Rapport d'analyses statistiques

Axelle Dupont, sbim, Hopital Saint Louis, Paris

July 3, 2017

Contents

List of Tables

List of Figures

1 Objectives

The primary objective of the study was to assess the survival, the risk of relapse and GVHD of patients who underwent allogenic sterm-cell transplantation (alloSCT) for aggressive T-cell lymphomas. The second objective was to determine the variables associated with these outcomes.

2 Methods

A retrospective analysis was conducted.A descriptive analysis of the variables recorded was perfomed.Different endpoints were defined : death, Progression Free Survival (PFC). EFS was defined as death,progression/relapse, grade 3-4 acute GVHD or extensive chronic GVHD.

Survival curves were estimated using Kaplan-Meier product-limit estimator. Competing risk survival analysis methods were applied to estimate the cumulative incidence (CIF) of developing events over time from alloSCT. These methods allow for the fact that a patient may experience an event which is different from that of interest. These events are known as competing risk events, and may preclude the onset of the event of interest, or may modify the probability of the onset of that event.In particular, a transplanted patient may die before a relapse occurs.

3 Results

3.1 Descriptive results

285 patients were initially selected.We excluded 1 patient that underwent two alloSCT. The final analysis was perfomed on 284 patients and 284 grafts.

3.1.1 Patients characteristics

Parameters	Values	N	Statistics*
		284	
Patient sex	Female	93	32.75 %
	Male	191	67.25 %
Age at diagnosis		284	45.01(15;68)
Stage at diagnosis	I	13	6.47 %
	II	17	8.46 %
	III	45	22.39 %
	IV	126	62.69 %
	NA	83	
Subtypes	AITL	82	28.87 %
	ALCL ALK-	20	7.04 %
	ALCL ALK?	2	0.7 %
	ALCL ALK+	21	7.39 %
	ATLL	16	5.63 %
	EATL	3	1.06 %
	HS	12	4.23 %
	LGL	1	0.35 %
	NK leukemia	1	0.35 %
	NK/T nasal	16	5.63 %
	NOS	110	38.73 %
Subtypes	NOS	110	38.73 %
	AITL	82	28.87 %
	ALCL	43	15.14 %
	ATLL	16	5.63 %
	NK/T nasal	16	5.63 %
	Others	17	5.99 %
Centres	angers	8	2.82 %
	Becquerel[941]	4	1.41 %
	C.H.R.U Brest[659]	2	0.7 %
	caen	4	1.41 %
	CHU clermond ferrand	7	2.46 %
	Geneve	6	2.11 %
	Gustave Roussy[666]	3	1.06 %
	H A Michallon[270]	5	1.76 %

H Bretonneau[272]	3	1.06 %
H Charles Nicolle[932]	1	0.35 %
H Claude Huriez[277]	8	2.82 %
H de l'ARCHET I[523]nice	3	1.06 %
H E Herriot[671]	5	1.76 %
H Haut-Leveque[267]	31	10.92 %
H Hautepierre[672]	11	3.87 %
H Jean Minjoz[233]	5	1.76 %
H La Miletrie[264]	5	1.76 %
H Mondor Hematol[252]	4	1.41 %
H Necker[160]	9	3.17 %
H Percy[665]	4	1.41 %
H Purpan[624]	8	2.82 %
H Sud/Pontchaillou[661]	7	2.46 %
H Sud[955]	1	0.35 %
Hotel Dieu[253]	32	11.27 %
liege	8	2.82 %
limoges	3	1.06 %
montpellier	10	3.52 %
nancy	1	0.35 %
Paoli Calmettes[230]	39	13.73 %
Pellegrin-Enfants[978]	1	0.35 %
Pitie-Salpetrriere[262]	8	2.82 %
St Antoine[775]	10	3.52 %
St Etienne[250]	4	1.41 %
St Louis[207]	24	8.45 %

Table 1: Patients characteristics

3.1.2 Treatments before alloSCT

Parameters	Values	N	Statistics*
		284	
Previous auto	No	191	67.25 %
	Yes	93	32.75 %
Programme auto allo	No	257	90.49 %
	Yes	27	9.51 %
First graft relapse	No	219	77.11 %
	Yes	65	22.89 %

Table 2: Treatments before alloSCT

3.1.3 Transplant conditions

Parameters	Values	N	Statistics*
		284	
Age at graft		284	46.97(16;69)
Donor age		263	28.76(1;54)
Donor sex	Female	114	40.71 %
	Male	166	59.29 %
	NA	4	
Delay diagnosis and allo SCT		284	717(89;9684)
>12 months delay	NO	149	52.46 %
	Yes	135	47.54 %
Disease status at transplant	CR	175	61.84 %
	PR	76	26.86 %
	PD	32	11.31 %
	NA	1	
Disease status at transplant	CR (?)	7	2.47 %
	CR1	94	33.22 %
	CR2	61	21.55 %
	CR3	13	4.59 %
	PD	32	11.31 %
	PR (?)	13	4.59 %
	PR1	39	13.78 %
	PR2	18	6.36 %
	PR3	5	1.77 %
	PR4	1	0.35 %
	NA	1	
Karnofsky score		263	90 [80;100]
Karnofsky score	100	92	34.98 %
	40	1	0.38 %
	50	4	1.52 %
	60	1	0.38 %
	70	9	3.42 %
	80	70	26.62 %
	90	86	32.7 %
	NA	21	
Karnofsky score	100	92	34.98 %
	Unable to carry on normal activity	15	5.7 %
	80	70	26.62 %
	90	86	32.7 %
	NA	21	
No of lines before alloSCT		254	2.201(1;9)
No of lines before alloSCT	1	73	28.74 %

