CASE REPORT

Saccharomyces: A Friend or Foe in ICU (A Case Report with Solution)

Prasoon Gupta[1], YP Singh[2], Akhil Taneja[3]

Abstract

Saccharomyces cerevisiae or *boulardii*, also known as baker's yeast or brewer's yeast, is normally a nonpathogenic microbe. It is commonly used as a probiotic to prevent antibiotic-associated diarrhea. We present a case of a 77-year-old woman with uncontrolled diabetes who developed *Saccharomyces fungemia* with use of *Saccharomyces* containing probiotic after 5 days of treatment. The probiotic was immediately discontinued. The indwelling central line was removed, she was started on amphotericin B and the fungemia resolved. This case report highlights this peculiar complication of probiotic use. We also find it important to increase the awareness amongst the healthcare providers about this likely risk while prescribing probiotics, especially for critically ill patients.

Keywords: Fungemia, Probiotic, *Saccharomyces*

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Introduction

Yeast are advanced fungi of division Ascomycetes, class Saccharomycetes which grow as single cell and includes *Candida* and *Saccharomyces*.[1] *Saccharomyces* and *Candida* are both a part of the normal flora of airway and gut in humans.

Saccharomyces, is a very common composition of probiotics used in the intensive care unit (ICU) for the treatment of antibiotic-associated diarrhea, *Clostridium difficile* infection and irritable bowel syndrome.[2] It is claimed to modulate endogenous intestinal flora and the immune system but the evidence in favor of such a claim is very limited. *S. boulardii* is a subtype of *S. cerevisiae*, although they are grouped together in the International code of botanical nomenclature (ICBN)[3] due to similar genetic composition.

Case Description

A 77-year-old lady, with uncontrolled diabetes (HbA1c-8.4), hypertension and chronic obstructive airway disease, was admitted to the ICU with diagnosed bilateral pneumonia with acute kidney injury. She was intubated in view of respiratory distress and a subclavian central line was inserted to start vasopressors. She was initially managed with injection piperacillin and tazobactum combination along with injection clindamycin. This was later changed to injection meropenem and injection teicoplanin in view of rising leucokyte counts. Subsequently, injection colistin was added, as the culture of endotracheal tube secretions reported carbapenem resistant organism (CRO). Injection Fluconazole was added empirically on day 5 of admission. On day 7, the patient developed watery diarrhea, for which injection racecadotril, injection metronidazole and *Saccharomyces* containing sachet were added presuming that it was antibiotic induced diarrhea or *C. difficile* infection. Stool routine/microscopy, culture and toxin for *C. difficile* were negative. The diarrhea settled. Three days after starting probiotics, the patient developed hypotension and diarrhea again. Injection fluconazole was changed to injection caspofungin and all cultures were repeated. The initial report of the blood culture after 48 hours were sterile. After four days, blood from central line and peripheral line showed growth of yeast which was reported as *Saccharomyces cerevisiae* (Figs 1 and 2). After a thorough search of literature, we stopped injection caspofungin and started injection amphotericin *B. Saccharomyces* containing probiotic was stopped and the central line was removed. Repeat blood cultures were sent on the third and seventh day after the positive report; it showed no fungal growth. However, the patient died 24 days post admission.

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Discussion

The first case report of *Saccharomyces*-related fungemia dates back in 1970 in a patient with prosthetic mitral valve.[4] *Saccharomyces* can cause systemic infections like unexplained fever, fungemia, endocarditis, pneumonia, liver abscess, peritonitis and septic shock.[5] It is very difficult to differentiate this from invasive candidiasis. Fortunately, treatment strategy and antifungal spectrum of both are the same. Risk factors for *Saccharomyces* fungemia are invasive lines, endotracheal intubation, total parenteral nutrition, immunocompromised host, uncontrolled diabetes, broad-spectrum antibiotics, long hospital stay, cancer, HIV, neutropenia, posttransplant and burns.[6] The present case was a known case of diabetes, chronic lung disease and was on mechanical ventilation. Management of this condition involves stoppage of probiotic, removal of invasive lines and administration of antifungals.[7] There is no literature on the antifungal of choice for *saccharomyces*. Amphotericin B and azoles except itraconazole are preferred along with echinocandins, as demonstrated in a few

LABORATORY INVESTIGATION REPORT

Patient name:	Mrs.	Location:	Patparganj
Age/Sex:	77 Year(s) Female	IP No./Bed No.:	
MaxId:	EHPG	Order Date/Collection Date:	23/01/2018 / 23/01/2018 07:43 PM
Ref. Doctor:	Pulmonology Unit	Report Date:	30/01/2018

Blood Culture and Sensitivity

Parameter	Result
Sample from:	Central line
Comment:	Isolated organism - Saccharomyces cerevisiae
Result:	
Comment:	

Fig. 1: Blood culture and sensitivity from central line showing *Saccharomyces cerevisiae*

Antibiotic	Susceptibility
Caspofungin	Sensitive
Fluconazole	Resistance
Flucytosine	Sensitive
Micafungin	Sensitive

Fig. 2: *Saccharomyces* antifungal susceptibility

case reports. Combination of amphotericin with flucytosine is used in serious cases.[8] Even MIC breakpoints of antifungals are not defined by major organizations for *Saccharomyces*. Two theories are prevalent for *Saccharomyces* fungemia, first is central line colonization and the other is gut translocation in sick patients. These probiotics are either used as sachets or capsules, in which sachets are more prone to be contaminated by hands of healthcare workers.

Suggested best practices to prevent this complication are:

- Avoid *Saccharomyces*-based probiotics especially in patients with suspected immune compromise.
- Use capsules and the preparations must be done outside the patient room with change of gloves immediately.[9]
- *Lactobacillus*-based probiotics can be preferred over *Saccharomyces*-based probiotics.
- It is important to differentiate between Candida and *Saccharomyces* early by the microbiologist. It may help them by providing detail, if patient is on *Saccharomyces* supplement.
- Awareness among clinicians about the risk factors of prescribing probiotics in ICU.
- It is advisable to send catheter tip culture after line removal so that central line or gut translocation as the possible source can be ascertained.
- The manufacturers of these supplements should be directed to have special warning tags about this complication
- More studies to be carried out for echinocandins as antifungal for *Saccharomyces*.
- MIC breakpoint needs to be defined.

Conclusion

Saccharomyces based probiotics should be used with caution in critically Ill patients. If any culture shows budding yeast cell and patient is on *Saccharomyces*-based probiotics , it is better to have a personal communication with microbiologist. Treatment strategy includes discontinuation of probiotics, removal of central venous catheters and echinocandin or amphotericin-based antifungals.

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