

ORIGINAL RESEARCH

ASSESSMENT OF ROLE OF TRANSCUTANEOUS PERIANAL ULTRASONOGRAPHY IN ASSESSMENT OF PERIANAL FISTULAE WITH MRI CORRELATION**Dr. Arvind Anand¹, Dr. P.D Gupta², Dr Amit Gupta³, Dr Saurav Bhagat⁴**¹Professor, Al Falah School of Medical Sciences & Research Centre, Dhauj, Faridabad, Haryana² Asst. Professor, Department of Surgery,^{3,4} Asst. Professor, Department of Radiodiagnosis,^{2,3,4} School of Medical Sciences and Research Sharda University, Plot No 32/34, Knowledge Park III Greater Noida, U.P. Pin Code 201310, India**ABSTRACT**

Background: Endoanal ultrasound (EAUS) and magnetic resonance imaging (MRI) of the pelvis are commonly employed for imaging of perianal fistulae, sinuses, and abscesses. The present study was conducted to assess role of transcutaneous perianal ultrasonography in assessment of perianal fistulae with MRI correlation.

Materials & Methods: 74 cases of perianal fistulae of both genders underwent perianal sonography and MRI examinations.

Results: Out of 74 patients, males were 44 and females were 30. Type was intersphincteric in 38, transsphincteric in 36 and suprasphincteric in 1. The difference was significant ($P < 0.05$). St. James's classification showed grade I in 30, grade II in 16, grade III in 10, grade IV in 14 and grade V in 4 cases. The difference was significant ($P < 0.05$). Detection of primary fistulous and sinus tract was positive on TPUS and MRI in 74 cases, detection of secondary tracts/ramifications was positive on 8 cases on TPUS and 9 cases on MRI, detection of abscess was seen in 11 cases on TPUS and 10 cases on MRI and detection of internal opening was seen in 70 cases in TPUS and 72 cases of MRI.

Conclusion: TPUS is an effective imaging modality in the evaluation of perianal fistulae. It has high sensitivity and specificity in diagnosing and classifying perianal fistulae and abscess comparable with MRI.

Key words: Suprasphincteric, fistula, MRI

Introduction

A fistula is defined as an abnormal connection between two structures or organs or between an organ and the surface of the body. In the case of perianal fistula, it is a connection between the anal canal and the skin of the perineum.¹ Perianal fistulization is an uncommon process, with a prevalence of 0.01%, although it causes significant morbidity. It predominantly affects young males, with a male-to-female ratio of 2:1. The most common presenting symptom is discharge (65% of cases), but local pain due to inflammation is also common.²

Endoanal ultrasound (EAUS) and magnetic resonance imaging (MRI) of the pelvis are commonly employed for imaging of perianal fistulae, sinuses, and abscesses. The use of a rigid EAUS probe can be traumatic or even not possible in patients with inflammatory perianal disease due to anal canal stenosis.³ Furthermore, EAUS does not allow the evaluation of pathological changes extending to involve the gluteal region. Transcutaneous perianal sonography (TPUS) represents another method to detect perianal inflammatory disease, which can be performed using regular US probes without special patient preparation.⁴ It is a quick, non-invasive, and feasible technique for the evaluation of various pathologic conditions of the pelvic floor. Patients are asked to lie down in the dorsal or left lateral decubitus position and the US probe is then placed near the anal opening. US scanning is done in the axial, sagittal, and coronal planes in order to screen the perianal regions.⁵ The present study was conducted to assess role of transcutaneous perianal ultrasonography in assessment of perianal fistulae with MRI correlation.

Materials & Methods

The present study comprised of 74 cases of perianal fistulae of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. The perianal sonography was performed using high-resolution 3 to 8 MHz linear and 2 to 5 MHz sector probes percutaneously.

The entire length of the tract was evaluated up to the external opening. Also, any ramifications along the primary tract were described. Parks classification was used for classifying the tracts. All patients underwent MRI examinations with 1.5 Tesla unit on Philips Gyroscan Achieva using sense body coil. Parks classification and St James's University Hospital MRI Classification of perianal fistulas were used for classifying fistulas. The primary tracts were described as four patterns: intersphincteric, transsphincteric, suprasphincteric, and extrasphincteric. As per St James's University Hospital MRI Classification, fistulas were classified as: 0—normal appearance, I—simple linear intersphincteric fistula, II—intersphincteric fistula with intersphincteric abscess or secondary fistulous track, III—transsphincteric fistula, IV—transsphincteric fistula with abscess or secondary track within theischioanal orischiorectal fossa, V—supralelevator and translevator disease. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

Table I Distribution of patients

Total- 74		
Gender	Males	Females
Number	44	30

Table I shows that out of 74 patients, males were 44 and females were 30.