	2	92	36.22 %
	3	65	25.59 %
	>=4	24	9.45 %
	NA	30	
No of lines before alloSCT	>2	89	35.04 %
	1 or 2	165	64.96 %
	NA	30	
HLA match	HLA mismatched	53	18.66 %
	HLA matched	231	81.34 %
HLA match	Alternative donnors	53	18.66 %
	Identical sibling	128	45.07 %
	Matched unrelated	103	36.27 %
HLA match	Identical sibling	128	45.07 %
	Matched unrelated	103	36.27 %
	Mismatched relative	7	2.46 %
	Mismatched unrelated	13	4.58 %
	Unrelated CB	33	11.62 %
Sex of donnor/patient	F/M	74	26.52 %
	Others	205	73.48 %
	NA	5	
CMV serostatus of donnor/patient	neg/neg	91	32.5 %
	Others	189	67.5 %
	NA	4	
Source of stem cells	BM	49	17.25 %
	CB	33	11.62 %
	PB	202	71.13 %
TBI	No	161	56.69 %
	Yes	123	43.31 %
conditioning Intensity	MAC	106	38.13 %
	NMA	27	9.71 %
	RIC	145	52.16 %
	NA	6	
Conditioning	BEAM	1	0.36 %
	BEAM + Campath	1	0.36 %
	BU CY	4	1.42 %
	BU CY + FLU+ ATG	1	0.36 %
	BU CY ATG	1	0.36 %
	EDX ATG	0	0 %
	ENX TBI 2gray	1	0.36 %
	FLU ATG	3	1.07 %
	FLU BU 1+ ATG	3	1.07 %
	FLU BU 2	1	0.36 %
	FLU BU 2+ ATG	73	25.98 %

	FLU BU 3+ ATG	21	7.47 %
	FLU BU 4+ ATG	10	3.56 %
	FLU BU EDX	8	2.85 %
	FLU BU EDX +ATG	6	2.14 %
	FLU EDX	1	0.36 %
	FLU EDX ATG	3	1.07 %
	FLU EDX MEL	1	0.36 %
	FLU ENX TBI 2gray	24	8.54 %
	FLU ENX TBI 4gray	2	0.71 %
	FLU ENX TBI 6gray	1	0.36 %
	FLU ENX TBI 6gray + campath	1	0.36 %
	FLU MEL	12	4.27 %
	FLU MEL + campath	4	1.42 %
	FLU MEL + Campath	1	0.36 %
	FLU MEL ATG	1	0.36 %
	FLU MEL TBI 2gray	1	0.36 %
	FLU TBI 2gray	21	7.47 %
	FLU TBI 2gray ATG	1	0.36 %
	FLU Tbi 8 gray	1	0.36 %
	MEL 140 TBI 10 gray	1	0.36 %
	MEL TBI VP16	1	0.36 %
	TB2F	2	0.71 %
	TBI 12 gray	1	0.36 %
	TBI 2gray	1	0.36 %
	TBI EDX	49	17.44 %
	TBI EDX +ATG	11	3.91 %
	TBI EDX FLU	5	1.78 %
	Thiotepa etoposide TBI12 gray	1	0.36 %
	NA	3	
Cells manipulation	No	275	97.86 %
	Yes	6	2.14 %
	NA	3	
Depletion	No	275	98.57 %
	Partial T depletion	4	1.43 %
	NA	5	
No of donnors	1	261	91.9 %
	2	23	8.1 %

Table 3: Transplant conditions

3.1.4 Post-AlloSCT Response

Parameters	Values	N	Statistics*
		284	
Agvhd	No	141	49.65 %
	Yes	143	50.35 %
Agvhd grade	No aGvHD present (Grade 0)	141	49.65 %
	Grade I	49	17.25 %
	Grade II	46	16.2 %
	Grade III	24	8.45 %
	Grade IV	17	5.99 %
	Present, grade unknown	7	2.46 %
Cgvhd	Early death	41	14.44 %
	no	146	51.41 %
	yes	97	34.15 %
Cgvhd grade	Early death (100D)	41	14.44 %
	Extensive	38	13.38 %
	Limited	55	19.37 %
	No cGvh	146	51.41 %
	grade unknown	4	1.41 %
Engrafted	Early death (30D)	5	1.76 %
	Engrafted	271	95.42 %
	Lost graft	2	0.7 %
	No engraftment	6	2.11 %
Cause of death	HSCT-GVHd	21	19.63 %
	HSCT-GVHd + infection	3	2.8 %
	HSCT-infection	27	25.23 %
	HSCT-toxicity	4	3.74 %
	HSCT related	3	2.8 %
	HSCT related ILD	1	0.93 %
	HSCT related MAT	1	0.93 %
	HSCT related MOF	2	1.87 %
	HSCT related MVO	1	0.93 %
	HSCT related pneumopathie interstititelle	2	1.87 %
	HSCT related PTLD	1	0.93 %
	HSCT related SDRA	1	0.93 %
	Other	1	0.93 %
	Relapse or progression of original disease	37	34.58 %
	Secondary malignancy	1	0.93 %
	Unknown	1	0.93 %
	NA	177	
Best reponse after SCT	CR	245	86.88 %
	Not evaluable	4	1.42 %

	Not evaluated	3	1.06 %
	PD	14	4.96 %
	PR	16	5.67 %
	NA	2	
Relapse/progression	Continuous progression	28	9.93 %
	No	217	76.95 %
	Non applicable	3	1.06 %
	Yes	34	12.06 %
	NA	2	

Table 4: Post-AlloSCT Response

3.2 Survival analysis in all patients

Median overall-survival from the date of AlloSCT was 20.18 (range 0.03 to 112.83). OS at 1 year was 0.68 (95 % 0.62 - 0.73), was 0.64 (95 % 0.58 - 0.7) at 2 years.OS at 4 years was 0.57 (95 % 0.5 - 0.63).

