E il trapianto allogenico?

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Disclosures of Massimo Martino

Company name	Research support	Employee	Consultant	Stockholder	Speakers bureau	Advisory board	Other
KITE/GILEAD					x	x	
BMS					x	x	
Novartis					x	x	
JANSENN CILAG					x	x	
PFIZER						x	
ABBVIE					x		x
SANDOZ	x						
TAKEDA						x	
MEDAC	x				x	x	
GSK						x	
AMGEN					x		
SANOFI						x	

FEATURE OPEN

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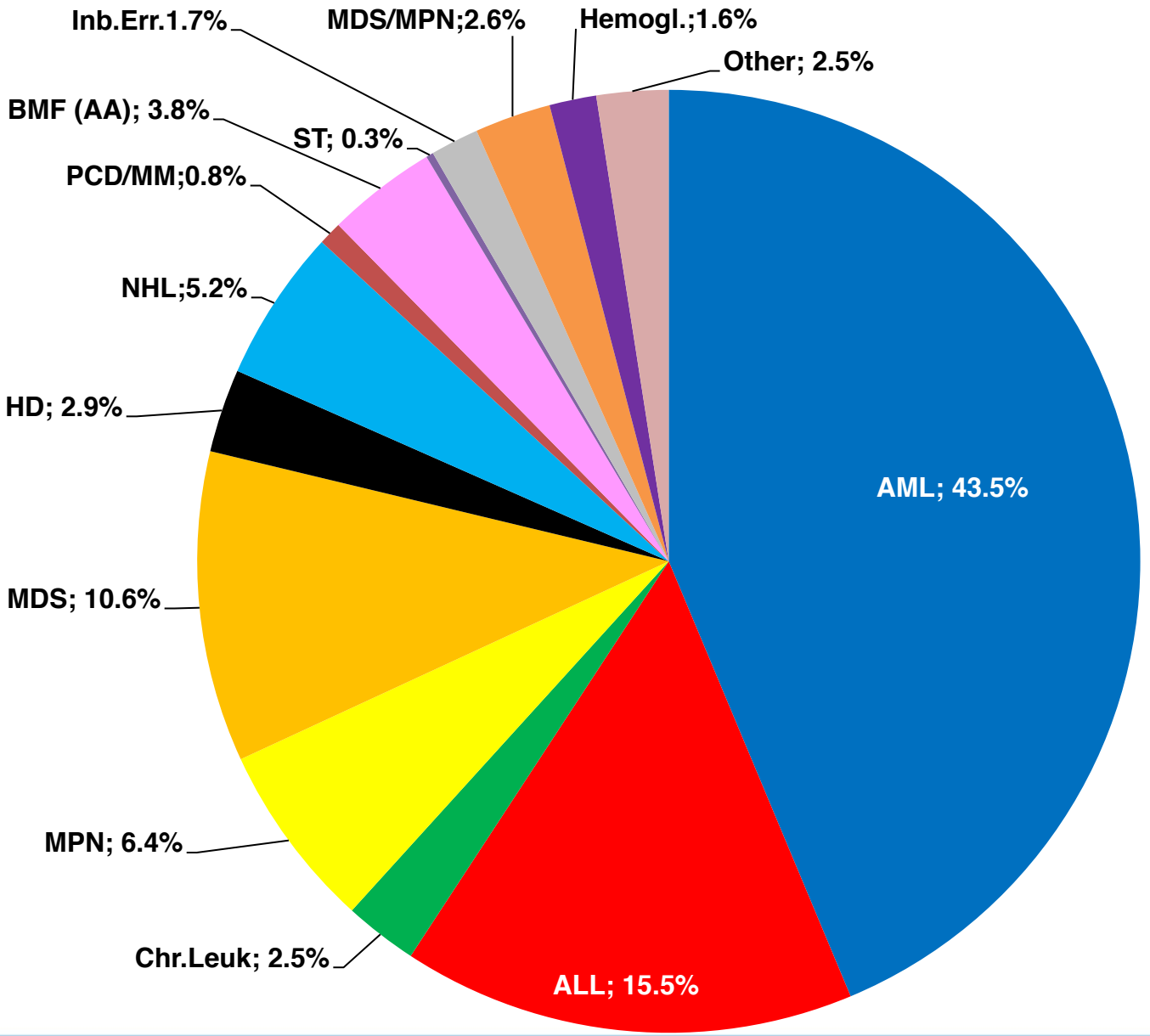
Indications for haematopoietic cell transplantation for haematological diseases, solid tumours and immune disorders: current practice in Europe, 2022

John A. Snowden[1✉], Isabel Sánchez-Ortega[2], Selim Corbacioglu[3], Grzegorz W. Basak[4], Christian Chabannon[5], Rafael de la Camara[6], Harry Dolstra[7], Rafael F. Duarte[8], Bertram Glass[9], Raffaella Greco[10], Arjan C. Lankester[11], Mohamad Mohty[12], Bénédicte Neven[13], Régis Peffault de Latour[14], Paolo Pedrazzoli[15], Zinaida Peric[16], Ibrahim Yakoub-Agha[17], Anna Sureda[18], Nicolaus Kröger[19] for the European Society for Blood and Marrow Transplantation (EBMT)

Disease	Disease status	MSD allo	MUD allo	MMAD allo	Auto	CAR-T
Haematological malignancies						
MCL	CR1	GNR/III	GNR/III	GNR/III	S/I	GNR/III
	CR/PR >1, no prior auto-HCT	CO/III	CO/III	D/III	CO/II	S/II
	CR/PR >1, after prior auto-HCT	CO/II	CO/II	CO/III	GNR/II	S/II
	Refractory	CO/II	CO/II	CO/III	GNR/II	S/II

Bone Marrow Transplantation (2022) 57:1217–1239; https://doi.org/10.1038/s41409-022-01691-w

Allogeneic Transplants (n. 1.998) - Indications 2023



Disease	%
AML	43.5
ALL	15.5
MDS	10.6
MPN	6.4
NHL	5.2
HD	2.9

Export date 01/03/2024

Clinical results obtained from studies using ALLO-SCT in RR MCL

	N	CTX	Disease status	2–5 y OS	PFS	Relapse rate
Robinson et al. 2002	22	RIC	CTS 73%	13%	/	100%
Maris et al. 2004	33	NMAC	CTS 54%	64%	60%	16%
Armand et 2008	15	RIC	/	42%	22%	33%
Tam et al. 2009	35	RIC	CTS 83%	53%	46%	/
Cook et al 2010	70	MAC	CTS 83%	37%	14%	65%
Hamadani et 2013	202	MAC 74	CTS 0%	25%	20%	33%
		RIC 128		30%	25%	32%
Le Gouill et a 2012	70	RIC	CTS			
Fenske et al. 2014	Early AUTO	RIC	CTS 100%	61%	52%	32%
	Early ALLO			62%	55%	15%
	Late AUTO			44%	29%	51%
	Late ALLO			31%	24%	38%
Kruger et al 2014	39		CTS 92%	73%	67%	15%
Mussetti et al 2015	29	RIC	CTS 90%	54%	41%	28%
Vaughn et al. 2015	70	NMAC	CTS 64%	55%	46%	26%
Tessoulin et al 2016	106	RIC	CTS 80%	62%	43%	30%
Robinson et al 2018	324	RIC	CTS 65%	40%	31%	40%
Dreger et al. 2019	22	RIC 82%				
Arcari et al. 2021	55	RIC	CTS 93%	56%	53%	16%

- ✓ The majority of patients relapsed or progressed after receiving AUTO-SCT
- ✓ Most patients had experienced a CR or PR just before ALLO-SCT (range 54 to 100%).
- ✓ The disease status at the time of ALLO-SCT is an important prognostic factor for survival,
- ✓ **OS rate varies widely, ranging from 13 to 73%, indicating a strong selection bias**
- ✓ **PFS rate varies widely, ranging from 14 to 67%**

