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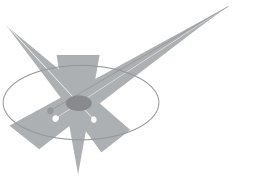

Review Paper

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Strategies for prevention of infectious complications in children after HSCT in relation to type of transplantation and GVHD occurrence

Authors' Contribution:
A Study Design
B Data Collection
C Statistical Analysis
D Data Interpretation
E Manuscript Preparation
F Literature Search
G Funds Collection

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Summary

Background Infectious complications are a major cause of morbidity and mortality in paediatric and adult patients undergoing haematopoietic stem cell transplantation (HSCT).

Aim Analysis of strategies for prevention of infectious complications in children after HSCT in relation to the type of transplantation and GVHD occurrence.

Materials/Methods A review of PubMed references based on evidence-based recommendations rated by the strength of the recommendation and the quality of the supporting evidence. The risk of infection was divided into: low for autologous HSCT, moderate for MSD-HSCT without GVHD, and high for unrelated, mismatched, haploidentical HSCT, cord blood HSCT, patients with moderate-to-severe GVHD, undergoing immunosuppressive treatment, CMV infection, *ex vivo* T-cell depletion or CD34 selection and *in vivo* T-cell depletion.

Results Prophylaxis strategy includes general infection control in hospital environment and pharmacological approach, related to antibacterial, antifungal and antiviral agents. Most studies were done on adult patients only, while some included both paediatric and adults patients. However, no differences in prophylaxis strategy and efficacy between age groups were reported in these studies. Recommendations for use of specific drugs in prophylaxis in transplantation period and recommendations for vaccination are presented in this paper.

Conclusions With changing practices, transplant teams are encouraged to review local patterns of infections and associated complications and communicate regularly with infection control committees for guidance on the evolution of isolation needs for the immunosuppressed patient before and after HSCT.

Key words **prophylaxis • infection • haematopoietic stem cell transplantation • strategy • vaccination**

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Background

Infectious complications are a major cause of morbidity and mortality in paediatric and adult patients undergoing haematopoietic stem cell transplantation (HSCT). The incidence and the severity code of infections depend on the function of the host's immune system. This function is strongly correlated with the application of immunosuppressive therapy and the time of immune reconstitution after HSCT. The risk of infection is higher in patients after allogeneic than autologous transplantation, and in patients with GVHD than without it. Patients with GVHD have severe immunological deficiencies due to the disease and the therapy itself. The risk of infection is higher in patients with delayed immune reconstitution, especially after haploidentical and cord blood transplantation (Table 1). Host defences compromised by HSCT that make patients vulnerable to infections can be divided into an early (before day +30), intermediate (days 30–100) and a late phase (after day +100). Each phase is related to increased risk of specific complications and specific infections that occur at variable frequency, but each of them carries relative life-threatening potential [1].

Table 1. Infections encountered after engraftment in intermediate and late phase of immunological recovery [2,3].

Infection	Relative frequency		
	Auto-HSCT	Allogeneic HSCT without GVHD	Allogeneic HSCT with GVHD
Intermediate phase			
Staphylococci	+	++	++
Fungi	+	++	+++
Gram-negative bacilli	–	–	+
CMV	+	++	+++
Late phase			
Encapsulated bacteria	–	–	++
Fungi	–	–	+

Aim

Review and analysis of strategies and recommendations for prevention of infectious complications in children after HSCT in relation to the type of transplantation and GVHD occurrence.

Methods of Data Collection

References were retrieved using the online database of the National Library of Medicine (PubMed; *http://www.ncbi.nlm.nih.gov/PubMed*) up to October 2006 (with emphasis on the latest randomized clinical trial reports). Terms used included: haematopoietic stem cell transplantation, infection, prophylaxis, strategy, guidelines, randomized clinical trials (RCT), meta-analysis, children, vaccination. The retrieved references were supplemented by references from the author's own database. The presented strategy is based on evidence-based recommendations (Table 2) rated by the strength of the recommendation and the quality of the supporting evidence [1].

Results

Determination of the risk for infection in specific patient populations is accomplished by evaluating various risk factors (exposure, state of immunosuppression and organ damage). For practical purposes, risk groups of infection after HSCT with respect to the type of transplantation can be divided into: (A) Low risk: autologous HSCT; (B) Moderate risk: MSD-HSCT with no GVHD (myeloablative, low-toxicity, reduced-intensity conditioning); (C) High risk: unrelated, mismatched, haploidentical HSCT (including cord blood HSCT), patients with moderate-to-severe GVHD, undergoing treatment with immunosuppressive agents (e.g. corticosteroids), CMV infection, *ex vivo* T-cell depletion or CD34