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Conference Abstract A2

Infectious Mortality After Allogeneic Hematopoietic Stem Cell Transplantation in the Early Post-Transplantation Period: A Single-Center Retrospective Study

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Background

Allogeneic hematopoietic stem cell transplantation is the cornerstone of therapy for various malignant and non-malignant hematological disorders. Despite advances in transplantation techniques and supportive care, infectious complications remain a major problem, particularly during the early post-transplantation period. This challenge is exacerbated in resource-limited settings where access to modern diagnostic methods and antimicrobial agents may be restricted.

Aim

To evaluate the frequency and spectrum of infectious complications and their impact on early mortality after allogeneic hematopoietic stem cell transplantation, and to analyze the effectiveness of an escalation strategy of empirical antibacterial therapy.

Materials and Methods

This retrospective study included 45 patients who underwent allogeneic hematopoietic stem cell transplantation from 2023 to the present at a single transplantation center. The objective was to assess the safety of the escalation strategy in recipients of allogeneic transplantation: recurrence of febrile neutropenia, bloodstream infection, sepsis or septic shock, admission to the intensive care unit, and death within 30 days from the onset of febrile neutropenia. Detailed patient characteristics are presented in Table 1. Blood cultures were obtained from all patients during episodes of febrile neutropenia, including those resulting in death. Cultures were performed from two separate sources — central venous catheter and peripheral vein — at each febrile episode. Preliminary results, including classification of the pathogen as Gram-positive or Gram-negative, were available within 24–48 hours after sampling using mass spectrometry on the VITEK 2 COMPACT system. Subsequent identification of microorganisms and assessment of their growth were performed using the VITEK MS PRIME (bioMérieux) microbiological analyzer.

Results

The median duration of follow-up for the entire cohort was 196 days (range: 7–800). At the time of analysis, 28 patients (62%) were alive. Among the 17 deaths, relapse of the underlying disease was the cause of death in 5 cases (30%), while infectious complications accounted for 10 deaths (59%). The remaining 2 deaths (11%) were due to other causes.

The median time to onset of febrile neutropenia after allogeneic transplantation was 4 days (–4 to 12). The median duration of empirical antibacterial therapy was 15 days (10–19). The median time to sepsis or septic shock from transplantation was 10 days (1–13). Four patients (40%) had a prior intensive care unit stay for sepsis or septic shock. Six patients (60%) had a documented infectious pathogen. All patients with sepsis (10/10; 100%) had late colonization with Klebsiella pneumoniae (local intensive care unit flora).

According to bacteriological studies, pathogens were identified in all cases. The most frequently detected pathogens in Gram-negative bacteremia were Pseudomonas aeruginosa (20%; n = 2), Escherichia coli (10%; n = 1), and Klebsiella pneumoniae (60%; n = 6). Pneumocystis pneumonia was diagnosed in 10% (n = 1) (ex juvantibus) (see Figure 1). All patients died from septic shock despite empirical antibiotic therapy administered in accordance with the escalation strategy. A detailed antibiotic therapy strategy for each patient is presented in Table 2.

№	**Cefoperazone/ Sulbactam**	**Meropenem**	**Linezolid**	**Vancomycin**	**Amikacin**	**Colistin**	**Ceftazidime/ Avibactam, Aztreonam**	**Fosfomycin**
1	+	+	+	+		+		
2	+	+	+	+		+	+	
3	+	+	+		+	+		+
4		+	+			+		
5	+	+	+			+		
6	+	+		+		+		
7		+		+		+		
8	+	+	+		+	+		
9	+	+	+			+	+	
10		+	+	+		+	+	

Conclusions

This retrospective study demonstrates the safety of escalation empirical antibacterial therapy in recipients of allogeneic hematopoietic stem cell transplantation. However, this approach should be used with caution when allogeneic transplantation is performed as salvage therapy, as well as in patients with a history of sepsis or septic shock and intensive care unit admission. It remains essential to determine microbial sensitivity at all stages of therapy before and after allogeneic transplantation, to modernize equipment, and to improve the qualifications of intensive care unit staff.

Characteristics of patients	Study group (n=45) N	 %
Median age (years)	28 (19 – 60)	
Sex Male Female	 31 14	 68.9 31.1
Diagnoses Acute myeloid leukemia Acute lymphoblastic leukemia Aplastic anemia Myelodysplastic syndrome	 21 15 8 1	 46.7 33.3 17.8 2.2
Indication for transplantation Standard therapy Salvage therapy	 39 6	 75.8 24.2

Number of transplantations First allogeneic transplantation Second allogeneic transplantation	 43 2	 95.6 4.4
Donor type Haploidentical Matched related donor	 22 23	 48.9 51.1
Source of stem cells Mobilized peripheral blood stem cells	 45	 100.0
Conditioning regimen RIC	 45	 100
Post-transplant cyclophosphamide for graft-versus-host disease prophylaxis	45	100

Picture №1