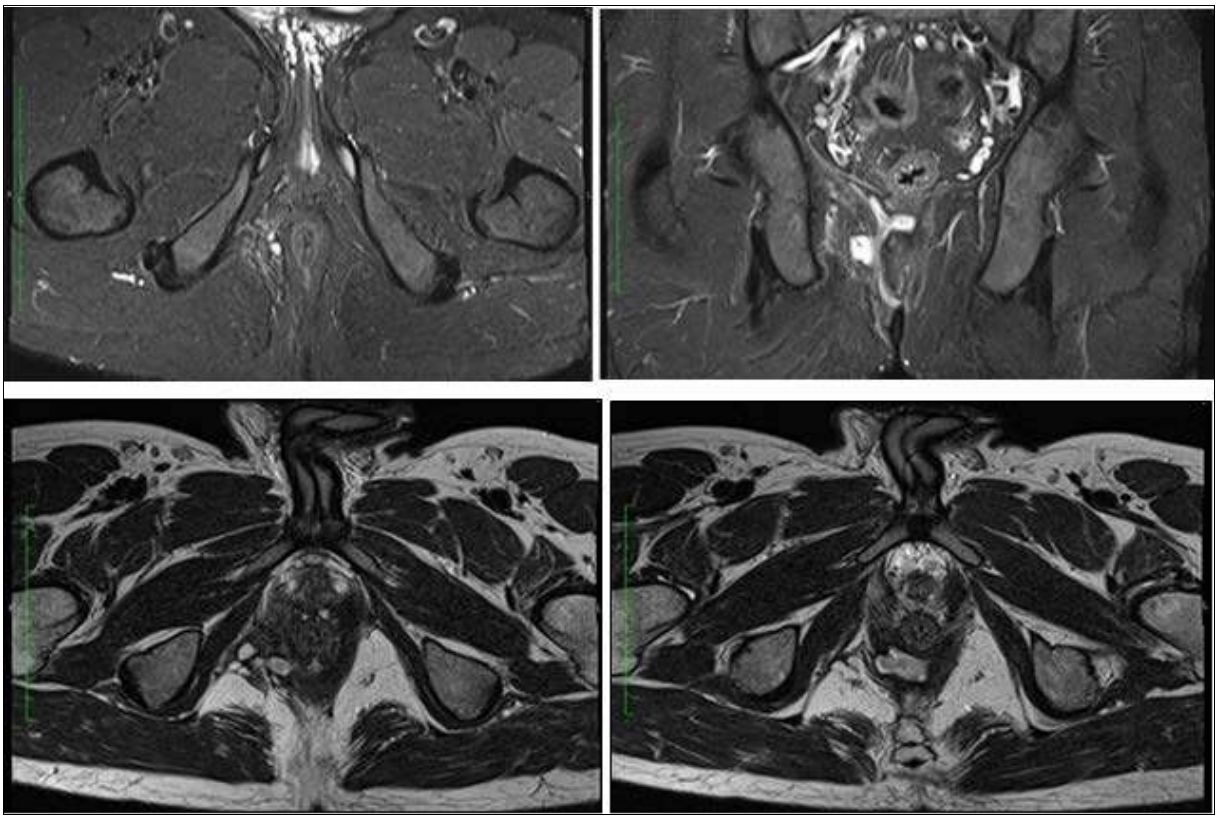
A) Intersphincteric fistula

a) A hyperintense partially fibrosed intersphincteric fistulous tract arising from the paramedian aspect of left gluteal region with external opening and projecting antero-superiorly piercing external sphincter at 2 O'clock position.
Small collection in the intersphincteric region from 12 O'clock to 5 O'clock position.

