Treatment of newly diagnosed MM Non-Transplant Eligible

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Disclosures

- **Thierry Facon**, University of Lille, CHU Lille, Service des Maladies du Sang, Lille, France
- Any compensation received was provided directly to CHU Lille
 - Speakers bureaus: Janssen, Bristol Myers Squibb, Takeda
 - Advisory boards: Janssen, Bristol Myers Squibb, Takeda, Sanofi, Roche, Karyopharm, Oncopeptides, Amgen

Frailty Concept and Assessment

Components of Frailty in Older Patients with Haematological Malignancies



Figure 1: Components of frailty in older patients with haematological malignancies Several examples of pathways to frailty are provided below each of the four scenarios.

Goede V, Neuendorff NR, Schulz RJ, et al. Lancet Healthy Longev 2021;2:e736-45

IMWG Frailty Score







Various frailty assessment tools

	IMWG frailty score	R-MCI	UKMRA MRP	Mayo risk score	Ancona Vulnerability Score	IFM simplified frailty scale
Biological / Clinical components	Age CCI	eGFR PFTs Frailty Age Cytogenetics	Age R-ISS CRP	Age NT- proBNP	CCI	Age CCI
Functionality tests	ADL IADL	PS (Karnofski)	PS (WHO)	PS (WHO)	PS (WHO)	ECOG
Population	Clinical trials	Clinical trials, real world	Clinical trials, real world	Real world	Real world	Clinical trials

ADL, Activities of Daily Living; CCI, Charlson Comorbidity Index; CRP, C-reactive protein; ECOG, Eastern Cooperative Oncology Group; eGFR, estimated glomerular filtration rate; IADL, Independent Activities of Daily Living; IMWG, International Myeloma Working Group; MM, multiple myeloma; NT-proBNP, N-terminal pro-brain natriuretic peptide; PFT; pulmonary function test; PS, performance status; R-ISS, Revised International Staging System; R-MCI, Revised Myeloma Comorbidity Index; UKMRA MRP, UK Myeloma Research Alliance Myeloma Risk Profile; WHO, World Health Organization

Gait speed and survival outcomes in elderly patients with hematological malignancies

Survival by gait speed

Survival by gait speed in patients with ECOG PS 0-1



Current Standards of Care

Current EHA-ESMO guidelines for the treatment of MM: frontline management of disease



ASCT, autologous stem cell transplantation; D-Rd, daratumumab + lenalidomide + dexamethasone; D-VMP, daratumumab + bortezomib + melphalan + prednisone; D-VRd, daratumumab + bortezomib + lenalidomide + dexamethasone;

D-VTd, daratumumab + bortezomib + thalidomide + dexamethasone; EHA, European Hematology Association; ESMO, European Society for Medical Oncology; Rd, lenalidomide + dexamethasone; VCd, bortezomib + cyclophosphamide + dexamethasone; VMP, bortezomib + melphalan + prednisone; VRd, bortezomib + lenalidomide + dexamethasone; VTd, bortezomib + thalidomide + dexamethasone.

Dimopoulos MA, et al. Ann Oncol. 2021;32:309-22.

Key study designs in non stem-cell transplantation NDMM



These charts are provided for ease of viewing information from multiple trials. Direct comparison between trials is not intended and should not be inferred.

^a RVd lite is phase II, others phase III.

DRd, daratumumab, lenalidomide, low-dose dexamethasone; D-VMP; daratumumab, bortezomib, melphalan, prednisone; R, randomized; SCT, stem-cell transplantation.



1. Mateos MV et al. N Engl J Med 2018;378:518–28. 2. Facon T et al. N Engl J Med 2019;380:2104–15. 3. Durie BGM et al. Lancet 2017;389:519–27. 4. O'Donnell EK, et al. Br J Haematol 2018;182:222–30.

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High-risk cytogenetics, %

PFS in Daratumumab TNE Studies

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FIGURE 1: PFS based on investigator assessment with D-VMP and VMP in the ITT population



MAIA



No. at risk

 Rd
 369
 333
 307
 280
 255
 237
 220
 205
 196
 179
 172
 156
 147
 134
 124
 114
 106
 98
 81
 64
 47
 20
 4
 2
 2
 0

 D-Rd
 368
 347
 335
 320
 300
 290
 276
 266
 256
 246
 237
 232
 223
 211
 200
 197
 188
 177
 165
 132
 88
 65
 28
 11
 3
 0

D-VMP 350 315 295 24 Mateos MV et al ASH 2022.

315 295 245 209 188 165 150 131 116 99

Kumar et al. ASH 2022



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MAIA





No. at risk

Rd 369 351 343 336 324 317 308 300 294 281 270 258 251 241 232 223 214 204 195 188 183 170 154 134 97 68 D-Rd 368 350 346 344 338 334 328 316 305 302 297 286 280 273 266 255 249 248 246 241 228 206 190 163 128 82 56 26 10 0 0

Mateos MV et al ASH 2022.