Table II Parks classification on TPUS

Type	Number	P value
Intersphincteric	38	0.12
Transsphincteric	36	
Suprasphincteric	1	
Extrasphincteric	0	

Table II shows that type was intersphincteric in 38, transsphincteric in 36 and suprasphincteric in 1. The difference was significant (P < 0.05).

Table III St. James's classification of perianal fistula on MRI

Grade	Number	P value
I	30	0.17
II	16	
III	10	
IV	14	
V	4	

Table III shows that St. James's classification showed grade I in 30, grade II in 16, grade III in 10, grade IV in 14 and grade V in 4 cases. The difference was significant (P < 0.05).

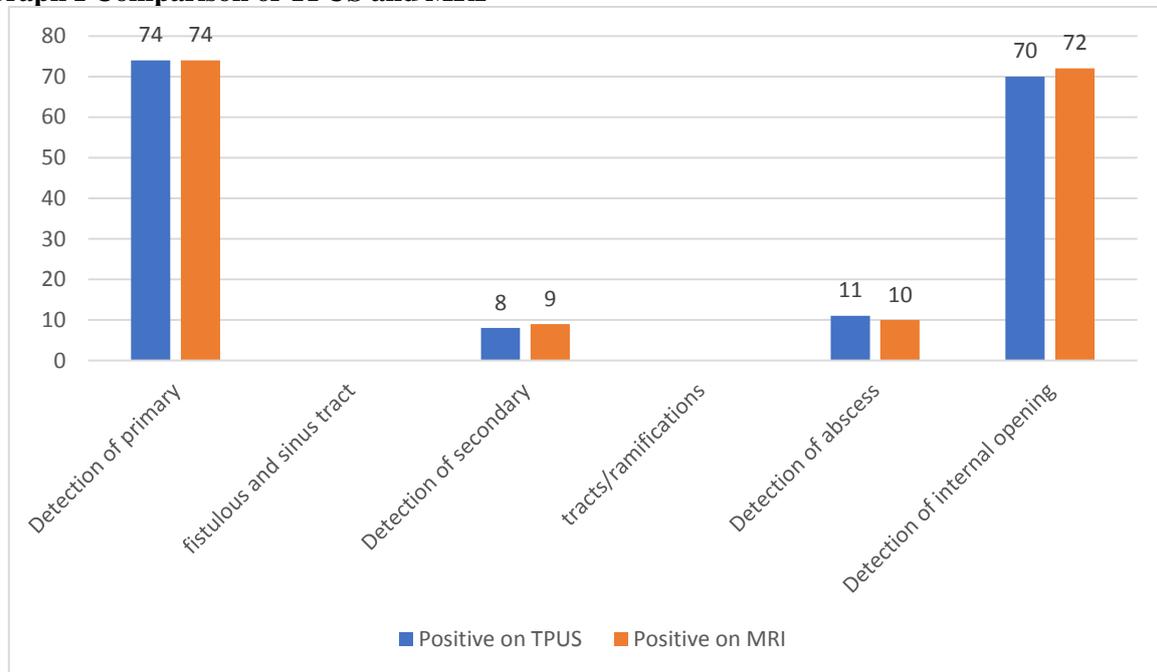
Table IV Comparison of TPUS and MRI

Parameters	Positive on TPUS	Positive on MRI
Detection of primary fistulous and sinus tract	74	74
Detection of secondary tracts/ramifications	8	9
Detection of abscess	11	10

Detection of internal opening	70	72
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Table IV, graph I shows that detection of primary fistulous and sinus tract was positive on TPUS and MRI in 74 cases, detection of secondary tracts/ramifications was positive on 8 cases on TPUS and 9 cases on MRI, detection of abscess was seen in 11 cases on TPUS and 10 cases on MRI and detection of internal opening was seen in 70 cases in TPUS and 72 cases of MRI.

