



“: ROLE OF TRANSPERINEAL ULTRASONOGRAPHY IN EVALUATION OF PERIANAL FISTULA AND ITS CORRELATION WITH MAGNETIC RESONANCE IMAGING”

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ABSTRACT

Aim: The aim of the present study is to conclude the sensitivity & specificity between MRI and transcutaneous ultrasonography in detection of perianal fistulas and accurate assessment of disease status of perianal fistulous tract and extent in relation to sphincteric complex and help in surgical planning to minimize recurrence.

Methods: This prospective study was done in the Department of Radiodiagnosis & Krssna diagnostic centre at Mahatma Gandhi Memorial Medical College & M.Y. Hospital, Indore, Madhya Pradesh, India from March 2016 to August 2017. A total of 50 patients who were present with a clinical suspicious of perianal fistula and visible external opening in anal region, they were evaluated by Transperineal ultrasonography (TPUS) and MRI fistulogram and result were ensured by surgical results.

Results: The accuracy of TPUS and MRI in detection of perianal abscess, the sensitivity, specificity, PPV and NPV of USG was found to be 92%, 100%, 100% and 91% respectively, while the sensitivity, specificity, PPV and NPV of MRI was found to be 100%, 90%, 93% and 100% respectively. The combination of MRI and TPUS is capable of detecting perianal fistulas with sensitivity of 100%. Abscesses were detected by TPUS with the same sensitivity as by MRI. TPUS therefore is a valuable tool in the screening for perianal disease.

Conclusion: The combination of MRI and TPUS is capable of detecting perianal fistulas with sensitivity of 100%. Abscesses were detected by TPUS with the same sensitivity as by MRI. Thus, the sensitivity and specificity of TPUS was comparable to MRI for detection of perianal fistula and abscess.

KEYWORDS : Transperineal Ultrasonography (TPUS), MRI fistulogram, perianal fistula.

INTRODUCTION

Perianal fistula is the commonest cause of morbidity in a society where people are from lower socioeconomic classes and have poor personal hygiene especially in developing countries (India). Perianal fistulas have a prevalence of approximately 0.01% and predominantly affect young adults, with a male-to-female ratio of approximately 2:1.

Perianal fistula is defined as a tract lined by granulation tissue which may have external opening, internal opening, or both external and internal openings. Perianal fistulae commonly occur in middle-aged men. They are thought to be a result of anal gland obstruction, with secondary abscess formation and external rupture of the abscess. Anal fistula develops when an intersphincteric infection continues. The majority of anal fistulas are of non-specific origin and are usually termed as idiopathic or crypto glandular. Perianal abscess is an acute manifestation and fistula-in-ano a chronic condition of the same disease.

The most common presenting symptom is discharge, discomfort and fever but local pain due to inflammation is also common. However, fistulas may be completely asymptomatic.

Perianal fistulas are imaged by conventional fistulograms however, this method has two main disadvantages, first being the primary tract and its extensions do not fill with contrast if they are plugged with pus or debris and second is 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.

Transcutaneous perineal ultrasound can be performed using regular ultrasound probes without special patient preparation. TPUS could provide detailed anatomical information about tract

location and its relation to sphincteric complex and it could be a useful imaging modality for monitoring the treatment response by assessing the disease activity. However, despite its methodical simplicity, TPUS is not yet widely used in the detection of perianal fistulae and/or abscesses.

Magnetic Resonance Imaging (MRI) is the modality of choice for evaluating perianal fistulas, MRI being a multiplanar imaging technique along with benefits of excellent soft tissue differentiation makes it an ideal diagnostic study to identify infected tracks and undetected abscesses. A detailed assessment of the anatomic relationship between the fistula and the anal sphincter complex allows surgeons to choose the best surgical treatment thus significantly reducing recurrence of the disease or possible secondary effects of surgery, such as fecal incontinence and recurrence. Failure to detect and er

Despite the obvious advantages of perineal ultrasound no studies exist so far that compared the effectiveness of TPUS with the established imaging methods such as MRI. Therefore, we investigated patients with clinical signs of perianal fistulae using TPUS and MRI and the results of each modalities were compared with surgical follow up.