Robinson SP, et al. Blood (2002)
Maris MB, et al. Blood. (2004)
Armand P, et al. BBMT (2008)
Mussetti A, et al. BMT (2015)
Tam CS, et al. Blood. (2009)
Cook G, et al. BBMT. (2010)
Hamadani M, et al. BBMT. (2013)
Vaughn JE, et al. Cancer. (2015)
Le Gouill S, et al. Ann Oncol. (2012)
Fenske TS, et al. J Clin Oncol. (2014)
Krüger WH, et al. Ann Hematol. (2014)
Tessoulin B, et al. BMT. (2016)
Robinson SP, et al. BMT. (2018)
Dreger P, et al.BMT. (2019)
Arcari A, et al. Leuk Lymphoma. (2021)

ALLOGENEIC HEMATOPOIETIC CELL TRANSPLANTATION FOR CHEMOTHERAPY-UNRESPONSIVE MANTLE CELL LYMPHOMA: A COHORT ANALYSIS FROM THE CIBMTR

CIBMTR®
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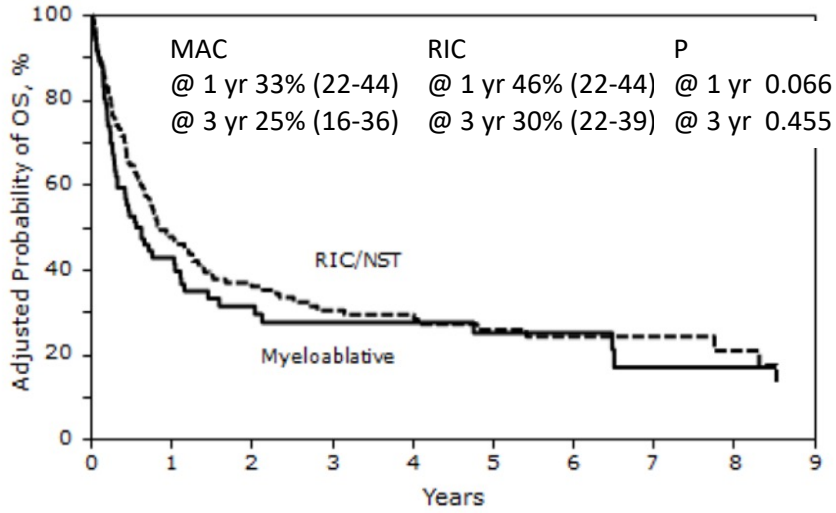
Outcome of 202 patients with refractory MCL who underwent allo-HCT using either MA or RIC/NST during 1998–2010.

Outcome event	Myeloablative		RIC/NST		P-value*
	N	Prob (95% CI)	N	Prob (95% CI)	
NRM	71		120		
@ 100 days		33 (23–45)		26 (18–34)	0.281
@ 1 year		43 (31–54)		38 (29–48)	0.561
@ 3 years		47 (35–59)		43 (34–53)	0.679
Relapse/Progression	71		120		
@ 1 year		26 (17–38)		24 (16–32)	0.664
@ 3 years		33 (22–45)		32 (23–41)	0.890
Progression free survival	71		120		
@ 1 year		31 (20–42)		38 (29–48)	0.316
@ 3 years		20 (11–32)		25 (17–34)	0.531



OS followying allogeneic transplantation: RIC/NMA vs MAC

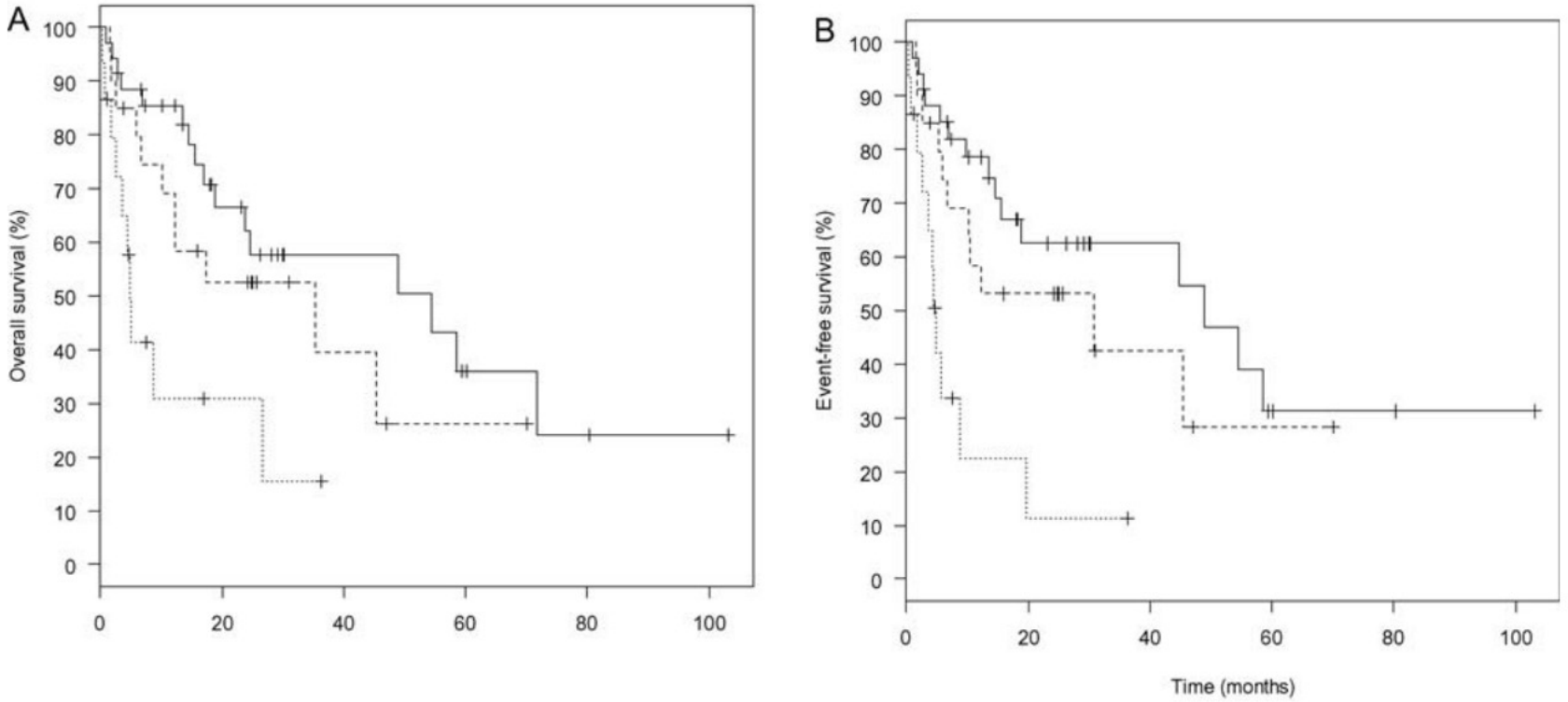
- ✓ The CIBMTR study included only patients with chemorefractory disease at ALLO-SCT.
- ✓ These patients are similar to the patients that were included in the CAR-T-cell trials.

Hamadani M, et al. *Biol Blood Marrow Transplant.* (2013) 19:625– 31. doi: 10.1016/j.bbmt.2013.01.009

Reduced-intensity conditioning allogeneic stem cell transplantation for relapsed/refractory mantle cell lymphoma: a multicenter experience

324 MCL patients treated with ALLO-SCT between 2000 and 2008.

- **heavily pretreated population**
- **46% of patients received previous AUTO-SCT**
- **60% of patients received more than 3 CT lines**
- **median follow-up of 70 months**



(… ..), patients in stable/progressive disease; (----), patients in partial response and (__) patients in complete response.

