Blasticomyces dermatitidis is a dimorphic fungus which grows as a mycelium in moist, organic-rich soil and produces conidial spores. Inhalation of these spores may cause blastomycosis, one of the important endemic mycoses which affects humans, dogs, and horses in North America.\(^1 \)\(^2\)

In vivo, the fungus converts to its yeast form which may be identified in body secretions such as sputum or in body tissues. Blastomycosis is most common in the Ohio and Mississippi River valleys and in areas around the Great Lakes.

**CASE REPORT**

An 18-year-old man, previously in good health, went on a three-day canoe trip in late July 1984, along the Manistee River in Northern Michigan. He slept outdoors on the river bank. Three weeks later, he sustained severe head injuries and a fractured femur in a road accident in metropolitan Detroit, was rendered comatose, and intubated in the emergency room. A tracheostomy was performed nine days later following a craniotomy for debridement of brain tissue. He remained in a deep coma and required a mechanical respirator for several weeks following the accident. Commencing three months after the accident and during the following 2 1/2 years, the patient required repeated removal of obstructive endotracheal granulations at the tracheostomy site which initially completely occluded the airway, preventing him from breathing or talking with the tracheostomy tube plugged. First visualized with a fiberoptic bronchoscope, the granulations were seen to arise anteriorly.

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**FIGURE 1** (Upper). Section of endotracheal granulation shows acute and chronic inflammation with intraepithelial microabscesses (M) and Langhans' giant cells. There is squamous metaplasia and marked pseudoepitheliomatous hyperplasia (hematoxylin-eosin; original magnification \( \times 160 \)). (Lower left). High power of microabscess shows Langhans' giant cell containing two yeast forms marked with asterisks (hematoxylin-eosin, original magnification \( \times 1600 \)). (Lower right). Gomori's silver methenamine stain more clearly defines the yeast forms. Areas of broad-based budding, a characteristic feature of this fungus, are marked with arrows (original magnification \( \times 1600 \)).

Immediately above the stoma, measuring up to 3 cm diameter. They were removed using direct laryngoscopy with microscope and "suspension" with stripping. The rest of the trachea, larynx, and bronchi appeared normal, as did chest roentgenograms at the time of his emergency admission and on later occasions. Microscopic examination and cultures of endotracheal granulations removed in late 1984 proved negative for organisms, but a few yeast-forms were observed in tissue sections of granulations removed in February 1985 and were confirmed to be Blastomyces dermatitidis by the Centers for Disease Control, Atlanta, using FITC-conjugated antiglobulins specific for the tissue form of this fungus. Later biopsy specimens yielded positive fungal cultures and typical histologic features (Fig 1 and 2). Since late 1986, the patient has remained free of any clinical evidence of blastomycosis, despite his refusal to be treated with an antifungal agent such as ketoconazole or amphotericin B. However, smears of biopsy tissue from the inner margin of the apparently healed, but still patent, tracheostomy taken on April 18, 1985, revealed broad-budding yeast forms, similar to those seen in Fig 2) consistent with blastomycosis.

**DISCUSSION**

Blastomycosis is most frequently a pulmonary disease, which, in humans, is usually self-limiting, but which may become chronic and exhibit a high fatality rate and systemic
Bilateral Extrapleural Effusions Complicating Bilateral Pneumonia*

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In the case reported herein a patient developed bilateral pneumonia and septic shock and subsequently developed bilateral effusions. Chest roentgenograms, computed tomograms, and findings from analysis of the fluid within the chest were consistent with typical empyemas. When surgical decortication was attempted, the effusions were found to be anatomically extrapleural. Symptomatic improvement was noted following debridement. (Chest 1989; 95:333-35)

PLEURAL EFFUSIONS occur as a result of an abnormality of fluid transport between the parietal and visceral pleura. Pleural effusions complicate pneumonia in up to 40 percent of the cases.1 We report a case of bilateral effusions complicating an episode of bilateral pneumonia which occurred extrapleurally (ie, posterior to the parietal pleura, and within the endothoracic fascia).

