Original Article

Diagnostic Accuracy of Magnetic Resonance Imaging in Evaluation of Perianal Fistula Keeping Surgical Finding as Gold Standard

Adnan Ahmed, Naila Tamkeen, Mahnoor Rehman Khan, Ghazala Wahid, Sahar Fahim and Uzma Badshah

ABSTRACT

Objective: To assess the diagnostic accuracy of magnetic resonance imaging (MRI) in the evaluation of perianal fistula when compared to surgical findings and identify any factors that may affect the accuracy (MRI) in identifying (perianal fistula) as will determine the positive and negative likelihood ratios, sensitivity and specificity of MRI in diagnosing perianal fistula and calculate the area under the summary receiver operating characteristic (ROC) curve for MRI in diagnosing perianal fistula.

Study Design: Non-probability consecutive sampling method

Place and Duration of Study: This study was conducted at the Department of Radiology. Hayatabad Medical Complex, Peshawar Jan 2020 to Jan 2021.

Materials and Methods: After receiving informed consent, a (1.5 Tesla) superconducting magnet with an external coil was used to provide MR imaging. The SPSS version 22 was used to input and evaluate the data.

Results: In our study, out of 85 patients, the patient's average age was (44.36±15.55) years, and the male-to-female patient ratio was 01.03:01. The sensitivity, specificity, and diagnostic precision of MRI were 93%, 92%, and 92%, respectively, using surgical findings as the gold standard.

Conclusion: Our study shows that MR imaging is a dependable and accurate method for identifying perianal fistulas, with high sensitivity and specificity, using surgical findings as the gold standard.

Key Words: Magnetic resonance imaging, surgery, evaluation, and perianal fistula

Citation of article: Ahmed A, Tamkeen N, Khan MR, Wahid G, Fahim S, Badshah U. Diagnostic Accuracy of Magnetic Resonance Imaging in Evaluation of Perianal Fistula Keeping Surgical Finding as Gold Standard. Med Forum 2023;34(4):19-21.

INTRODUCTION

Perianal fistulas are anorectal lesions that may lead to complications such as pain, infection, and fecal incontinence[1]. The definitive diagnosis of perianal fistula is made by surgical exploration and excision of the fistula tract. However, preoperative imaging such as magnetic resonance imaging (MRI) is often used to assess the size, course, and extent of the fistula tract[2,3]. Several studies have reported that MRI has good accuracy in the diagnosis of perianal fistulas. With surgical findings serving as the gold standard, the purpose of this research was to assess the diagnostic efficacy of magnetic resonance imaging (MRI) in the diagnosis of perianal fistula[4]. A systematic review was conducted to identify relevant studies that reported on MRI accuracy in the diagnosis of perianal fistulas. Pooled estimates of the sensitivity, specificity, positive and negative likelihood ratios, and area under the summary receiver operating characteristic (ROC) curve were calculated using the bivariate random-effects model[5]. this systematic review suggest that MRI is a highly accurate tool in the diagnosis of perianal fistulas, with excellent sensitivity and specificity[6]. This review provides evidence that MRI is an effective and reliable tool in the diagnosis of perianal fistulas[7].

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Received: October, 2022
Accepted: January, 2023
Printed: April, 2023

MATERIALS AND METHODS

This Single Center study was conducted at the Peshawar HMC Radiology Department from Jan 2020 to Jan 2021 in study. Sequential non-probability sampling was utilized. HMC Peshawar Radiology Department selected 177 eligible patients. In a pre-made proforma each patient's name, age, sex, and contact information after informed consent were entered. MR imaging employed a (1.5 Tesla) superconducting magnet and external coil. The MRI

images showed the internal opening, its connection to the sphincters, and the central fistulous tract. Secondary extensions, abscesses, and collections were. Per operational definition, a single consultant radiologist diagnosed the fistula as high-intensity tubular structures on T2WI and the abscess as fluid-filled collections with T2WI high signals. Surgery outcomes were compared to MRI data to distinguish positive and negative cases. SPSS 26 analyzed all data. Age was one of several quantitative variables with averages and standard deviations. MRI and surgical data showed gender and perianal fistula rates and percentages. Utilizing surgical results as the gold standard, a 2x2 table was created to assess MRI's sensitivity, specificity, PPV, NPV, and diagnostic accuracy. Gender, age, and BMI stratified data. Chi-Square exam. Post-stratification was significant if $p < 0.05$.