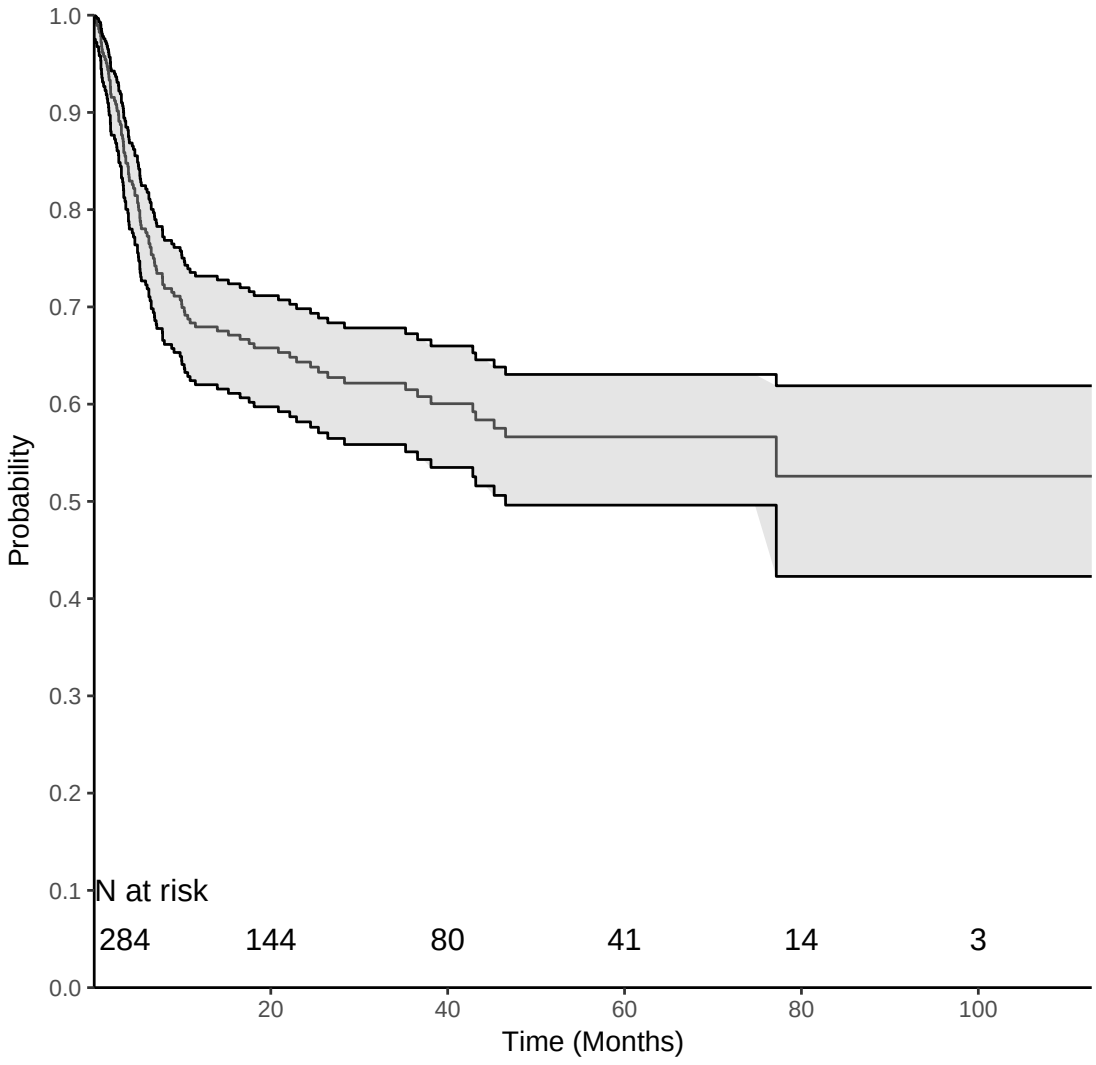

Figure 1: Overall survival

CIF for relapse/progression at 1 years was 0.18 (95 % 0.13 - 0.23), at 2 years 0.19 (95 % 0.15 - 0.24). CIF for death without relapse or progression at 1 year was 0.19 (95 % 0.14 - 0.24), at 2 years 0.22 (95 % 0.17 - 0.27).

