Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Background: CD34+ graft cell dose (CD) has an imperative relationship to survival outcomes after allogeneic peripheral blood stem cell transplant (allo-PBSCT). A few studies have evaluated the effect of graft CD on outcomes after SCT. However, an optimal dose of CD34+ cells has yet to be defined. This systematic review and meta-analysis were performed to evaluate outcomes with graft CD in allo-PBSCT.

Method: A total of 1744 records from 4 databases (PubMed, Embase, Cochrane, and Clinical trials.gov) were screened following the PRISMA guidelines, and ten studies reporting outcomes for varied graft CD in allo-PBSCT were included. Quality evaluation was done using the NIH quality assessment tool. The pooled analysis was done using the 'metaXL', and the random-effects model was used to estimate the pooled prevalence with 95% CI. The interstudy heterogeneity among the studies was assessed using the Q statistic proposed by Cochrane and the I^2 index introduced by Higgins and Thompson.

Results: A total of 3908 patients were included in this meta-analysis. The patients were grouped according to three graft CD variations: low dose (LD), optimal dose (OD), and high dose (HD) were defined as $<3x10^6$/kg, 4-8 $x10^6$/kg, and >8 $x10^6$/kg, respectively. (Table 1) For dose-specific analysis, the patients who did not fall into each of the three groups were grouped as 'others'. There were a total of 500, 388, and 132 patients in the LD, OD, and HD groups, respectively. The median age of patients was 42 (0.4-76) years. The pooled overall survival (OS) in the OD group after a median follow-up of 2.5 (1.4-3) years was 59% (96% CI 0.44-0.73, I^2=85), while in LD and HD group was 55% (95% CI 0.38- 0.71, I^2=82) and 49% (95% CI 0.23-0.75, I^2=81) at a median follow-up of 3 (2-3) years and 2 (2-3) years, respectively. The pooled prevalence of relapse in the OD group at the median follow-up of 3 (3-5) years was 35% (95% CI 0.28-0.42, I^2=21). Only Yamamoto et al. reported relapse of 39% in the LD group at two years. The pooled prevalence of relapse-free survival (RFS) was 57% (95% CI 0.43- 0.70, I^2= 87) at the median follow-up of 2 (1.4-5) years in the OD group. The pooled incidence of acute graft versus host disease (GVHD) was 29% (95% CI 0.19-0.40, I^2=61%) in the LD group while 43% and 30% in the OD and HD groups, as reported by Urbano et al. and Passweg et al., respectively.

Conclusion: The OS was better in the OD group as compared to LD and HD groups. The relapse, RFS, and GvHD incidence could not be compared in different dose groups because of the scarcity of data. Further randomized prospective studies are the need of the hour to define the optimal dosing of graft cells.

