PATHOGENICITY IN MICE OF STRAINS OF CANDIDA ALBICANS (ROBIN) BERK. ISOLATED FROM BURN PATIENTS

by

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ABSTRACT

Three strains of Candida albicans, isolated from burn patients who succumbed to systemic candidiasis, were studied in random-bred Swiss white mice to determine their relative pathogenicity and their histopathology. The most virulent strain caused 89.5% mortality, compared to 70% and 65% at 21 days for the other two strains. Histopathological studies showed extensive involvement of the kidneys, with heavy colonization of the renal pelvis; pseudomycelia, budding cells, and blastospores were observed in all animals that died. Animals surviving after 21 days were sacrificed; no extreme pathological reaction nor cells of C. albicans could be detected.

INTRODUCTION

The pathogenicity of Candida albicans (ROBIN) BERK. has long been recognized. This species is considered the most important pathogen of the genus, although other species have been shown to be pathogenic to man (HURLEY, 1966; 1967). Until comparatively recently, C. albicans has been considered to be no more than the cause of thrush and of an occasional vulvovaginitis. However, in recent years, other candidal infections have been reported with increasing frequency.

Among reported cases of human candidiasis, the onset of the disease usually has been associated with conditions complicating broad spectrum antibiotic therapy and altered metabolism. Aside from radiation therapy, no other physical agent has been reported as a predisposing factor to candidiasis. We present here the results of investigations of the pathogenicity of C. albicans, based on animal survival time and histopathological reaction. The strains used were isolated from patients who succumbed to terminal candidiasis, where “burn” was the predisposing factor.

MATERIALS AND METHODS

The strains of C. albicans used in this study were supplied by Dr. EDWARD HILL, Department of Surgery, Cincinnati General Hospital.

1) Paper No. 673, Dept. of Botany, Ohio State Univ., 1735 Neil Ave., Columbus, 43210; based, in part, on a thesis presented in partial fulfillment of the M. Sc. degree.

2) Reprint requests should be sent to the junior author at the address above.

Accepted for publication: 8. I. 1972.
The isolates were obtained from burn patients who succumbed to terminal candidiasis where "burn" was the predisposing factor. As nearly as can be ascertained from the data supplied with cultures, *C. albicans* was the sole pathogen recovered from clinical specimens obtained from the patients. Two of the isolates, designated as F 2655 and F 2554, were obtained from burn patients and the third, designated as R 490, was from the sputum of a patient who was an "iatrogenic" problem following prolonged antibiotic therapy.

The organisms were cultured and maintained on Sabouraud Dextrose Agar slants. The identification of the isolates was verified by chlamydospore production and serum filamentation tube technique. Twenty-four hour subcultures were used as the source of the inoculum. Cells were harvested by washing the surface of the slants with sterile physiological saline. Cell counts were made with a haemocytometer to determine the number of cells per volume of the suspension. Viable cell counts were made with the use of 0.01 % (w/v) Janus Green B following the technique of Berliner & Reca (1966) for *Histoplasma capsulatum* and of Schmitt & Erdos (1968) for *C. albicans*.

A total of $5.5 \times 10^6$ viable infective particles was injected per animal by the intravenous route using the caudal veins. Twenty random-bred, male Swiss white mice, obtained from commercial breeders, were used for each isolate.

Animals which succumbed to the infection were autopsied and those that survived beyond 21 days were sacrificed. Portions of the

<table>
<thead>
<tr>
<th>Culture</th>
<th>No. of mice inoculated</th>
<th>Number dead within 21 days</th>
<th>% dead</th>
</tr>
</thead>
<tbody>
<tr>
<td>F 2554</td>
<td>20</td>
<td>14</td>
<td>70</td>
</tr>
<tr>
<td>R 490</td>
<td>20</td>
<td>13</td>
<td>65</td>
</tr>
<tr>
<td>F 2655</td>
<td>19*</td>
<td>17</td>
<td>89.5</td>
</tr>
</tbody>
</table>

Table 1 - Mortality in 21 days after intravenous inoculation with *Candida albicans*

* one animal died immediately after injection presumably not due to infection