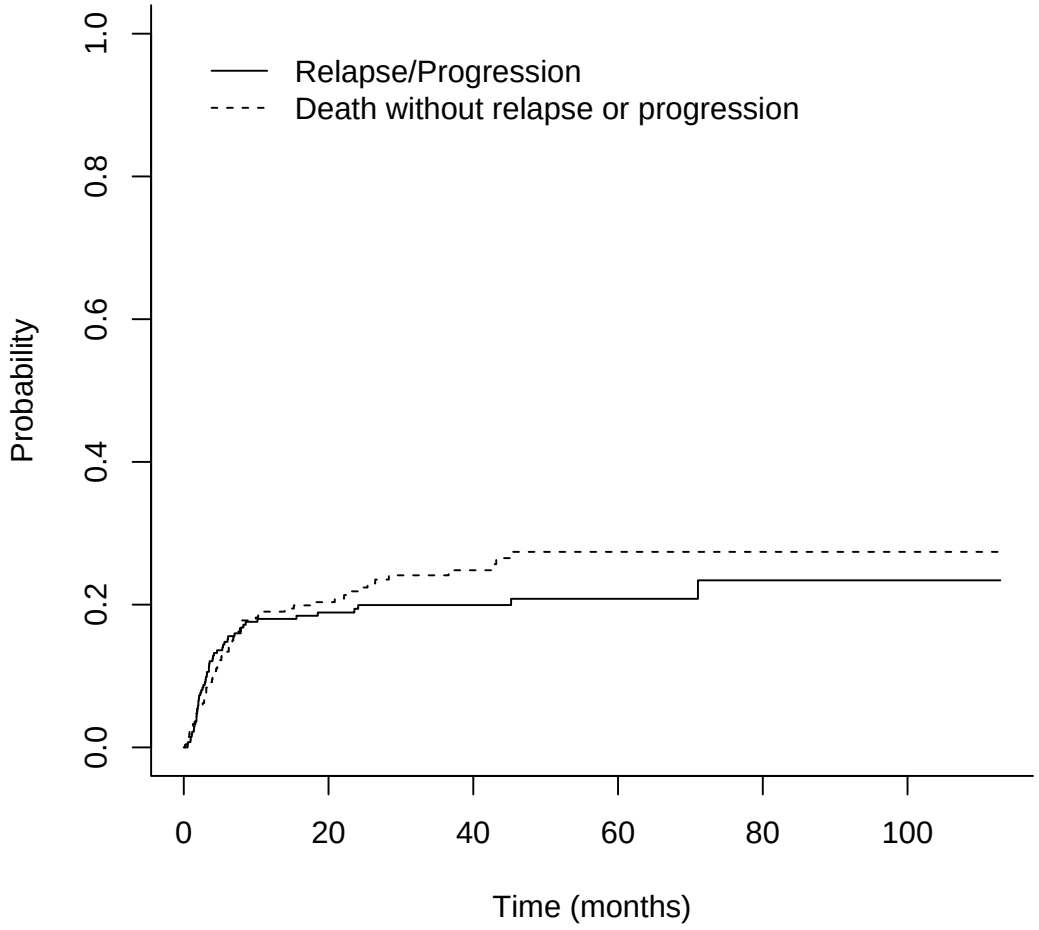

Figure 2: CIF of relapse or progression and death without relapse or progression

PFS at 1 year was 0.63 (95 % 0.57 - 0.69), was 0.59 (95 % 0.53 - 0.65) at 2 years. PFS at 4 years was 0.52 (95 % 0.45 - 0.59).

EFS at 1 year was 0.49 (95 % 0.44 - 0.56), was 0.47 (95 % 0.41 - 0.54) at 2 years. EFS at 4 years was 0.43 (95 % 0.37 - 0.5).

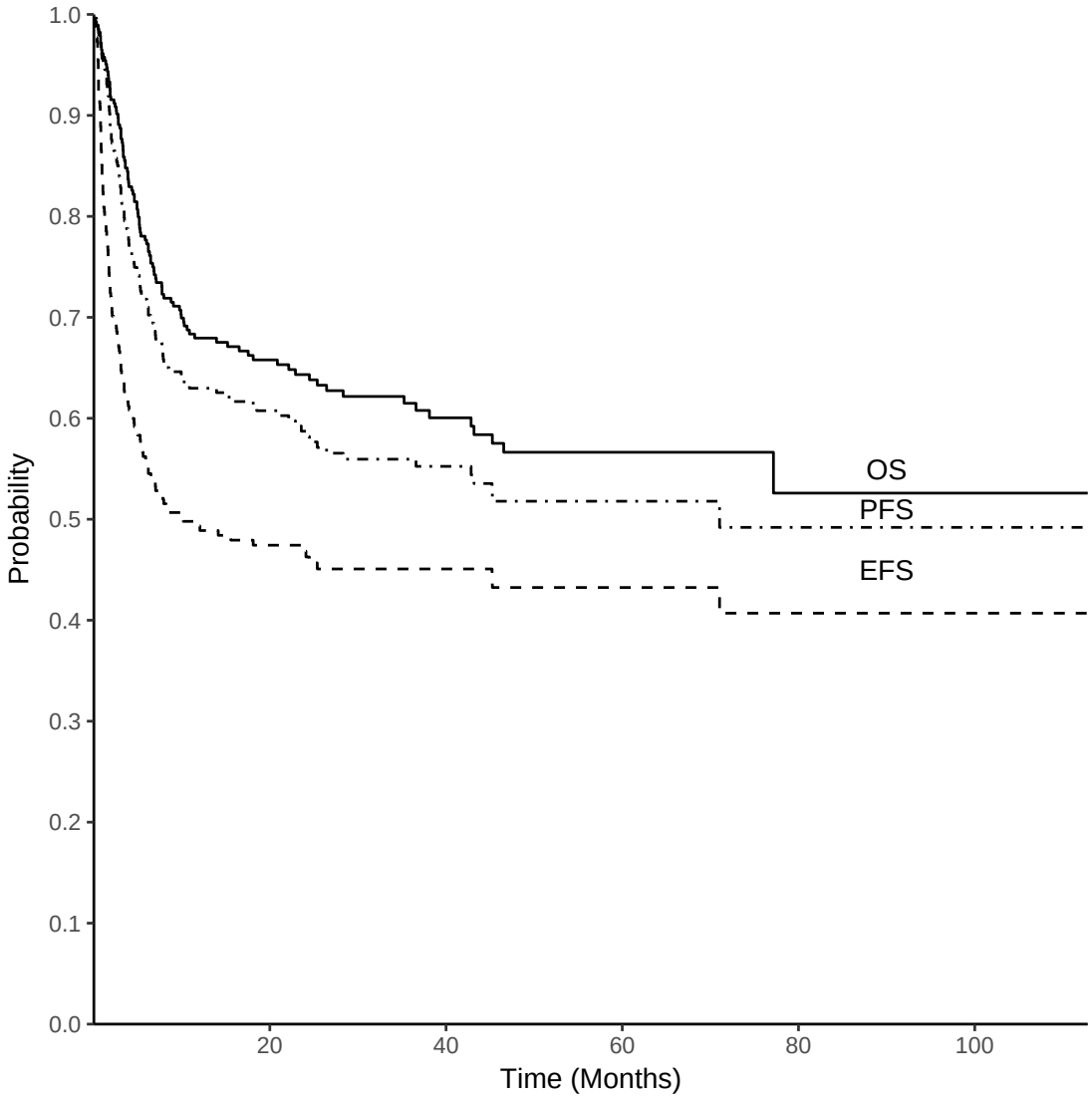

Figure 3: Event-free survival and Progression free survival

CIF for related HSCT death at 1 years was 0.2, at 2 years 0.23. CIF for non-related HSCT Death at 1 year was 0.12, at 2 years 0.13.