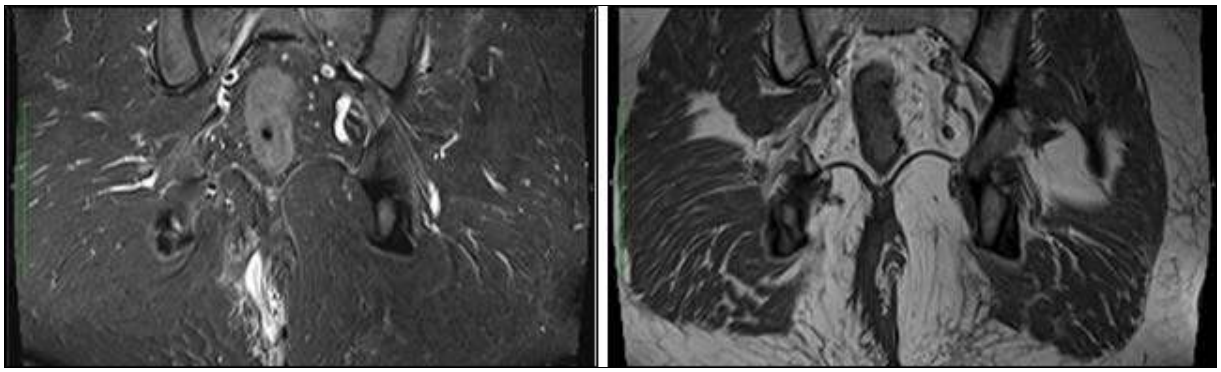


T1W T2W T1W tirm

b) A thick walled hyperintense track in intersphincteric plane with external opening traversing cranially along right ischio-anal region, showing focal loculated collection in the region of mid / upper anal canal and piercing the external sphincter at 7 o'clock position showing loculated collection in inter-sphincteric plane.