Table 1: Dose groups with outcomes

Author (Y)	CD34+ Cell Dose (M cell/kg)	Cell Dose Group	Evaluable patients based on dose (n)	Overall Survival (n)	Overall survival in other cell dose groups	Prevalence of overall survival	Relapse (n)	Relapse in other cell dose groups and (n)	Prevalence of relapse	Relapse free survival (n)	Prevalence of relapse free survival	aGVHD (n)	aGVHD in other cell dose groups and (n)	Prevalence of aGVHD
Chihiro Yamamoto (2017)	<2	Low Dose	425	185 @ 2yr	Dose 2-5: 1135 out of 2494	55% @ 3 yr (95% CI 0.38-0.71) OR* 0.95 (95% CI 0.74-1.22)	158 @ 2yr	Dose 2-5: 918 out of 2494	NA	NA	NA	139 @ 0.25yr	Dose 2-5: 925	29% @ 1.6 yr (95% CI 0.19-0.40) OR* 1.09 (95% CI 0.94-1.27)
Alvaro Urbano - Ispizua (2001)	1 to 3		28	21 @ 3yr	Dose >3: 29 out of 56		NA			NA		NA	NA	
Alvaro Urbano - Ispizua (2002)	<2		47	24 @ 3yr	Dose >2: 111 out of 268		NA			NA		10 @ 3yr	Dose >2: 105 out of 268	
Nakamura Ryotaro (2001)	>4.6	Optimal Dose	25	16 @ 1.4yr	Dose <4.6: 12 out of 24	59% @ 2.5 yr (95%CI 0.44-0.73), OR* 0.80 (95%CI 0.55 to 1.15)	NA		35% @3 years (95% CI 0.28-0.42) OR* 1.16 (95%CI 0.73-1.86)	15 @ 1.4yr	57% @ 2yr (95%CI 0.43-0.7) OR 1.05 (95% CI 0.37- 3.01)	NA		NA
Maria Queralt Salas (2019)	<9		28	21	Dose >9:19 out of 40		NA			19 @ 2yr		NA		
Alvaro Urbano - Ispizua (2002)	>4		150	56 @ 3yr	Dose <4: 78 out of 165		54 @ 3yr	Dose <4: 75 out of 165		NA		65 @ 3yr	Dose <4: 51 out of 165	
Elmariah (2019)	5 to 10		93	57 @ 2yr			NA	NA		NA		NA		
K Maie (2014)	>4		52	33 @ 3yr	Dose <4: 19 out of 54		14 @ 3yr	Dose <4: 33 out of 54		NA		NA		
JW Lee (2015)	<10		40	NA	NA		17 @ 5yr	Dose <10: 7 out of 41		18 @ 5yr		NA		
Maria Queralt Salas (2019)	>9	High Dose	40	19	Dose <9: 21 out of 28	49% @ 2yr (95% CI 0.23-0.75) OR* 1.26 (95% CI 0.74- 2.16)	NA		NA	NA	NA	NA		NA
JR Passweg (2001)	>10		10	8 @ 2yr	NA		NA			NA		3 @ 2yr	NA	
Mehta (2009)	>8		6	0 @ 3 yr	Dose <8: 41 out of 124 patients		NA			NA		NA		
Elmariah (2019)	>10		35	23 @ 2yr	Dose <10: 66 out of 109 patients		NA			NA		NA		
JW Lee (2015)	>10		41	NA	NA		7 @ 5yr	18 @ 5yr		32 @ 5yr		19	23	

NA- Not available, n- number of patients, aGVHD- acute graft versus host disease, M- million (10^6), yr - years
*OR was calculated for each outcome to quantify the strength of association between the cell dose of interest (grouped into low, optimal and high) and the remaining cell dose groups in each study.

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Is It Safe to Continue Allogeneic Hematopoietic Cell Transplantation Via Cryopreservation during COVID-19 Pandemic?

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Introduction and aim: Cryopreservation of allogeneic hematopoietic cells is usually not recommended as it might affect transplantation success by reducing the number of viable stem cells in allogeneic hematopoietic cell transplant (AHCT). In order to ensure patient, donor and product safety during COVID-19 pandemic process, both national and international scientific societies. According to the recommendations of the European Bone Marrow Transplantation Society (EBMT)

declared on the 8th of March 2020, it is recommended that if donor candidate has a risk of community acquired COVID-19, stem cell product should be frozen and then stored, so that the patient does not begin the conditioning regimen until successful stem cell collection.

Material and method: Data from patients whose stem cell product was frozen and stored and who underwent AHCT during the pandemic era (between March 2020 and July 2021) was collected at our center retrospectively. All statistical analysis was made via SPSS ver. 20.0.

Findings: A total of 42 patients were transplanted using cryopreserved allogenic hematopoietic cells and the distribution of the characteristics of these patients are summarized in Table 1. The rate of AHCT did not decrease significantly in our transplant center. Since irrecusable transplants have become especially important during the pandemic era, most of the transplants were conducted due to acute myeloid leukemia (AML). Instead of a bone marrow "harvest", peripheral blood was preferred for obtaining stem cell product. The cryopreserved products were stored for a maximum of 14 days. Both related and unrelated transplant products were cryopreserved and stored. As two patients deceased before post-transplant +28th day, their data could not be included in the results. Data from transplants with cryopreserved product was compared to transplants made with freshly collected stem cells. Results are shown in Table 2.

