# Congenital cutaneous candidiasis and *Candida albicans* brain abscesses in a preterm infant

This case report describes a female preterm infant who developed extensive skin candidiasis within a few days of birth, which progressed to invasive fungal disease (fungal septicaemia with associated funguria, renal fungal balls, candida meningitis, ventriculitis and fungal brain abscesses). Despite a prolonged course of antifungal treatment the fungal brain abscesses and fungal renal balls proved very difficult to clear.

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**Key points**

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1. A case of invasive fungal infection following congenital cutaneous candidiasis is described.
2. Fungal skin infections should be managed aggressively in vulnerable neonates.
3. Healthcare professionals need to be aware of skin candidiasis and the devastating complication of candida brain abscess.

*Candida albicans* is not an infrequent cause of late onset sepsis; however fungal meningitis and abscesses are relatively uncommon in neonates.[1] When these morbidities occur they are usually associated with poor neurodevelopmental outcomes and/or mortality. Strategies to decrease the risk of acquiring invasive fungal infection have resulted in most neonatal intensive care units (NICUs) commencing antifungal prophylaxis regimens in a targeted group of neonates – usually the very preterm and/or very low birthweight babies.[2,3] Risk factors for developing invasive fungal infection include:[4]

- extreme prematurity
- very low birth weight
- maternal chorioamnionitis (especially the confirmed presence of candida on high vaginal swabs)
- sepsis
- prolonged use of antibiotics
- delay in establishing enteral feeding
- prolonged use of central or peripheral venous access
- prolonged hospitalisation within an NICU.

## The case

This report describes a female infant born at 23 weeks' gestation with a birth weight of 650g. The infant's mother had evidence of chorioamnionitis (maternal fever and foul-smelling amniotic fluid) and a background history of preterm prolonged rupture of membranes. The mother's high vaginal swab was positive for candida. At Corniche Hospital, oral nystatin is used as antifungal prophylaxis in infants <1.5kg (100,000 units every six hours from birth and continued for six weeks or until the central venous catheter is removed, whichever comes later).

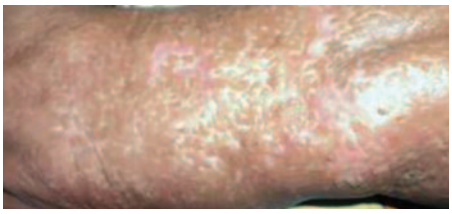

**FIGURE 1** Skin lesions on the back at three months of age. The lesions have healed with extensive scarring.

Soon after birth the infant developed multiple skin lesions that were later confirmed to be candida infection. She was commenced on a three-week course of intravenous fluconazole that was combined with topical antifungal creams. The skin lesions, which were mainly confined to the back and groin, eventually healed leaving extensive scarring (**FIGURE 1**).

The infant's neonatal course was complicated by a meconium plug requiring laparotomy, bilateral grade IV intraventricular haemorrhage (IVH), retinopathy of prematurity (grade 3 requiring laser treatment) and fungal septicaemia. The septicaemia was associated with funguria, renal fungal abscess, candida meningitis, ventriculitis and fungal brain abscesses. The fungal abscesses on cranial ultrasound were first seen at 30 days of life (**FIGURE 2**).

The fungal brain abscesses and fungal renal balls proved very difficult to clear

despite a prolonged course of antifungal treatment using a combination of liposomal amphotericin B and fluconazole over a 12-week period (**FIGURE 3**). The continued presence of candida was confirmed on biopsy of the calcified brain lesions.

Currently the infant is self-ventilating in air and feeding by bottle with delayed gross and fine motor milestones. She has been transferred from the NICU to the paediatric intensive care unit where she will remain under long-term follow up with the neurosurgeons and infectious disease consultants. She initially received a combination of liposomal amphotericin B and fluconazole for three months. Fluconazole was then discontinued and replaced with voriconazole. The combination of voriconazole and liposomal amphotericin B has been in place over a further five months and is still ongoing.

The fungal abscesses have been refractory to available treatment despite being fully sensitive to the administered antifungal agents. The challenge of eradicating the abscesses may be related to the multiloculated nature of the hydrocephalus.

Surgical interventions including placement of bilateral external ventricular drains (EVD), an endoscopic third ventriculostomy (ETV) and more recently bilateral endoscopic fenestration of the intraventricular cysts have been undertaken. These interventions have contributed positively to a decline in CSF protein levels from 20g/L to 3g/L. Recent CSF cultures have been sterile with normal biochemistry suggestive of eradication of the disease. A ventriculoperitoneal or cystoperitoneal shunt is planned. Not unexpectedly, the child has developed a seizure disorder that is currently controlled using maintenance phenytoin.

## Conclusion

Invasive fungal disease may occur following congenital cutaneous candidiasis resulting in significant morbidity and/or mortality. Fungal skin infections should be managed aggressively in vulnerable neonates.

