Ultrasonography Accuracy for Perianal Fistula Anatomy

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Background: Endorectal ultrasonography is a diagnostic modality for evaluation of perianal pathologies and suitable surgical planning, especially in perianal fistula, due to its close relation to the anal sphincter complex. Detection of anatomical location of fistula tract and abscess is critical to select the best procedure.

Objectives: This study tries to demonstrate the accuracy of endorectal ultrasonography in mixed group of patients in diagnosing perianal fistula during two years, retrospectively.

Patients and Methods: After Ethics Committee approval, all endorectal ultrasonography reports of all patients with perianal fistula referred to Shiraz Endorectal Ultrasonography Clinic of Shiraz colorectal research center between 2010 and 2012 were gathered. All endorectal ultrasonographies in this center was perform by a colorectal surgeon with BK Medical Class I type B Ultrasonography scanner with 12 MHz probe.

Results: Finally, 183 cases of perianal fistula were enrolled in the study. Operation notes were evaluated and the type of fistula was compared with ultrasound findings. This study showed that endorectal ultrasonography has adequate accuracy with 97.92% sensitivity and acceptable 89.53% specificity in diagnosis of perianal fistula. Compared with other reports, it seems that endorectal ultrasonography is an acceptable diagnostic tool for detecting perianal fistula compared with other diagnostic modalities.

Conclusions: Endoanal sonography would be one of the high sensitive modalities for evaluation of perianal fistula. Detection of anatomy of fistula helps surgeon to choose best method for surgery.

Keywords: Ultrasonography; Fistula; Sensitivity; Specificity

1. Background

Endorectal ultrasonography since its proposal time in 1989, has become the imaging of choice for evaluation of fecal incontinence and perianal sepsis and fistula (1). Preoperative evaluation of patients with perianal fistula for understanding the anatomy of the tract helps better design of operation plan and relatively, less postoperative consequences such as inadvertent sphincter injury, recurrence or missed occult abscess (2). The therapeutic goal of treating perianal fistula is to obliterate the internal opening and any associated epithelial tract with minimal sphincter division; thus, American Society of Colon and Rectal Surgeons proposed endorectal ultrasonography as a very effective preoperative measure to delineate fistula tract (3). Endorectal ultrasonography reported to have the sensitivity and specificity of 100% and 77% for detecting perianal abscesses; while its sensitivity and specificity for detecting perianal fistula was 89% and 66%, respectively (4). Another study evaluates the accuracy of ultrasonography reported the accuracy of 100% for detecting fistula tract and fluid collection and 91% accuracy for detecting horseshoe collection. However, ultrasonography was only 10% accurate for detecting internal orifices (5). Routine usage of ultrasonography for evaluation of Perianal fistula is suggested from a Korean study, which reports the sensitivity of 94% and specificity of 87% in patients with perianal fistula (6). The value of endorectal ultrasonography for detecting fistula anatomy is already studied, but most of studies were done with low sample sizes. However, since diagnostic test indices might alter with the pathology prevalence, it was appeared that evaluation of endorectal ultrasonography accuracy in Iranian population is essential regarding very limited available data and different epidemiology of perianal pathologies. On the other hand, the patients underwent endoanal ultrasonography and surgery team have not been evaluated yet.

2. Objectives

This study tries to demonstrate the accuracy of endorectal ultrasonography in mixed group of patients in diagnosing perianal fistula during two years retrospectively.

3. Patients and Methods

After ethics committee approval, the endorectal ultrasonography reports of all patients with perianal fistula referred to Shiraz Endorectal Ultrasonography Clinic of Shiraz colorectal research center between April 2010 and October 2012 were gathered. All endorectal ultrasonographies in this center was performed by a constant colorectal surgeon with supervision of a radiologist with BK Medical Class I type B Ultrasonography scanner with 12 MHz probe. Patients were categorized as high and low type, regarding ultrasonography findings. If fistula tract involvement is less than 30% of external sphincter muscle, it was considered as low type and if more than 30%, it is considered as high type or complex fistula. The operation findings of patients were extracted from Shahid Faghihi Hospital operation room archive, where nearly all patients undergone their surgical intervention.. In order to determine the sensitivity, specificity, negative and positive predictive values operation findings considered as gold standard test result and result of preoperative endorectal ultrasonography compared with operation findings. Gathered data including endorectal ultrasonography findings, operation findings and demographic data entered into our database. Patients with operation findings in favor of fistula consider as disease positive and without operative fistula findings consider as disease negative. Patients with ultrasonography findings of fistula consider as test positive and vice versa.