MATERIAL & METHODS

This prospective study was done in the Department of Radiodiagnosis & Krssna diagnostic centre at Mahatma Gandhi Memorial Medical College & M.Y. Hospital, Indore, Madhya Pradesh, India from March 2016 to August 2017. A total of 50 patients who were present with a clinical suspicious of perianal fistula and visible external opening in anal region, they were evaluated by Transperineal ultrasonography (TPUS) and MRI fistulogram and result were ensured by surgical results.

Transperianal ultrasonography was performed using curvilinear and linear probes available in the Department of Radiodiagnosis. Magnetic Resonance Imaging evaluation of fistula using 3Tesla MRI scanner was performed after obtaining an informed consent.

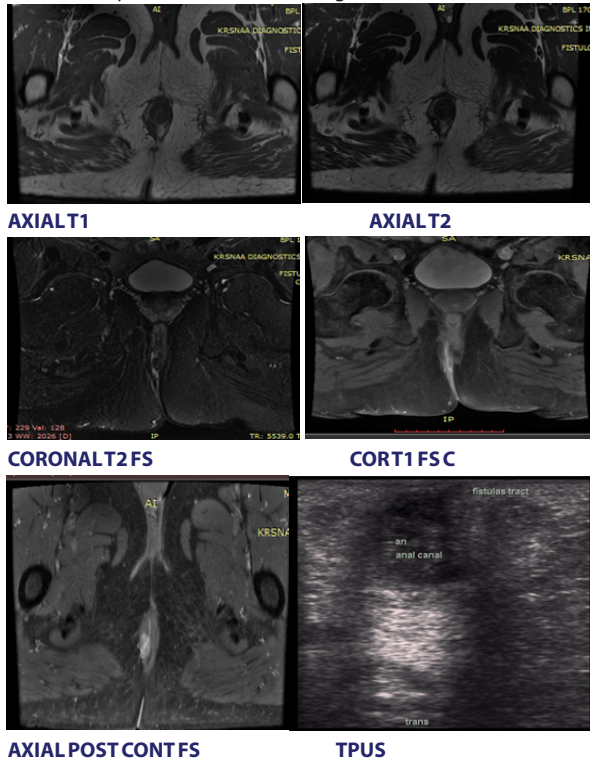


FIGURE 1: Axial T1 and T2W images demonstrate Intersphincteric fistula which is hypointense on T1W & hyperintense on T2W images. Coronal T2 Fat Suppressed images and post contrast axial & coronal images showing internal opening at 7'o clock position. TPUS showing anechoic fistulous tract extending from the skin surface toward the anal canal and internal opening at 1'o clock position close to midline.

INTERSPHINCTERIC FISTULA

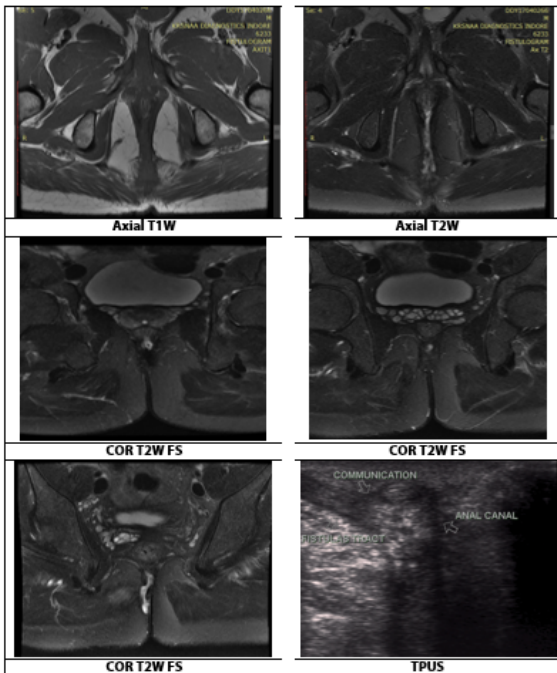


FIGURE-2-Transsphincteric fistulous tract appearing T1

hypointense and T2 hyperintense. Coronal T2W fat suppressed images sequentially showing internal opening at 6'o clock position, submucosal tract of the fistula and external opening at the skin. TPUS showing hypoechoic fistulous tract with internal opening in the anal canal.

