

Anal Endosonography for Recurrent Anal Fistulas: Image Enhancement with Hydrogen Peroxide

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Anal endosonography is a new technique that is useful in the preoperative assessment of patients with anal fistulas. Endosonographic images are created by the reflection of sound waves from the interfaces between tissues of varying densities. In order to accentuate tissue interface layers at the level of the fistula tract, we introduced hydrogen peroxide into the fistula tract through the external opening during anal ultrasonography in two patients with recurrent anal fistula. Hydrogen peroxide injection resulted in hyperechoic imaging of the preinjection hypoechoic horseshoe fistula tract. Endosonographic findings were confirmed at the time of surgery in both patients. We conclude that hydrogen peroxide enhancement of the fistula tract is a simple, effective, and safe method of improving the accuracy of endoanal ultrasound assessment of recurrent anal fistula. [Key words: Anal ultrasound; Image enhancement; Anal fistulas; Hydrogen peroxide]

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Endoanal ultrasonography allows excellent imaging of the anal canal anatomy including the sphincter musculature and surrounding tissues.¹ This technique has also been useful for the evaluation of patients with fecal incontinence. Several authors have reported their experience with anal ultrasonography in the preoperative assessment of patients with fistula-in-ano.^{2, 3} Inaccurate assessment of the location of the fistula tract occurred in up to 20 percent of cases.²⁻⁴ In cases of recurrent fistulas, the scarring and postsurgical changes result in attenuation of tissue layers, which may ap-

pear variably as images of hyperechoic, hypoechoic, or mixed echogenic densities. Because of the difficulty in identifying the fistula tract in recurrent anal fistulas, we used hydrogen peroxide as an image-enhancement technique. With the introduction of hydrogen peroxide, increased oxygenation within the fistula tract results in an accentuation of the ultrasonic tissue interface and an enhanced image. We report our experience in two patients in whom this technique allowed us to confirm the location of the fistula tract.

TECHNIQUE

A Bruel and Kjaer (Naerum, Denmark) type 1890 rectal endoprobe with a rotating transducer at 7.0 MHz (focal length of 2-5 cm) is used. The endoprobe is fitted with a hard transonic 1.7 cm in diameter conical head that is filled with degassed water to provide acoustic coupling. The conical head causes minimal distortion to the anal canal and little discomfort to patients during scanning.

The patient is placed in the left lateral decubitus position. A digital examination is performed before introduction of the endoprobe. A lubricated condom filled with ultrasonic gel is draped over the head of the probe which is introduced gently into the anal canal. Sequential scanning of the anal canal is then performed from the level of the puborectalis to the anal verge. The anal sphincters are assessed for thickness and any disruptions in the muscle are noted. The position and direction of any fistula tract or abscess collection is documented. With this equipment, fistula tracts normally appear to be *hypoechoic* (Fig. 1).

The external opening is cannulated with a soft silastic catheter (Angiocath 18-gauge) and secured

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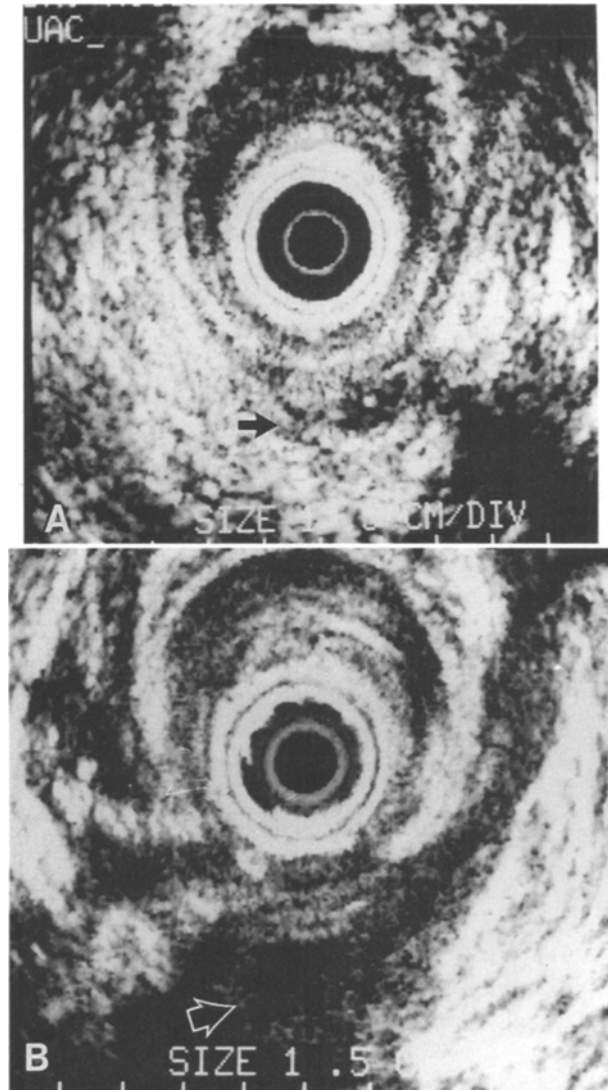


Figure 1. A. Preinjection anal ultrasound image of recurrent fistula (arrow indicates area of suspected tract). B. Preinjection ultrasound scan showing possible fistula tract (arrowed) extending in horseshoe fashion around the left side.

in place. Approximately 1 to 2 ml of hydrogen peroxide is then injected slowly and scanning of the anal canal is repeated (Fig. 2). With hydrogen peroxide instillation, the fistula tract becomes hyperechoic (Fig. 3). In order to validate the ultrasound findings, a comparison was made with the intraoperative records. In both patients, the area of hyperechogenicity correlated with the operative findings of a fistula tract. Both of these patients had deep postanal abscess collections with horseshoe extensions into the ischioanal fossa which had been preoperatively displayed on the endorectal ultrasound scan.