- **One-third of patients were progression free**
- **Survival was better with chemosensitive disease**

Le Gouill S, et al. Ann Oncol. (2012) 23:2695–703

The toxicity of ALLO-SCT remains important and limits its applicability

	N	CTX	NRM
Robinson et al. (1)	22	RIC	82%
Maris et al. (59)	33	NMAC	24%
Armand et al. (60)	15	RIC	37%
Tam et al. (61)	35	RIC	9%
Cook et al. (49)	70	MAC	18%
Hamadani et al. (53)[§]	202	MAC 74	47%
		RIC 128	43%
Le Gouill et al. (54)	70	RIC	
Fenske et al. (62)	Early AUTO	RIC	3%
	Early ALLO		25%
	Late AUTO		9%
	Late ALLO		17%
Kruger et al. (63)	39		24%
Mussetti et al. (56)	29	RIC	29%
Vaughn et al. (50)	70	NMAC	28%
Tessoulin et al. (51)	106	RIC	28%
Robinson et al. (52)	324	RIC	24%
Dreger et al. (57)	22	RIC 82%	5%
Arcari et al. (58)	55	RIC	23%

NRM rate varies widely, ranging from 5 to 82% !!!!!!!!!!

Castagna L, et al. Front Med 2022

Factors predictive of higher NRM incidence in MCL

severe aGVHD was predictive of a high mortality rate in 2 studies

age > 60 years and heavy pretreatment to be predictive of severe toxicity

	N	CTX	Risk factors	NRM
Mussetti et al.	29	RIC	NR	29%
Vaughn et al.	70	NMAC	No factors	28%
Tessoulin et a	106	RIC	G3–4 aGVHD	28%
Robinson et al.	324	RIC	No factors	24%
Dreger et al.	22	RIC 82%	NR	5%
Arcari et al.	59	RIC	G3–4 aGVHD, > 2 CT lines, age > 60 y	23%

Mussetti A, et al. Bone Marrow Transplant. (2015)
Vaughn JE, et al. Cancer. (3015)
Tessoulin B, et al . *Bone Marrow Transplant.* (2016)
Robinson SP, et al. Bone Marrow Transplant. (2018)
Dreger P, et al. Bone Marrow Transplant. (2019)
Arcari A, et al. Leuk Lymphoma. (2021)

Allogeneic Hematopoietic Stem Cell Transplantation for Relapsed or Refractory B-Cell Non-Hodgkin Lymphoma: A Retrospective Multicenter Analysis on 285 Procedures Performed between 2000 and 2020

Corrado Tarella[1], Simona Sammassimo, MD[2], Samuele Frassoni[3,4], Alida Dominietto, MD[5], Raffaella Cerretti, MD PhD[6], Maria Caterina Micò[7], Rocco Pastano, MD[2], Martina Pennisi[8], Chiara Ghiggi[5], Gottardo De Angelis, PhD[6], Alessandra Algarotti[7], Patrizia Chiusolo, MDPhD[9], Enrico Derenzini, MD PhD[10,11], Simona Sica, MD PhD[9], Paolo Corradini, MD[8,12], Vincenzo Bagnardi, PhD[3], Emanuele Angelucci[5], Alessandro Rambaldi[13,7], William G Arcese, MD[14], Anna Dodero, MD[8], Andrea Bacigalupo, MD[9]

Data from 285 allo-HSCT procedures performed during 2000 and 2020 in 281 R/R B-NHL patients aged ≥ 18 yrs have been collected.

Indolent lymphoma	Aggressive B-cell lymphoma	MCL
123 (43.3%)	**124 (43.7%)**	**37 (13%)**
FL = 108	**DLBCL = 91**	

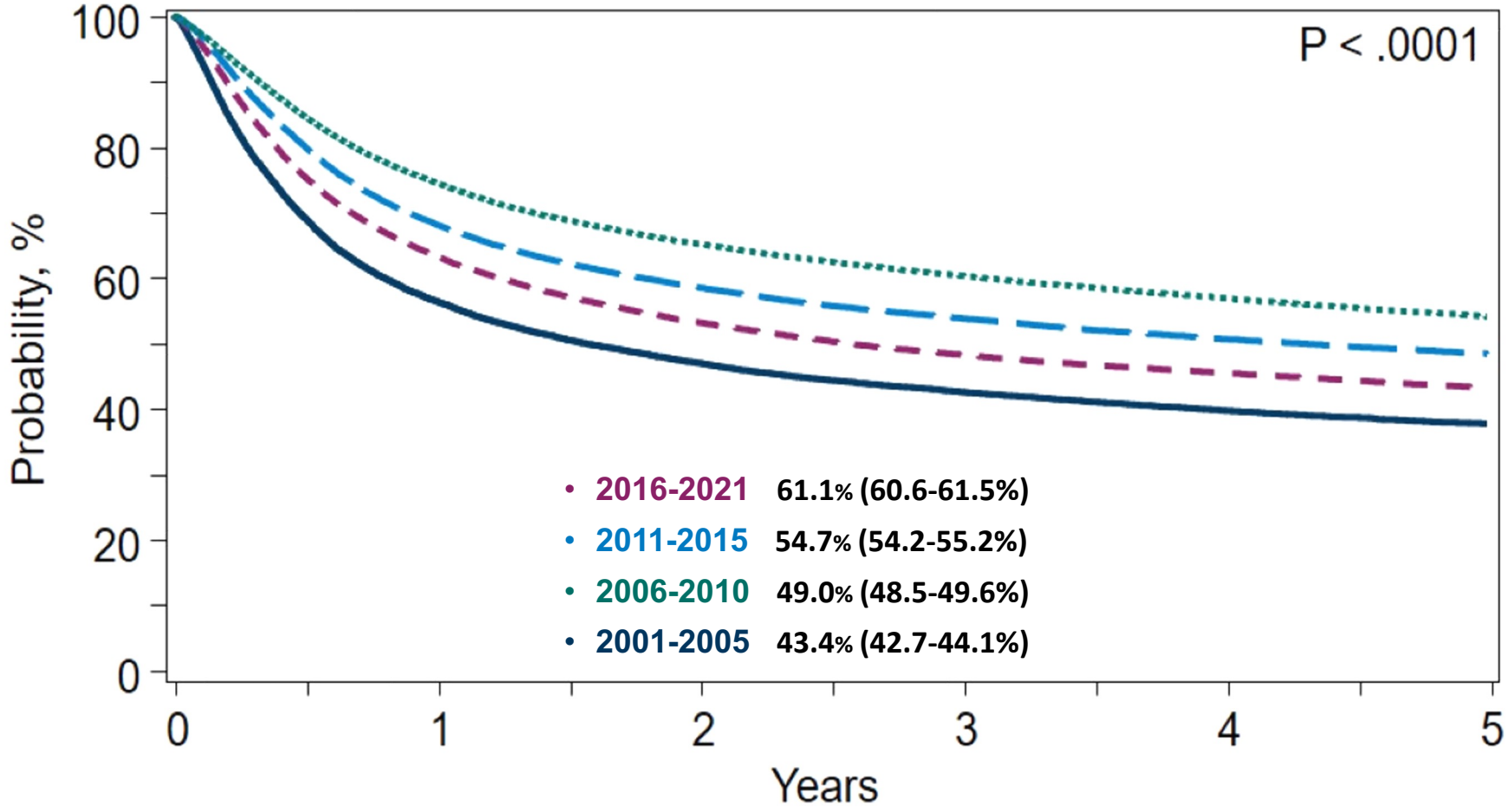
Blood 144 (2024) 2186–2187

	PFS	OS
3-yr	43.9 (95% CI 38.1-49.6) 55.6% (46.3-63.9) indolent lymphoma* 37.9 % (29.4-46.3) aggressive lymphoma* 27.0% (14.1-41.8) MCL* 52.7% (43.9-60.8) CR at allo-SCT* non-CR (3-yr PFS ranging between 30.9 and 43.3%)* 54% indolent lymphoma 26% aggressive lymphoma 0% MCL	50.4% (44.5-56.1
5-yr	41.2% (35.4-46.9)	48.8% (42.9-54.5)

*only pre-transplant variables associated with a significant benefit on PFS in both univariate and multivariate analysis. Similar features were observed for OS.