Transsphincteric fistula

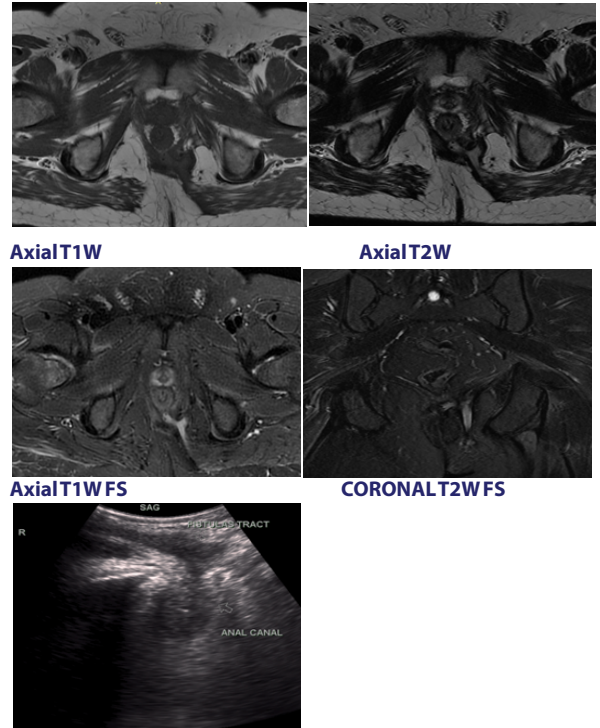


FIGURE 3: Axial T1W and T2W Images showing Transsphincteric fistulous tract which appears hypointense on T1W and hyperintense on T2W images. Axial T1W and coronal T2W Fat Suppressed images showing internal branching and opening at 6'o clock position in anal canal. TPUS showing anechoic fistulous tract is seen extending from the skin surface open at 12'o clock position in anal canal.

Trans-sphincteric fistula with internal branching.

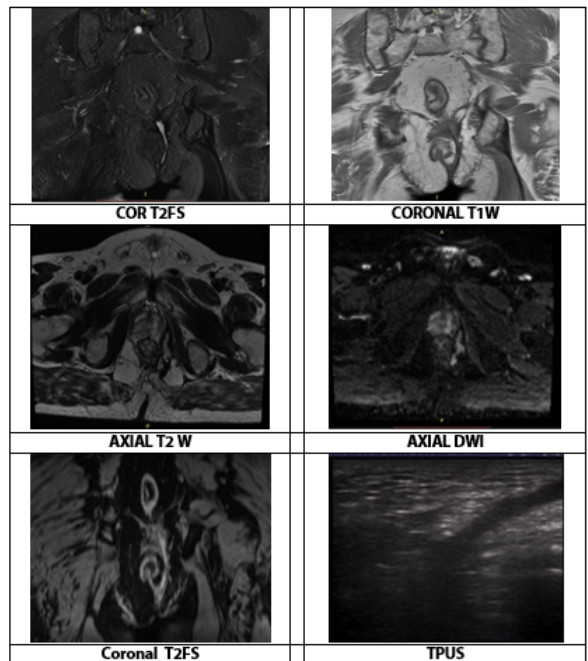


FIGURE 4 : Extrasphincteric fistula which appears hyperintense on T2W Fat suppressed images and hypointense axial T1W images. There is associated abscesses in the left ischioanal fossa which appear hyperintense on T2W images and show restriction on diffusion images (DWI). Coronal T2 Fat Suppressed and Axial T2 demonstrate fistulous tract with inflammatory changes seen in ischioanal fossa. TPUS showing anechoic fistulous tract is seen extending from the skin surface go away from the anal canal, not involve the any sphincter complex.

Extrasphincteric fistula in ischioanal fossa with abscess.

