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Significant Improvement in Survival after Unrelated Donor Hematopoietic Cell Transplantation in the Recent Era



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ABSTRACT

Patients and physicians may defer unrelated donor hematopoietic cell transplantation (HCT) as curative therapy because of the mortality risk associated with the procedure. Therefore, it is important for physicians to know the current outcomes data when counseling potential candidates. To provide this information, we evaluated 15,059 unrelated donor hematopoietic cell transplant recipients between 2000 and 2009. We compared outcomes before and after 2005 for 4 cohorts: age <18 years with malignant diseases (n = 1920), ages 18 to 59 years with malignant diseases (n = 9575), ages ≥ 60 years with malignant diseases (n = 2194), and nonmalignant diseases (n = 1370). Three-year overall survival in 2005 to 2009 was significantly better in all 4 cohorts (<18 years: 55% versus 45%, 18 to 59 years: 42% versus 35%, ≥60 years: 35% versus 25%, nonmalignant diseases: 69% versus 60%; *P* < .001 for all comparisons). Multivariate analyses in leukemia patients receiving HLA 7/8 to 8/8–matched transplants showed significant reduction in overall and non-relapse mortality in the first year after HCT among patients who underwent transplantation in 2005 to 2009; however, risks for relapse did not change over time. Significant survival improvements after unrelated donor HCT have occurred over the recent decade and can be partly explained by better patient selection (eg, HCT earlier in the disease course and lower disease risk), improved donor selection (eg, more precise allele-level matched unrelated donors) and changes in transplantation practices.

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INTRODUCTION

Allogeneic hematopoietic cell transplantation (HCT) using an unrelated donor is curative therapy for patients with high-risk hematologic diseases who need a transplant but lack a human leukocyte antigen (HLA)–identical sibling

donor. Survival after unrelated donor HCT has nearly doubled since the first unrelated donor transplantations in the late 1980s [1,2]. Currently, 1-year survival of 60% to 70% can be expected for patients with high-risk acute leukemia who receive an unrelated donor HCT relatively early in their disease course [3,4]. For some diseases, survival after HLA-matched unrelated donor transplantation has been shown to be comparable to HCT using HLA-identical sibling donors [5–10]. However, patient and physician perceptions of the risks and efficacy of unrelated donor transplantation may prevent some patients from being referred for this

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Table 1
Demographic Characteristics by Age, Diagnosis, and Time Period