Figure 2. Hydrogen peroxide injected into fistula tract during anal endosonography.

DISCUSSION

The image obtained on ultrasound results from echoes obtained from the wave passing through interfaces created by tissues of varying density and transmission characteristics. Interpretation of these images is often difficult and largely related to the experience of the operator.⁵ Choen *et al.*⁴ reported that anal ultrasonography for anal fistulas was associated with incorrect findings in about 20 percent of cases, which was comparable to the consultant's digital examination in their institution. This report discouraged the use of endoanal ultrasound in routine preoperative evaluation of anal fistulas.

Indeed, the simple anal fistula can be easily defined on careful examination and treatment is straightforward.⁶ Recurrent and complex anal fistulas, however, present a more challenging problem since scarring from previous operations can complicate clinical assessment.⁷ Such patients may have underlying sphincter damage and it is therefore useful to define the status of the sphincter anatomy and location of the fistula tract. Anal ultrasound is a useful preoperative diagnostic tool because it is minimally invasive, allows excellent visualization of anorectal anatomy, and has virtually no complications.^{2,3}

A problem encountered with ultrasonographic imaging of recurrent fistulas is that scarring causes attenuation of tissues and can produce a variably hyperechoic or hypoechoic image.⁸ This creates confusion as one relies on a particular pattern of images to distinguish between different tissues and fistula tract.

One of the difficulties in the interpretation of the ultrasonographic image of the recurrent anal fistula arises from the attenuation of tissue layer as

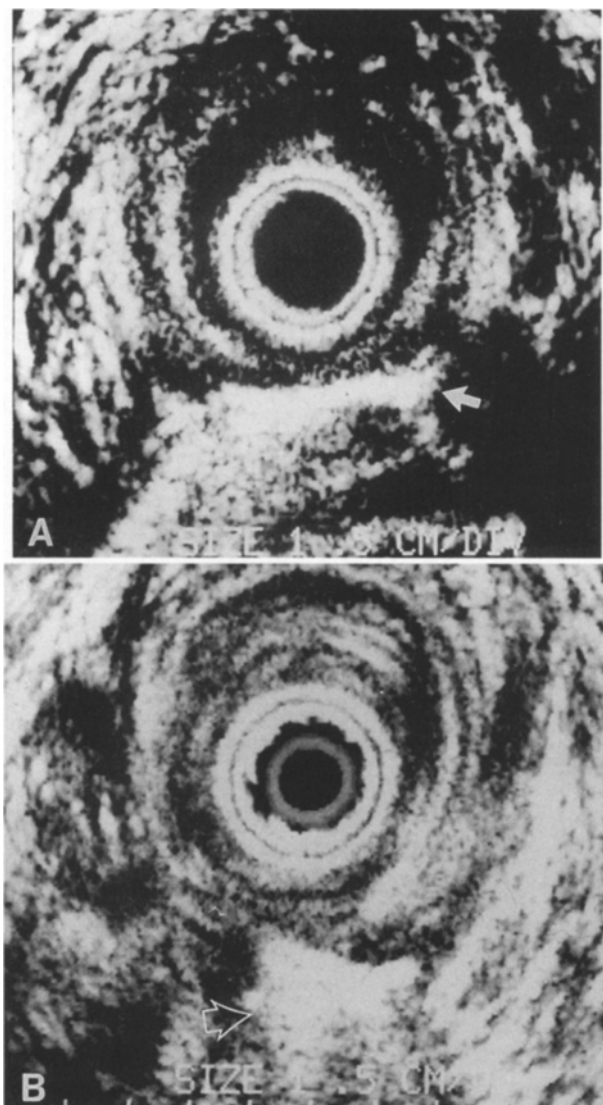


Figure 3. A. Repeat ultrasound scan of patients in Figure 1A after hydrogen peroxide image enhancement (hyper-echoic area arrowed). B. Postinjection scan showing a postanal abscess cavity (arrowed) but absence of any horseshoe extension.

a result of scarring. Hydrogen peroxide instilled into the fistula tract acts as contrast medium within the tract so that it now appears brilliantly hyper-echoic. By comparison to images obtained with and without hydrogen peroxide, one can confidently map the position of the fistula tract and its extensions. Other advantages are its simplicity, economy, and safety.

We have experimented with hydrogen peroxide enhancement in simple, low intersphincteric and transsphincteric fistulas but have been disappointed. In these low fistulas, injection of hydrogen peroxide into the external opening often results in bubbling through the internal opening into the anal canal which then acts as a barrier to the ultrasound wave, obscuring further visualization. We do not, therefore, recommend its use in the routine, low uncomplicated anal fistula.

CONCLUSIONS

We have found hydrogen peroxide injection to be a safe and economic method of image enhancement in anal endosonography. This simple technique improves the accuracy of preoperative assessment of the recurrent and complex anal fistula.

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