CANDIDA RUGOSA CENTRAL VEINOUS CATHETER INFECTION IN A CHILD

The genus *Candida* is composed of approximately 200 species which are differentiated primarily by their ability to assimilate various substrates, especially carbohydrates.
Some Candida species are part of the normal oral, gastrointestinal and vaginal flora of humans.\textsuperscript{1}\textsuperscript{2} Candida albicans, the major human pathogen in the genus Candida, is the leading cause of opportunistic fungal disease.\textsuperscript{3}\textsuperscript{4} Candida tropicalis and Candida parapsilosis are also frequently encountered in human infections. However, the other species of genus Candida have rarely or never been implicated as human pathogens. Candida rugosa has been reported as an agent of intravascular catheter-associated fungemia in one case and as invasive disease in an immunosuppressed patient with leukemia in another.\textsuperscript{5}\textsuperscript{6} In the third reported case C. rugosa was isolated from sputum culture of a patient with leukemia, but a definitive diagnosis of invasive disease was not established.\textsuperscript{7} We describe the first case to our knowledge of invasive disease in childhood and the first instance of a central venous catheter infection caused by C. rugosa.

**Case report.** A 9-year-old white female with cystic fibrosis (CF) was admitted to Texas Children's Hospital in March, 1993, with a 7-day history of fever, 38.9°C, increased cough and sputum production. She had had multiple hospitalizations for exacerbations of CF-related infections and had an implantable central venous catheter (Port-A-Cath\textsuperscript{7}) placed at another CF center 4 years before admission.

On admission the patient had a temperature of 38.1°C. Her weight was less than the fifth percentile and her height was at the fifth percentile for age. Physical examination revealed coarse breath sounds bilaterally with diffuse rales and decreased breath sounds at the bases with occasional wheezes on auscultation of the chest. There was no erythema, warmth or tenderness over the area of Port-A-Cath\textsuperscript{8} site on the right chest wall. Fingers and toes had clubbing. The remainder of her examination was unremarkable.

Initial laboratory studies included a white blood cell count of 12,600 cells/mm\textsuperscript{3} with 59% neutrophils, 2% bands, 33% lymphocytes, 4% monocytes, 1% eosinophils and 1% basophils; platelet count was 340,000/mm\textsuperscript{3} and a urinalysis was normal. The serum prealbumin was 10.4 mg/dl (normal values, 19 to 47 mg/dl). A chest radiograph showed hyperinflated lungs, a coarse interstitial pattern and patchy areas of increased density consistent with CF. No evidence of well-defined consolidative infiltrate was visualized though there was a minimal increase in patchy densities from a film 3 weeks previously.

The patient was hospitalized with the presumptive diagnosis of Pseudomonas bronchopneumonia. Cultures of sputum and blood drawn through the central catheter and a peripheral vein were obtained. Intravenous ticaricillin plus clavulanic acid and tobramycin were administered.

Blood cultures drawn from the implanted central catheter on the first and second hospital days were positive for budding yeast cells. On the second hospital day therapy with intravenous amphotericin B (dose escalating up to 1.0 mg/kg/day) was administered, the catheter was removed and the catheter tip was cultured. The two blood cultures from the central catheter and the catheter tip grew C. rugosa, identified by Vitek Automicrobial System\textsuperscript{8} (Yeast Card V1302) in the Texas Children's Hospital Laboratory. Blood cultures drawn by venipuncture on the first 2 hospital days were sterile. Sputum cultures grew Pseudomonas aeruginosa.

The patient became afebrile on the third day of therapy. An echocardiogram did not reveal valvular vegetations. Repeat daily blood cultures during therapy and blood cultures after the completion of a total dose of 10 mg/kg of amphotericin B were sterile. The central catheter was replaced on the 13th hospital day. Because of the clinical improvement antibiotics were discontinued on the 18th hospital day and the patient was discharged home in good condition at the end of the third week of hospitalization.

**Discussion.** C. rugosa has been isolated frequently from infected bovine mammary glands and the experimental infectivity of this organism has been shown in cattle.\textsuperscript{7} However, a review of literature has shown it to be a very rare cause of invasive disease in humans.\textsuperscript{1} Two of the three reported cases were immunocompromised patients.\textsuperscript{8} A 70-year-old woman had acute myelocytic leukemia and developed systemic disease caused by C. rugosa on two occasions while granulopenic. The patient was treated with amphotericin B and made an uneventful recovery. In a 46-year-old man with hairy cell leukemia, C. rugosa was isolated from sputum in the presence of a pulmonary infiltrate. Because of the apparent spontaneous clearing of the infiltrate, it could not determined whether this represented colonization or disease caused by C. rugosa. The third patient, a 54-year-old man, with history of ethanol abuse and a portocaval shunt, was being treated because of acute and chronic subdural hematomas. He developed an intravascular catheter-associated fungemia caused by C. rugosa after a cut-down procedure.\textsuperscript{9} His infection was cured after treatment with amphotericin B.

It has been suggested that adult CF patients with implantable venous access systems are at increased risk for systemic candidiasis.\textsuperscript{10} Three adults with CF and C. albicans infection of totally implantable devices have been reported.\textsuperscript{11}\textsuperscript{12} Our patient had an implantable central venous catheter for 4 years. Our patient also was mildly malnourished. This might have reduced her immunity and contributed to her susceptibility to candidal infection. It is possible that the isolation of C. rugosa from the central catheter in this case represented contamination or colonization. However, the patient's clinical condition, the response to intravenous amphotericin B treatment and repeated isolation of the organism from central catheter and catheter tip indicate an infection related to the central venous catheter.

A potential problem in the management of infections caused by C. rugosa has been the poor in vitro susceptibility of isolates recovered from animals to amphotericin B and other antifungal agents.\textsuperscript{13} However, the human and other environmental isolates have not shown such a decrease in susceptibility.\textsuperscript{14}

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