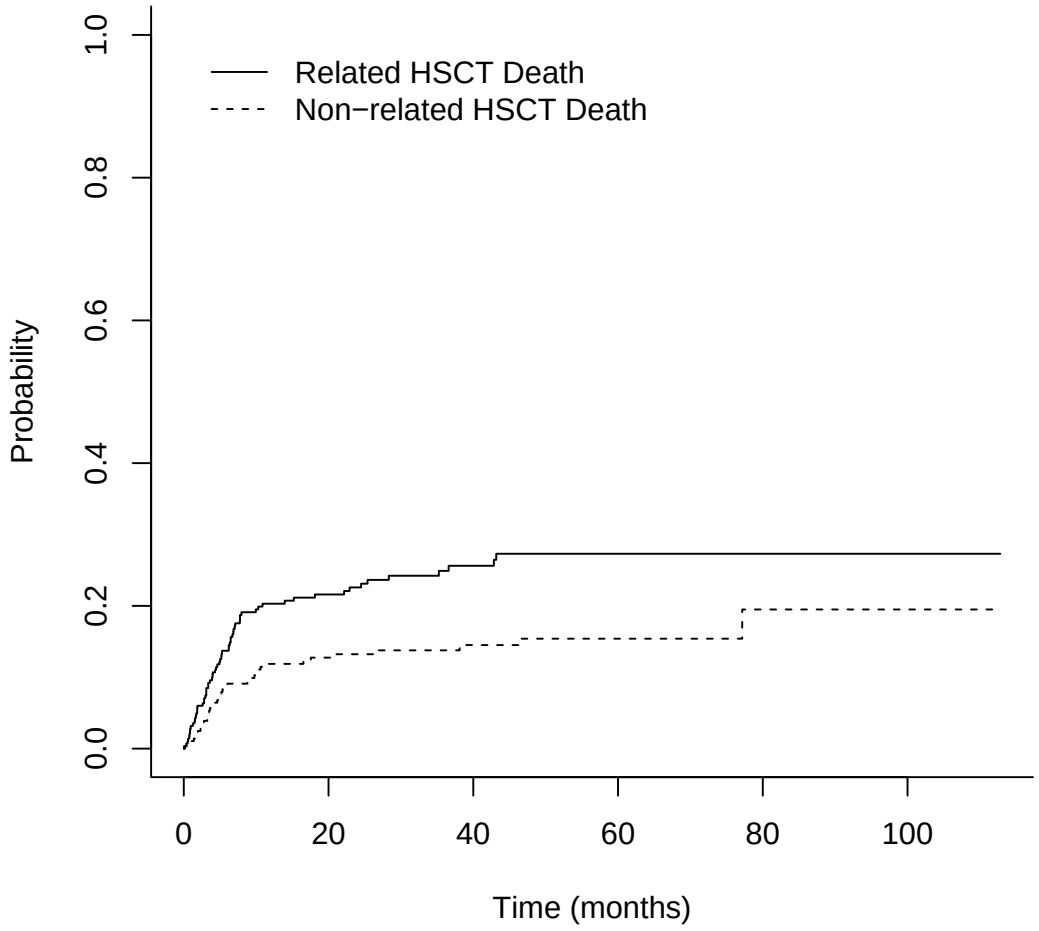

Figure 4: CIF of Related HSCT Death and Non-related HSCT Death

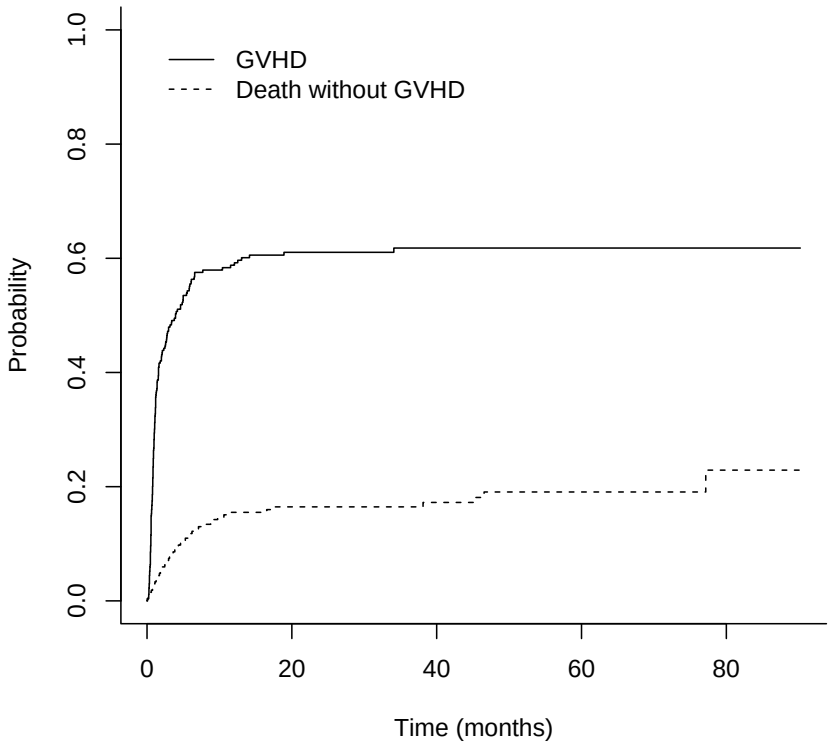

Figure 5: CIF of GVHD and Death without GVHD (acute or chronic)

3.3 Survival analysis after a complete remisson post alloSCT

245 patients whith a complete remission were included.

