Cutaneous North American blastomycosis most often results from the hematogenous spread of Blastomyces dermatitidis following pulmonary infection. Cutaneous lesions, which may be either verrucous or ulcerative plaques, commonly occur on or around orifices contiguous to the respiratory tract. We report the case of a 57-year-old man with cutaneous North American blastomycosis who presented with a well-demarcated, firm, moist, verrucous perianal plaque 4 months following the onset of a prolonged upper respiratory tract infection. Dissemination of B. dermatitidis to the perianal skin is rare, but North American blastomycosis should be considered in the broad differential diagnosis of perianal lesions in any patients who have lived in or traveled to endemic regions.

Cutaneous North American blastomycosis is a deep fungal infection caused by Blastomyces dermatitidis, a thermally dimorphic fungus that is endemic to the Great Lakes region as well as the Mississippi and Ohio River valleys where it thrives in moist acidic soil enriched with organic material.1,2 In humans, the annual incidence rate is estimated to be 0.6 cases per million,3 though it may be as high as 42 cases per 100,000 in endemic areas.4 Infection typically results from the inhalation of conidia and manifests as either acute or chronic pneumonia.5 Most patients with acute disease present with nonspecific flulike symptoms and a nonproductive cough.

Dissemination occurs in approximately 25% of cases,6 most commonly affecting the skin. Other potential sites of dissemination include bone, the genitourinary tract, and the central nervous system. Cutaneous lesions, which may be either verrucous or ulcerative plaques, often occur on or around orifices contiguous to the respiratory tract.7 Verrucous lesions tend to have an irregular shape with well-defined borders and surface crusting. Ulcerative lesions have heaped-up borders and often have an exudative base.8 The differential diagnosis of cutaneous North American blastomycosis includes squamous cell carcinoma, giant keratoacanthoma, verrucae, basal cell carcinoma, scrofuloderma, lupus vulgaris, nocardiosis, syphilis, bromoderma, iodo-derma, granuloma inguinale, tuberculosis verrucosa cutis, mycetoma, and actinomycosis.7,8

Although periorificial cutaneous manifestations of disseminated blastomycosis are common, perianal lesions are rare. The differential diagnosis of perianal verrucous plaques includes condyloma acuminatum, squamous cell carcinoma, adenocarcinoma, Buschke-Löwenstein tumor, actinomycosis, and localized fungal infections such as blastomycosis.9

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Case Report

A 57-year-old man presented with a palpable perianal mass that produced small amounts of blood in his underwear and on toilet paper. The patient reported no history of hemorrhoids, anoreceptive intercourse, or sexually transmitted disease. Four months prior to presentation, he had a prolonged upper respiratory tract illness with a subjective fever and productive cough of 2 months' duration. The patient described himself as an avid outdoorsman who worked at a summer resort and spent a great deal of time in the forests of central Wisconsin last autumn. Physical examination revealed a well-demarcated, firm, moist plaque with a verrucous surface that measured 3.5×2.7 cm and extended from the anal verge to the perianal skin (Figure 1).

Potassium hydroxide preparation of a biopsy specimen (Figure 2), a punch biopsy of the lesion (Figure 3), and Gomori methenamine-silver staining (Figure 4) revealed scattered yeast spores, some demonstrating broad-based budding, with pseudoepitheliomatous hyperplasia, dermal neutrophils, and intraepithelial microabscesses. The patient's urine was positive for Blastomyces antigen (1.04 ng/mL). Chest radiography demonstrated a localized infiltrate in the right hilum with possible mass effect. Computed tomography showed a consolidative opacity measuring 4.0×3.4 cm in the upper lobe of the right lung (Figure 5).

Figure 1. A well-demarcated, firm, moist plaque with a verrucous surface extended from the anal verge to the perianal skin.

Figure 2. A biopsy specimen prepared with potassium hydroxide showed broad-based, figure eight-shaped budding yeast spores above the arrowhead (original magnification ×600).

Figure 3. A punch biopsy of the lesion revealed scattered yeast spores, some demonstrating broad-based budding, with pseudoepitheliomatous hyperplasia and microabscesses (H&E, original magnification ×400).

Figure 4. Gomori methenamine-silver stain demonstrated broad-based budding yeast (original magnification ×400).
The patient was diagnosed with cutaneous North American blastomycosis and prescribed a 6-month course of oral itraconazole 200 mg twice daily. At his 3-month follow-up visit, the perianal plaque had almost completely resolved (Figure 6). However, because the patient had increasing lower extremity edema, subjective hearing loss, and abnormal liver function tests, itraconazole treatment was discontinued and replaced with oral fluconazole 400 mg daily for the next 3 months. The right hilar mass had visibly improved on follow-up chest radiography 2 months after the patient started antifungal therapy with itraconazole and had resolved within another 3 months of treatment.

Comment
Cutaneous blastomycosis results most often from the hematogenous spread of \textit{B. dermatitidis} from the lungs and rarely from direct inoculation.\textsuperscript{5,10} Skin lesions tend to occur on exposed areas, such as the face, scalp, hands, wrists, feet, and ankles.\textsuperscript{7,11-13} Dissemination to the perianal skin is rare, though it has been reported in 2 other patients; both patients, similar to our patient, had evidence of pulmonary involvement at some point in their clinical course.\textsuperscript{9,14} Diagnosis is based on identification of \textit{B. dermatitidis} by microscopy or culture. Potassium hydroxide preparation of biopsy specimens typically shows broad-based budding yeast.\textsuperscript{13} Characteristic findings of histopathologic studies include pseudo-epitheliomatous hyperplasia, intraepidermal abscesses, and a dermal infiltrate of polymorphonuclear leukocytes.\textsuperscript{15} On fungal culture, \textit{B. dermatitidis} is slow growing and may require a 2- to 4-week incubation period. Serologic tests are available, but sensitivity is low, at 9%, 28%, and 77% for complement fixation, immunodiffusion, and enzyme immunoassay, respectively.\textsuperscript{16}

Conclusion
North American blastomycosis should be considered in patients who have verrucous or ulcerative perianal lesions and have lived in or traveled to endemic regions, especially if they have recent or ongoing pulmonary symptoms. Potassium hydroxide preparation and fungal staining of biopsy specimens can aid in diagnosis.

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REFERENCES
7. Mercurio MG, Elewski BE. Cutaneous blastomycosis. 
8. Saccenete M, Woods GL. Clinical and laboratory 
2010;23:367-381.
dermatitidis of the perianal skin: report of a case. Dis Colon 
Rectum. 2007;50:118-121.
10. Gray NA, Baddour LM. Cutaneous inoculation blasto-
mycosis [published online ahead of print April 17, 2002]. 
Clin Infect Dis. 2002;34:e44-e49.
11. Kissi B, Mahmoud F, Thakkar JR. Blastomycosis pre-
senting as recurrent tender cutaneous nodules. S D Med. 
12. Mandell GL, Bennett JE, Dolin R. Mandell, Douglas, 
and Bennett's Principles and Practice of Infectious Diseases. 
13. Mason AR, Cortes GY, Cook J, et al. Cutaneous blas-
2008;47:824-830.
14. Linn JE. Pseudo-epitheliomatous lesions of the perirectal 
tissue: report of a case of squamous epithelioma due to 
15. Wooffe MJ, Cripps DJ, Warner TF. Verrucous plaques on 
for blastomycosis: assessments during a large point-source 