WEB TABLE I DIAGNOSIS OF INVASIVE FUNGAL INFECTIONS IN CHILDREN

	Hematological malignancy & transplant recipients	*Pediatric Intensive Care*	*Premature Neonates*	*Immune Deficiency*

Risk Factors	• Underlying malignancy (AML, High risk ALL including relapse)
	• Type of transplant(more with allogenic HSCT as compared to autologous HSCT)
	• Characteristics of chemotherapy
	• Prolonged neutropenia (ANC <500/microL for > 10 days)
	• High dose Corticosteroid (>0.3mg/kg/day)
	• Central venous catheter (CVC)
	• Parenteral nutrition, mucositis
	• Concomitant bacterial infection, sepsis. Septic shock
	• Preceding broad spectrum antibiotic usage
	• Solid organ transplant
		• Admission to intensive care
		• Malignancy
		• Immune compromised state
		• Gastrointestinal disorder
		• Trauma & surgery (cardiac, abdominal, neurosurgery)
		• Catherization (CVC, urinary)
		• Broad spectrum antimicrobial use
		• Systemic steroids
			• Immaturity of premature neonate's epidermis and intestinal mucosal barriers
			• Grade of prematurity
			• Prolonged intensive care
			• Parenteral nutrition
			• Mechanical ventilation
			• Proton pump inhibitors
			• CVC
			• Post-natal steroids, antimicrobials
			• Abdominal surgery
			• Candida colonization before onset of IC
			.
				• Immune deficiency
				• Chronic granulomatous disease
				• Deficiency of T-cell immunity are predisposing factors for PCP
				  • Severe combined immune-deficiency
				• HIV,CD40 ligand deficiency
				• Defective cell mediated immunity
				  • HIV
				  • Hyperimmunoglobulin M Syndrome
				  • Hyper IgG syndrome
				  • GATA 2 deficiency
				• Disorder of host phagocyte function
				• Chronic granulomatous disease(CGD)

Organism	• Invasive Aspergillosis (IA) and Invasive Candidiasis	• Candidiasis (commoner) and invasive aspergillosis	• Candida species(commonest), localized Infections (cutaneous, gastrointestinal) with aspergillus and Mucorales	• Aspergillus, Candida, Mucorales, Cryptococcus, PCP
Candidiasis				
Clinical Features	• Candida *spp* represent the third most common cause of nosocomial bloodstream infection in children • Three distinct entities of candida infection include: candidemia in absence of deep seated infection, candidemia with disseminated infection and deep seated infection in absence of candidemia. Dissemination can occur to organs like lungs, liver, spleen, kidneys, brain (meningitis, meningoencephalitis),eye(chorioretinitis, endophthalmitis),heart and skeleton	• Symptoms indistinguishable from those of sepsis secondary to bacterial infection and fever refractory to antibiotic treatment • Thrombocytopenia important indicator for IC	• Generalized sepsis • Infection generally starts by 3rd week of postnatal age • Meningoencephalitis in absence of overt signs/symptoms • Dissemination to heart, kidneys, eyes, bones, joints • Candida infection in kidney may be complicated with fungal ball leading to urinary tract obstruction • Candidemia should be suspected in neonates with clinical signs of sepsis and new onset thrombocytopenia • Hypoglycemia	• PCP: Dry cough, hypoxia, dyspnea, low grade fever, rapid worsening of distress with requirement of respiratory support • Cryptococcus: Meninoencephalitis, pneumonia, disseminated disease • Invasive aspergillosis: Failure to thrive, fever, cough(non productive), chest discomfort, progressive dyspnea(hemoptysis is rare) • Multifocal bone disease, splenic/ hepatic abscess, skin /lymph node involvement • Candida: commonest cause of ungal meningitis, fungemia, fungal lymphadenitis in CGD

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Aspergillosis Primary Sites of Invasive aspergillosis are lungs and sinuses. Other uncommon sites include brain,skin (when present is a useful source of diagnostic specimen with a positive culture yield) and heart. 1. Respiratory symptoms (seen in approximately half of the affected) include cough, dyspnea, chest pain, tachypnea, oxygen requirement, (pulmonary involvement), fever, nasal congestion/discharge, facial pain/fullness, numbness, nasal discharge, headache (rhinosinusitis). 2. CNS presentations include brain abscess, vasculitis, meningoencephalitis,intracerebral haemorrhage and haemorrhagic infarcts) 3. Cutaneous presentations include ulcers, cellulitis, purpuric nodules, necrotic eschar. 4. Cardiac clinical presentations include pericardial effusion, intracardiac thrombus and endocarditis **Mucormycosis**: Similar to aspergillosis, two primary sites of infection for Mucor mycosis include pulmonary parenchyma and the sinuses (paranasal sinuses,sinoorbital / rhinocerebral involvement,and skin occasionally. The presenting signs and symptoms are similar to those of IA.			