Treatment of *Candida albicans* meningitis with intravenous and intrathecal miconazole

A case report

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Summary

Systemic fungal infection in an infant is difficult to diagnose and manage. The treatment is prolonged and is usually with toxic drugs. The use of intravenous and intrathecal miconazole (Daktarin; Janssen) in a small baby of 5 months was most satisfactory.

The superficial mycoses are lesions involving the nails, hair and skin. They are transmitted by direct human contact and are usually chronic but seldom fatal. The systemic mycoses are not contagious but are usually contracted by the inhalation of asexual spores. Subsequent spread via the bloodstream may lead to the involvement of various organs, serious illness and in some cases, death. Systemic mycoses are often difficult to diagnose and when the organism is isolated it may be dismissed as a contaminant. This report describes such a case occurring in a very young infant and the successful treatment of a systemic mycosis with one of the newer antifungal agents.

Case report

A 4½-month-old baby weighing 4500 g was admitted to Victoria Hospital, Wynberg, for treatment of meningitis. This was diagnosed in the Outpatient Department of Red Cross War Memorial Children’s Hospital and the child was sent directly to Victoria Hospital. He had been born preterm at 30 weeks weighing 1300 g and had an initial Apgar score of 1, and 6 at 5 minutes. He subsequently developed hyaline membrane disease, idiopathic neonatal jaundice and had a patent duc tus arteriosus. Treatment as a neonate was with oxygen, intravenous penicillin and aminoglycosides. He was eventually discharged from the maternity hospital after 3 months. On admission to Victoria Hospital weight and height were still below the 3rd centile (NCHS standards) and the only positive physical sign was neck stiffness.

Fungi pathogenic to man are commonly found in nature. They occur as free-living forms in the upper soil, decaying vegetation and bird excreta and may produce superficial or systemic disease in man.

The superficial mycoses are lesions involving the nails, hair and skin. They are transmitted by direct human contact and are usually chronic but seldom fatal. The systemic mycoses are not contagious but are usually contracted by the inhalation of asexual spores. Subsequent spread via the bloodstream may lead to the involvement of various organs, serious illness and in some cases, death. Systemic mycoses are often difficult to diagnose and when the organism is isolated it may be dismissed as a contaminant. This report describes such a case occurring in a very young infant and the successful treatment of a systemic mycosis with one of the newer antifungal agents.

The infant had been started on treatment at the Red Cross War Memorial Children’s Hospital with intravenous penicillin, cefotaxime and chloramphenicol. The CSF findings are set out in Table I. Eight days after admission he had a convulsion and a repeat CSF examination (Table I) was thought to be suggestive of tuberculosis. Anti-tuberculosis treatment was added to the drug regimen. *Candida albicans* was grown from the CSF but was thought to be contaminant. There was no improvement in the infant’s condition and two subsequent CSF examinations also grew *C. albicans* (Table I). Miconazole (Daktarin; Janssen) 60 mg every 8 hours was then given via a central venous line for 28 days and intrathecally 15 mg on alternate days for 14 doses. The clinical condition of the infant improved and the CSF findings (Table I) returned relatively rapidly to normal. A repeat CSF examination 9 days after stopping treatment was virtually normal. A subsequent immunological diagnostic work-up revealed no abnormality.

**Discussion**

The number of cases of systemic mycosis has risen because of the greater incidence of immunocompromised individuals. Known associations include prematurity, malnutrition, the use of steroids and cytotoxic drugs, indwelling central venous lines (in total intravenous nutrition), use of antibiotics. Several of these factors (prematurity, malnutrition, antibiotic usage) may have been applicable in this patient although no immune deficit could be demonstrated after recovery. The delay in diagnosis owing to the dismissal of the isolation of *Candida* as a contaminant is similar to that reported elsewhere.

Conventional management of fungal meningitis is with amphotericin B and flucytosine. This has disadvantages that in treatment is prolonged and amphotericin is nephrotoxic, making it particularly unsuitable for use in young babies. Intravenous and intrathecal miconazole has been reported in the successful management of fungal meningitis in older individuals. Side-effects are minimal, the most commonly noted being tachycardia. This did not occur in our patient. The intravenous dosages we used were those recommended by the pharmaceutical company, namely 20–40 mg/kg/d, not to exceed 15 mg/kg per infusion. Infusions were given 8-hourly over a period of 45 minutes. The miconazole was mixed with 50 ml 0.9% sodium chloride with strict aseptic precautions in a laminar flow compartment in our pharmacy. The intrathecal dose recommended was the same as for adults — 15–20 mg on alternate days for 28 days. The response to this treatment was satisfactory and relatively rapid. Six months after discharge the patient was found to be completely normal.

Thanks are due to Professor D. W. Beatty for the immunological studies on this patient and to Dr A. Loubser, Medical Superintendent, Victoria Hospital, for permission to publish.
### TABLE I. CSF FINDINGS

<table>
<thead>
<tr>
<th>Date</th>
<th>Protein (g/l)</th>
<th>Globulin</th>
<th>Glucose</th>
<th>Culture</th>
</tr>
</thead>
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<td></td>
<td></td>
</tr>
<tr>
<td>29 Aug. 1986</td>
<td>4,0</td>
<td>3+</td>
<td></td>
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<td>Anti-tuberculosis treatment started</td>
<td></td>
<td></td>
<td></td>
<td>C. albicans</td>
</tr>
<tr>
<td>1 Sept. 1986</td>
<td>3,0</td>
<td>2+</td>
<td></td>
<td>C. albicans</td>
</tr>
<tr>
<td>5 Sept. 1986</td>
<td>2,5</td>
<td>3+</td>
<td></td>
<td>C. albicans</td>
</tr>
<tr>
<td>Miconazole started 9 Sept. 1986</td>
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<td>2+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Sept. 1986</td>
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<td>+</td>
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<td>Treatment stopped</td>
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<td>15 Oct. 1986</td>
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<td>0</td>
<td>Normal</td>
<td>Negative</td>
</tr>
</tbody>
</table>

P = polymorphonuclear leucocytes; L = lymphocytes.

### REFERENCES


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### Myoglobinuric renal failure after generalised tonic-clonic seizures

#### A case report

**A. N. MURRAY, G. RIORDAN, C. R. SWANEPOEL, R. W. EASTMAN**

#### Summary

A 47-year-old man developed progressive renal impairment after a series of seven generalised tonic-clonic seizures. The patient did not become oliguric and because recovery of renal function was rapid, dialysis was not required. The diagnosis of myoglobin-induced renal failure was made on the basis of markedly elevated muscle enzyme values, and myoglobin in the urine.


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#### Case report

A 47-year-old man, previously well, had a series of seven generalised tonic-clonic seizures. Each seizure lasted a few minutes, after which he would regain consciousness for up to 15 minutes before relapsing into the next seizure. The seizures ceased after the administration of intravenous diazepam, and the patient was admitted to hospital.

Examination revealed a drowsy patient, with no abnormal neurological findings. His temperature was 38°C, and blood pressure 120/80 mmHg. He was not dehydrated. The rest of the clinical examination was normal, and in particular he had full muscle strength and there was no muscle tenderness.

The urine contained 4+ blood, and no protein. On microscopic examination there were a few granular casts. On admission the patient’s haemoglobin concentration and white cell count were normal. The serum electrolyte and urea values were initially normal. However, over the ensuing days the serum potassium, urea and creatinine values rose progressively (Table I). The urine output remained between 1 and 2 l/d.

Management of the renal failure consisted of fluid restriction, and prophylactic ion-exchange resins. Dialysis was not