Table 1. Patient Characteristics

Age (mean)	40 (22- 72)
Male/ Female	25/ 17
Diagnosis	
AML	23 (% 54.7)
B-ALL	5 (% 11.9)
T-ALL	3 (% 7.1)
MDS- RAEB	5 (% 11.9)
Chronic neutrophilic leukemia	1 (% 2.4)
Langerhans cell histiocytosis	1 (% 2.4)
Lymphoma	2 (% 4.7)
Biphenotypic leukemia	1 (% 2.4)
Atypical CML	1 (% 2.4)
Pre-transplant status	
Complete remission	17 (% 40.6)
MRD (+) remission	14 (% 33.3)
Partial response	2 (% 4.7)
Active disease	9 (% 21.4)
Median stem cell viability (%)	90 (85- 100)
Median stem cell count (x10^6/ kg)	6,17 (3,39- 8,25)
HLA matching	
10/ 10	27 (% 64.3)
9/ 10	7 (% 16.7)
Haploidentical	8 (% 19)
Myeloablative/ RIC- reduced toxicity	31/ 11
Median amount of product (x10^6/ kg)	6,36 (3,39- 8,25)

AML: acute myeloid leukemia, ALL: acute lymphoblastic leukemia, MDS: myelodysplastic syndrome, KML: chronic myeloid leukemia, MRD: measurable residual disease

Table 2. Comparison of Cryopreserved and Fresh Product AHCTs

	Cryopreserved (n= 42)	Freshly Collected (n= 49)	p Value
Median Age	40	45	0.9
Female gender	17	19	0.9
HLA compatibility			
10/10	27	28	0.484
9/10	7	13	0.474
Haploidentical	8	8	0.608
Median CD34+ product quantity (x10^6/ kg)	6,17	6.01	0.076
Median stem cell viability	90	95	0.06
Pretransplant remission	33	26	0.087
Myeloablative preparation regimen	31	32	0.095
Platelet engraftment day			
> 20.000/ mm^3	+10	+11	0.08
> 50.000/ mm^3	+16	+15	
Neutrophil engraftment day			
> 500/ mm^3	+11	+11	0.1
> 1000/ mm^3	+14	+13	
Myeloid/ T chimerism (+28.gün)			
Full chimeric	28	44	0.09
< % 95	2	3	
Primary engraftment failure	3	5	0.09
Secondary engraftment failure	0	1	0.1
aGvHD	12	21	0.803
Febrile neutropenia	15	22	0.071
Covid-19 infection during transplant	3	N/A	N/A
Exitus	8	21	0.072

aGvHD: acute graft vs host disease

While merely autologous stem cells were cryopreserved before the pandemic era, according to our results cryopreservation did not cause significant engraftment failure, allowed the continuation of transplants in a more controlled and planned manner. Preservative dimethyl sulfoxide was not associated with acute kidney injury in patients receiving cryopreserved stem cells.

Conclusion: Our results from the current study submits that cryopreservation of allogeneic hematopoietic cells is an effective and reliable method in accordance with the pandemic measures. Some countries that had abandoned cryopreservation are thought to bring back these measures with a possible new COVID-19 wave. With the COVID-19 pandemic, non-urgent transplants have already been postponed and it will be vital to continue transplantation process by carefully following COVID precaution, especially for irrecusable transplants.

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Pretransplant Desensitization for Donor-Specific Anti-HLA Antibodies Improves Overall Survival Compared to No Treatment and Produces Outcomes Equivalent to Absence of Donor-Specific Antibodies in Haploidentical Hematopoietic Cell Transplantation

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Introduction: In patients requiring haploidentical hematopoietic cell transplant (haplo-HCT), the presence of donor specific anti-HLA antibodies (DSAs) is associated with high rates of primary graft failure and poor overall survival. However, there is limited data regarding the effect of desensitization.

Methods: Adult patients undergoing haplo-HCT with post-transplant cyclophosphamide at Washington University School of Medicine from July 2009 to July 2021 with available pre-treatment DSA testing were identified. Patients were divided into three cohorts: no DSA, untreated DSA or treated DSA. Anti-HLA antibody testing was performed using the LABScreen Single Antigen Kit (One Lambda, West hills, CA, USA). A positive test was defined as a mean fluorescence intensity (MFI) > 2000. Desensitization therapy was carried out per the treating physician. Overall survival (OS) was analyzed using the Kaplan-Meier method and groups were compared via the log-rank test.

Results: We retrospectively identified 304 patients (DSA negative: 274, DSA positive: 30) for study inclusion. Baseline demographics are presented in table 1. DSA positive patients had a median of 2 DSAs (range: 1 – 5) and 47% had DSAs to class I HLA alone, 23% to class II alone, and 30% to both classes. Median