4. Results

During two years period, 200 cases of suspected perianal fistula were referred to our endorectal ultrasonography clinic and 183 cases were operated in this center. Then, operation finding and preoperation endoanal ultrasonography were compared to evaluation the type of fistula. Table 1 demonstrates the basic demographic features of studied population. As shown in the table, male and female groups have the same age and most of cases had history of previous perianal abscess incision and drainage. Since Inflammatory Bowel Disease (IBDs) are not frequent in Iran, we had only one female case of IBD in our studied population. Most of cases (64.1% of men and 56.4% of women) had history of complains such as perianal itching, bleeding, bulging, discharge and pain for more than six months (Table 1).

Table 1. Basic Demographic Features of Studied Population

	Male	Female
No. (%)	128 (69.9)	55 (30.1)
Age, Mean ± SD [a]	43.7 ± 12.14	39.87 ± 11.31
Past History of perianal abscess I and D, %	83.6	85.5

[a] Mean age difference of male and female population was not statistically significant (P value = 0.366).

The prevalence of high and low type fistula in our database was 47% and 52%, respectively, based on our ultrasonography findings; while surgery findings reported the prevalence of high type and low type fistula as 43% and 56%, respectively. Results of diagnostic test parameters analyses demonstrate high sensitivity of endorectal ultrasonography and acceptable specificity 97.92% and 89.53%, respectively. Positive and negative predictive values are 91.26% and 97.47%, respectively. All of confidence intervals are within acceptable limits (Table 2).

Table 2. Overall Result of Endorectal Ultrasonography Accuracy Evaluation [a]

	Diagnostic Tests Analysis Result, (95% Confidence Interval) [b]
Sensitivity	97.92, (92.68-99.75)
Specificity	89.53, (81.06-95.10)
Positive Likelihood Ratio	9.36, (5.04-17.37)
Negative Likelihood Ratio	0.02, (0.01-0.09)
Disease Prevalence	52.75, (45.23-60.18)
Positive Predictive Value	91.26, (84.06-95.93)
Negative Predictive Value	97.47, (91.15-99.69)

[a] Data are presented as %.
[b] Linear Weighted Kappa (95% Confidence Interval), 0.858 (0.780-0.937).

The calculated kappa for endorectal ultrasonography is 0.85 with confidence interval of 0.780 to 0.937, which is statistically remarkable.

5. Discussion

Result of our study demonstrate the value of endorectal ultrasonography for diagnosis of perianal fistula, especially regarding its high sensitivity (97.92%) and acceptable specificity (89.53%) it could be proposed as a screening test for diagnosis of perianal fistula. The relation of perianal fistula tract to the anal sphincter complex reveals the necessity of perianal region anatomic evaluation in order to understand preoperative sphincter defect and also defining appropriate surgical plan (3). Currently multiple diagnostic modalities are available for this anatomic evaluation. Schwartz et al. compare the accuracy of MRI and endorectal ultrasonography. They did not find any statistical difference between these modalities. They suggest exam under anesthesia for definite diagnosis (7). Siddiqui et al. also did not find any statistically significant difference between the sensitivity of endorectal ultrasonography and MRI in their meta-analysis for accuracy of ultrasonography and MRI, while they reported MRI to have better specificity than ultrasonography (8). Although newer modalities such as three dimensional ultrasonography and MRI are proposed for diagnosis of perianal fistula (9); but our study and other authors showed endorectal ultrasonography has acceptable accuracy for this entity. Endorectal ultra-

sonography is a simple, fast and well-tolerated diagnostic modality; while MRI is a costly procedure and could not be performed in patients with claustrophobia and metal implants. Both techniques are accurate in experienced specialists (10). As stated, preoperative evaluation of perianal fistula anatomy is essential and currently multiple modalities are available for this investigation our study, as well as previous studies, report an acceptable accuracy for endorectal ultrasonography. However one of the limitations of our study might be its retrospective methodology, however very few studies have this amount of sample size and most of studies have evaluated less than 50 patients (4, 5). Another limitation is related to comparison of result with MRI, because of lack of facility of MRI with endo coil.

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Author's Contributions

Leila Ghahramani, MD: conception and design, revising the article critically, final approval; Seyed Vahid Hosseini, MD: conception and design, revising the article critically, final approval; Admad Izadpanah, MD: acquisition of data, drafting the article, final approval; Alimohammad Bananzadeh, MD: acquisition of data, drafting the article, final approval; Mohammad Rezazadeh Kermani, MD: revising the article, acquisition of data, final approval; Alireza Safarpour, MD: acquisition and analysis of data, final approval, drafting the article; Salar Rahimi Kazerooni, MD: acquisition and analysis of data, final approval, drafting the article; Mohsen Pirmoradi, MD: revising the article, acquisition of data, final approval.

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