

## Case report

# An autopsy case of disseminated trichosporonosis with candidiasis of the urinary bladder

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**Summary.** A case of disseminated trichosporonosis associated with *Candida* infection of the urinary bladder is presented. Coffee bean shaped or crescent shaped yeast-like elements are characteristic of *Trichosporon* and useful in differentiating *Trichosporon* from *Candida* but such histological features are less efficient than the immunohistochemistry in identifying mixed fungal infection. In the present case, an application of avidin-biotin-complex (ABC) method with anti-*Trichosporon* antiserum and anti-*Candida* antiserum enabled us to diagnose a mixed infection by both fungi.

**Key words:** *Trichosporon* – *Candida* – Immunohistochemistry – Autopsy

## Introduction

The fungus *Trichosporon beigelii* is a yeast that is known as the causative agent of white piedra, a nodular hair shaft infection (Cooper and Silva-Hunter 1985).

In the past few years, *T. beigelii* has been recognized as an invasive fungal infection in immunocompromised patients (Rivera and Cangir 1975; Evans et al. 1980; Kirmani et al. 1980; Gold et al. 1981; Saul et al. 1981; Yung et al. 1981; Hoy et al. 1986; Walsh et al. 1986). Systemic *T. beigelii* infection associated with other fungal infection has rarely been reported.

We describe a case of disseminated trichosporonosis associated with *Candida* infection of the urinary bladder.

## Case report

A 75-year-old man was admitted to Kinki University Hospital on 9 January 1986, with fever and dyspnoea of effort. Chest X-ray films at the admission showed alveolar infiltrates of the right lung and some kinds of bacteria were cultured from the sputum. He was treated with antibiotics and became afebrile followed by the disappearance of the shadows. But the chest X-ray started showing wandering shadows. Allergic pneumonitis induced by antibiotics was suspected, and steroids were started on 27 February. Although his chest X-ray got better, his general condition was not improved. From 18 March onwards, urine culture yielded *Candida albicans* and *T. beigelii* repeatedly. On 9, 11 and 15 April, *T. beigelii* was revealed in blood cultures. Intravenous administration of miconazole was started on 11 April. However, his condition deteriorated and he died of respiratory failure on 16 April.

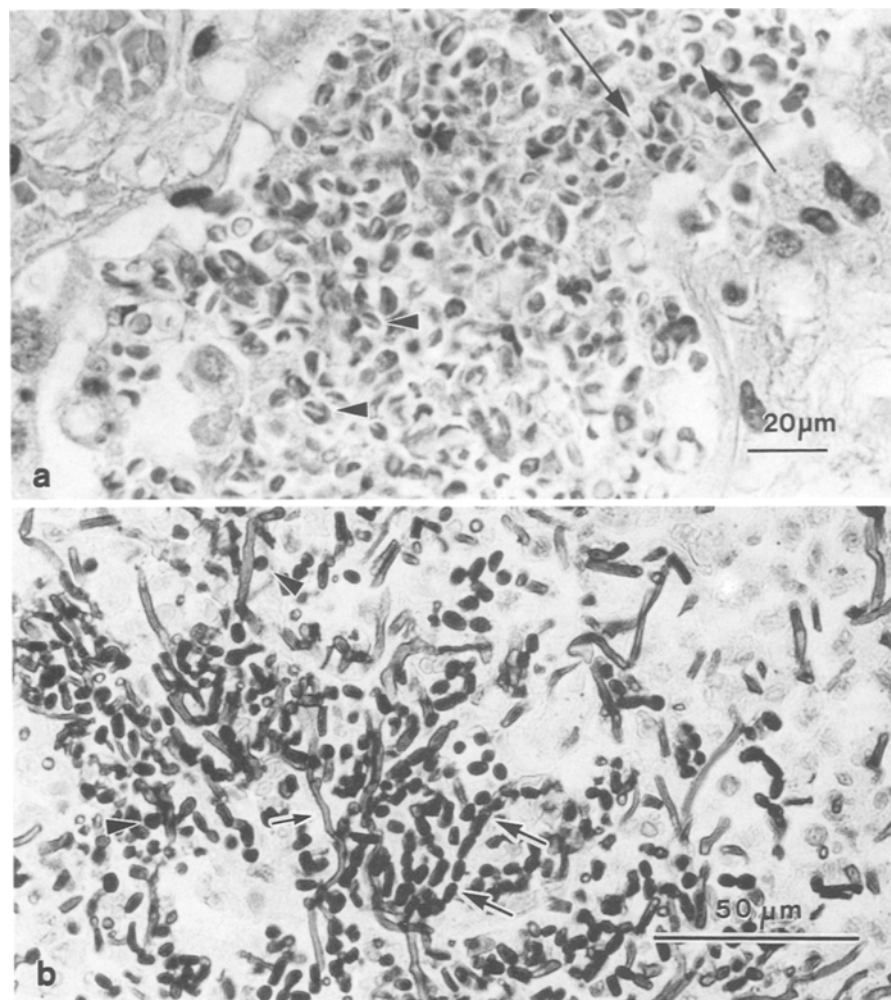
**Autopsy findings.** The postmortem examination was performed 1 h 29 min after death and revealed scattered yellowish-white nodular lesions in the kidneys (left, 190 g; right, 170 g), the heart (520 g) and the thyroid gland. Histologically, these lesions are composed of yeast-like and hyphal elements with a few polymorphonuclear leukocytes and nuclear debris. Most of the yeast-like elements are pleomorphic (Fig. 1 a). The detected hyphae, along which there are blastoconidia and arthroconidia, are rather broad but irregular in width (3–10 µm) with septation and sparse branching (Fig. 1 b). The combination of these fungal elements are consistent histologically with *Trichosporon* species.