OS at 1 year was 0.74 (95 % 0.68 - 0.8), was 0.7 (95 % 0.64 - 0.76) at 2 years. OS at 4 years was 0.62 (95 % 0.56 - 0.7).

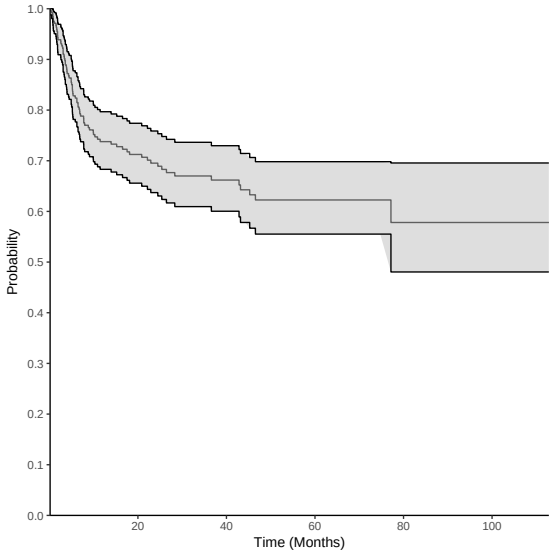

Figure 6: OS in patients with a complete remission post alloSCT

CIF for relapse at 1 year was 0.12 (95 % 0.07 - 0.16), at 2 years 0.13 (95 % 0.09 - 0.18). CIF for death without relapse at 1 year was 0.19 (95 % 0.14 - 0.24), at 2 years 0.22 (95 % 0.17 - 0.28).

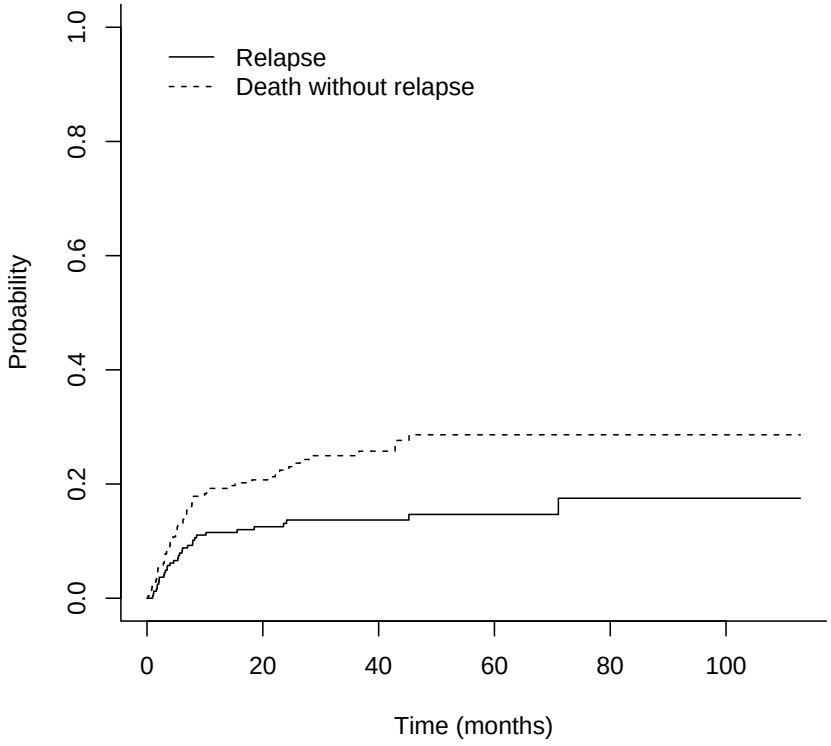

Figure 7: CIF of relapse and death without relapse (in patients with a complete remission post alloSCT)