Blood 144 (2024) 2186–2187

Trends in Survival after Allogeneic HCTs, in the US, 2001-2021



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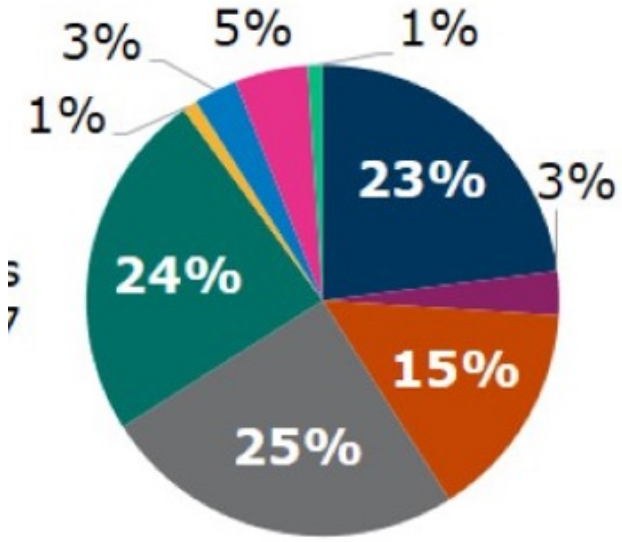
Causes of Death after Allogeneic HCTs in the US, 2012-2022

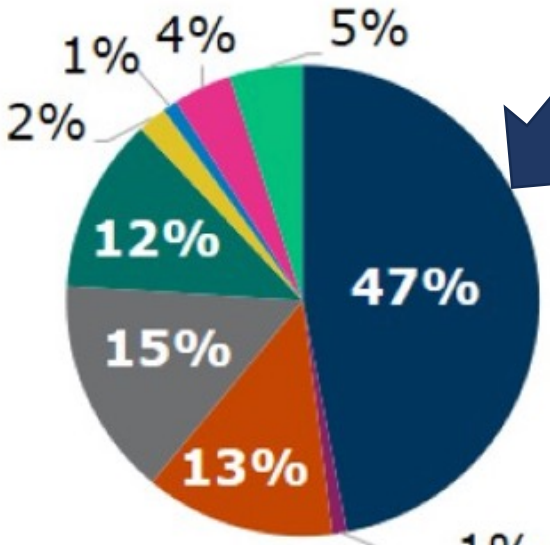
Died within 100 days post-transplant



n=7133

9.6 %

Died at or beyond 100 days post-transplant*



n=27505

36.4 %

- Primary disease
- Organ failure
- Hemorrhage
- Graft rejection
- GVHD
- Infection
- Malignancy subsequent to HCT
- Other
- Not reported

*Data reflects 10-year mortality.

Age ≥18 years
Total transplants = 75507

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The outcome of the transplant depends on three sets of factors:

Disease factors

diagnosis
disease stage
cytogenetic
molecular markers
MRD
etc…

Procedure factors

donor
source of HSCs
conditioning
HLA compatibility
GVHD prophylaxis
etc…

Patient factors

age
performance status
organ functions
comorbidity
etc…

Table 4. Risk factors influencing treatment failure (relapse or NRM) after allogeneic HSCT.

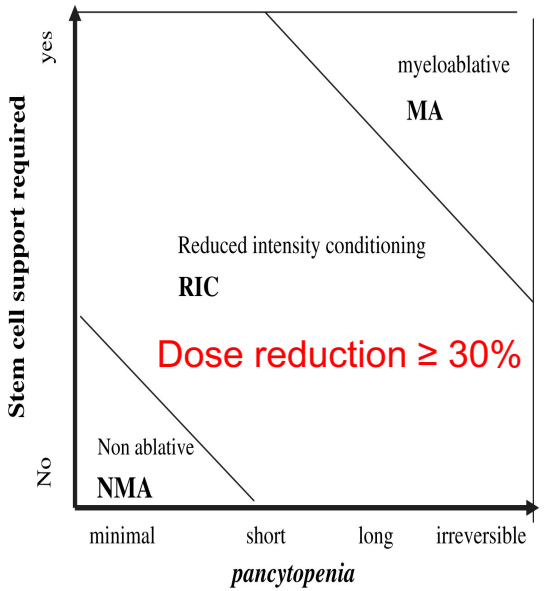
Disease-specific factors	
Advanced disease status	relapse > NRM
Unfavorable cytogenetics/molecular genetics	relapse > NRM
Susceptibility to GVL-effect	relapse > NRM
Patient-specific risk factors	
Age	NRM > relapse
Performance status	NRM > relapse
Comorbidities	NRM > relapse
Transplant-specific risk factors	
MRD positivity	relapse > NRM
HLA disparity	NRM > relapse
CMV incompatibility	NRM > relapse
Center effect (JACIE accredited)	NRM > relapse

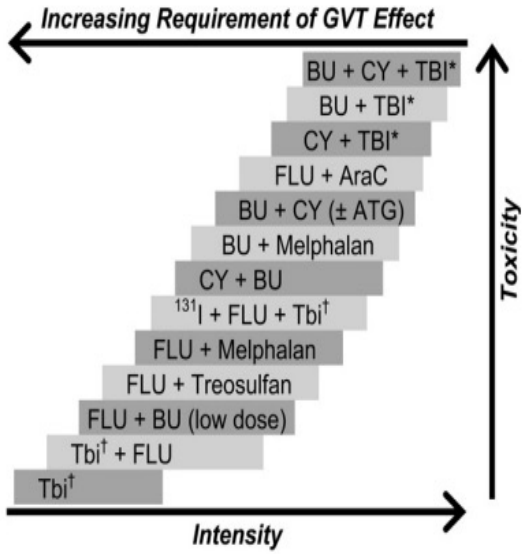
NRM, non-relapse mortality; HSCT, hematopoietic stem cell transplantation; GVL, graft-*versus*-leukemia effect; MRD, measurable residual disease; CMV, cytomegalovirus; JACIE, Joint Accreditation Committee ISCT-Europe & EBMT.

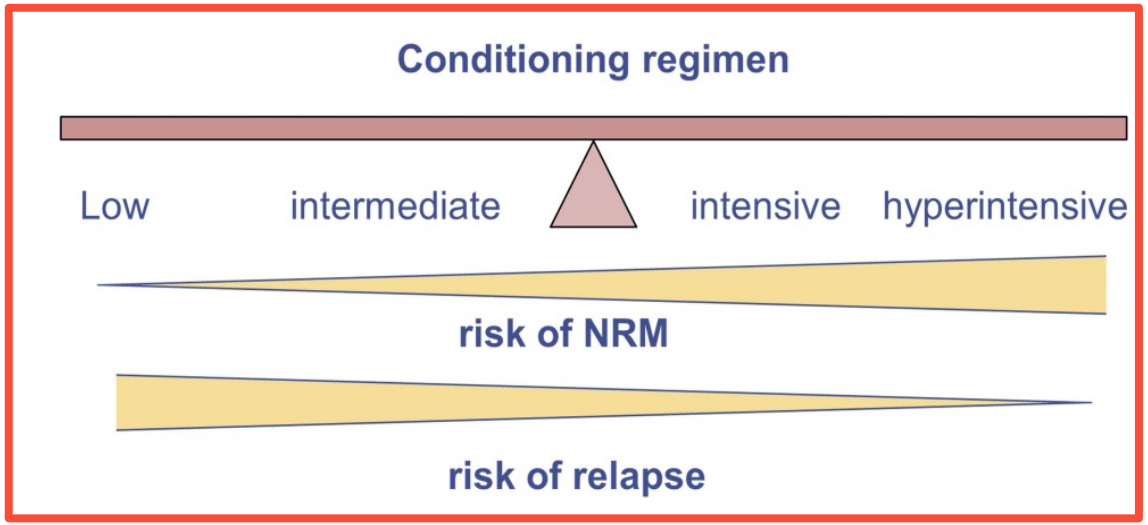
How can we improve the transplantation results?

