

Magnetic Resonance Imaging of Perianal Fistulas

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KEYWORDS

• Fistula • MR imaging • Perianal • Crohn disease

KEY POINTS

- MR imaging has been shown to accurately show the anatomy of the perianal region.
- Currently, MR imaging is also a reliable technique to assess the outcome of medical therapy using the anti-TNF agent infliximab in patients with Crohn disease with fistula-in-ano occurring during the first year of follow-up.
- Another important advantage of MR imaging is the multiplanar assessment. However, imaging planes must be correctly aligned to the anal canal.
- Despite the closure of draining external orifices after infliximab therapy, fistula tracks persist with varying degrees of residual inflammation, which may cause recurrent fistulas and pelvic abscesses.

INTRODUCTION

Perianal fistulas are a major cause of morbidity. Fistulas are defined as an abnormal communication between 2 epithelium-lined surfaces. In the case of a perianal fistula, the connection is between the mucosal layer of the anal canal and the perianal skin.

Perianal fistulas predominantly affect young adults, especially men in their fourth decade.¹

Treatment of perianal fistulizing disease is medical or surgical. Patients with Crohn disease are first treated with antibiotics, immunosuppressive agents, or anti-tumor necrosis factor (anti-TNF) antibodies. Fistulas not related to Crohn disease are usually treated with surgery.²

Recurrence after therapy is the most common problem. To avoid recurrence after medical or surgical therapy, detailed information must be obtained about the location of any fistula track and the affected pelvic structures. High-resolution magnetic resonance (MR) imaging allows precise

assessment of the relationship of the fistula track to the pelvic floor structures, and identification of secondary fistulas or abscesses.

NORMAL ANAL CANAL ANATOMY

Underneath the mucosa, the anal canal consists of an internal layer of circular smooth muscle (the internal sphincter) and an outer striated muscle layer (the external sphincter). The 2 sphincters are separated by the intersphincteric space, which contains predominantly fat (**Fig. 1**). This space forms a natural plane of lower resistance in which fistulas can easily spread.³ The external sphincter is surrounded by the fat-containing ischioanal and ischioanal space.²

The internal sphincter is continuous with the circular smooth muscle of the rectum. It is responsible for 85% of the anal resting tone.⁴ In most individuals, disruption of the sphincter will not cause loss of continence.⁵

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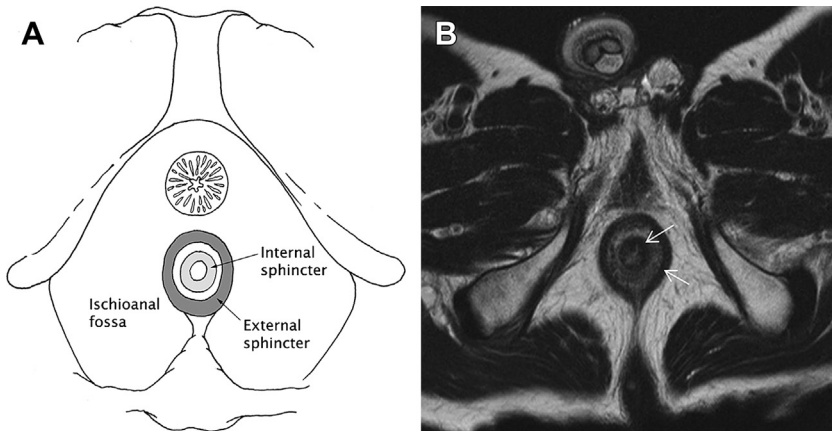


Fig. 1. Drawing (A) and axial T2-weighted MR image (B) show the normal anatomy of the perianal region (at the level of the mid-anal canal). Arrows indicate internal and external sphincter.

The external sphincter is continuous with the puborectal and levator ani muscles (Fig. 2). It contributes only 15% of the anal resting tone, but its strong voluntary contractions resist defecation. A disruption of the external sphincter can lead to incontinence.⁵

MR imaging has been shown to accurately show the anatomy of the perianal region. On axial T2-weighted images, the internal and external anal sphincter appear as circular structures with low signal intensity.

After intravenous administration of gadolinium, the internal and external sphincter can be easily distinguished on T1-weighted images by their different contrast enhancement. The internal sphincter muscle enhances to a higher degree than the external sphincter muscle (Fig. 3).^{6,7}

CAUSE OF PERIANAL FISTULAS

In patients without Crohn disease, perianal fistulas usually arise from infected or obstructed

intersphincteric anal glands (cryptogenic fistulas).⁸ The anal glands lie at the level of the dentate line in the mid-anal canal and can penetrate the internal sphincter toward the intersphincteric plane (intersphincteric fistula). From this space, the infection may track down the intersphincteric plane to the skin. Alternatively, infection may pass both layers of the anal sphincter to enter the ischioanal space (transsphincteric fistula).⁵

The cause of perianal fistulas in Crohn disease may be a fistula arising from inflamed or infected anal glands, and/or penetration of fissures or ulcers in the rectum or anal canal.⁸⁻¹⁰

DIAGNOSIS: ACCURACY AND APPLICATION OF MR IMAGING

The use of MR imaging in the evaluation of perianal fistulas has been reported in many studies,¹¹⁻¹³ showing it to be the preferred technique for pre-operative evaluation of perianal fistulas and improved patient outcome.⁴ MR imaging has a

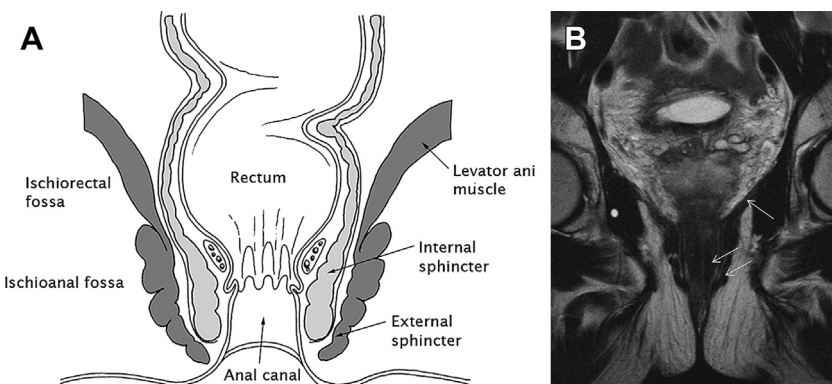


Fig. 2. Drawing (A) and T2-weighted image (B) show the normal anatomy of the perianal region in the coronal plane. Arrows indicate internal and external sphincter.

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