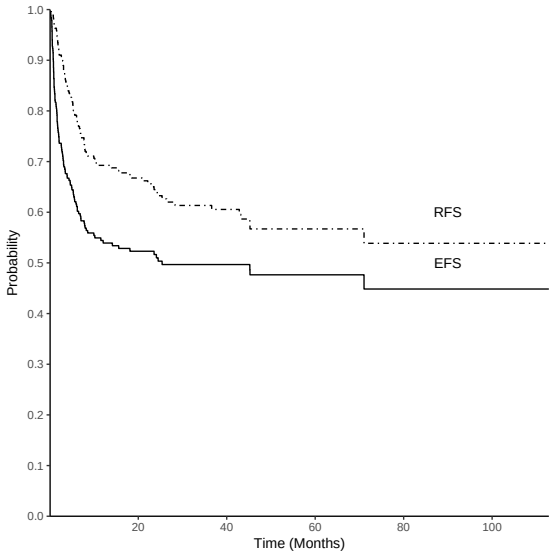

Figure 8: RFS and EFS in patients with a complete remission post alloSCT

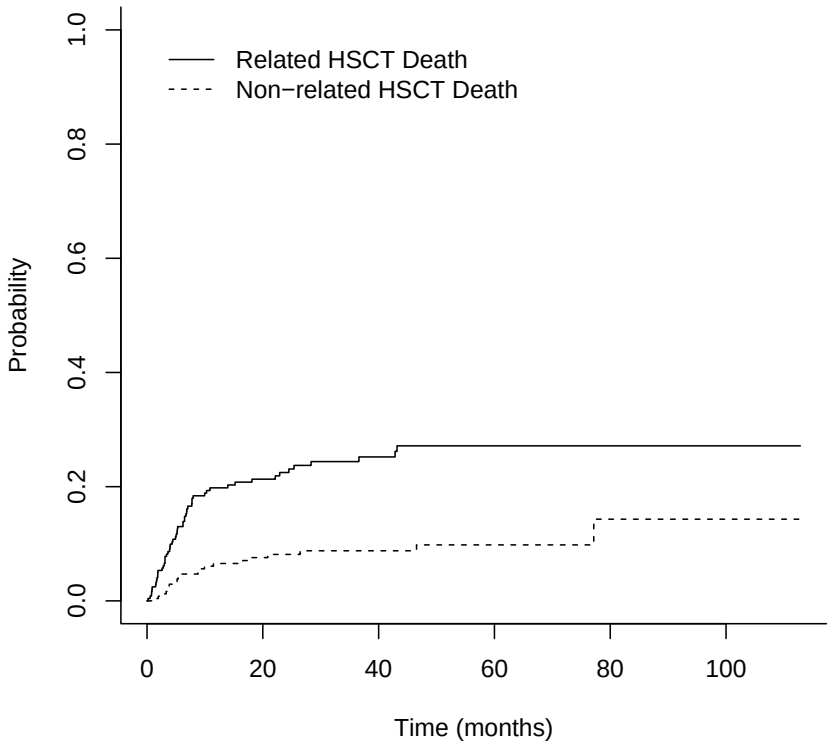

Figure 9: CIF of Related HSCT Death and Non-related HSCT Death (in patients with a complete remission post alloSCT)

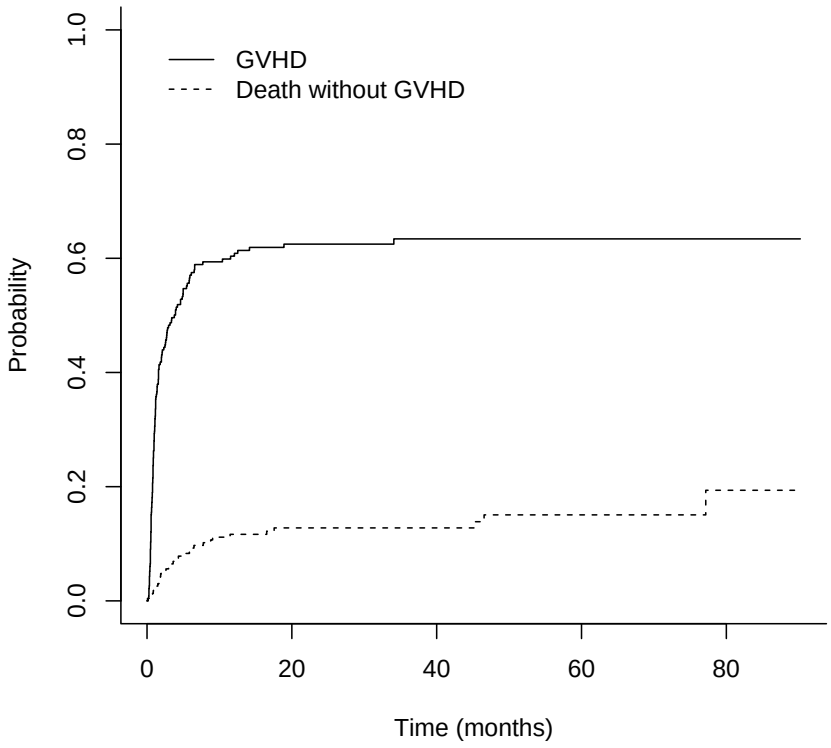

Figure 10: CIF of GVHD and Death without GVHD (acute or chronic)(in patients with a complete remission post alloSCT)

variable	Variable	HR	IC	pval	p
Age at graft					0.35
		1.01	[0.99 - 1.02]	0.36	
subtypes	NOS	1.00			0.46
	AITL	1.21	[0.75 - 1.97]	0.43	
	ALCL	1.16	[0.64 - 2.09]	0.63	
	ATLL	1.93	[0.93 - 4.01]	0.079	
	NK/T nasal	1.82	[0.85 - 3.93]	0.13	
	Others	1.55	[0.69 - 3.48]	0.29	
Delay between diag and allo SCT > 12 mo	NO	1.00			0.54
	Yes	0.89	[0.6 - 1.3]	0.54	
Stage at diagnosis	I	1.00			0.72
	II	0.49	[0.14 - 1.74]	0.27	
	III	0.79	[0.31 - 1.98]	0.61	
	IV	0.78	[0.33 - 1.81]	0.56	
Disease status at transplant	CR	1.00			0.027
	PR	0.97	[0.61 - 1.53]	0.89	
	PD	2.08	[1.24 - 3.49]	0.006	
Karnofsky score	100	1.00			0.007
	Unable to carry on normal activity	3.05	[1.35 - 6.89]	0.007	
	80	2.06	[1.18 - 3.6]	0.011	
	90	2.12	[1.24 - 3.61]	0.006	
First graft relapse	No	1.00			0.049
	No previous graft	2.49	[1.08 - 5.73]	0.032	
	Yes	2.13	[0.87 - 5.22]	0.098	
No of lines before alloSCT	>2	1.00			0.084
	1 or 2	0.70	[0.47 - 1.04]	0.080	
HLA match	HLA mismatched	1.00			0.10
	HLA matched	0.68	[0.43 - 1.07]	0.092	
Sex of donnor-patient	F/M	1.00			0.027

