



# INVASIVE CANDIDIASIS AND CANDIDAEMIA IN NEONATES AND CHILDREN: UPDATE ON CURRENT GUIDELINES

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# Content

- 1- Introduction
- 2- Diagnosis
- 3- Treatment in neonates
- 4- Prevention in neonates
- 5- Treatment in children
- 6- Conclusions.

# INTRODUCTION

- Invasive fungal infections (IFIs)
- *Candida* spp. : 8-10% of nosocomial BSIs.
- Non-albicans *Candida* spp.: >50%
- High mortality rates: 7,7-26% -> 43-54%

**Table 1: spectrum activity of current antifungals against *Candida* spp.**

Organism	AMB	FCZ	CAS	MICA
<i>C. albicans</i>	S	S	S	S
<i>C. glabrata</i>	S-I	S-Sdd-R	S	S
<i>C. parapsilosis</i>	S	S	S-I	S-I
<i>C. krusei</i>	S-I	R	S	S
<i>C. guilliermondii</i>	S	S	R	R

**AMB:** amphotericin B, **FCZ:** fluconazole, **CAS:** caspofungin, **MICA:** micafungin.

- **Table 2: Comparison of methodology of guidelines for IC/candidaemia in neonates/children.**

	<b>DMYKG/PEG</b>	<b>ECIL</b>	<b>ESCMID</b>	<b>IDSA</b>
Population	Children,neonates	Paediatric haematological patients, HSCT recipients, other malignancies	Children(haematological malignancies, solid tumours, allogeneic HSCT, autologous HSCT, recurrent leukaemias, neonates	Paediatric non-neutropaenic patients, neonates
Scope	Treatment of IC/candidaemia in children, treatment of IC/candidaemia in neonates	Diagnosis procedures, prevention/treatment of IC/candidaemia	Prevention/treatment of IC/candidaemia in children, prevention/treatment of IC/candidaemia in neonates	Treatment of IC/candidaemia in non-neutropaenic children, prevention/treatment of IC/candidaemia in neonates
Published	2011	2014	2012	2009

**DMYKG/PEG:** German Speaking Mycological Society/Paul-Ehrlich Society for Chemotherapy; **ECIL:** European Conference on Infection in Leukaemia; **ESCMID:** European Society of Clinical Microbiology and Infectious Diseases; **IDSA:** Infectious Diseases Society of America

# Diagnosis of IC/Candidaemia in neonates and children

- Standard diagnosis procedures: blood cultures for yeasts, cultures/microscopic examination of approach liquid and solid diagnostic specimens: *Cornerstone of diagnosis.*
- *MIC: CLSI* (North American), *EUCAST* (European standard)
- 1,3-beta-D-glucan(BG)
- PCR

# Treatment of IC/Candidaemia in neonates

- General principles:
  - ✓ prompt initiation of antifungal treatment
  - ✓ control of predisposing underlying condition
  - ✓ removal of catheter.

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- ***IDSA***: lumbar puncture and a dilated retinal examination (B-III), remove the catheter (A-II), imaging of the genitourinary tract, liver and spleen is advised in case sterile body fluid cultures have persistently positive results (B-III).

- **Table 3: Comparison of the recommendations on therapy of IC/candidaemia in neonates.**

	<b>IDSA</b>	<b>DMYKG</b>	<b>ESCMID</b>
<b>D-AMB</b>	A-II	C-III	B-II
<b>L-AMB</b>	B-III	A-II	B-II
<b>Caspofungin</b>		A-II	C-II
<b>Micafungin</b>	B-III	A-II	B-II
<b>Fluconazole</b>	B-II	A-II	B-II

- **D-AMB:** amphotericin B deoxycholate
- **L-AMB:** liposomal amphotericin B.

- **Amphotericin B** : the preferred initial therapy in neonates with candidemia ( grade 2C ). Alternate therapy or in combination: **Fluconazole**. (*Uptodate 2015*).
- Candidal CNS infections:  
**Amphotericin B** (grade 2C ).**Flucytosine** may be added. (*Uptodate 2015*).

# Prevention of IC/candidaemia in neonates

- *ESCMID* and *IDSA* recommend the use of antifungal prophylaxis in extremely low birth weight neonates, treatment of maternal vaginal candidiasis.
- *IDSA*: the prophylactic use of fluconazole may be considered for neonates < 1000g in nurseries with high rates of IC/candidaemia (A-I)

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- “ We do not suggest the routine use of prophylactic fluconazole in all premature infants ( *grade 2B*). Prophylactic fluconazole may be considered in extremely low birth weight infants in centers with a high incidence of fungal infection” (*Uptodate 2015*).

# Treatment of IC/Candidaemia in children

**Table 4: Comparison of the recommendations on therapy of IC/candidaemia in children**

	<b>DMYKG</b>	<b>ESCMID</b>
D-AMB	C-III	C-I
<b>L-AMB</b>	<b>A-I</b>	<b>A-I</b>
ABLC	A-II	B-II
Capsosungin	A-II	A-I
<b>Micafungin</b>	<b>A-I</b>	<b>A-I</b>
Fluconazole	A-II	B-I
Voriconazole	A-II	B-I

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- General management principles, the removal of catheter is strongly recommend (A-II).
  - The optimal duration of therapy for uncomplicated candidaemia is 14 days after blood cultures are sterile.

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- Fluconazole seems no longer to be considered at first choice therapy.
  - No recommendation regarding combined antifungal therapy is given.

# Conclusions

- For neonates, micafungin, fluconazole and lipid formulations of amphotericin B: strongly recommended
- Lipid formulations of amphotericin B and Voriconazole seems to offer additional treatment options for first line treatment in children.
- Fluconazole: no longer to be considered as first choice

Thank you for your attention!

