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Modern management of deep post-anal space abscess and horseshoe fistulas

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ABSTRACT

Deep post-anal space abscesses and horseshoe fistulas are complicated anorectal diseases that can lead to significant morbidity. Surgical intervention is the treatment of choice; however, the anatomical location and natural course of the disease makes management difficult. The goals of care are to eliminate the source of infection, prevent recurrence, and preserve anorectal function. Several different treatment strategies have been described. The modified Hanley procedure is the most commonly utilized technique with low recurrence rates and minimal anorectal dysfunction. Complete resolution of the perianal sepsis followed by definitive repair with standard methods of treating cryptoglandular fistulas is recommended.

Introduction

The deep post-anal space abscess and associated horseshoe fistula are unique presentations of anorectal sepsis.[1] Patients suffering from these manifestations of anorectal fistulous disease experience significant complications affecting their anorectal function and subsequently their quality of life. The management of this pathology is challenging due to its anatomical location, involvement of surrounding structures, and the common failure of proper diagnosis, leading to insufficient treatment, recurrence, and impairment of continence. Successful management of these problems requires practitioners to have a thorough understanding of anorectal anatomy and physiology. Management decisions made based on these parameters can have a profound influence on a patient's anorectal function and quality of life.

Pathogenesis and anatomy

Most anocutaneous abscesses usually originate from an infected or obstructed anal gland that connects with an anal crypt located at the line of Morgagni in the anal canal. A suppurative process then develops, which extends through the internal sphincter. The infection can then travel through a number of potential spaces that surround the anal canal (Fig. 1). Parks' classification of anorectal fistulas is also based on the route of the fistula from the crypt to the anorectal skin (Fig. 2). The deep post-anal space was first described by Courtney[2] in 1949. This space is bound superiorly by the levator ani muscles, which insert posteriorly into the side of the coccyx. Inferiorly, are the fibers of the superficial external sphincter muscle, which inserts into the tip of the coccyx as the anococcygeal ligament. The anterior boundary is the posterior surface of the deep external sphincter muscle. Laterally the boundaries of this space are the ischial tuberosities.

Deep post-anal space abscesses form in the ischiorectal fat above the anococcygeal ligament, which is continuous with the lateral ischiorectal fossae. A lack of fascial or ligamentous boundary at this level allows infection to “horseshoe” around the anus in this space. Horseshoe abscesses can also occur in the intersphincteric space or superficial post-anal space.[3,4] Frequently this suppurative process may then develop secondary openings over the buttocks and perineum and even extend to the lower abdominal wall, medial aspect of thighs, and scrotum or labia.

Clinical presentation and evaluation

The clinical symptoms and signs of a deep post-anal space abscess or horseshoe fistula are most commonly perineal pain, painful defecation occasionally causing suppression of bowel movements, fever, and leukocytosis.[3,5,6] Due to the severe pain, patients usually cannot tolerate a rectal or anoscopic exam in the

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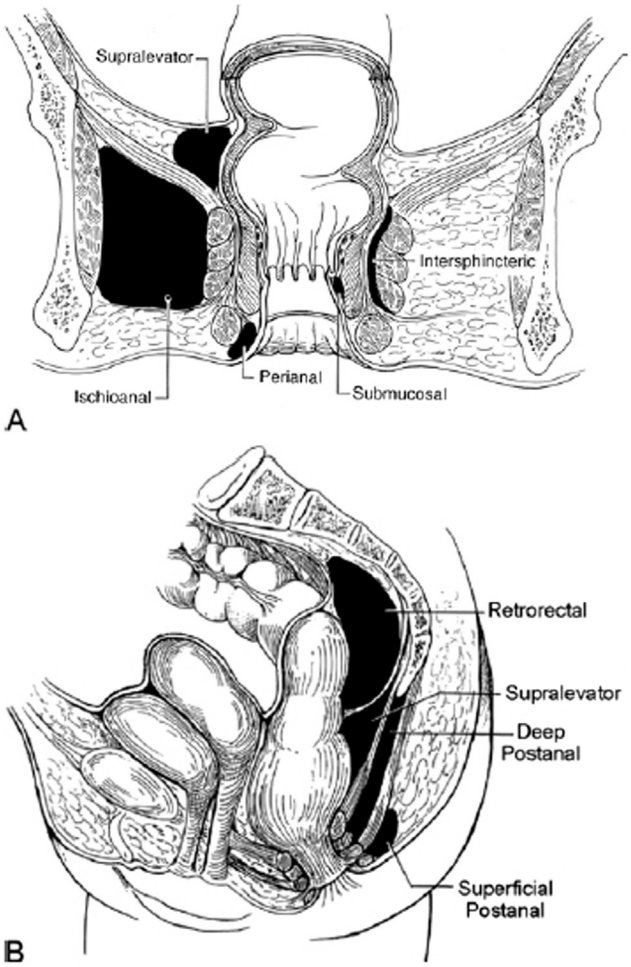