CASE REPORT

A previously healthy 48-year-old white woman developed a dry cough and “swelling” in her throat. She had no fever, chills, or headaches and was given erythromycin and an intramuscular injection of dexamethasone (Decadron). Three days later, she was admitted to a hospital with the same symptoms, as well as lethargy, shortness of breath, and “spasms” in her neck and shoulders. Physical examination on admission revealed a pulse of 128 beats per minute and blood pressure of 60 mm Hg by palpation. Erythema was noted on her upper chest, and enlarged, tender lymph nodes were palpated in the neck. Auscultation of the chest revealed bibasilar rales and pleural friction rubs at both bases. The WBC was 9,600 per cu mm, with 29 percent neutrophils, 33 percent band forms, and 37 percent lymphocytes. Serum electrolyte levels and findings from urinalysis were within normal limits. The chest roentgenogram on admission (Fig 1) revealed bilateral lower lobe alveolar infiltrates.

A flow-directed catheter was passed through the left subclavian vein and demonstrated a pulmonary capillary wedge pressure of 5 mm Hg. The patient was treated with volume replacement, dopamine, cephalaxin, and gentamicin intravenously. Her blood pressure rapidly improved, and further clinical improvement was noted over several days. A chest roentgenogram obtained on the sixth day of hospitalization (Fig 2) revealed bilateral effusions. A thoracentesis was performed on the left side and yielded 250 ml of a turbid yellow fluid with the following values: WBC, 22,500 per cu mm; differential cell count, 53 percent neutrophils and 47 percent lymphocytes; RBC, 7,000 per cu mm; glucose, 5 mg/dl; LDH, 960 IU/L; total protein, 3.9 g/dl; and pH 7.0. Serum values from that time were as follows: glucose, 97 mg/dl; LDH, 354 IU/L; and total protein, 5.7 g/dl. Culture of the fluid from thoracentesis showed no growth, and cytoclogic examination revealed no abnormal cells. A culture of blood drawn on admission grew Hemophilus influenzae in one bottle on the ninth day of hospitalization. Therapy...

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FIGURE 2. A wet-mount prepared from the yeast phase of B dermatitidis grown at 37°C on biphase brain-heart infusion agar/ broth. Several broad-based budding cells (arrows) with refractile, double-contoured walls, 8 to 15 microns in size, can be seen in the aggregate of yeast cells: (original magnification X 1600).

Dissemination, most frequently to skin, bones, or male genitourinary system.3 Rare involvement of the upper respiratory tract, usually laryngeal, is thought to be almost invariably secondary to previously resolved or concomitant pulmonary infection.2 Kaufman recently described a case of tracheal blastomycosis secondary to documented pulmonary infection in a patient without a tracheostomy. He could find no previously reported case of tracheal blastomycosis in the literature. Studies of human epidermics of blastomycosis indicate an approximate incubation period of one to three months. This is consistent with the interval between our patient sleeping on the river bank when he was possibly exposed to the fungus and his development of airway obstruction. It can be postulated that the tracheostomy wound provided a favorable nidus for growth of the blastomyces, which up to that time, were lying dormant in his respiratory tract. However, the exact location of this organism during this period before its appearance in the trachea remains unknown. The tardiness in making a diagnosis with more than six months elapsing before a few fungal yeast forms were identified in tissue is similar to the clinical situation which has been described in laryngeal blastomycosis.3,5 A noteworthy histologic feature was the pseudoepitheliomatous hyperplasia (which in other instances has led to the erroneous diagnosis of squamous carcinoma in patients subsequently found to have laryngeal blastomycosis3,5). Future management of this patient remains problematic, as it is uncertain whether removal of his metal tracheostomy tube would allow the opening to close without development of future obstructive granulations.

NOTE: Earlier findings in this patient have been presented in abstract form (Clin and Invest Med 1986;A94).

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