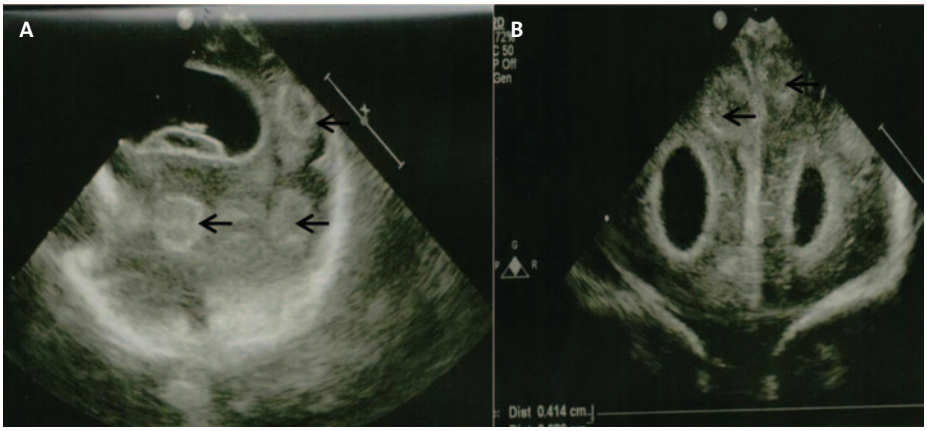


**FIGURE 2** Cranial ultrasound images at 30 days of life before commencing antifungal treatments. (A) Right lateral (sagittal) view. The arrows indicate brain abscesses in the parietal, occipital and temporal areas of the brain. (B) Frontal (coronal) view at the level of the anterior horns of the lateral ventricles. The arrows indicate brain abscesses on either side of the midline.

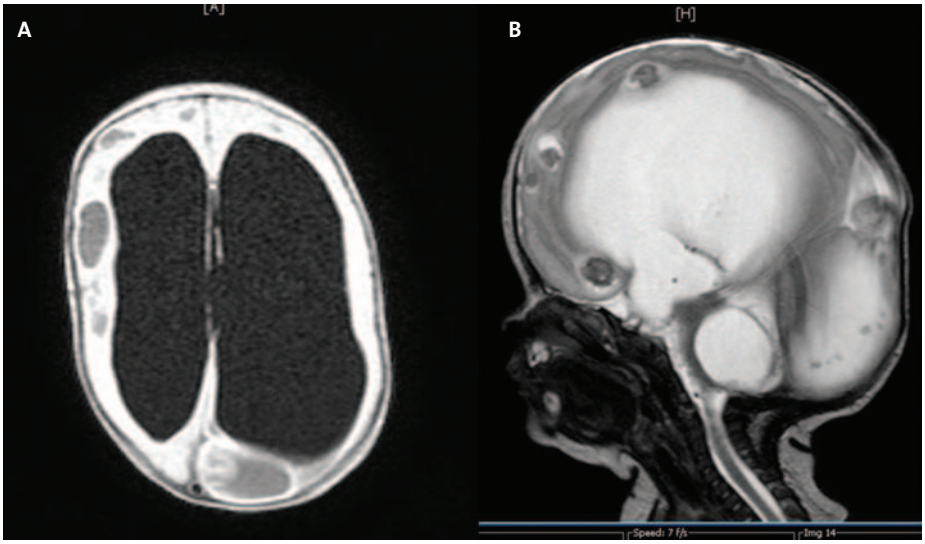


**FIGURE 3** (A) T1 (coronal) and (B) T2 (sagittal) magnetic resonance images (MRIs) of the brain taken after five weeks of therapy with intravenous liposomal amphotericin B and fluconazole showing multiple ring enhancing lesions located in intraventricular, periventricular and intraparenchymatous areas. There is also hydrocephalus, secondary to bilateral grade IV intraventricular haemorrhage.

## Patient consent

The authors received written consent to publish this report from the patient's parents.

## References

1. **Stoll B.J., Hansen N., Fanaroff A.A. et al.** Late-onset sepsis in very low birth weight neonates: the experience of the NICHD Neonatal Research Network. *Pediatrics* 2002;110:285.
2. **Austin N., Darlow B.A., McGuire W.** Prophylactic oral/topical non-absorbed antifungal agents to prevent invasive fungal infection in very low birth weight infants. *Cochrane Database Syst Rev* 2013;3:CD003478.
3. **Austin N., McGuire W.** Prophylactic systemic antifungal agents to prevent mortality and morbidity in very low birth weight infants. *Cochrane Database Syst Rev* 2013;4:CD003850.
4. **Saiman L., Ludington E., Pfaller M. et al.** Risk factors for candidemia in neonatal intensive care unit patients. The National Epidemiology of Mycosis Survey study group. *Pediatr Infect Dis J* 2000;19:319-24.