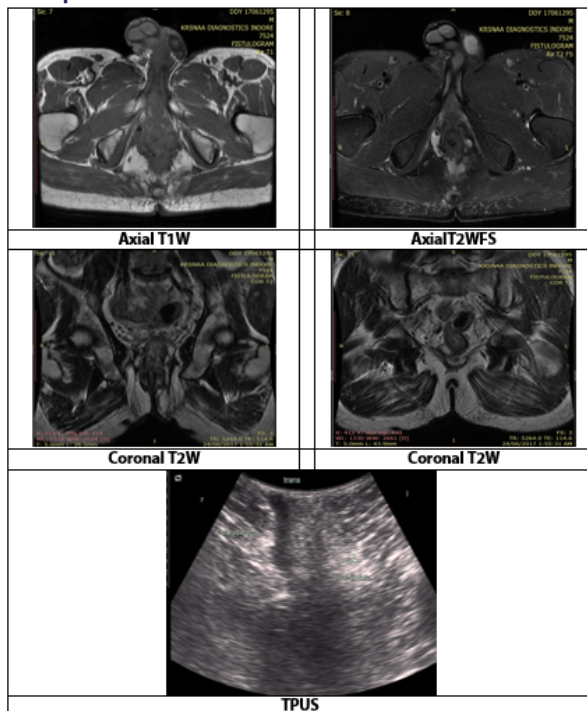


FIGURE 5: Axial T1W and T2W fat suppressed image showing collection with secondary tract in rtischioanal fossa which appears hypointense on T1 and hyperintense on T2 images. Coronal T2W images showing extrasphincteric sinus tract passing through the left side in ischioanal fossa with multiple extensions above the levator ani muscle. No demonstrable internal opening was identified. TPUS showing anechoic fistulous tract extending supralelevator from the skin surface.

Extrasphincteric Sinus Tract

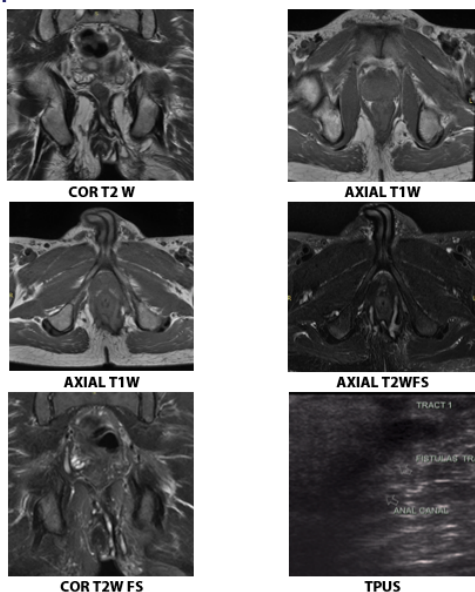


FIGURE 6: Coronal T2W image demonstrate primary tract of suprasphincteric fistula. Axial T1W image demonstrating internal opening at 6'o clock position in the anal canal. Axial T1 and Axial T2 Fat Suppressed images demonstrate b/lintersphincteric secondary tracts. Coronal T2W Fat Suppressed image demonstrating primary tract with secondary branching. TPUS showing anechoic fistulous tract with secondary internal branches.

SUPRASPHINCTERIC AND INTERSPHINCTERIC FISTULAS WITH SECONDARY BRANCHES.

RESULTS AND DISCUSSION

A total of 50 patients who were present with a clinical suspicion of perianal fistula and visible external opening in anal region. They were evaluated by Transperianal ultrasonography (TPUS) and MRI Fistulogram and result were confirmed by surgical results.

Table 1: Distribution of cases on USG, MRI and follow up

S. No.	Type of lesion	USG	MRI	FOLLOW UP
1	Perianal Fistula	40	39	38
2	Sinus tract	10	11	12
	Total	50	50	50

In our study majority of patients were males (44) constituting 88% of cases followed by female 6 (12%). Male predominance is noted, Majority of patients presented with Pus discharge seen in 76% of cases followed by Pain in perianal region seen in 40% of cases. Most common cause of perianal fistula was idiopathic 19 (50%) followed by Tuberculosis 11 (29%). Most of the External opening are single (40) followed by multiple opening seen in 10 cases. Intersphincteric (60%)

were the most common perianal fistula followed by Transsphincteric (30%). Most of the internal opening are single seen in 30 cases followed by multiple internal opening seen in 8 cases. Most of Internal opening situated at 6'o clock position (50%) followed by 12'o clock (32%).