Graph I Comparison of TPUS and MRI



Discussion

The anal canal is a cylindrical structure surrounded by two muscular layers, the internal and external sphincters. The internal sphincter is composed of smooth muscle, the fibers of which are continuous with the circular smooth muscle of the rectum. This sphincter contracts involuntarily and is responsible for 85% of the resting tone of the anal canal. The external sphincter is composed of striated muscle and has posterior attachments to the anococcygeal ligament and anterior attachments to the perineal body and urogenital diaphragm.⁶ It merges proximally with the puborectalis muscle, which then merges with the levator plate of the pelvic floor. The external sphincter contributes only 15% of the resting anal tone, although its strong voluntary contractions prevent defecation. The internal sphincter can be divided without causing loss of continence, but excessive division of the external sphincter can lead to fecal incontinence.⁷ The two sphincters are separated by the intersphincteric space, which contains fat, areolar tissue, and the longitudinal muscle. This space forms a natural plane of lower resistance in which fistulas and pus can readily spread. The longitudinal muscle is formed by distal termination of rectal longitudinal smooth muscle and does not clearly contribute to the function of the anal sphincter.⁸ The present study was conducted to assess role of transcutaneous perianal ultrasonography in assessment of perianal fistulae with MRI correlation.

We found that out of 74 patients, males were 44 and females were 30. Singh et al⁹ evaluated the role of transcutaneous perianal ultrasonography (TPUS) in patients with perianal fistula and to correlate the findings with magnetic resonance imaging (MRI) as gold standard. Out of total 37 patients, the most common age group of presenting individuals was 45 to 60 years with male to female ratio of 6.4:1. There was excellent agreement between TPUS and MRI for detecting primary fistulous tract with kappa correlation coefficient of 1. The kappa correlation coefficient for detecting secondary fistulous tracts and abscess on TPUS and MRI was 0.839 and 0.937 showing excellent agreement. Moderate agreement was seen with kappa correlation coefficient of 0.839 in the detection of internal opening on TPUS and MRI.

We found that type was intersphincteric in 38, transsphincteric in 36 and suprasphincteric in 1. Varsamis et al¹⁰ found that pelvic MRI is superior to EAUS for the evaluation of perianal fistulas (especially for supralelevator and extrasphincteric ones). Preoperative pelvic MRI is associated with statistically significant better results and prognosis after surgical treatment of the disease. Preoperative EAUS poses high sensitivity and specificity in identifying intersphincteric and transsphincteric perianal fistulas, as well as the internal opening of a fistula-in-ano. There is only one meta-analysis which compares the diagnostic accuracy of the two mentioned imaging modalities in preoperative fistula detection. Sensitivity of both - pelvic MRI and EAUS, is acceptably high (0.87). Specificity of pelvic MRI is 0.69 in comparison to EAUS (0.43), but both values are considered low. We found that St. James's classification showed grade I in 30, grade II in 16, grade III in 10, grade IV in 14 and grade V in 4 cases. A study conducted by Wedemeyer et al¹¹ confirmed high sensitivity and specificity of TPUS when compared with pelvic MRI for diagnoses and characterization abscess with excellent agreement between the two imaging methods ($\kappa > 0.83$).

We found that detection of primary fistulous and sinus tract was positive on TPUS and MRI in 74 cases, detection of secondary tracts/ramifications was positive on 8 cases on TPUS and 9 cases on MRI, detection of abscess was seen in 11 cases on TPUS and 10 cases on MRI and detection of internal opening was seen in 70 cases in TPUS and 72 cases of MRI. Domkundwar et al¹² evaluated the role of transcutaneous perianal ultrasonography in evaluation of fistulas in ano and to assess its possible role as a first-line investigation, for follow-up, and as a possible substitute for magnetic resonance imaging. Transcutaneous perianal ultrasonography was performed in 30 patients with fistulas in ano with the use of a 3- to 6-MHz sector probe, a 7- to 11-MHz linear probe, and a 5- to 7-MHz endocavitary probe. Patients were followed clinically and at surgery to assess the accuracy of transcutaneous perianal ultrasonography. A total of 43 fistulas, sinus tracts, or both were found in 26 patients. They appeared as hypoechoic tracts. Eleven of 30 patients had the presence of a collection or abscess, which appeared as hypoechoic areas. Twenty-four of 29 patients with positive findings underwent surgery. In these, 35 of 39 tracts were surgically confirmed (positive predictive value, 90%). The positive predictive value for demonstration of an internal opening was 85% (22/26) when compared with direct visualization or probing. Sensitivity for detection of tracts was 100%, and that for demonstration of an internal opening was 96% (26/27). The negative predictive value for sinus/fistulous tracts was nearly 100%. Transcutaneous perianal ultrasonography could not adequately evaluate suprasphincteric-type fistulas. However, it is a good, inexpensive modality in the evaluation of patients with fistulas in ano and also helps in follow-up of these patients. It can also be used to select patients who need magnetic resonance imaging.

The limitation the study is small sample size.

Conclusion

TPUS is an effective imaging modality in the evaluation of perianal fistulae. It has high sensitivity and specificity in diagnosing and classifying perianal fistulae and abscess comparable with MRI.

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