- novel conditioning regimens
- a better prophylaxis and management of graft- versus-host disease
- an ameliorated posttransplant support system

Conditioning regimens for allogeneic HCT in patients with AML and MDS





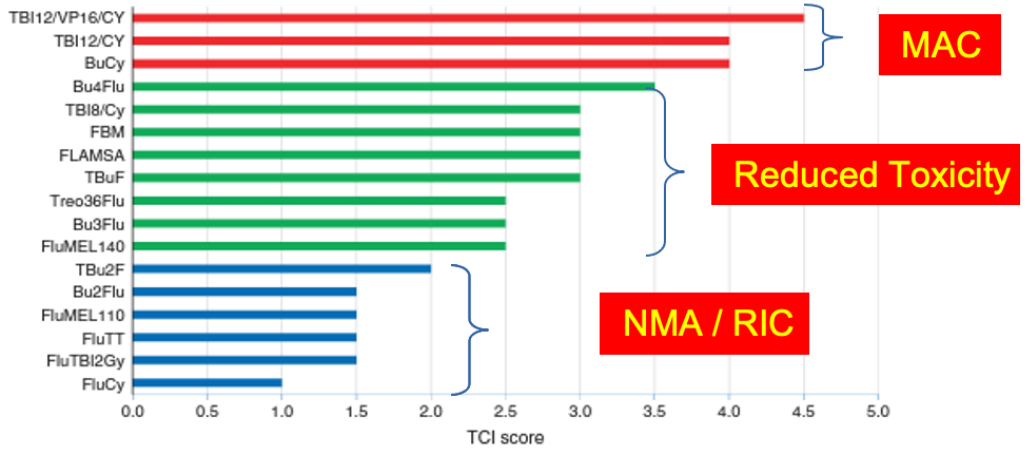


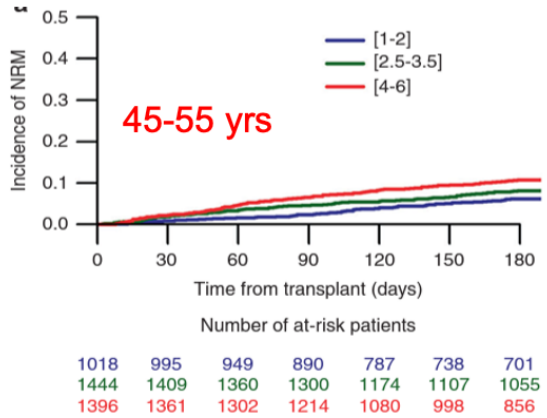
- ✓ Myeloablative conditioning (MAC) regimens provide higher engraftment rates and stronger tumor cytoreduction, but they are associated with higher toxicity and NRM
- ✓ MAC is considered the standard of care for fit patients younger than 65 years because reduced nonrelapse mortality is offset by higher relapse mortality after reduced intensity conditioning (RIC).
- ✓ RIC regimens are treatment options in older patients or patients unfit for MAC regimens.
- ✓ MAC regimens result in lower relapse and improved survival in patients with AML with MRD before HCT, while survival is similar for MAC and RIC regimens in the absence of MRD.
- ✓ Further studies are necessary to assess if patients without MRD would be better candidates for RIC regimen

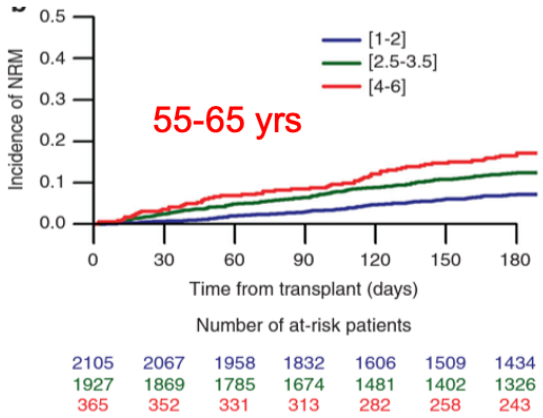
Jethava YS, et al. Bone Marrow Transplant. 2017; Scott BL, et al. J Clin Oncol. 2017; Scott BL, et al. . Transplant Cell Ther. 2021; Solomon SR, et al. Blood Adv. 2019; Devine SM, et al. J Clin Oncol. 2015
Hourigan CS, et al. J Clin Oncol. 2020; Walter RB, et al. Leukemia. 2015; Festuccia M, et al. Biol Blood Marrow Transplant. 2016

Transplant Conditioning Intensity Score
EBMT

Component	Dose level			Added points for each dose level
	Low	Intermediate	High	
TBI fractionated (Gray)	≤5	6–8	≥9	1
Busulphan (mg/kg)	≤6.4 iv & ≤8 po	9.6 iv & 12 po	12.8 iv & 16 po	1
Treosulfan (g/m2)	30	36	42	1
Melphalan (mg/m2)	<140	≥140	≥200	1
Thiotepa (mg/kg)	<10	≥10	≥20	0.5
Fludarabine (mg/m2)	≤160	>160		0.5
Clofarabine (mg/m2)	≤150	>150		0.5
Cyclophosphamide (mg/kg)	<90	≥90		0.5
Carmustine (mg/m2)	≤250	280–310	≥350	0.5
Cytarabine (g/m2)	<6	≥6		0.5
Etoposide (mg/kg)	<50	≥50		0.5







The authors retrospectively tested the impact of TCI on 8255 adult (45-65 years) acute myeloid leukemia patients who underwent HCT in first complete remission.
TCI scoring enabled the identification of a distinct subgroup of RIC and MAC conditioning regimens with an intermediate TCI [2.5-3.5] score that had identical outcomes and which are frequently referred as "reduced toxicity conditioning»

TCI, transplant conditioning intensity

Spyridonidis A, et al. Bone Marrow Transplant. 2020;55:1114-1125.

