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GASTROINTESTINAL TRANSLOCATION AS A POSSIBLE SOURCE OF CANDIDEMIA IN AN AIDS PATIENT

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SUMMARY

Apart from cryptococcosis and histoplasmosis, which are mycoses contained by T cell-mediated mechanisms of host defense, fungemia is rarely found in AIDS patients. The frequency of fungemia due to *Candida* spp. has been reported to be as low as 1%. We report a non-neutropenic AIDS patient who presented a candidemia which probably arose from her gastrointestinal tract.

KEYWORDS: Fungemia; AIDS; Candidiasis.

INTRODUCTION

The opportunistic infections in AIDS patients are primarily due to organisms that take advantage of T-cell immunodeficiency, particularly *Pneumocystis carinii, Mycobacteria, Toxoplasma* and *Cytomegalovirus*. Apart from cryptococcosis and histoplasmosis, which are mycoses contained by T cell-mediated mechanisms of host defense, fungemia is rarely found in AIDS patients[3, 11].

Superficial candidal infections are especially prevalent in AIDS patients. Almost all of these patients are colonized by *Candida* spp and most of them will get oropharyngeal candidiasis in the advanced stage of the disease. However, candidemia has rarely been described in this population[3, 4]. In fact, the frequency of fungemia due to *Candida* spp has been reported to be as low as 1%. Moreover, invasive candidiasis and trichosporonosis in AIDS patients has been most commonly found to be associated with the use of intravascular catheters[1, 4, 7, 11].

We report a 33 year-old woman infected with HIV who presented a candidemia which probably arose from her gastrointestinal tract.

CASE REPORT

The patient was admitted to the emergency room on August 30, 1994, because of fever and dyspnea. She had been well until three months earlier when she experienced the onset of anorexia, fever and night sweats. One month before admission, dry cough and dyspnea appeared. In addition, she began to experience diarrhea consisting of 5 to 10 episodes/day of nonbloody liquid stools. There was no history of drug addiction and she had acquired the HIV infection from her previous infected sexual partner.

On physical examination the patient was pale, emaciated, dehydrated, cyanotic and exhibited poor peripheral capillary refill. The temperature was 39.7°C, the pulse was 136 per minute and the respiratory rate 28 per minute. Her blood pressure was 85/60 mmHg. No skin lesion or lymphadenopathy was found. The head and neck were normal except for oral thrush. A few scattered wheezes were heard in both lungs and the heart was normal. The abdomen was normal except for an increment in bowel sounds. The neurologic examination was negative. A hematological investigation revealed a leukocyte count of 5.2 x 10^6/l, a neutrophil count of 4 x 10^6/l, a CD_4 + lymphocyte count of 128/mm^3, hemoglobin of 5.3 g/dl and a hematocrit of 17%.

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The creatinine and hepatic functions were normal. X-Ray films of the chest revealed linear opacities in both lungs and no pleural effusion or mediastinal lymphadenopathy was visible. A specimen of arterial blood, drawn while the patient was breathing room air, yielded a pO_2 of 60 mmHg, a pCO_2 of 28.9 mmHg and a pH of 7.43.

Vesical and peripheral venous catheterizations were established during the first three days of hospitalization to provide adequate clinical management of the hypotension. Rapid volume expansion with crystalloid was needed to control the blood pressure. In addition, a blood transfusion and supplemental oxygen were utilized in order to provide tissue oxygenation. Trimethoprim and sulfamethoxazole, 4 and 20 mg/kg i.v. per day, was the initial treatment for the lung infection.

After eight days of hospitalization, the patient felt better and the clinical conditions had improved although the temperature remained high. The patient was submitted to a bronchoscopy and was diagnosed tuberculosis. The chemotherapy was changed to isoniazid, rifampin and pyrazinamide. A venous blood culture processed by the Bactec System yielded *Candida albicans*.

At the time the diagnosis of candidemia the patient had no symptoms of urinary infection and there was no evidence of clinical deterioration. However, she still had fever and experienced the onset of disphagia. The Foley catheter had been withdrawn five days before the blood culture was collected. The patient was treated with amphotericin B, 0.5 mg/kg a day for 14 days. Twenty days after admission the patient had completely recovered and was discharged.

Urine as well oral and anal swab specimens were collected and inoculated on to Sabouraud-agar plates immediately after the blood culture result in order to identify the source of the candidemia. All agar-plates yielded *C. albicans*. To investigate the genotypic relatedness among the *C. albicans* isolates, the chromosomal DNA analysis was performed by pulsed-field gel electrophoresis with a CHEF-DR III (Bio-Rad, Richmond-CA) using methodology previously described[2]. Briefly, colonies from *C. albicans* were incubated overnight in 1% yeast extract, 2% peptone