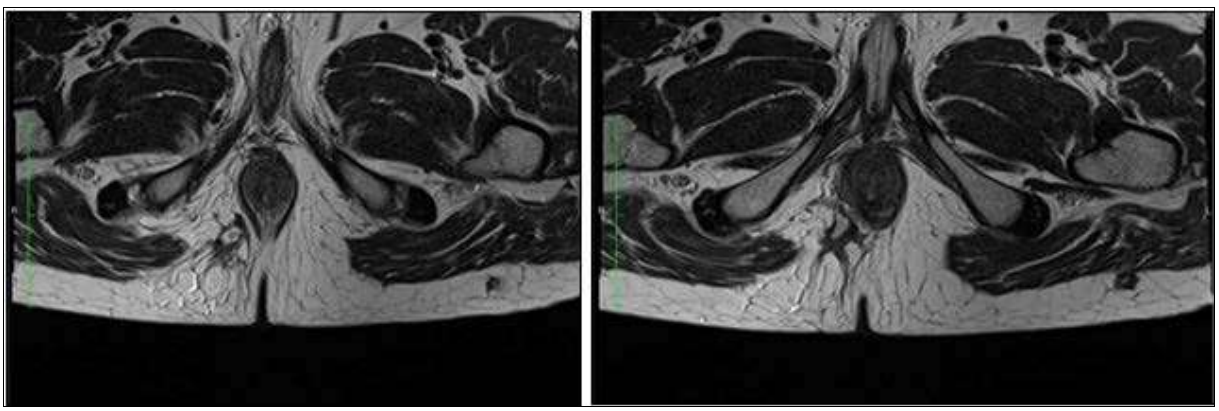


Transsphincteric fistula

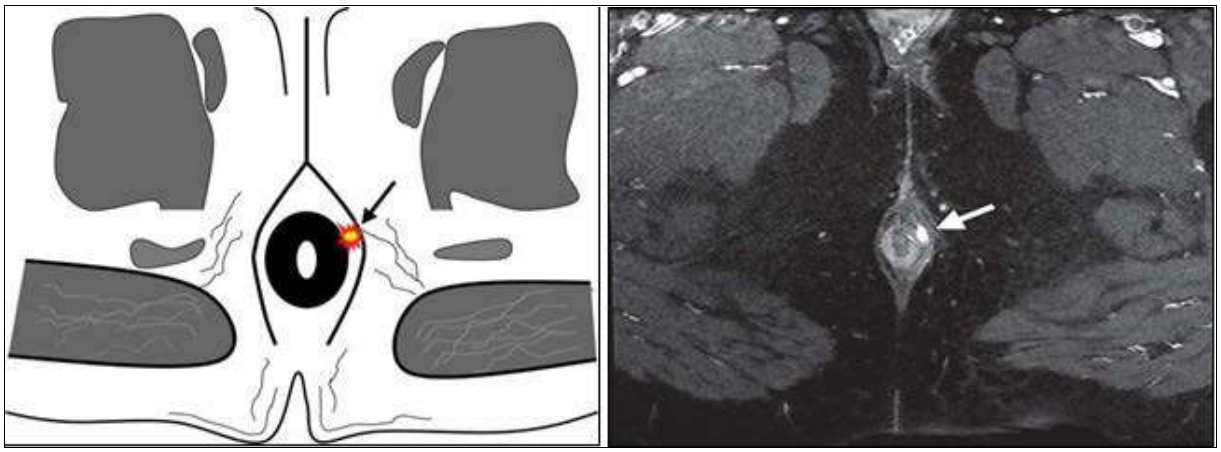


T1 tirm T1W

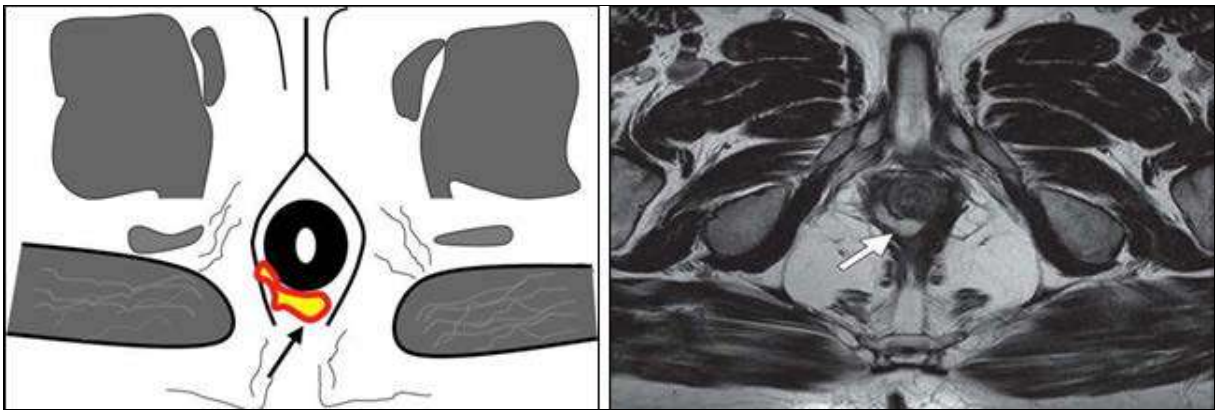
A thick transsphincteric perianal fistula with internal opening piercing the external sphincter at 6 - 7 o' clock position in high anal canal and secondary ramification abutting right levator ani muscle ending blindly in the right ischio-anal canal.