Possible scenarios for integrating ALLO-SCT and CAR-T-Cell therapy

- **CAR-T-cell therapy can be applied first, and ALLO-SCT can be applied if there is progression/relapse**
  - ***American Society of Transplantation and Cellular Therapy, CIBMTR, and EBMT clinical practice recommendations for cellular therapies in MCL, CAR-T-cell therapy is recommended as the standard of care for patients with R/R MCL***

- **ALLO-SCT before, and CAR-T-cell therapy if there is progression/relapse**
  - ***Lack utility (but in DLBCL) , registry study, significant difference in NRM incidence in favor of CAR-T-cell***

- **CAR-T-cell therapy can be used as induction therapy in a tandem CAR-T- cell therapy/ALLO-SCT sequence, as frequently done for acute lymphoblastic leukemia**
  - ***Predict the outcome after CAR- T-cell therapy based on predictive factors before and after infusion. For these high-risk patients, ALLO-SCT could be used after reinduction therapy to obtain CR or to reduce the lymphoma burden as much as possible.***

MCL: Risk Factors

Risk factors are heterogeneous within a patient and between patients

MCL is biologically heterogeneous, and risk stratification incorporates multiple biologic factors

Low Risk

- Low KI-67 (≤10%)
- SOX-11 negative
- IGHV hypermutated
- Stable karyotype

High Risk

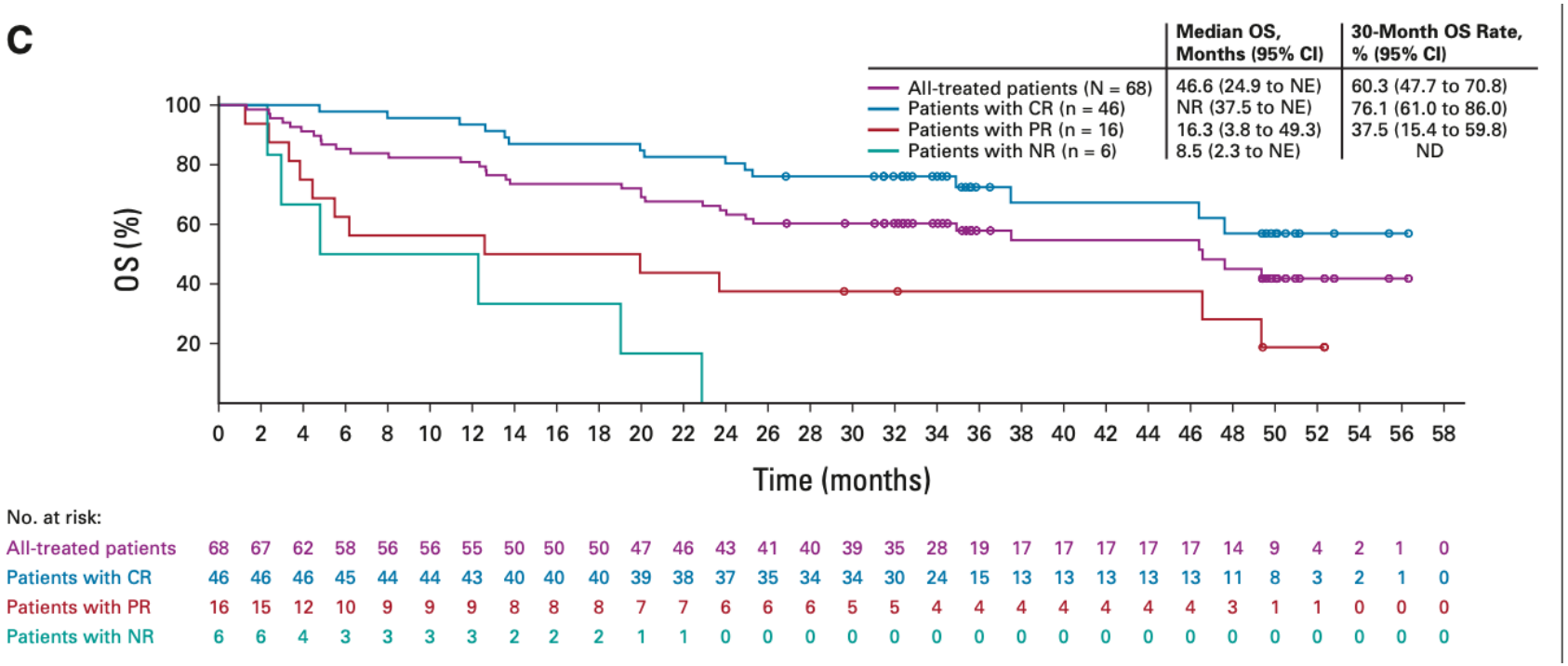
- Blastic/blastoic/pleomorphic
- High KI-67 (>30%)
- Complex karyotype
- *TP53* deletion or mutations

Hoster. Blood. 2008;111:558-565.

These informations were frequently unknown in registry studies

Three-Year Follow-Up of KTE-X19 in Patients With Relapsed/Refractory Mantle Cell Lymphoma, Including High-Risk Subgroups, in the ZUMA-2 Study

Michael Wang, MD[1]; Javier Munoz, MD, MS, MBA[2]; Andre Goy, MD, MS[3]; Frederick L. Locke, MD[4]; Caron A. Jacobson, MD, MMSc[5]; Brian T. Hill, MD, PhD[6]; John M. Timmerman, MD[7]; Houston Holmes, MD, MBA[8]; Samantha Jaglowski, MD[9]; Ian W. Flinn, MD, PhD[10]; Peter A. McSweeney, MB, ChB[11]; David B. Miklos, MD, PhD[12]; John M. Pagel, MD, PhD, DSc[13]; Marie José Kersten, MD, PhD[14]; Krimo Bouabdallah, MD[15]; Rashmi Khanal, MD[16]; Max S. Topp, MD[17]; Roch Houot, MD, PhD[18]; Amer Beitinjaneh, MD[19]; Weimin Peng, PhD[20]; Xiang Fang, PhD[20]; Rhine R. Shen, PhD[20]; Rubina Siddiqi, PhD[20]; Ioana Kloos, MD[20]; and Patrick M. Reagan, MD[21]



The prognosis of patients who partially respond or do not respond to brexu-cel therapy is very poor, with a median OS of 16.3 and 8.5 months respectively

Wang M, et al J Clin Oncol. 2023

Outcome of Patients with Mantle Cell Lymphoma after Failure of Anti-CD19 CAR T-Cell Therapy: A Descar-T Study By Lysa Group

ORAL ABSTRACTS Session 623.Mantle Cell, Follicular, Waldenstrom's, and Other Indolent B Cell Lymphomas: Clinical and Epidemiological

178 MCL patients who received a Brexu-Cel infusion between July 2018 and 2023

Baseline characteristics	
Median follow-up	14.5 months
Median age	66 years
high MIPI	35.8%
Ki-67 index ≥ 30%	76.2%
T*P53* mutation	30.2%
in RR after at least 2 prior lines	100%
	including a BTKi : 97%
	auto/allo-transplant : 44%

Marion Aymard et al. Blood (2024) 144 (Supplement 1): 239.

Outcome of Patients with Mantle Cell Lymphoma after Failure of Anti-CD19 CAR T-Cell Therapy: A Descar-T Study By Lysa Group

Post-CAR T R/R	61 (34%)
Progression or relapse in 0-3 mo.	28%
Progression or relapse in 3-6 mo.	42%
Progression or relapse after 6 mo.	30%
OS2*	5.8 mo. (CI95: 3.2-11.3)
OS2 early relapse (< 3 months)	1.8 mo.
OS2 relapse within 3-6 months	6.7 mo.
OS2 relapse after 3-6 months	9 mo.
PF2*	2 mo. (CI95: 1.4-2.8)

*After a median follow up of 15 months

Within all clinical characteristics at time of CAR-T infusion, MIPI score remained the only significant feature associated with OS2 in the multivariable model.

Marion Aymard et al. *Blood* (2024) 144 (Supplement 1): 239.