In the present study the most common age group of patients was 30-39 years with, the mean age of patients was 38.5 years, and the age group between 30-39 years accounted for the largest proportion of patients (38%) followed by patient of 40-49 year (36%). 88% (44) Males were found to have perianal fistula while only 12% (6) females were seen to have perianal fistula. There was an overwhelming male predominance, and the male-to-female ratio was 7:1. The reasons for this discrepancy are likely to be social or cultural rather than medical, as females tend to feel embarrassed about this disease and try to conceal it.

The most common presenting complaint with which patients presented was perianal discharge which was seen in 76% (38) followed by pain in the perianal region which was seen in 40% (20) patients. Difficulty in defecation was seen in 36% (18) patients and bleeding per rectum was seen in 24% (12) patients. Fever was seen in 32% (16) and was seen to be associated with active inflammatory fistulous tract.

The most common cause of perianal fistula in 50% (19) patients was idiopathic while 29% (11) cases were due to tuberculosis. 8% (3) patients were constituted by pelvic inflammatory disease and 5.5% (2) cases were due to Crohn's disease. Diverticulitis and pelvic malignancy constituted small percentage of cases being 5.5% (2) and 2% (1) respectively.

24% (12) patients had the external opening anteriorly, and 76% (38) patients had posteriorly while most of the external openings were single 80% (40) and multiple in only 20% (10). This is in agreement with earlier studies which stated that fistulous tracks originating posterior to the transverse anal line were seen most frequently and external opening of most of the perianal fistulas were single.

TPUS diagnosed 80% (40) cases of perianal fistulas of which intersphincteric fistula was most common perianal fistula seen in 60% (24) cases followed by trans-sphincteric fistulas which was seen in 30% (12) cases. 70% (26) patients had associated perianal abscess, 75% (30) patients had single internal opening, 2.25% (9) cases had multiple internal openings, 55.6% (5) had horseshoe fistulous tract and 44.4% (4) had multiple internal branching. TPUS detected only 5% (2) cases each of Extrasphincteric and Suprasphincteric fistulas because of poor visualisation of supra and extrasphincteric type of fistulas in TPUS. However on surgical follow up 76% (38) patients had perianal fistula. This discrepancy in diagnosing perianal fistula was seen because one patient with a fistula reported on TPUS turned out to have a perianal sinus during surgery. Thus, out of 50 patients, surgical and TPUS finding were in accordance in 36 patients. Apart from these, two patients were reported on TPUS as having a perianal sinus but during surgery they turned out to have fistulas and two fistulas were misdiagnosed at TPUS, one proved to be a sinus at a surgery and in one patient no fistula is seen.

MR Fistulogram diagnosed 78% (39) cases of perianal fistulas of which inter-sphincteric fistula was most common seen in 60% (23) cases followed by trans-sphincteric fistulas which was seen in 25% (10) cases. 60% (30) patients had associated perianal abscess, 87% (34) patients had single internal opening, 10.5% (4) cases had multiple internal openings, 8% (4) had horseshoe fistulous tract and 8% (4) had multiple internal branching. MR fistulogram diagnosed 5% (2) cases of Extrasphincteric and 10% (4) cases of Suprasphincteric fistulas. However on surgical follow up 76% (38) patients had perianal fistula. The discrepancy of one patient was seen because one fistula reported on MRI turned out to have a perianal sinus during surgery. Thus, out of 50 patients, surgical and MRI finding were in accordance in 38 patients. Apart from these, one patient was reported on MRI as having a perianal sinus but during surgery they turned out to have fistulas.

Most common site of internal opening was seen to be at 6 O'clock position 50% (19) in TPUS and 56% (22) in MRI which on surgical follow up turned out to be 55% (21). The cause of this was due to the fact that most of the anal glands were found at 6 O'clock.

The true positive and false negative for TPUS alone in diagnosing perianal fistulas were 36 and 02. The false positives and true negatives were 04 and 08 respectively. The sensitivity and NPV of TPUS in diagnosing perianal fistula was turned out to be 94.7% and 80% respectively. The specificity and PPV were 66.7% and 90% respectively.

The true positive and false negative for TPUS alone in diagnosing perianal abscess were 26 and 02. The false positives and true negatives were 0 and 22 respectively. The sensitivity and NPV of TPUS in diagnosing perianal fistula was turned out to be 92.8% and 91.6% respectively. The specificity and PPV were 100% each.