RESULTS

In our study, out of 85 patients the male to female patient ratio was [01.03:01,] with the patients' average age being [44.36 15.55] years.

Table No.1: MRI frequency distribution

[MRI]	[Frequency]
[Positive]	[43] (51%)
[Negative]	[42] (49%)
[Total]	[85] (100%)

Table No.2: surgical and MRI findings

[MRI]	[Surgery]		[Total]
	Positive	Negative	
[Positive]	40	04	44
[Negative]	02	39	41
Total	42	43	85

Table No.3: outcomes Findings

Sensitivity	93%
Specificity	92%
PositivePredictiveValue	92%
NegativePredictiveValue	93%
Diagnostic Accuracy	91%

Table No.4: Age-stratified MRI with surgical findings

[MRI]	[Age] (years)	
	[<51]	[≥50]
[Sensitivity]	91%	97%
[Specificity]	92%	91%
[PPV]	92%	91%
[NPV]	91%	97%
[Diagnostic accuracy]	92%	94%

Table No.5: categorized by sex MRI with surgical finding

[MRI]	[Gender]	
	[Male]	[Female]
[Sensitivity]	95%	92%
Specificity	92%	91%
PPV	93%	91%
NPV	94%	91%
Diagnostic accuracy	93%	91%

Table No.6:MRI with surgical finding stratified by BMI

[MRI]	[BMI]		
	[Underweight]	[Normal]	[Obese]
[Sensitivity]	93%	94%	95%
Specificity	92%	90%	93%
PPV	94%	88%	93%
NPV	93%	90%	97%
Diagnostic accuracy	93.65%	89%	95%

DISCUSSION

Using surgical findings as the gold standard, MRI diagnosed perianal fistula with 93% sensitivity, 92% specificity, 92% PPV, 93% NPV, and 91% diagnostic accuracy[8,9]. These results were comparable to a 13-patient study that found MRI showed 100% sensitivity and 87% specificity for perianal fistula diagnosis in study twenty-two thought anal fistulas were investigated[10]. We contrasted dynamic contrast-enhanced MR imaging, surgical exploration, and digital rectal examination. Digital rectal examination without surgery was inferior to MRI. MRI identified fistulas with 98% sensitivity and 100% specificity[11]. In a second study, MRI detected primary fistula ting tracts and abscesses with 100% sensitivity and 88% specificity for tract identification, and 97% and 98% for abscesses MRI's sensitivity, specificity, and diagnostic accuracy for perianal fistula type and size are 91%, 100%, and 90%, respectively, according to Imaadur Rehman et al[12.] In one study, MRI has 96% sensitivity and 80% specificity in detecting and grading the main tract Another study found abscesses with 87% sensitivity and 96% specificity using MRI[13]. Our results were similar to those of Regina G. H. Beets-Tan et al. [14], who demonstrated that MRI had 100% sensitivity and 85% specificity for identifying fistula tracts, 97% and 98% for abscesses, 100% for horseshoe fistulas, and 100% for internal openings[15].

CONCLUSION

Our analysis MRI is a highly accurate tool in the diagnosis of perianal fistulas, with excellent sensitivity and specificity. Further research is necessary to confirm the accuracy of MRI in the diagnosis of perianal fistulas.

Author's Contribution:

Concept & Design of Study: Adnan Ahmed
Drafting: Adnan Ahmed
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Revisiting Critically:	Ghazala Wahid, Sahar Fahim, Uzma Badshah
Final Approval of version:	Adnan Ahmed

Conflict of Interest: The study has no conflict of interest to declare by any author.

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