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# Management of anorectal and intra-abdominal infections in the neutropenic cancer patient



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## Anorectal infection in the neutropenic cancer patient

### Background

Anorectal infection in the neutropenic cancer patient is a significant and potentially fatal complication in patients receiving systemic chemotherapy. The diagnosis is often made clinically on the basis of signs and symptoms (perianal pain, erythema, and tenderness), after surgical drainage of an abscess, or from cross-sectional imaging demonstrating perianal inflammation, fluid collection, or fistula formation. The management of these patients is not straightforward, and the literature continues to be unclear about the indications for and timing of surgical intervention. In the immunocompetent patient, the management is well defined, often including an examination under anesthesia and drainage if an abscess is present.

The patient with neutropenia, thrombocytopenia, and perianal disease receiving chemotherapy for malignancy presents the clinician with unique circumstances that often affect management strategy. In a multidisciplinary fashion, the treating team must consider factors such as recent chemotherapy toxicity, stage and prognosis of malignancy, performance status, comorbidities, neutropenia, immunosuppression, thrombocytopenia, and steroid use. These unique features highlight the difference between anorectal infection in patients with neutropenic cancer and anorectal infection found in the general population. Early reports of patients with neutropenia and perianal infection indicate mortality rates as high as 50%.<sup>1,2</sup> The mortality rates have decreased in modern series with most patients recovering with supportive care, antimicrobial therapy, and the selective use of surgical intervention. Although there has been an improvement in outcomes, determining the optimal medical management, as well as the indications for and appropriate timing of surgical intervention, remains a challenge for clinicians.

### *Incidence of and risk factors for anorectal infection in the neutropenic cancer patient*

The incidence of perianal infection in patients with hematologic malignancy is between 5% and 9%.<sup>3-6</sup> Although the incidence of such infections in patients with soft tissue and

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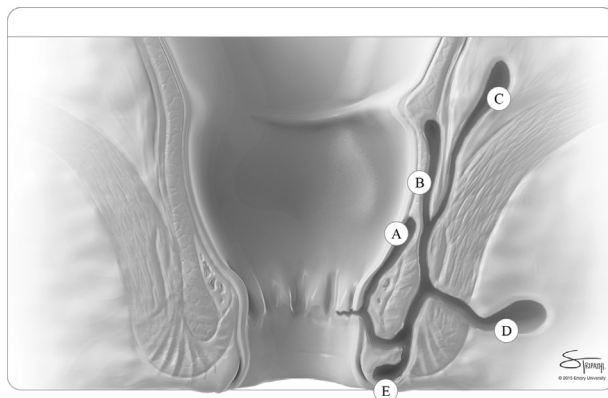
solid-organ malignancy is unknown, the incidence of perianal infection in patients with cancer with neutropenia is higher than that in the general population, which has been estimated to be approximately 100,000 cases per year in the United States.<sup>7</sup>

One of the most significant risk factors for perianal infection is neutropenia.<sup>2–6,8</sup> Neutrophils are an essential component of the immune response, playing a key role in the inflammation, localization, and pus formation.<sup>5</sup> Chemotherapy regimens resulting in myelosuppression are more common in the treatment of hematologic malignancy than in solid-organ malignancy. Ablative regimens used in the preparation for bone marrow transplant can also cause profound pancytopenia, placing patients at risk for neutropenia-associated infections. In patients with hematologic malignancies, male sex and age younger than 40 years are also risk factors for perianal infections.<sup>4,5,9,10</sup>

### *Pathogenesis of perianal infection in the neutropenic cancer patient*

The pathogenesis of perianal infection in the neutropenic patient is similar to that in the immunocompetent patient. A combination of factors, including impaired host defense against invasion of microorganisms, profound neutropenia, and mucosal injury by cytotoxic drugs, can all contribute to increased rates of perianal infection.<sup>11</sup> Anorectal abscesses arise in crypt glands in the anal canal surrounding the dentate line (pectinate line).<sup>12</sup> The dentate line is the visible transformation in the anal canal from the proximal columnar epithelium of the rectum to the squamous epithelium of the perianal skin. The surgical anal canal is approximately 3 cm in length from the anal verge (or internal sphincter) to the proximal levator ani (at the level of the puborectalis muscle). An average of six glands lined by stratified columnar epithelium with mucous-secreting or goblet cells open into crypts surrounding the anal canal. Infection occurs when the anal crypt is obstructed from inspissated debris and bacterial overgrowth proceeds. The inflammatory response primarily proceeds with a neutrophil response, purulence formation, and an abscess collection. The abscess collection follows the path of least resistance and terminates where the anal glands penetrate the sphincter complex. The resulting abscess can potentially form in a number of perianal potential spaces: submucosal, intermuscular, supralelevator, ischiorectal, or perianal locations (Fig 1).<sup>12</sup> As the infection matures, it may resolve with an immune response or it may grow larger, causing pain, swelling, and drainage. Although this represents the normal response in immunocompetent patients, neutropenic patients are unable to mount a neutrophil response and subsequent abscess formation.

The infection may continue to grow into a defined collection in one of the potential spaces of the sphincter complex. The collection location depends on the extent of penetration of the infected gland into surrounding tissues and the path of least resistance; possible locations



**Fig. 1.** (Left) Anal glands opening in anal crypts. (Right) Extension of abscess to adjacent spaces. (A) Submucosal, (B) high intermuscular, (C) supralelevator, (D) ischiorectal, and (E) perianal (illustration provided by Satyen Tripathi, Emory University).

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