Treatment Patterns and Outcomes Following Progression of Disease Post-CAR-T Therapy in Relapsed or Refractory Mantle Cell Lymphoma: A Multicenter Analysis

306 pts who received CD19 CAR-T for R/R MCL, of which 104 (34%) experienced POD

- The median time from CAR-T infusion to POD was 6 months (IQR 3-12).
- Pts with POD had
  - a median age of 67 yrs (range 36-86)
  - received a median of 3 lines of therapy pre-leukapheresis, including a BTK inhibitor (BTKi) in 97% of patients;
  - 36% of BTKi-exposed patients had BTKi-unresponsive disease.
  - 55% blastoid/pleomorphic
  - 75% Ki67 ≥50%,
  - 61% MIPIb high-risk,
  - 60% *TP53*- mutated MCL.
  - post-POD biopsy, 12%had CD19-negative disease

ORAL ABSTRACTS Session 623.Mantle Cell, Follicular, Waldenstrom's, and Other Indolent B Cell Lymphomas: Clinical and Epidemiological

Zachary D. Epstein-Peterson et al. Blood 144 (2024) 238–240

Treatment Patterns and Outcomes Following Progression of Disease Post-CAR-T Therapy in Relapsed or Refractory Mantle Cell Lymphoma: A Multicenter Analysis

After POD occured	
no anti-lymphoma therapy	15 pts
Radiation	11 pts
Pirtobrutinib	13 pts (ORR 31%)
Chemoimmunotherapy	12 pts (ORR 25%)
Venetoclax	10 patients (ORR 20%)
BsAb	10 pts (ORR 60%)
Small molecule combinations	8 patients (ORR 50%)
To all first systemic	ORR 42%

Median PFS from time of POD mo.	2.3 (95% CI 1.9-3.4
Median OS from time of POD mo.	5.4 (95% CI 4.5-9.4
1-year OS rate	33%.

Predicted inferior OS	
TP53 mutations	**(HR 2.83, 95% CI 1.08-7.43, P = 0.026)**
age ≥65 years	**(HR 1.83, 95% CI 1.07-3.15, P = 0.023)**
MIPIb high-risk	**(HR 3.56, 95% CI 1.08-11.7, P = 0.042)**
non-response to CAR-T	**(HR 3.55, 95% CI 1.93-6.53, P < 0.001)**

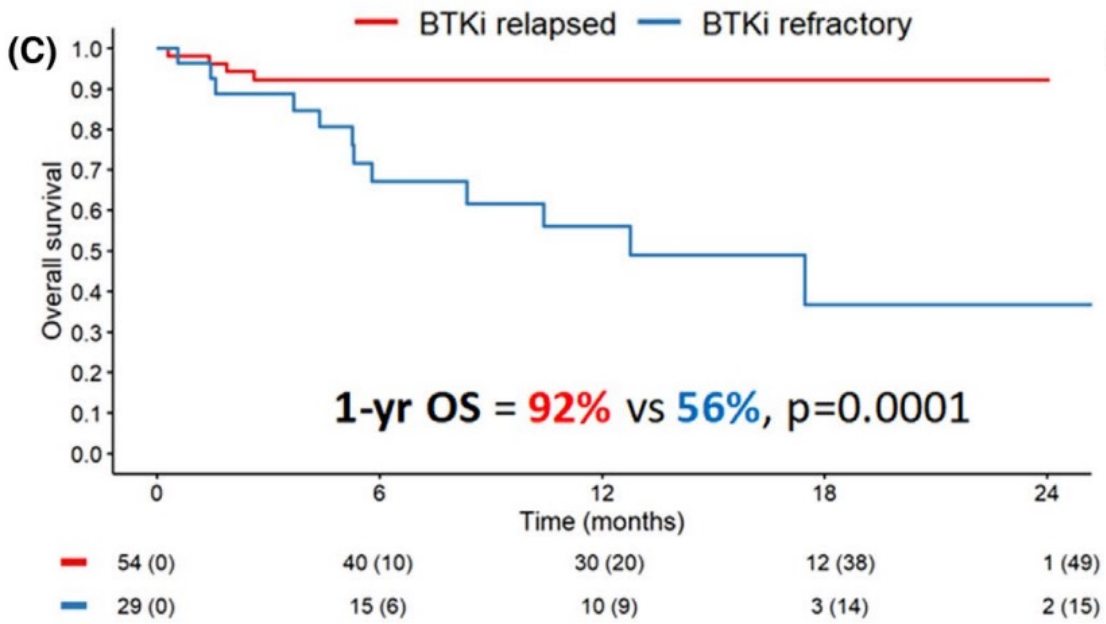
Zachary D. Epstein-Peterson et al. Blood 144 (2024) 238–240

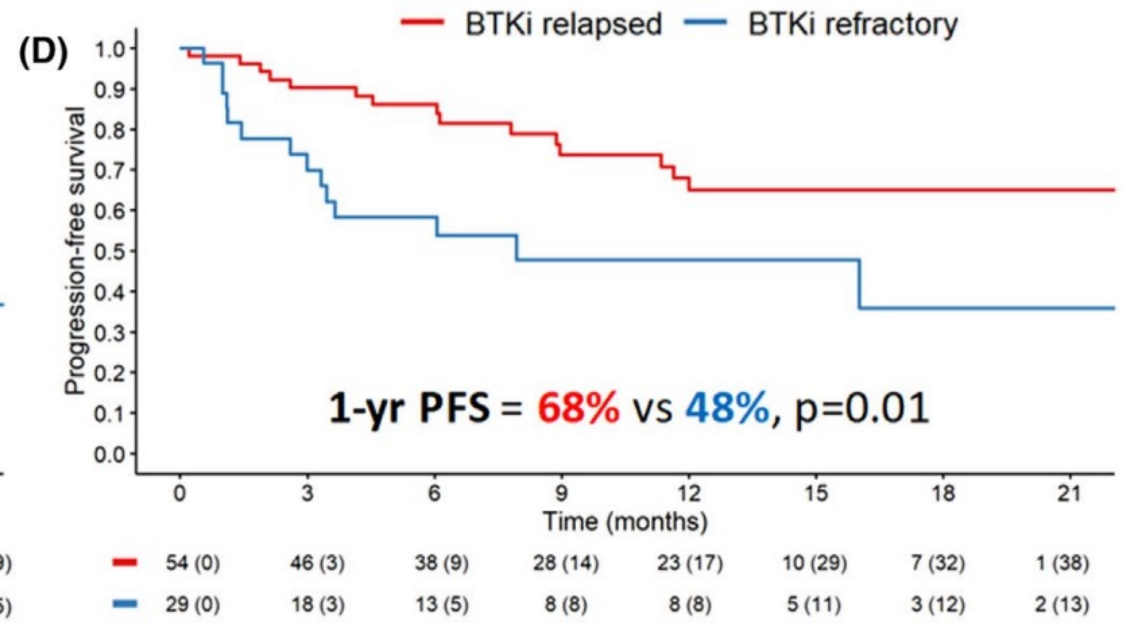
ORIGINAL PAPER
Haematological Malignancy – Clinical

BJHaem
BRITISH JOURNAL OF HAEMATOLOGY

Brexucabtagene autoleucel in-vivo expansion and BTKi refractoriness have a negative influence on progression-free survival in mantle cell lymphoma: Results from CART-SIE study

BTKi-refractory patients were defined as those whose disease either did not respond or progressed within 6 months of initiating BTKi therapy.





The study identified refractoriness to BTKi treatment and platelet count as significant prognostic factors

Stella F, et al. Br J Haematol. 2024

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the association between in-vivo CAR T-cell expansion and progression-free survival (PFS).