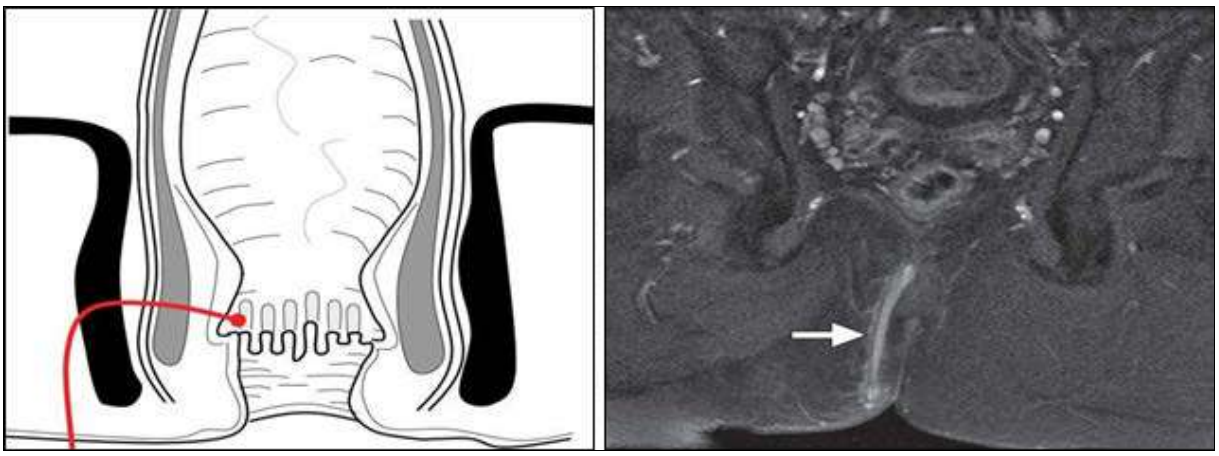
T2W T2W



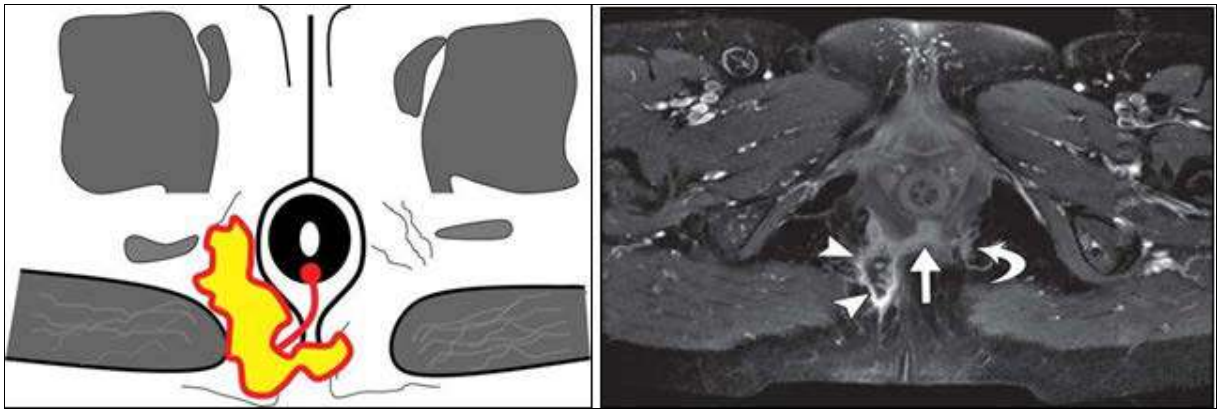
Grade 1: Single Intersphincteric Fistula



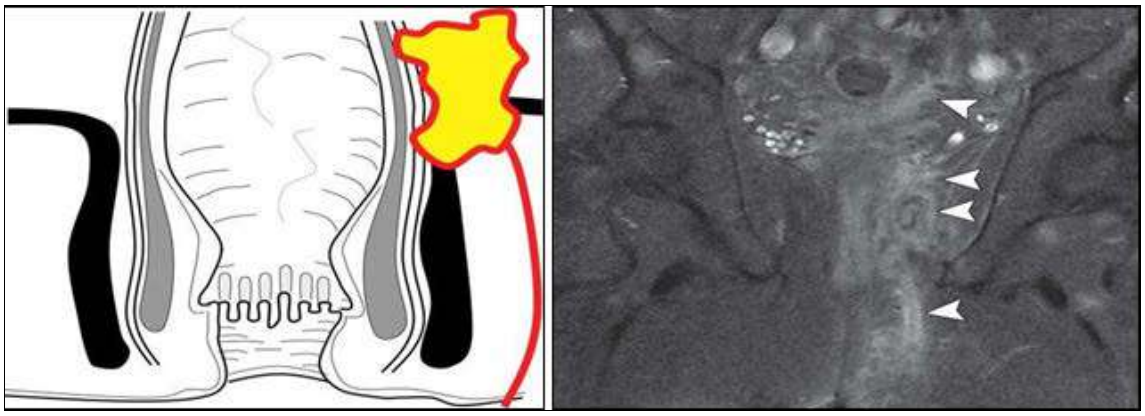
Grade 2: fistula – Intersphincteric fistula with collection/ abscess formation



Grade 3: Simple transsphincteric fistula



Grade 4: Transsphincteric fistula with collection/ abscess formation



Grade 5: Supra / extrasphincteric fistula

Conclusion

- In our study of 50 patients, out of which 42 were males & 8 were females, the most common affected age group were between 25-35 years (42%).
- The most common location of fistula in our study was at 6'O – 7'O clock (36%) position followed by 12- 1'O clock (28%) position.
- The most common type in our study being intersphincteric type(48%) according to PARK'S classification and the most common Grade in our study being grade 1 (simple intersphincteric fistula)(26%) according to St JAMES classification.
- Adequate understanding of relevant pelvic anatomy and fistula classification on MRI examination is essential in providing proper assessment of perianal fistulas.
- Evaluation of clinically undetectable disease has significant bearing on guiding medical & surgical therapy & can help minimize recurrence & better predict outcome compared to surgical exploration.

Conflict of Interest

Not available

Financial Support

Not available

References

1. Haaga CT and MRI of the whole body.
2. American journal of roentgenology. July 2012;199(1):W35-42.
3. American college of gastroenterology; c2012.
4. Indian journal of radiology & imaging; c2000.
5. Sainio P. Fistula-in-ano in a defined population. Incidence and epidemiological aspects. Ann Chir Gynaecol. 1984;73(4):219-24.
6. Ziech M, Felt-Bersma R, Stoker J. Imaging of peri- anal fistulas. Clin Gastroenterol Hepatol. 2009;7(10):1037-45.
7. Eisenhammer S. A new approach to the anorectal fistulous abscess based on the high intermuscular lesion. Surg Gynecol Obstet. 1958;106(5):595–9.
8. de Miguel Criado J, del Salto LG, Rivas PF, *et al*. MR imaging of perianal fistulas: spectrum of imaging features. Radiographics. 2012;32(1):175–94.

How to Cite This Article
Israni N, Shah DA. A study on magnetic resonance imaging in patients having perianal pathology. International Journal of Radiology and Diagnostic Imaging. 2022;5(4):30-38.