Characteristic	Age <18 Yr, Malignant Diseases			Age 18-59 Yr, Malignant Diseases			Age ≥60 Yr, Malignant Diseases			Nonmalignant Diseases		
	2000-2004	2005-2009	P Value*	2000-2004	2005-2009	P Value*	2000-2004	2005-2009	P Value*	2000-2004	2005-2009	P Value*
Recipients, n	904	1016		3827	5748		410	1784		477	893	
Centers, n	97	103		138	152		76	115		83	133	
Follow-up, median (range), mo	91 (3-147)	47 (4-78)	<.001	95 (3-145)	42 (3-84)	<.001	76 (9-121)	36 (3-82)	<.001	82 (4-147)	39 (2-85)	<.001
Recipient gender			.90			.03			.07			.20
Female	362 (40)	410 (40)		1618 (42)	2557 (44)		125 (30)	628 (35)		197 (41)	337 (38)	
Male	542 (60)	606 (60)		2209 (58)	3191 (56)		285 (70)	1156 (65)		280 (59)	556 (62)	
Recipient race/ethnicity			.06			.003			.80			.58
White	632 (70)	694 (68)		3324 (87)	4896 (85)		391 (95)	1671 (94)		328 (68)	599 (67)	
Hispanic	137 (15)	178 (18)		220 (6)	356 (6)		8 (2)	41 (2)		70 (15)	131 (15)	
Black/African American	85 (9)	65 (6)		167 (4)	255 (4)		6 (1)	31 (2)		41 (9)	79 (9)	
Asian/Pacific Islander	29 (3)	39 (4)		64 (2)	104 (2)		1 (<1)	17 (1)		28 (6)	47 (5)	
American Indian/Alaska Native	4 (<1)	7 (1)		6 (<1)	23 (<1)		0	1 (<1)		1 (<1)	8 (1)	
Other/multiple race	10 (1)	22 (2)		22 (1)	31 (1)		1 (<1)	8 (<1)		5 (1)	18 (2)	
Declined/unknown	7 (1)	11 (1)		24 (1)	83 (1)		3 (1)	15 (1)		4 (1)	11 (1)	
Karnofsky/Lansky score at HCT			.005			<.001			<.001			.008
90 to 100	691 (76)	822 (81)		2313 (60)	3521 (61)		236 (58)	1031 (58)		337 (71)	675 (76)	
10 to 80	115 (13)	126 (12)		1098 (29)	1853 (32)		120 (29)	639 (36)		101 (21)	180 (20)	
Unknown	98 (11)	68 (7)		416 (11)	374 (7)		54 (13)	114 (6)		39 (8)	38 (4)	
Recipient CMV status			.01			.009			.58			.16
Negative	504 (56)	500 (49)		1698 (44)	2383 (41)		137 (33)	633 (36)		220 (46)	395 (44)	
Positive	395 (44)	507 (50)		2097 (55)	3300 (57)		269 (66)	1127 (63)		246 (52)	488 (55)	
Unknown	5 (1)	9 (1)		32 (1)	65 (1)		4 (1)	24 (1)		11 (2)	10 (1)	
Coexisting disease at HCT	269 (30)	376 (37)	<.001	1858 (49)	3644 (63)	<.001	296 (72)	1398 (78)	.02	196 (41)	443 (50)	.008
Diagnosis			<.001			<.001			.002			<.001
AML	279 (31)	290 (29)		1409 (37)	2412 (42)		202 (49)	884 (50)		-	-	
ALL	383 (42)	462 (45)		667 (17)	973 (17)		18 (4)	65 (4)		-	-	
CML	85 (9)	44 (4)		620 (16)	421 (7)		20 (5)	32 (2)		-	-	
Other leukemia	26 (3)	32 (3)		230 (6)	381 (7)		38 (9)	193 (11)		-	-	
MDS	57 (6)	99 (10)		355 (9)	634 (11)		59 (14)	293 (16)		-	-	
Myeloproliferative diseases	39 (4)	44 (4)		98 (3)	210 (4)		20 (5)	93 (5)		-	-	
NHL	30 (3)	38 (4)		352 (9)	622 (11)		46 (11)	211 (12)		-	-	
Hodgkin lymphoma	1 (<1)	3 (<1)		24 (1)	48 (1)		0	3 (<1)		-	-	
Plasma cell disorders	-	-		46 (1)	33 (1)		2 (<1)	7 (<1)		-	-	
Other malignant diseases	4 (<1)	4 (<1)		26 (1)	14 (<1)		5 (1)	3 (<1)		-	-	
SAA	-	-		-	-		-	-		186 (39)	402 (45)	
Inherited erythrocyte disorders	-	-		-	-		-	-		95 (20)	137 (15)	
Inherited immune system disorders	-	-		-	-		-	-		70 (15)	177 (20)	
Inherited disorders of metabolism	-	-		-	-		-	-		71 (15)	59 (7)	
Histiocytic disorders	-	-		-	-		-	-		43 (9)	96 (11)	
Inherited platelet disorders	-	-		-	-		-	-		10 (2)	8 (1)	
Other nonmalignant diseases	-	-		-	-		-	-		2 (<1)	14 (2)	
Disease risk [†]			.03			<.001			.04			
Standard	546 (60)	644 (63)		1632 (43)	2810 (49)		141 (34)	700 (39)		-	-	
High	278 (31)	261 (26)		1740 (45)	2139 (37)		198 (49)	738 (41)		-	-	
Other	80 (9)	111 (11)		455 (12)	799 (14)		71 (17)	346 (19)		-	-	
Time from diagnosis to HCT, mo			.03			<.001			.003			
0 to 6	259 (29)	360 (35)		862 (23)	1779 (31)		84 (20)	519 (29)		-	-	
6 to 12	195 (22)	191 (19)		1076 (28)	1426 (25)		136 (33)	470 (26)		-	-	
12 to 24	178 (20)	189 (19)		878 (23)	1098 (19)		77 (19)	300 (17)		-	-	

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