The lungs (left, 530 g; right, 600 g) were irregularly fibrotic and haemorrhagic. Cytomegalovirus-infected cells and yeast-like elements are found in the fibrotic lesion. The urinary bladder was haemorrhagic in the mucosa with numerous pseudohyphae (Fig. 2) and a few septated hyphae. The remaining organs and tissues are free of fungus.

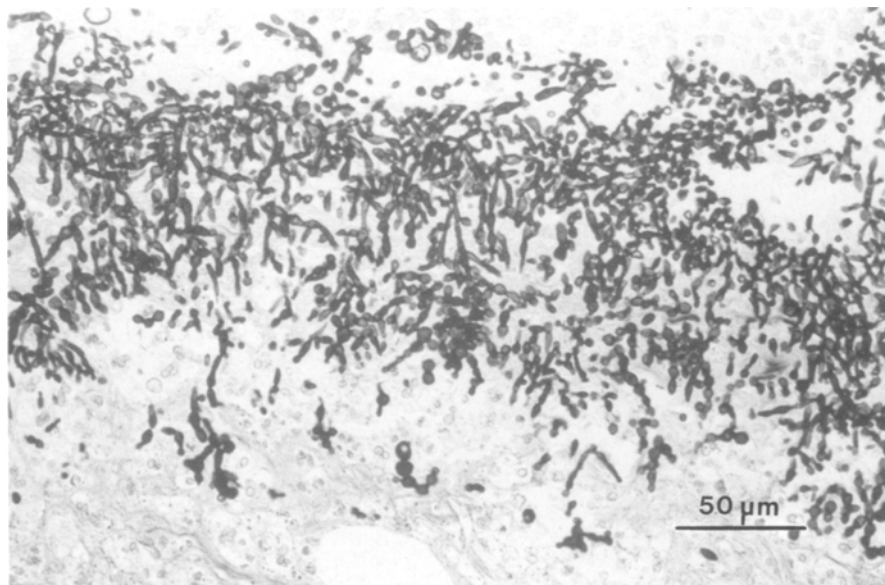
Anti-*Trichosporon* antiserum provided by Dr. Mochizuki (Mochizuki et al. 1988) is strongly reactive with the septated hyphae in the urinary bladder (Fig. 3 a) and all fungal elements in other organs by immunohistochemical method (Hsu et al. 1981). However, anti-*Candida* antiserum provided also by Mochizuki is reactive only with the pseudohyphae in the urinary bladder (Fig. 3 b).

**Mycologic findings.** Unfortunately no tissues obtained by autopsy were cultured. The isolates from antemortem blood and urine produced a cream-coloured, yeastlike colonies, within 7

