Brain Abscess Caused by *Blastomyces dermatitidis* in a Child With Cystic Fibrosis*

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An 8-year-old girl with moderately severe cystic fibrosis and right upper lobe bronchiectasis developed a cerebellar abscess caused by *Blastomyces dermatitidis*. To our knowledge, this is the youngest child with cystic fibrosis and a brain abscess, and the first documented case caused by a fungus. *(Chest 1994; 106:601-03)*

Brain abscess is rare in patients with cystic fibrosis (CF). Previously described cases have occurred in adults or adolescents and were caused by bacteria that are part of the normal oral flora.¹² We report the case of an 8-year-old girl with moderately severe CF who developed severe headaches with vomiting and was found to have a cerebellar abscess caused by the fungus *Blastomyces dermatitidis*.

**CASE REPORT**

An 8-year-old girl with CF, moderately severe obstructive lung disease, and chronic right upper lobe bronchiectasis noted on previous chest radiographs (Fig 1) and computed tomographic (CT) scan was admitted to the hospital for a right upper lobe lobectomy. At the time of hospital admission, she complained of mild, intermittent frontal headaches of 3 weeks' duration without fevers, emesis, or dizziness. History included a central venous access port placed for intravenous antibiotic administration and a gastrostomy tube inserted for failure to thrive. She was hospitalized three times during the 7 months prior to the planned lobectomy for respiratory exacerbations associated with *Pseudomonas aeruginosa* colonization. Treatment during those hospitalizations included antipseudomonal antibiotics. The patient's first course of systemic steroids for bronchospasm was 3 months prior to hospital admission when she was placed on a regimen of prednisone, 0.5 mg/kg/day, for 5 weeks. While receiving intravenous antipseudomonal antibiotics prior to surgery, her headaches worsened and she began vomiting. Results of her neurologic and funduscopic examinations were normal. A head CT scan demonstrated a 4X3-cm left cerebellar mass that enhanced with contrast (Fig 2). The mass was surgically resected and found to be a discrete abscess cavity. A fungal potassium hydroxide (KOH) stain of the lesion revealed budding yeast and the patient was started on a regimen of intravenous amphotericin B. Cultures of the lesion grew *B dermatitidis* and serologic tests via immunodiffusion were positive for Blastomyces. Blood and urine fungal cultures were negative and liver function studies, a bone scan, abdominal CT scan, and an ophthalmologic examination were all normal. On further questioning, we learned that our patient had

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FIGURE 1. Right upper lobe bronchiectasis (arrow) noted on chest radiograph.

FIGURE 2. Head CT scan demonstrating left posterior cerebellar abscess (arrow).
frequently vacationed with her family to northern Wisconsin, an area that is endemic for *B. dermatitidis*. She received a total of 1.2 g of amphotericin B (54 mg/kg) and did well without neurologic sequelae. Follow-up brain scans revealed resolution of the abscess cavity.

The patient was readmitted to the hospital 2 months after her abscess resection for the right upper lobe lobectomy. Lung tissue specimens from the resected lobe revealed acute and chronic bronchiitis and fibrosis with intra-alveolar hemorrhage. Fungal KOH stains were negative and a washing of the specimen grew *P. aeruginosa*, but no fungi. The patient remains neurologically normal 12 months after abscess resection.

**DISCUSSION**

Only ten cases of brain abscess in cystic fibrosis have been previously reported (Table 1). Each of these previous cases involved either younger adolescents or adults and did not specify the patient’s age. Rabkin and Blaser suggested that the “absence of pediatric cases suggests some morbid developments in long-standing disease necessary before susceptibility to brain abscess is established.” This case would dispute that claim as our patient was only 8 years old. Other studies have suggested a relationship between sinus disease in CF and development of brain abscesses. Our patient, however, had no previous clinical symptoms to suggest chronic sinus inflammation.

This present case also differs from earlier reports in the organism that caused the abscess. In five cases, either aerobic or anaerobic bacteria were cultured from the abscess cavity, while cultures were either sterile or not reported in the others. *Blastomyces dermatitidis*, an unusual cause of intracranial abscess in children, was recovered from our patient. Central nervous system blastomycosis is usually caused by hematogenous spread from a pulmonary source. Although we cannot determine whether the primary focus of infection in our patient was her lung, the organism never grew on several sputum cultures that were sent in the period prior to the diagnosis of her brain abscess. Her right upper lobe was severely bronchiectatic and colonized with *P. aeruginosa* for many years and the possibility of a recent cocolonization with *B. dermatitidis* exists. It is also possible that the amphotericin B eradicated the organism from her lungs by the time that the right upper lobe lobectomy was done.

We believe that our patient contracted blastomycosis while vacationing in northern Wisconsin, an area that is endemic for *B. dermatitidis*. Since her family frequently visited this area, it is impossible to determine exactly when she was initially exposed to the organism. We are uncertain whether the oral steroids played a role in her acquisition of this infection.