Fig. 1. Anorectal anatomy and potential spaces for anorectal abscesses: (A) coronal section and (B) sagittal section. (Reprinted with permission from Vasilevsky CA, Anorectal abscess and fistula. In: Beck DE, Roberts PL, Saclarides TJ, Senagore AJ, Stamos MJ, Wexner SD, eds. *The ASCRS Textbook of Colon and Rectal Surgery*. New York, NY, Springer Publishing Company; 2011:220.)

office or emergency room. Treating physicians must maintain a high index for suspicion when evaluating patients with anal pain with few external clinical findings. These patients should be considered for an exam under anesthesia. On physical exam or exam under anesthesia, findings vary depending on the extent of the disease.[3] An isolated small abscess in the deep post-anal space may not be palpable. A larger abscess collection may reveal an indurated or boggy puborectalis at the anorectal ring. If ischiorectal extensions are present, induration, erythema, or secondary openings can be appreciated over the ischiorectal fossa. On anoscopic exam, an internal opening may be visible in the posterior midline and pus may be seen exuding from the crypt. However, at times, the opening may not be easily identified due to epithelialization, failure of drainage through the crypt, or obscurement due to associated inflammation and induration.[7]

In most cases, a good history and physical exam is sufficient enough to raise suspicion for deep post-anal space pathology. However, in complex cases or recurrent disease, radiographic adjuncts can be helpful in defining difficult internal openings, additional fistula tracts, secondary abscess collections, degree of lateral extension, and sphincter involvement.[8] In these cases, the radiographic studies of choice are magnetic resonance imaging (MRI) or endoanal ultrasound with or without hydrogen peroxide injection.[8–13] With an MRI, T2-weighted images will show hyperintense fluid collections infralevatorly that crosses the midline and connects with the rectal lumen.[14] An abscess cavity on endoanal ultrasound will appear as a hypoechoic area with possible hyperechoic spots within it with connection to a fistulous tract, which will be seen as a hypoechoic tract crossing the external sphincter, internal sphincter, and subepithelium (Fig. 3).[12] In our experience, we have also found computed tomography (CT) to be helpful in the acute setting (Fig. 4).

History of surgical management

Several techniques for the management of deep post-anal space abscesses have been described. However, there is paucity of literature providing convincing data for the optimal treatment. The basic principle of these procedures is to eliminate the septic foci with the smallest amount of functional derangement.[8]

An early description of the surgical treatment for horseshoe fistulas was by John Arderne,[15] an English surgeon during the 14th century. His approach was a “lay-open” technique that involved excising the internal opening and unroofing all fistulous tracts (Fig. 5). In the 1870s, William Allingham,[17] the first specialist in colon and rectal surgery in the United States, presented his experience with India rubber ligature for the treatment of fistula-in-ano after being introduced to it by Professor Dittel of Vienna.[16] Making some modifications from Professor Dittel's description, Allingham used a probe to find the fistula tract from within the anal lumen and pass a piece of solid India rubber ligature through to the external opening. A tight loop was made with the ligature and a small pewter clip was pressed together to secure the ligature. He reported that the ligature cut through the fistula in about six days and he advocated for the procedure stating the advantages of no bleeding, no pain, and fast recovery. Essentially, it was an early description of the modern day cutting seton. However, the concept did not meet with much enthusiasm, and Arderne's technique of unroofing all fistulous tracts predominated until the 1960s.

However, Arderne's procedure caused significant anorectal deformity and fecal incontinence. In 1965, Hanley[3] described a more conservative surgical approach focused on preserving anatomy and function while eliminating the offending cryptoglandular complex. His technique for a deep post-anal space abscess involved a primary fistulotomy in the posterior midline. An incision was made from the primary opening to the tip of the coccyx while severing the subcutaneous external sphincter muscle and lower internal sphincter muscle. The anococcygeal ligament was divided to access the deep post-anal space. The deep external sphincter was left intact. In the presence of horseshoe fistula extensions, lateral counterincisions were made to drain the involved ischiorectal spaces. He concluded that this technique provided adequate drainage of the deep post-anal space and horseshoe fistulas with minimal anatomic defect and functional impairment (Fig. 6).

Hanley's eponymous procedure became the mainstay for the treatment of deep post-anal space abscesses and horseshoe fistulas. In 1975, Hamilton[18] reported the use of Hanley's technique in 65 patients, with only four recurrences. Hanley also published his experience after exclusively using his described operation for 10 years at the Oschner Clinic in 1976. He reported that of the 41 patients he treated with acute and chronic horseshoe anal fistulas, there were no recurrences and incontinence “was not a problem.”[2]

Hanley's understanding of the pathogenesis of deep post-anal space abscesses and horseshoe fistulas significantly impacted the more conservative approach to treatment that he described. However, despite the reports of improved function and lower recurrence rates than Arderne's methods, his technique required transection of relevant components of the posterior sphincter