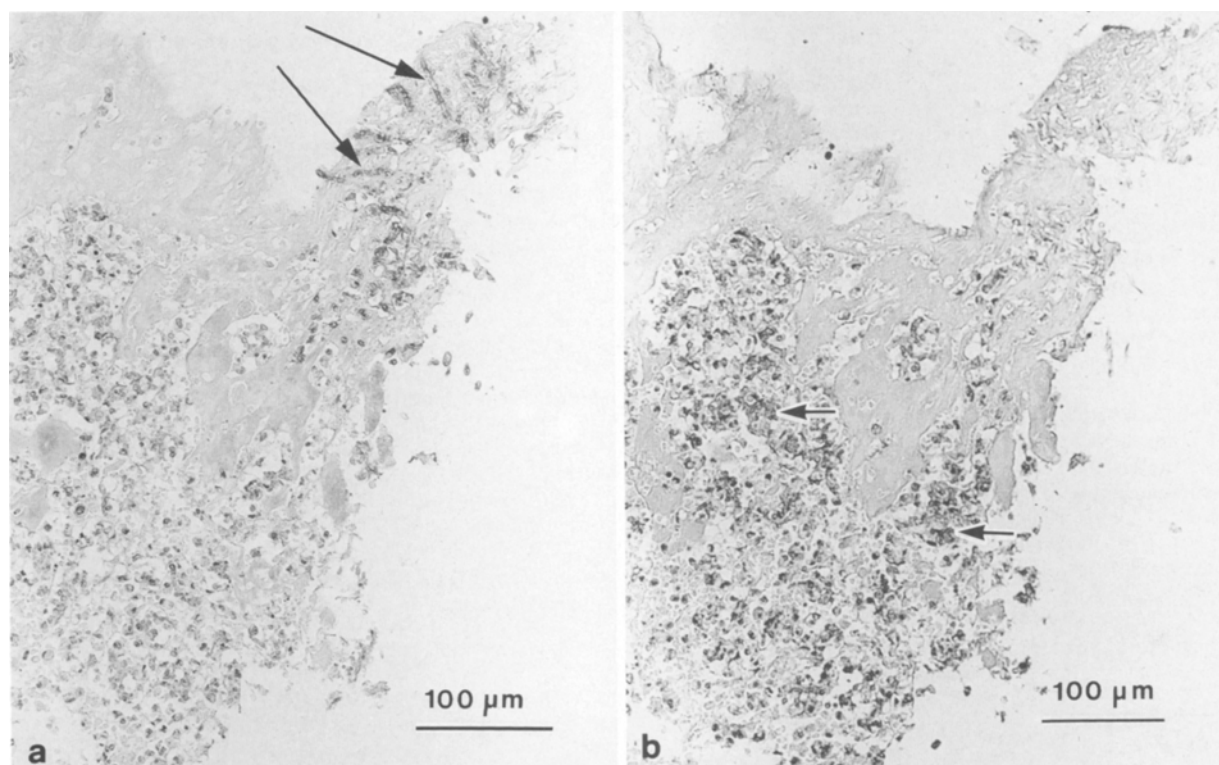
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**Fig. 1 a.** The sizes of yeast-like elements are various. Coffee bean shaped (*arrowheads*) and crescent shaped (*arrows*) elements are obviously found. Hematoxylin and eosin, × 890. **b** Arthroconidia (*large arrows*) are "box-carred" shaped. Blastoconidia (*arrow heads*) are budding from hyphae. Hyphae (*small arrows*) are irregular in width and septated. Grocott's methenamine silver, × 540



**Fig. 2.** Yeast-like fungi invade deeply into the submucosa making pseudohyphae. Grocott's methenamine silver, × 356



**Fig. 3a.** Hyphae (arrows) are reactive with the anti-*Trichosporon* antiserum. ABC method with anti-*Trichosporon* antiserum,  $\times 178$ . **b** Yeast-like elements (arrows) are reactive with the anti-*Candida* antiserum. ABC method with anti-*Candida* antiserum,  $\times 178$

days on Sabouraud's agar. The colonies developed radial furrows and irregular folds. Microscopic examination showed septate hyphae that fragmented into oval or rectangular arthroconidia. Some blastoconidia were also seen. API 20 C Auxanogram (Dermoumi 1979) was used to identify the isolates. They assimilated glucose, 2 keto-D-gluconate, L-arabinose, xylose, xylite, galactose, methyl-D-glucoside, N-acetyl-D-glucosamine, cellobiose, lactose, maltose, saccharose and trehalose. These assimilation pattern and hyphae production are consistent with *T. beigelii*.

## Discussion

The rarity of *Trichosporon* infection and its close morphological resemblance to *Candida* seem to have induced pathologists to regard *Trichosporon* fungal elements as *Candida*. In fact, the present case was once diagnosed as disseminated candidiasis.

Arthroconidia, blastoconidia, and hyphae have all to be found in the tissue to confirm the diagnosis of *Trichosporon* infection (Cooper and Silva-Hutner 1985). The combination of these fungal elements are not always detected and we wondered whether there were other characteristic fungal elements for *Trichosporon*. Evans et al. (1980) reported that yeasts of *Trichosporon* were measured

up to 10 µm in diameter in the tissue, whereas yeasts of *Candida* rarely exceeded 4 µm. Saul et al. (1981) found *Trichosporon* yeasts to be more pleomorphic than those of *Candida* species. In this case, we realized that the shapes of the yeast-like elements were crescent like or similar to coffee beans. However, the detection of those characteristic shapes does not give enough information to differentiate simple *Trichosporon* infection from mixed infection of *Trichosporon* and *Candida*. An immunohistochemical technique is useful in identifying the two fungi in tissue sections of mixed infection (Kobayashi et al. 1988). In the present case, an immunohistochemical technique using antiserum to each fungus revealed mixed infection of *Trichosporon* and *Candida* of the urinary bladder and disseminated trichosporonosis, and this was consistent with the results of antemortem blood and urine culture.

Although other authors have reported invasive mixed mycosis due to *T. beigelii* and another fungus (Gold et al. 1981; Saul et al. 1981; Hoy et al. 1986; Walsh et al. 1986; Mori et al. 1988), its number is very few. This report is the first of disseminated trichosporonosis associated with *Candida* infection of the urinary bladder.

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