This case demonstrates that unusual infections caused by uncommon organisms may complicate the course of CF in children.

**REFERENCES**

Hepatic Vein Obstruction Due to Swan-Ganz Catheter Placement*

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Complications from Swan-Ganz catheters during insertion, long-term placement, or removal have been known since its development. I describe the unusual presentation of a pacing Swan-Ganz catheter mispositioned into the hepatic vein producing vascular obstruction, yet with adequate cardiac pacing. (Chest 1994; 106:603-05)

Since the introduction of the flow-directed balloon-tipped catheter (Swan-Ganz) for continuous monitoring of hemodynamic function and cardiac pacing, a number of authors have reported complications associated with the routine use of this catheter.1-3 Arrhythmias, infection, perforation of the pulmonary artery, as well as vascular occlusion and pulmonary infarction have occurred. In addition, the catheter has injured the pulmonic and tricuspid valves and has been reported to knot within the ventricle. Recently, I had the opportunity to evaluate a patient with a Swan-Ganz pacing catheter with an unusual presentation that I have not seen reported.

CASE REPORT

This 73-year-old woman presented in October 1992 with a complaint of chest pain. Paramedics were called to her home and noted the patient to have a BP of 68/42 mm Hg, and an irregular pulse rate of 26 beats/min. A cardiac rhythm (lead 2) suggested a third-degree heart block with junctional escape rhythm. The patient was transported to the local emergency department where one of the staff physicians inserted a pacing Swan-Ganz catheter (Baxter model 93-200 H-7F, Edwards Swan-Ganz Pac- ing TD Catheter with AMC Thrombos shield) with successful capture at a rate of 80 beats/min; vital signs improved (Fig 1). Cardiac enzymes subsequently became positive.

The patient had a history of high BP, type II diabetes mellitus, and peripheral vascular disease. She had a myocardial infarction in June 1991. Coronary angiograms at that time revealed 40 percent narrowing of the right carotid artery, 30 percent narrowing of the trunk of the circumflex, and 50 percent narrowing of the proximal anterior descending branch. The ejection fraction at that time was estimated to be 40 percent. An anterior apical wall aneurysm was also identified on the echocardiogram. A chest radiograph obtained at the time of this hospital admission revealed normal heart size and a light diffuse bilateral lower lobe infiltrate. A Swan-Ganz catheter was noted to loop in the right ventricle and terminate in what was reported as consolidated right lower lobe. The attending physician presumed the Swan-Ganz catheter was properly positioned because of appropriate pacer capture. The nurses reported either the "inability to 'wedge' the catheter" or "abnormal pulmonary artery pressures on monitoring" and appropriate hemodynamics were thus not obtained. Cardiology consultation confirmed the diagnosis of an acute inferior wall myocardial infarction with complications of complete heart block and congestive heart failure. They recommended observation for 7 days prior to the decision to insert a permanent pacemaker.

On the fourth hospital day, acute respiratory failure developed. Arterial blood gases indicated a pH of 7.41, PO2 of 23.9 mm Hg, PO2 of 48.9 mm Hg, HCO3 of 50 mmol/L, and SaO2 of 86 percent (FIO2 of 45 percent). The patient had a WBC count of 19,400 cells per ml with 75 percent polymorphonuclear cells, 9 percent bands, 9 percent lymphocytes, and 6 percent monocytes. Liver enzyme levels were markedly elevated with respect to those at hospital admission (Table 1). A new chest radiograph revealed the heart size to be normal. Persistent bilateral basilar infiltrates were seen. The Swan-Ganz catheter appeared looped in the right ventricle with the tip of the catheter below the diaphragm and presumed in the right hepatic vein (Fig 2). Echocardiogram revealed an ejection fraction of 10 to 20 percent.

In view of the inappropriate placement of the Swan-Ganz catheter and suspected hepatic vein obstruction, the decision was made to replace the catheter. The patient was 100 percent dependent on the pacemaker as indicated by a trial of turning off the pacemaker resulting in the patient’s heart rate dropping to 30 beats/min with an occasional junctional escape rhythm and systolic BP dropping to 40 mm Hg. A new pacing Swan-Ganz catheter was inserted before removal of the old catheter with the use of fluoroscopy to ensure appropriate placement and to detect possible entanglement with the initial Swan-Ganz catheter. This was performed successfully with appropriate pacemaker capture. Hemodynamics were now appropriately recorded (Table 1).

![Figure 1](http://journal.publications.chestnet.org/pdfsaccess.ashx?url=/data/journals/chest/21698/) Electrocardiographic tracing subsequent to insertion (at the time of hospital admission) of Swan-Ganz catheter with ventricular pace leads showing successful capture.

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FIGURE 1. Electrocardiographic tracing subsequent to insertion (at the time of hospital admission) of Swan-Ganz catheter with ventricular pace leads showing successful capture.