Case reports

SACCHAROMYCES CEREVISIAE FUNGEMIA IN A HEAD AND NECK CANCER PATIENT: A CASE REPORT AND REVIEW OF THE LITERATURE

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ABSTRACT

We report the case of a 65-year old male who developed *Saccharomyces cerevisiae* fungemia after completing a course of concomitant chemotherapy and radiation therapy for head and neck carcinoma. He had grade IV oral mucositis, and received *Saccharomyces boulardii* (Perenterol®) orally as treatment for aseptic diarrhoea just before the onset of fungemia. We discuss the epidemiology and pathology of *Saccharomyces cerevisiae* in the cancer patient population.

INTRODUCTION

Saccharomyces cerevisiae is a yeast commonly used in baking and brewing and as a biotherapeutic agent. It is an opportunistic yeast pathogenic for man as some isolates can grow at 37°C and even at 42°C. Whereas *Saccharomyces cerevisiae* is completely harmless for healthy people, it can be dangerous for patients with an underlying disease. Recently some cases of invasive *Saccharomyces cerevisiae* infections have been described in different patient populations. We report a case of severe *Saccharomyces cerevisiae* fungemia in a patient treated with chemotherapy and radiation therapy for oropharyngeal carcinoma.

CASE REPORT

A 65-year old man was diagnosed with poorly differentiated oropharyngeal carcinoma classified T3 N2 M0. He was treated with concomitant chemo radiotherapy, consisting of cisplatin and 5-fluorouracil plus external beam radiotherapy (60 Gy). By day 24 following initiation of the treatment he was hospitalised for grade IV oral mucositis requiring total parenteral nutrition. Antineoplastic treatment was continued. On day 42, he developed *Staphylococcus aureus* bacteriemia. He was treated with vancomycin (Vancocin®). Transesophagal ultrasonography revealed the presence of a thrombus in the right atrium attached to the distal end of the indwelling catheter. The patient was transferred to another hospital for open heart removal of the catheter and the attached thrombus. Culture of the catheter and the thrombus remained sterile. After surgery, the patient remained in the intensive care unit for 3 days where he developed aseptic diarrhoea. He was treated with *Saccharomyces boulardii* (Perenterol®) for 2 days. He was transferred to us where 2 days later he became highly febrile.

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Blood tests revealed an important inflammatory syndrome associated with neutrophilic leucocytosis. *Saccharomyces cerevisiae* was found in 6 consecutive blood cultures but could not be detected in any other specimen. No other site of infection could be found. Amphotericin B (Fungizone®) 60 mg/day was started and continued for 4 weeks. Rapidly, temperature disappeared and inflammatory parameters improved. The patient was discharged and transferred for rehabilitation. Evaluation 6 months later showed partial remission of the tumour and no sign of residual infection.

DISCUSSION

Since 1980 when the first case was described (1) only a small number of *Saccharomyces cerevisiae* fungemia have been reported. However, in the last 10 years it has been encountered more frequently (2, 3). *Saccharomyces cerevisiae* is a yeast that is used to make food products like beer, wine and bread (4). *Saccharomyces boulardii* is a "domesticated" strain of *Saccharomyces cerevisiae*, isolated by H Boulard in 1923 from tropical fruit in Indochina. It is administered to treat diarrhoea (Perenterol®). *Saccharomyces boulardii* is not a recognized taxon and cannot be differentiated from *Saccharomyces cerevisiae* isolates either by classical identification methods or by commercial systems. Molecular analysis is required to characterize this variant (5).

Saccharomyces cerevisiae has a very low pathogenicity although it is a common colonizer of mucosal surfaces (6). Fungal colonization has been thoroughly studied in 42 patients with haematologic malignancies receiving chemotherapy. *Saccharomyces cerevisiae* was frequently isolated and the rate of isolation significantly increased over time after admission. Patients usually had multiple sites of fungal colonization, however only a few infectious events were noticed in this study (7).

The spectrum of *Saccharomyces cerevisiae* infections is large: gynaecologic, gastrointestinal, pulmonary and cardiovascular infections have been described (8). Patients reported were often immunocompromised, newborns, critically ill or suffering of a chronic disease like renal failure (9). Fungemia is a very rare event. It has been reported in patients treated for haematologic malignancies or after bone marrow transplant (10). In a large retrospective study of 102 nosocomial fungemia, *Saccharomyces cerevisiae* was encountered only once (11). Piarroux reported a much higher incidence in French teaching hospitals. *Saccharomyces cerevisiae* caused 16 out of 437 fungemia (3.6%) and was the fifth most common pathogen. After molecular analysis all but one case were due to *Saccharomyces boulardii* (5). In a retrospective study of unusual fungal infections in cancer patients, Ainaissie reported one case of *Saccharomyces cerevisiae* infection (12). In this study, the prognosis of unusual fungal infections in cancer patient population was related to persistent neutropenia, disseminated visceral infection but not with fungemia alone. This observation is in accordance with our case since the patient completely recovered after therapy directed at this organism.

Recently catheter contamination has been suggested as a source of infection (13). Interestingly, a case of *Saccharomyces cerevisiae* fungemia has been reported after root canal treatment (14). Biochemical tests proved that *Saccharomyces cerevisiae* was transferred to the blood stream during dental surgery.

The treatment of choice for *Saccharomyces cerevisiae* infection is amphotericin B. Minimal Inhibition Concentrations (MIC) for itraconazole, fluconazole or ketoconazole are significantly higher (7, 15), furthermore a case of *Saccharomyces cerevisiae* fungemia has been reported despite antifungal prophylaxis with fluconazole (16). Interestingly, repetitive cultures have shown that karyotype of *Saccharomyces cerevisiae* remained identical over time from a colonizing to infection causing strain (15). The role of oral intake of *Saccharomyces boulardii* as a medicine for the development of infection has been reported to be of upmost importance, especially in immunodeficient or critically ill patients (3, 5, 16). However, some cases without intake of such medication have been described (17).

The origin of *Saccharomyces cerevisiae* fungemia in our patient is probably the intestinal translocation of the yeast. This phenomenon was promoted by grade IV mucositis since neither infection of the catheter nor massive colonization was observed. Despite the fact that we cannot definitively prove that the infection was due to *Saccharomyces boulardii* since no molecular analysis was performed, it appears that the role of Perenterol® is probably crucial. This emphasizes the risk of using *Saccharomyces boulardii* as a biotherapeutic agent in cancer patients and illustrates the emergence of new pathogens in this patient population.

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RÉSUMÉ

Nous décrivons le cas d'un patient masculin atteint d'un cancer de la sphère tête et cou qui a développé après la fin de son traitement de radio-chimiothérapie une levurémie à *saccharomyces cerevisiae*. Il souffrait d'une mucite orale de grade IV et a reçu juste avant l'apparition de la levurémie du *saccharomyces boulardii* (Perenterol®) pour le traitement d'une diarrhée aseptique. Nous discutons l'épidémiologie et la pathogénie du *Saccharomyces cerevisiae* chez les patients cancéreux.

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