The true positive and false negative for MRI alone in diagnosing perianal fistulas were 37 and 01. The false positives and true negatives were 02 and 10 respectively. The sensitivity and NPV of MRI in diagnosing perianal fistula was turned out to be 97.3% and 90.9% respectively. The specificity and PPV were 83.0% and 94.8% respectively.

The true positive and false negative for MRI alone in diagnosing perianal abscess were 28 and 0. The false positives and true negatives were 02 and 20 respectively. The sensitivity and NPV of MRI in diagnosing perianal fistula was turned out to be 100% and 100% respectively. The specificity and PPV were 90.0% and 93.3% respectively.

On comparing the accuracy of TPUS and MRI in detection of perianal fistula, the sensitivity, specificity, PPV and NPV of USG was found to be 94%, 67%, 90% and 80% respectively, while the sensitivity, specificity, PPV and NPV of MRI was found to be 97%, 83%, 95% and 91% respectively.

On comparing the accuracy of TPUS and MRI in detection of perianal abscess, the sensitivity, specificity, PPV and NPV of USG was found to be 92%, 100%, 100% and 91% respectively, while the sensitivity, specificity, PPV and NPV of MRI was found to be 100%, 90%, 93% and 100% respectively.

The combination of MRI and TPUS is capable of detecting perianal fistulas with sensitivity of 100%. Abscesses were detected by TPUS with the same sensitivity as by MRI. TPUS therefore is a valuable tool in the screening for perianal disease. Especially when immediate action is necessary and sophisticated diagnostic imaging could delay diagnosis due to limited availability, TPUS is a simple, cost-effective, and non-invasive diagnostic modality which is comparable to MRI for evaluating Perianal fistula.

We suggest that TPUS, with limited use of MRI can give comparable results. Our study showed that perianal fistulae, complex fistulous systems as well as perianal abscesses could be detected with high sensitivity using TPUS. The results were comparable to pelvic MRI and surgical follow up.

CONCLUSION

The aim of the present study is to conclude the sensitivity & specificity between MRI and transcutaneous ultrasonography in detection of perianal fistulas and accurate assessment of disease status of perianal fistula tract and extent in relation to sphincter complex and help in surgical planning to minimize recurrence.

The TPUS and MRI scans were viewed and various perianal lesion were identified. We concluded that most of the patients in our study group belonged to the age group 30-39 years (38%) with mean age of 38.5 years.

In our study, males constituted 88 % of the cases and rest were female. Majority of patients presented with perianal discharge (76%) and perianal pain which was seen in 40% of total patients. Most common cause of perianal fistula was Idiopathic 50% (19) followed by (TB) Tuberculosis 29% (11). Most common site of internal opening was seen at 6 O'clock position 50% (19) in TPUS and 56% (22) in MRI. Most of patient had the external opening posteriorly 76% (38) and 24% (12) patients had anteriorly, while most of the external openings were single 80% (40) and multiple in only 20% (10). TPUS diagnosed 80% (40) cases of perianal fistulas of which inter-sphincteric fistula was most common perianal fistula seen in 60% (24) cases followed by trans-sphincteric fistulas which was seen in 30% (12) cases. MR Fistulogram diagnosed 78% (39) cases of perianal fistulas of which inter-sphincteric fistula was most common seen in 60% (23) cases followed by trans-sphincteric fistulas which was seen in 25% (10) cases. On comparing the accuracy of TPUS and MRI in detection of perianal fistula, the sensitivity, specificity, PPV and NPV of USG was found to be 94%, 67%, 90% and 80% respectively, while the sensitivity, specificity, PPV and NPV of MRI was found to be 97%, 83%, 95% and 91% respectively.

On comparing the accuracy of TPUS and MRI in detection of perianal abscess, the sensitivity, specificity, PPV and NPV of USG was found to be 92%, 100%, 100% and 91% respectively, while the sensitivity, specificity, PPV and NPV of MRI was found to be 100%, 90%, 93% and 100% respectively.

The combination of MRI and TPUS is capable of detecting perianal fistulas with sensitivity of 100%. Abscesses were detected by TPUS with the same sensitivity as by MRI. Thus, the sensitivity and specificity of TPUS was comparable to MRI for detection of perianal fistula and abscess.

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