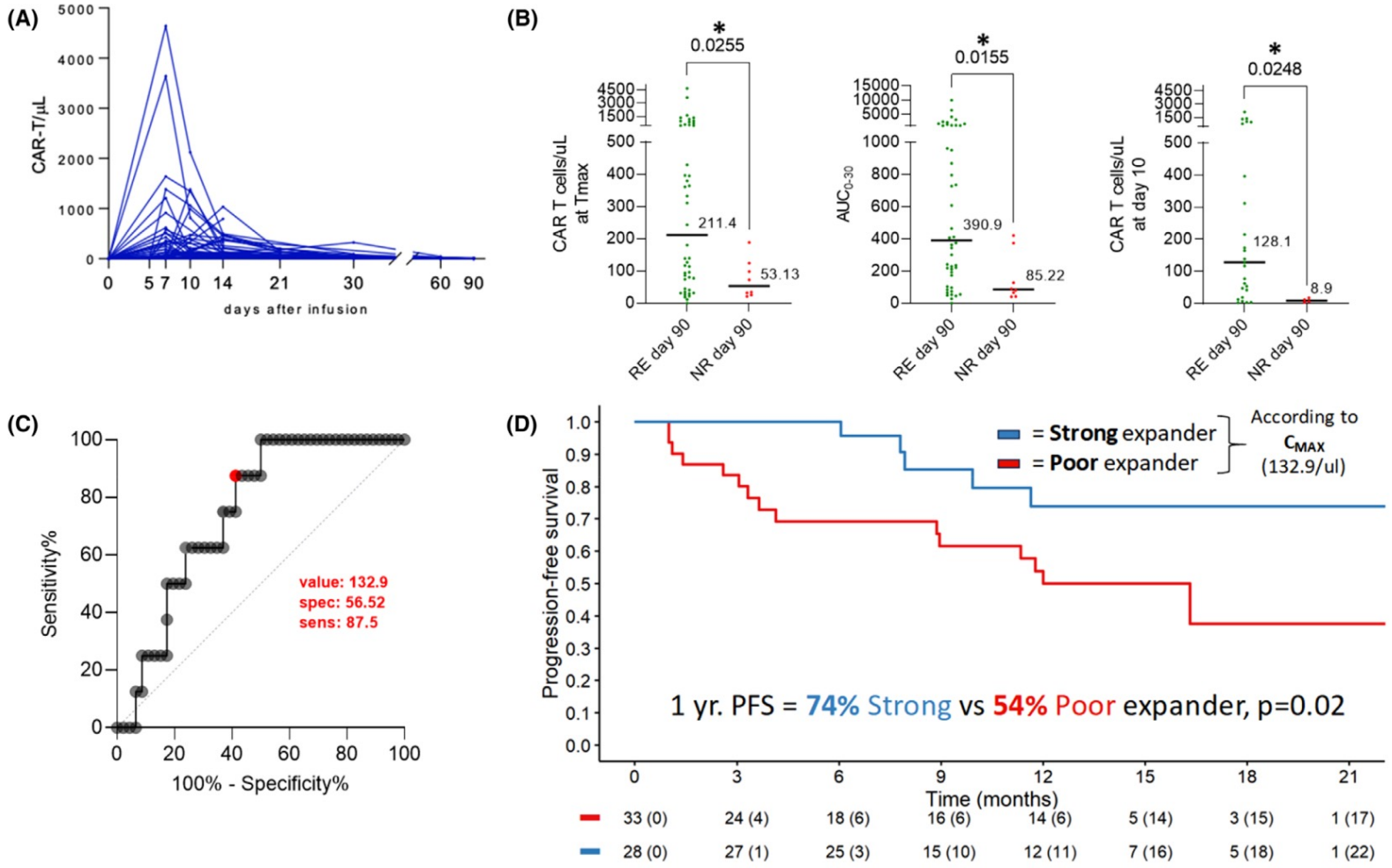


FIGURE 2 In-vivo brexu-cel expansion—(A) Expansion kinetics; (B) Day 90 response according to expansion; (C) ROC curve to identify a C_{MAX} cut-off with higher sensitivity (sens) and specificity (spec) in predicting day 90 response; (D) progression-free survival according to the C_{MAX}.

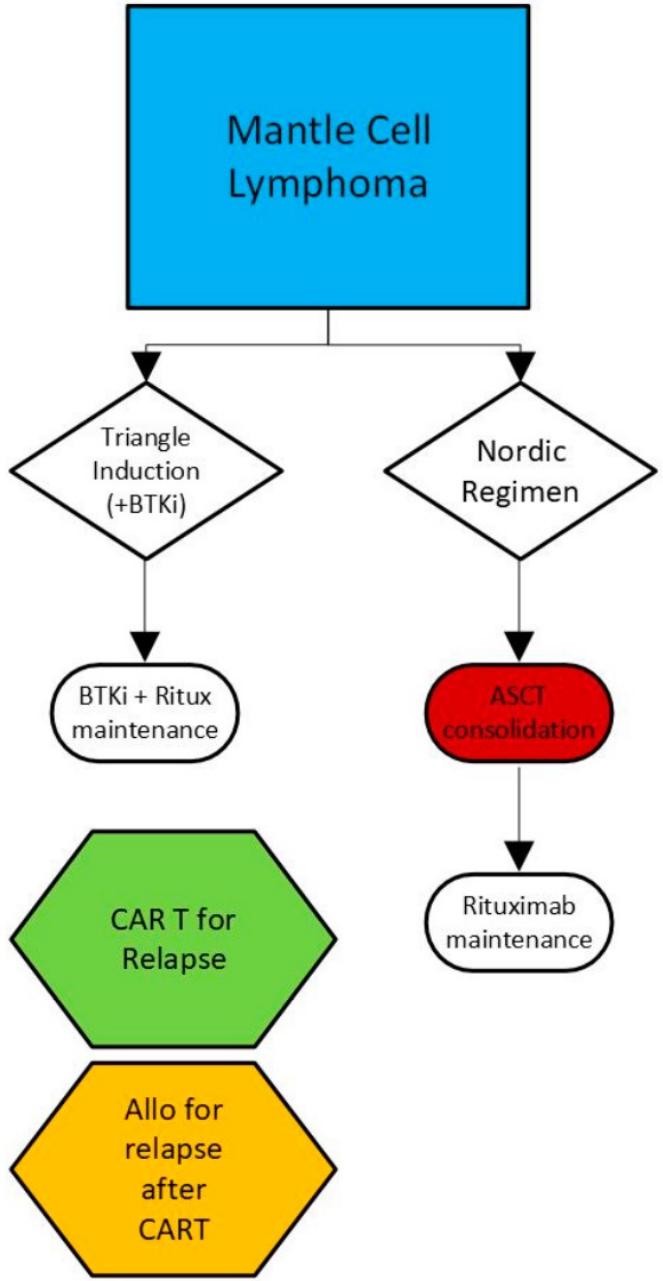
Stella F, et al. Br J Haematol. 2024

FEATURE OPEN

Indications for haematopoietic cell transplantation for haematological diseases, solid tumours and immune disorders: current practice in Europe, 2022

John A. Snowden[1✉], Isabel Sánchez-Ortega[2], Selim Corbacioglu[3], Grzegorz W. Basak[4], Christian Chabannon[5], Rafael de la Camara[6], Harry Dolstra[7], Rafael F. Duarte[8], Bertram Glass[9], Raffaella Greco[10], Arjan C. Lankester[11], Mohamad Mohty[12], Bénédicte Neven[13], Régis Peffault de Latour[14], Paolo Pedrazzoli[15], Zinaida Peric[16], Ibrahim Yakoub-Agha[17], Anna Sureda[18], Nicolaus Kröger[19] for the European Society for Blood and Marrow Transplantation (EBMT)

Disease	Disease status	MSD allo	MUD allo	MMAD allo	Auto	CAR-T
Haematological malignancies						
MCL	CR1	GNR/III	GNR/III	GNR/III	S/I	GNR/III
	CR/PR >1, no prior auto-HCT	CO/III	CO/III	D/III	CO/II	S/II
	CR/PR >1, after prior auto-HCT	CO/II	CO/II	CO/III	GNR/II	S/II
	Refractory	CO/II	CO/II	CO/III	GNR/II	S/II



Conclusions

- **ALLO-SCT for patients who relapse/progress after CAR-T, but this population is very difficult to treat.**
- **CR is strongly related to the outcome post-allo**
- **ALLO-SCT can be complicated by the aggressiveness of disease, poor patient performance status and/or cytopenias, which can preclude the administration of induction therapy.**
- **Tandem CAR-T/Allo for high-risk patients. However, specific studies should be conducted in this field, using strong predictive factors of post-CAR-T cells outcome.**