STUDY TO SEE THE EFFECT AND USE OF ENDOSONOGRAPHY OF ANORECTAL FISTULAS, AND IT’ S COMPARISON WITH MRI

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ABSTRACT

Objective: To determine the accuracy of endoanal ultrasonography (EUS) in identifying fistula anatomy and comparison with MRI.

Methods: Endosonographic imaging was performed with a Siemens (Erlangen, Germany) Fl 400 ultrasound scanner with an end-fire 7.5-MHz biplane endorectal probe and a B-K Medical (Sandhoften, Denmark) scanner with an 1850 axial –type side-fire 5.0 – to 10.0 – MHz rotating endoscopic probe. Result: Out of the 60 patients with confirm fistula in ano clinical examination reveal track in 60% (n36) cases while internal opening observed only in 5% (n3). TRUS Shows track in 100% and internal opening in 90% in comparison MRI visualization of book internal opening in 100% and 98% respectively.

Conclusion: Endosonography can accurately assess the anal sphincter, peroxide – enhanced 3- dimensional imaging can increase the utility of EUS in detection and characterization of perianal fistulas and planning of optimal therapy. However, MRI can be used complementary modality to EUS, especially for deep pelvis lesions.

KEYWORDS: Endoanal, Ultrasonography, MRI.

INTRODUCTION

Fistulas are classified according to their primary path of extension relative to the External Anal Sphincter (EAS) and the puborectalis muscle. The St James’S University Hospital classification consists of 5 grades and relates the parks surgical classification to anatomy seen on MRI in both axial and coronal planes. Grade 1: Simple linear intersphincteric fistula,
which typically extends directly from the perianal skin into the anal canal, sparing both the ischiorectal and ischioanal spaces. These fistulas do not transverse the EAS but may traverse the distal-most portion of the IAS, below the level of the dentate line.\(^1\). Grade-2: Intersphincteric fistula with abscess or secondary tract. Also bounded by the EAS secondary fistulaus tracks may be the horseshoe type, crossing the midline, or they may ramify in the ipsilateral intersphincteric plane. A horseshoe fistula is best shows in the axial plane. Grade 3: Transssphincteric fistula, which pierces through both layers of the sphincter complex and then arcs down to the skin through the ischiorectal and ischioanal fossae. Grade-4: Transssphincteric fistula with an abscess or a secondary track within ischiorectal fossae. As with grade 3 lession, the key anatomic discriminator of a grade 4 fistula is the track crossing the EAS. These fistulas are more complex, and surgical treatment is likely to disrupt the EAS and alter continence.\(^2,3\) Grade 5: Supralevator and translevator disease. Suprasphincteric fistulas extend upward in the intersphincteric plane and the top of the levator ani to pierce downward through the ischioanal fossa. When the track transverse the levator plate, a translevator fistula is presents. These fistulas pose problems for a treatment because further assessment is needed to detect pelvic sepsis.\(^4-8\)

**MATERIAL AND METHODS**

Transanal ultrasound (US) is a technique to investigate the anatomy of the anal canal and the rectum and a diagnostic tool for diseases of the anorectic region such a fistula in ano and abscesses, fecal incontinence, pelvic floor disorders and rectal prolapses, anal and rectal tumors.\(^9\) Regarding endoanal US, the use of multi-Frequency (6-16 MHz) transducers allows an accurate study of the examined visceral structures and it surrounding tissues, of the ischiorectal and pelvirectal fossae and of other viscera such as the vagina, the pelvic bones or the prostate. Furthermore it is crucial to carry out this examination with a rotating probe which allows a 360 degree vision of the pelvic anatomy.\(^10\) When studying the rectum a gasless water inflated balloon covering the probe is used; it adheres to and distance the rectal walls, avoiding artifacts due to the presence of gas in the ampulla. In addition it is also relatively low cost and it spares the patients radiations compared to other diagnostic such as CT scan and MRI.\(^11\)

Intentional preparation is unnecessary for endoanal US, while an enema should be provided two hours prior endorectal US. The exam lasts 15 to 20 minutes. The patient is then examined
in left lateral decubitus or supine; the scope is inserted in to the rectum and slowly pulled back, to allow the view of the rectum and anal canal.[12]

MRI imaging examination performed with body requires no special patients preparation, are well tolerated, and provides excellent anatomic details of the anal the sphincters and the anatomic boundaries of the pelvis (Table 1).

RESULT

Table 1: Protocol for MR Imaging of anal fistulas

<table>
<thead>
<tr>
<th>Parameters</th>
<th>T2W FSE</th>
<th>T1W FSE</th>
<th>T2W FSE</th>
<th>FS T1W FSE</th>
<th>FS T1W FSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imaging plane</td>
<td>Sagittal</td>
<td>Oblique axial</td>
<td>Oblique axial</td>
<td>Oblique axial</td>
<td>Oblique coronal</td>
</tr>
<tr>
<td>TR/TE(msec)</td>
<td>4500/110</td>
<td>450/12</td>
<td>4500/110</td>
<td>450/12</td>
<td>450/12</td>
</tr>
<tr>
<td>FOV(cm)</td>
<td>29 x 29</td>
<td>26 x 26</td>
<td>26 x 26</td>
<td>26 x 26</td>
<td>24 x 24</td>
</tr>
<tr>
<td>Section thickness (mm)</td>
<td>2.5</td>
<td>4.0</td>
<td>4.0</td>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Intersection gap(mm)</td>
<td>0</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td>Matrix</td>
<td>320 x 256</td>
<td>384 x 224</td>
<td>320 x 256</td>
<td>384 x 224</td>
<td>512 x 224</td>
</tr>
<tr>
<td>NSA</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Note- parameters were established with the signa excite 1.5-T system (GE Healthcare, Milwaukee, Wis). FOV= field of view, FS= fat- suppressed, NSA = number of signals acquired, TE echo time,T1 W=T1- weighted, TR= repetition time, T2W=T2 – weighted