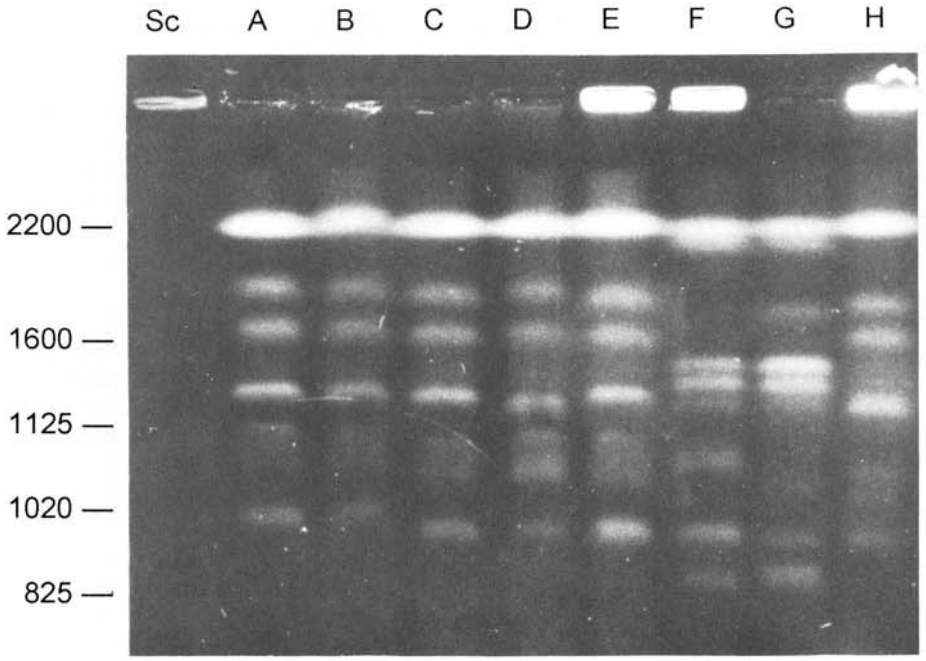

Fig. 1: Electrophoretic karyotype prepared for pulsed-field gel electrophoresis exhibiting the genetic relatedness of *C. albicans* strains isolated from different sites: blood (lanes A, H), urine (lane B), stool (lane C) and oral cavity (lanes D and E). Lanes F and G are *C. albicans* from two different patients (control strains). Sc is the DNA marker (*S. cerevisiae*).

and 2% dextrose. After centrifugation, the cells were washed with 50 mM EDTA, pH 8.0 and incubated with lyticase. Agarose blocks were prepared by adding 1% low melt agarose to this solution. The blocks were incubated for 12 h in 0.01 M Tris buffer, 0.45 M EDTA, 1% laurylsarcosine and 1 mg of Proteinase K per milliliter. The washing procedures were repeated several times next day and 2 mm of each agarose block were inserted in individual wells of a 8% chromosomic grade agarose gel. A counter clamped homogeneous electric field system was used to separate different molecular weights of *C. albicans* chromosomal DNA. *Saccharomyces cerevisiae* chromosome/DNA size standard (BioRad) was inserted in the gel as a standard. In addition, it was included in this experiment 2 isolates of *C. albicans* obtained from oral cavity of two HIV patients in order to contrast their genotype with the isolates from the present case. The electrophoretic conditions were: 150 volts; 13°C; switch time: 120 sec for 24 h and then 240 sec for 36 h. The gel was stained in ethidium bromide and photographed under UV light. Two isolates were considered to have the same electrophoretic karyotype profile if all the bands in one isolate matched the bands in another, by visual comparison.

The results of electrophoretic karyotype showed identical chromosomal DNA profiles among the 6 *C. albicans* isolates obtained from different sites (six identical chromosomal bands with molecular weights ranging from 2.2 to 1020 kb) and also discriminated the unrelated strains (Fig. 1).

DISCUSSION

Microbial translocation is a phenomenon of passage of large particles through an intact epithelial border. Translocation of *Candida* through the gastrointestinal tract has been recognized as an important source of candidemia, particularly in neutropenic patients[9]. Despite the high incidence of oropharingeal candidiasis, translocation has not been clearly discussed as a potential source of candidemia in AIDS patients[3, 4].

In the present case, one could suggest that the candidemia resulted from a renal infection secondary to the vesical catetherizaton during the first three days of hospitalization. However, this hypothesis can not be sustained because: 1) the patient had never reported any urinary symptoms; 2) the vesical catheter was withdraw five days before the detection of the candidemia; and 3) renal candidiasis rarely results from an ascending infection; but rather arises secondary to hematogenous candidiasis[5]. A further possible source for the candidemia could have been the intravascular line. However, this line was established in a peripheral vein and *Candida* spp. have seldom been identified as a cause of peripheral thrombophlebitis[10]. In addition, the patient never exhibited any clinical evidence of peripheral thrombophlebitis.

The patient had signs and symptoms of oropharyngeal candidiasis that worsened after eight days of antibiotic therapy. The high doses of trimethoprim/sulfamethoxazole combination may have eradicated the endogenous competing bacterial flora resulting in their replacement by yeast colonization, thus permiting a higher rate of *C. albicans* translocation and candidemia[9]. Of interest, KRAUSE et al. reported a case of a healthy volunteer who developed signs and symptoms of sepsis after the ingestion of high inocula of *Candida*, exhibiting blood and urine cultures positive for yeast[6]. Additionally, sulfamides also decrease the intracellular killing of *Candida* spp. by neutrophils[8].

In view of the above evidences we suggested that the source of the candidemia in the present case was the gastrointestinal tract. The hypothesis of gastrointestinal translocation is strongly supported by the electrophoretic karyotypes results. The *C. albicans* isolate yielded from blood exhibited the same genomic DNA profile as that of isolates obtained from oral cavity and stool.

It is important that despite the limited number of clinical reports of candidemia in HIV positive persons, necropsy studies have reported rates of invasive candidiasis in as high as 10% of the cases[12]. For this reason, we think that translocation as a possible source of candidemia in AIDS patients should be further investigated.

RESUMO

Translocação gastrointestinal como possível fonte de fungemia em paciente portador de AIDS

Diferente de histoplasmose e criptococose, doenças fúngicas associadas a depressão da imunidade celular, fungemia causada por *Candida* spp. tem sido raramente relatada em pacientes com AIDS. O presente relato ilustra um caso de candidemia em paciente não neutropênico portador de AIDS, cuja origem parece ter sido via translocação através do trato gastrointestinal.

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