CMV serostatus of donor-recipient pairs as a risk factor for CMV infection after allogeneic stem cell transplantation

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Cytomegalovirus infection (CMV infection) remains a frequent complication, associated with multiorgan disease in immunocompromised patients especially in patients after allogeneic stem cell transplantation (allo-HSCT). The presence of CMV IgG antibodies shows the immune response to human CMV of individuals. Many studies have shown that donor / recipient (D / R) CMV serostatus is an important factor that influences on the patient outcomes after allo-HSCT.

In our study we try to assess the incidence of CMV infection during 6-months follow-up period in patients after allo-HSCT depending on D / R CMV serostatus. Detailed patient characteristics (n=108) are presented in a table 1. We performed the CMV IgG antibody test in patients and their donors before allo-HSCT. Then we identified the D / R pairs depending on their positive or negative CMV IgG tests (=CMV status). In every group we investigated the incidence of CMV infection from 0 to 180 days after allo-HSCT. CMV infection was defined as detection of CMV DNA in any body fluid or tissue specimen by real-time polymerase chain reaction.

Our data presented in the table 1 show, that the incidence of CMV infection during 6-months follow-up period was higher in groups, where R+ had positive tests for CMV IgG. It confirms that CMV seropositive recipient serostatus remains the significant risk factor for CMV infection. The development of CMV infection from 30 to 180 days after allo-HSCT in the group D+ / R- was higher compared to D- / R- group. Possibly, it is associated with the incidence of acute and chronic graft-versus-host disease (GVHD) and long-term immunosuppression that increase the risk for CMV infection.

Therefore, to improve patient outcomes after allo-HSCT researchers should depend not only on the human leukocyte antigens (HLA) matching but also on the donor / recipient CMV serostatus.

Table 1. The impact of CMV serostatus of donor and recipient (D / R) on the incidence of CMV infection.

Patient characteristics (n=108)	D- / R-, n = 9	D+ / R-, n = 8	D- / R+, n = 15	D+ / R+, n = 76	p-value[1]
Gender, n (%)					0.39
Female	3 (33%)	6 (75%)	9 (60%)	44 (58%)	
Male	6 (67%)	2 (25%)	6 (40%)	32 (42%)	
Age, Median (IQR)					0.79
	37 (30 – 41)	29 (23 – 46)	35 (29 – 47)	37 (28 – 43)	
Diagnosis, n (%)					
Aplastic anemia	-	-	-	1 (1.3%)	0.18
Lymphoma	2 (22%)	-	-	1 (1.3%)	
Myelodysplastic syndrome (MDS)	-	-	1 (6.7%)	12 (16%)	
Acute lymphoblastic leukemia (ALL)	3 (33%)		6 (40%)	25 (33%)	
Acute myeloid leukemia (AML)	3 (33%)		6 (40%)	35 (46%)	
Primary myelofibrosis	-		1 (6.7%)	-	
Chronic lymphocytic leukemia (CLL)	-		1 (6.7%)	-	
Chronic myelogenous leukemia (CML)	1 (11%)	-	-	1 (1.3%)	
Chronic myelomonocytic leukemia (CMML)	-	-	-	1 (1.3%)	
Conditioning regimen, n (%)					
Myeloablative conditioning regimen (MAC)	1 (11%)	2 (25%)	3 (20%)	9 (12%)	0.52
Reduced intensity conditioning regimen (RIC)	8 (89%)	6 (75%)	12 (80%)	67 (88%)	
Graft source, n (%)					
Bone marrow	1 (11%)	-	3 (20%)	17 (22%)	0.60
Peripheral blood stem cells	8 (89%)	8 (100%)	12 (80%)	59 (78%)	
Type of donor, n (%)					
Matched related donor (MRD)	1 (11%)	1 (12%)	3 (20%)	24 (32%)	**<0.001**
Matched unrelated donor (MUD)	4 (44%)	-	8 (53%)	16 (21%)	
Mismatched unrelated donor (MMUD)	-	-	4 (27%)	8 (11%)	
Haploidentical related donor	4 (44%)	7 (88%)	-	28 (37%)	
CMV infection (0 – 30 days after allo-HSCT), n (%)					
No	9 (100%)	8 (100%)	7 (47%)	56 (74%)	**0.007**
Yes	-	-	8 (53%)	20 (26%)	
CMV infection (30 – 90 days after allo-HSCT), n (%)					
No	8 (89%)	3 (38%)	3 (20%)	28 (37%)	**0.007**
Yes	1 (11%)	5 (62%)	12 (80%)	48 (63%)	
CMV infection (90 – 180 days after allo-HSCT), n (%)					
No	7 (88%)	2 (50%)	10 (83%)	48 (77%)	0.52
Yes	1 (12%)	2 (50%)	2 (17%)	14 (23%)	

[1]Fisher's exact test; Kruskal-Wallis rank sum test

Speaker Biography

Anna Dmitrova has completed her study at RUDN University, Russia at the age of 23 years. She is a fellow in the department of bone marrow transplantation in National Research Center for Hematology, Russia. She studies reconstitution of cytomegalovirus-specific T cell immunity in patients after allogeneic stem cell transplantation, management and prophylaxis of cytomegalovirus infections. She has over 50 publications. She is also working on development of unrelated donation in Russia with the unrelated donor-recruiting group in National Research Center for Hematology, Russia.

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