

# The incidence of hospital fungal infections — yeast fungaemia

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## Summary

In order to determine the incidence and the causative agents of fungaemia, a survey was undertaken of blood culture specimens received from the Bloemfontein academic hospitals. Over a period of 1 year, 5 017 successive blood cultures were examined; 1 030 (20,5%) had growth of which 106 (2,1%) yielded yeasts. *Candida albicans* (42%), *C. tropicalis* (26%) and *C. parapsilosis* (20%) were the species most frequently isolated. Fungaemia occurred most often after broad-spectrum antimicrobial therapy and abdominal disorders.

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Fungaemia is most often caused by yeasts. It remains, and is being recognised more often as, an important cause of mortality and morbidity in hospitalised patients.

Approximately 25 of the more than 600 species of yeasts known today are human pathogens.<sup>1</sup> Yeasts are commonly associated with both the internal and external environment of man. *Candida albicans*, the most frequent pathogen, forms part of the normal intestinal tract flora in 20 - 40% of asymptomatic people.<sup>2,3</sup>

There has been a marked increase in the frequency of yeast infections, which is mainly due to the increased use of broad-spectrum antimicrobial drugs, corticosteroids, antitumour agents, the oral contraceptive pill, a prolonged stay in intensive care units, and the increase in the incidence of immunocompromised patients, especially diabetics and subjects with the acquired immunodeficiency syndrome (AIDS).<sup>4-7</sup>

Fungaemia occurs most frequently in immunocompromised patients or patients with indwelling devices, whether intravascular, urinary or peritoneal.<sup>2,3</sup>

The severity of fungal infections ranges from benign localised conditions, such as thrush, to fungaemia and disseminated fatal infections.<sup>2</sup>

In order to determine the incidence of fungaemia and the causative agents, a survey was carried out on blood culture specimens received over a 1-year period from patients in the Bloemfontein academic hospitals.

## Materials and methods

Blood for blood cultures was taken aseptically and growth was detected with a Bactec detector, according to the methods of Prevost and Bannister.<sup>8</sup>

Yeasts were identified according to the methods used by Badenhorst *et al.*<sup>9</sup>

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## Results

From January to December 1989 5 107 successive blood cultures were examined. Of these 1 030 (20,5%) showed growth of which 106 (2,1%) yielded yeasts.

*C. albicans* was isolated in 42% of cases. Other yeasts isolated were *C. tropicalis* (26%), *C. parapsilosis* (20%), *C. glabrata* (7%), *Hansenula anomala* (2%) and there was 1 isolation each of *C. guilliermondii*, *C. krusei* and *Geotrichum candidum* (Table I).

TABLE I. YEASTS ISOLATED

Yeast species	No. isolated	%
<i>C. albicans</i>	44	42
<i>C. tropicalis</i>	28	26
<i>C. parapsilosis</i>	21	20
<i>C. krusei</i>	1	1
<i>C. glabrata</i>	8	7
<i>C. guilliermondii</i>	1	1
<i>H. anomala</i>	2	2
<i>G. candidum</i>	1	1
<b>Total</b>	<b>106</b>	<b>100</b>

During the survey, it was possible to identify some of the possible predisposing factors for fungaemia. It was found that in 47% of cases disease was related to the abdomen and was associated with laparotomy, pancreatitis and abdominal sepsis. *C. albicans* was isolated in 26 of the 49 cases (53%), *C. tropicalis* in 10 (20%) and *C. parapsilosis* in 7 (14%) (Table II).

The most frequent non-abdominal conditions predisposing to fungaemia included septicaemia (30%), pneumonia (7,5%) and kwashiorkor (7,5%). In contrast to isolates in patients with abdominal conditions, *C. albicans* and *C. tropicalis* were each isolated in 32% of cases while *C. parapsilosis* was isolated in 25% of cases (Table II).

Broad-spectrum antimicrobial drugs were prescribed in 94% of cases of fungaemias (Table II).

## Discussion

During this study yeasts were isolated in 2,1% of blood cultures and therefore represented 10% of blood cultures which yielded growth.

As expected, *C. albicans* was the yeast most frequently isolated. The high incidence of *C. tropicalis* and *C. parapsilosis*, especially in non-abdominal conditions, is in accordance with the findings of other authors<sup>10,11</sup> who have shown that these yeast species have a high affinity for plastic materials present in various catheters, which adsorb and colonise them easily.

The high occurrence of *C. albicans*, more prominent in abdominal conditions, reflects its association with the intestinal tract.