	Others	0.62	[0.41 - 0.93]	0.022	
CMV serostatus of donnor patient	neg/neg	1.00			0.78
	Others	0.94	[0.63 - 1.42]	0.78	
Source of stem cells	BM	1.00			0.016
	CB	1.71	[0.91 - 3.21]	0.094	
	PB	0.77	[0.47 - 1.27]	0.31	
Conditionning intensity	MAC	1.00			0.98
	NMA	0.94	[0.48 - 1.83]	0.85	
	RIC	0.98	[0.65 - 1.48]	0.92	
Depletion	No	1.00			0.87
	Partial T depletion	1.12	[0.28 - 4.55]	0.87	
Agvhd grade 3-4	0	1.00			0.0001
	1	2.57	[1.65 - 4.02]	<0.0001	
Cgvhd	No or early death	1.00			0.0006
	Yes	0.48	[0.31 - 0.75]	0.001	

Table 5: univariate analysis of 5 years OS survival

variable	Variable	HR	IC	pval	p
Age at graft					0.86
		1.00	[0.99 - 1.01]	0.87	
subtypes	NOS	1.00			0.23
	AITL	1.10	[0.73 - 1.68]	0.64	
	ALCL	0.91	[0.54 - 1.53]	0.73	
	ATLL	2.08	[1.13 - 3.84]	0.019	
	NK/T nasal	1.60	[0.81 - 3.16]	0.18	
	Others	1.22	[0.55 - 2.7]	0.62	
Delay between diag and allo SCT	NO	1.00			0.63
	Yes	0.92	[0.66 - 1.29]	0.63	
Stage at diagnosis	I	1.00			0.94
	II	0.89	[0.31 - 2.57]	0.83	
	III	1.07	[0.44 - 2.61]	0.89	
	IV	1.11	[0.48 - 2.56]	0.81	
Disease status at transplant	CR	1.00			0.057
	PR	1.24	[0.85 - 1.83]	0.27	
	PD	1.90	[1.14 - 3.16]	0.014	
Karnofsky score	100	1.00			0.41
	Unable to carry on normal activity	1.55	[0.61 - 3.94]	0.35	
	80	1.32	[0.85 - 2.06]	0.22	
	90	1.39	[0.9 - 2.13]	0.13	
First graft relapse	No	1.00			0.59
	No previous graft	1.30	[0.71 - 2.37]	0.40	
	Yes	1.13	[0.58 - 2.2]	0.72	
No of lines before alloSCT	>2	1.00			0.082
	1 or 2	0.73	[0.51 - 1.04]	0.078	
HLA match	HLA mismatched	1.00			0.077
	HLA matched	0.69	[0.47 - 1.03]	0.067	
Sex of donnor-patient	F/M	1.00			0.10

	Others	0.73	[0.5 - 1.05]	0.093	
CMV serostatus of donnor patient	neg/neg	1.00			0.83
	Others	1.04	[0.72 - 1.5]	0.83	
Source of stem cells	BM	1.00			0.036
	CB	1.90	[1.06 - 3.42]	0.031	
	PB	0.99	[0.63 - 1.57]	0.98	
Conditionning intensity	MAC	1.00			0.70
	NMA	1.17	[0.64 - 2.16]	0.61	
	RIC	1.16	[0.81 - 1.67]	0.42	
Depletion	No	1.00			0.18
	Partial T depletion	2.13	[0.79 - 5.78]	0.14	

Table 6: univariate analysis of 5 years GRFS

variable	Variable	HR	IC	pval	p
Age at graft					0.45
		1.01	[0.99 - 1.02]	0.45	
subtypes	NOS	1.00			0.32
	AITL	1.02	[0.65 - 1.62]	0.93	
	ALCL	1.01	[0.57 - 1.77]	0.98	
	ATLL	2.02	[1.04 - 3.94]	0.038	
	NK/T nasal	1.76	[0.86 - 3.63]	0.12	
	Others	1.01	[0.43 - 2.38]	0.98	
Delay between diag and allo SCT	NO	1.00			0.40
	Yes	0.85	[0.59 - 1.23]	0.40	
Stage at diagnosis	I	1.00			0.84
	II	0.63	[0.2 - 1.96]	0.43	
	III	0.76	[0.31 - 1.9]	0.56	
	IV	0.69	[0.3 - 1.61]	0.39	
Disease status at transplant	CR	1.00			0.088
	PR	1.23	[0.82 - 1.85]	0.32	
	PD	1.92	[1.1 - 3.37]	0.022	
Karnofsky score	100	1.00			0.012
	Unable to carry on normal activity	1.31	[0.46 - 3.76]	0.62	
	80	2.05	[1.23 - 3.42]	0.006	
	90	2.03	[1.24 - 3.31]	0.005	
First graft relapse	No	1.00			0.17
	No previous graft	1.75	[0.88 - 3.48]	0.11	
	Yes	1.37	[0.64 - 2.94]	0.41	
No of lines before alloSCT	>2	1.00			0.12
	1 or 2	0.73	[0.5 - 1.08]	0.12	
HLA match	HLA mismatched	1.00			0.058
	HLA matched	0.65	[0.43 - 1]	0.048	
Sex of donnor-patient	F/M	1.00			0.44

	Others	0.85	[0.57 - 1.28]	0.44	
CMV serostatus of donnor patient	neg/neg	1.00			0.97
	Others	0.99	[0.67 - 1.47]	0.97	
Source of stem cells	BM	1.00			0.036
	CB	1.96	[1.04 - 3.7]	0.039	
	PB	0.96	[0.58 - 1.59]	0.89	
Conditionning intensity	MAC	1.00			0.43
	NMA	0.75	[0.37 - 1.55]	0.44	
	RIC	1.15	[0.78 - 1.7]	0.49	
Depletion	No	1.00			0.056
	Partial T depletion	3.16	[1.16 - 8.59]	0.025	

Table 7: univariate analysis of 5 years EFS