Perianal fistulas appear as hypoechoic tracks with internal gas or echogenic debris on endoanal sonography. The primary track often has a relatively thick fibrous wall and is filled. With endoanal sonography, echogenicity of fluid varies, depending on the tissue composition and stage of inflammation. It can appear isoechoic, hypoechoic, or hyperechoic or can show mixed echogenicity compared with the surrounding structures. Relatively active anal fistulas are likely to contain more fluid or a fluid like substance. Nonactive perianal tracks are fibrous bands without fluid. The secondary tracks are side branches of the primary track and often extend above level of the internal opening. The internal opening often appears as a hypo echoic area causing a break in the layers of the anal canal wall.

Unenhanced T1: weighted image provide an excellent anatomic overview of the sphincter complex, levator plate, and intermediate signal intensity, such as the sphincters and levator ani muscles. At immediate postoperative evaluation hemmorage products high signal intensity on T1 weighted images and thus may be differentiated from the residual tracks, inflammation, and abscess appears as area of low intermediate signal intensity and may not
be distinguished from normal structures, such as the sphincters and levator ani muscles. At immediate postoperative evaluation, hemorrhage products high signal intensity on T1-weight image and thus may be differentiated from the residual tracks.

T2-weight image provide good contrast between the hyper intense fluid in the track and the hypo intense fibrous wall of the fistula and allow adequate differentiation of the anatomic boundaries between the internal and external sphincters. Active fistulous tracks and extensions have signal intensity on T2-weight images, while the sphincters and muscles have low signal intensity. Chronic fistulous tracks or scars appear as area of low signal intensity on both T1 and T2 weighted images. Abscesses also have signal intensity on T2-weighted images due to the presence of pus in the central cavity.

Out of 60 cases, track visualization by EUS is 100% and internal opening seen in 90% cases while with MRI track visualization and internal opening identification was 100% and 98% respectively. Inter sphincteric fistula seen in 20% (12 Cases), Transsphincteric fistula 70% (42 cases), 2 cases of extrasphincteric and 4 cases of subcutaneous fistula were observed (Table-2).

Table-2: Track visualization and internal opening identification.

<table>
<thead>
<tr>
<th>Clinical examination</th>
<th>Track visualization/Identification</th>
<th>Internal Opening</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60%</td>
<td>5%</td>
</tr>
<tr>
<td>EUS</td>
<td>100%</td>
<td>90%</td>
</tr>
<tr>
<td>MRI</td>
<td>100%</td>
<td>98%</td>
</tr>
</tbody>
</table>

**DISCUSSION**

Although endoanal sonography usually will visualized the sphincter complex and intersphincteric plane, it fails to reliably allow distinction of fistula from inflammation and scarring and is limited in its ability to accurately delineate anatomic spaces outside the EAS moreover, spread of fistulas may be horizontal in the submucosal[13], intersphincteric, or even extrasphincteric spaces without any accompanying abscess. Imagining in the axial plane may indeed be default for those fistulas that are in the horizontal plane, especially under circumstances in which sonographic image resolution is inadequate.[14] Numerous reports have described the accuracy of endoanal sonography in the depiction of the transducer frequency; sonography has reported 57% to 95% accuracy in the detection of the primary fistula. Magnetic resonance imaging in the coronal and axial planes shows fistulous track in
relation to the sphincter complex, ischiorectal fossa, and levator plate imaging in the sagittal and oblique planes is helpful in selected cases.\textsuperscript{[15-17]}

Peroxide-enhanced imaging improves the accuracy of endoanal sonography and provides a dynamic depiction of perianal fistulas. Hydrogen peroxide injection accentuates tissue interface layers at the level of the fistula tract and result in hyper-echoic imaging of the per injection hyperechoic fistula tract. This technique depicts the entire course of the echogenic fistula and permits accurate classification of perianal fistula. It improves identification of trans-sphincteric and inter-sphincteric primary tracks and secondary extensions, particularly horseshoe tracks. Ratto et al. found that accuracy rates of clinical examination, endoanal sonography, and hydrogen peroxide-enhanced sonography were 65.4%, 50%, and 76.9% respectively, for primary tracks, 73.1%, 63.4%, and 88.5% for secondary tracks and 80.8%, 92.3% for horse shoe extensions. Kruskal et al., reported that, despite the result of 12 endoanal sonographic studies initially being normal, 8 showed trans-sphincteric fistula and 8 superficial sinus tracks after hydrogen-peroxide injection. Poen et al., found that with hydrogen peroxide-enhanced sonography, the fistulas tract was classified correctly in 20 patients, the overall concordance with surgery being 95%, peroxide-enhanced endoanal sonography is especially useful for patients with recurrent perianal fistulas in whom scarring should be distinguished from recurrent fistulas. Kruskal et al., reported that peroxide injection permitted fistulas to be distinguished from scarring in 20-30 patients. Peroxide-enhanced endoanal sonography is also reliable in detection of the internal opening.\textsuperscript{[15-20]}

**CONCLUSION**

Peroxide–enhanced and 3D imaging can increase to the utility of endoanal sonography in detection and characterization of perianal fistulas and planning of optimal therapy. However, MRI is useful as a complementary modality to endoanal sonography, especially for the evaluation of deep pelvic lesion.

**REFERENCES**


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