The use of broad-spectrum antimicrobial drugs could be one of the reasons why yeasts were the only micro-organisms

TABLE II. PREDISPOSING CONDITION, ANTIMICROBIAL DRUG USED AND YEAST ISOLATED

Predisposing condition	No. of patients	%	No. antimicrobial drug			Yeasts isolated (No.)
			Nil	Narrow	Broad	
<b>Abdominal</b>	<b>49</b>					
Laparotomy	41	39	0	0	41	<i>C. albicans</i> (20) <i>C. tropicalis</i> (10) <i>C. parapsilosis</i> (7) <i>C. glabrata</i> (3) <i>C. guilliermondii</i> (1)
Pancreatitis	6	6	0	1	5	<i>C. albicans</i> (4) <i>C. glabrata</i> (2)
Abdominal sepsis	2	2	1	0	1	<i>C. albicans</i> (2)
<b>Other</b>	<b>57</b>					
Septicaemia	32	30	0	1	31	<i>C. tropicalis</i> (13) <i>C. albicans</i> (10) <i>C. parapsilosis</i> (6) <i>C. glabrata</i> (2) <i>H. anomala</i> (1)
Kwashiorkor	8	7,5	0	0	8	<i>C. albicans</i> (7) <i>C. tropicalis</i> (1)
Pneumonia	8	7,5	0	1	7	<i>C. parapsilosis</i> (4) <i>C. tropicalis</i> (3) <i>C. glabrata</i> (1)
Neonates	6	5	2	0	4	<i>C. parapsilosis</i> (4) <i>H. anomala</i> (1) <i>C. albicans</i> (1)
Leukaemia	1	1	0	0	1	<i>C. tropicalis</i> (1)
Rheumatic fever	1	1	0	0	1	<i>C. krusei</i> (1)
Burn wounds	1	1	0	0	1	<i>G. candidum</i> (1)
<b>Total</b>	<b>106</b>	<b>100</b>	<b>3</b>	<b>3</b>	<b>100</b>	
<b>% antimicrobial drug used</b>			<b>3</b>	<b>3</b>	<b>94</b>	

isolated from the blood cultures, since these drugs would act as selective agents.

This survey has shown that abdominal conditions, especially abdominal surgery and the use of broad-spectrum antimicrobial drugs, are the main predisposing factors for fungaemia. Clinicians treating these patients should therefore always be alert to the possibility of a fungaemia.

#### REFERENCES

- Blinkhorn RJ, Adelstein D, Spagnuolo PJ. Emergence of a new opportunistic pathogen, *Candida lusitanae*. *J Clin Microbiol* 1989; 27: 236-240.
- Cooper BH, Silva-Hutner M. Yeasts of medical importance. In: Lynette EH, Balows A, Hausler WJ, Shadomy HJ, eds. *Manual of Clinical Microbiology*. 4th ed. Washington, DC: American Society for Microbiology, 1985: 526-539.
- Odd FC. *Candida and Candidosis: a Review and Bibliography*. 2nd ed. London: Baillière Tindall, 1988.
- Sobczak H. A simple disc-diffusion test for differentiation of yeast species. *J Med Microbiol* 1985; 20: 307-316.
- Qadri SMH, Flournoy DJ, Qadri SGM, Ramirez EG. Rapid identification of yeasts by semi-automated and conventional methods. *Med Microbiol Immunol (Berl)* 1986; 175: 307-316.
- Horn R, Wong B, Kiehn TE, Armstrong D. Fungemia in a cancer hospital: changing frequency, earlier onset, and results of therapy. *Rev Infect Dis* 1985; 7: 646-655.
- Hunter PR. Nosocomial infections due to *Candida albicans*. *Br Soc Multitach* 1988; 9: 3-10.
- Prevost E, Bannister E. Detection of yeast septicemia by biphasic and radiometric methods. *J Clin Microbiol* 1981; 13: 655-660.
- Badenhorst L, Botha PL, Janse van Rensburg MN. Vinnige identifikasie-metodes van giste tydens fungemie. *S Afr Med J* 1991; 79: 304-306 (this issue).
- Hopfer RL, Orengo A, Chesnut S, Wenglar M. Radiometric detection of yeasts in blood cultures of cancer patients. *J Clin Microbiol* 1980; 12: 329-331.
- Douglas LJ. Adhesion of pathogenic *Candida* species to host surfaces. *Microbiol Sci* 1985; 2: 243-247.