D-VMP

Kumar et al. ASH 2022

Analysis of OS in Pre-specified Patient Subgroups

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FIGURE 3: Analysis of OS in pre-specified patient subgroups

D-VMP

	n/N	Median OS (mo)	n/N	Median OS (mo)	HR	(95% CI)*
Sex					1	
Male	78/160	72.7	94/167	50.7	⊢ − ●−−−1	0.70 (0.52-0.95)
Female	82/190	83.0	113/189	55.1		0.60 (0.45-0.79)
Age					I	
<75 years	105/246	85.5	137/249	56.6		0.62 (0.48-0.80)
≥75 years	55/104	59.1	70/107	49.7	H • H	0.71 (0.50-1.01)
Race						
White	142/297	81.0	182/304	52.9	⊢ ●−−1	0.66 (0.53-0.82)
Other	18/53	NE	25/52	78.1	↓ ●	0.55 (0.30-1.01)
Region	407/000		4 == 100 =	50.0		
Europe	137/289	82.2	177/295	53.6		0.66 (0.53-0.83)
Other	23/61	NE	30/61	57.9	•	0.57 (0.33-0.98)
Baseline renal function (CrC	l)	02.0	442/244	57.0		0.74 (0.54.0.04)
>60 mL/min	92/200	83.0	113/211	57.9		0.71 (0.54-0.94)
Sou mu/min	08/150	79.2	94/145	40.1		0.55 (0.40-0.76)
Masmal	140/201	02.2	172/202	EE 7		
Inormal	20/46	OZ.Z	24/52	35.7		0.66 (0.54-0.65)
Inipalieu ISS disease stage	20/40	INE	54/52	40.7		0.51 (0.29-0.89)
I I I I I I I I I I I I I I I I I I I	18/69	NE	26/67	NE		0.52 (0.29-0.96)
ii ii	63/130	83.0	88/160	61.3		0.52 (0.25-0.50)
iii	79/142	63.0	93/129	42.3		0.57 (0.42-0.78)
Type of MM	131112	00.0	557725	1210		0.07 (0.12 0170)
løG	98/207	81.0	124/218	58.2	⊢_ ●	0.71 (0.54-0.92)
Non-IgG	43/82	72.5	51/83	46.2	⊢	0.67 (0.45-1.01)
Cytogenetic risk at study ent	trv				1	
High risk [♭]	33/53	46.2	31/45	39.5	⊢ ●	0.85 (0.52-1.38)
Standard risk	113/261	83.0	149/257	55.1		0.58 (0.45-0.74)
ECOG PS score						
0	22/78	NE	55/99	53.7	⊢● ──1	0.35 (0.21-0.57)
1-2	138/272	72.5	152/257	52.9	⊢ ●−−1 !	0.73 (0.58-0.92)
				ŗ		
				0	0.5 1.0	1.5
					Eavors D-VMP Fay	VOIS VMP

VMP

MAIA

FIGURE 3: Analysis of OS in pre-specified patient subgroups^a

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	D-Ka			(a)		
	n/N	Median OS (mo)	n/N	Median OS (mo)	HR (95% C	I) ⁶
Sex					I	
Male	86/189	NE	114/195	60.6	<u>⊢</u> • I	0.70 (0.53-0.93)
Female	64/179	NE	88/174	67.8		0.62 (0.45-0.85)
Age					I.	
<75 years	71/208	NE	101/208	77.6		0.64 (0.47-0.86)
≥75 years	79/160	73.5	101/161	54.8		0.67 (0.50-0.90)
Race						,
White	138/336	NE	181/339	65.4	⊢ •−1 ↓	0.69 (0.55-0.86)
Other	12/32	NE	21/30	49.1	⊢ ●───┤ .	0.43 (0.21-0.88)
Region						,
North America	40/101	NE	61/102	54.8		0 54 (0 36-0 80)
Other	110/267	NE	141/267	66.4		0.71 (0.55-0.91)
Baseline renal function (CrC	'h		1111207	00.1		017 1 (0100 0101)
>60 ml /min		NE	113/227	69.7	⊢ ●−−1	072(055-096)
<60 mL/min	67/162	NE	89/1/2	54.8		0.56(0.41-0.77)
Baseline benatic function	0//102	TVL.	05/142	54.0		0.50(0.41-0.77)
Normal	132/335	NE	188/340	63.8		0.62 (0.49-0.77)
Impaired	18/31	63.5	14/29	73.8		1 29 (0 64-2 60)
ISS disease stage	10/51	05.5	14/25	75.0		1.25 (0.04-2.00)
I I I I I I I I I I I I I I I I I I I	28/98	NE	36/103	NE		0.78 (0.48-1.28)
ii.	64/163	NE	88/156	61.7		0.59 (0.43-0.81)
	59/107	65.2	79/110	47.2		0.55(0.450.01)
Type of MM	56/10/	05.2	/0/110	47.5		0.00(0.47-0.93)
laG	02/225	NE	120/221	68.6		074 (0 56 0 97)
Non IgG	20/74	NE	120/251	E2 7		0.74(0.30-0.37)
Cuto gon otic rick at study on	25/74	INE	40/70	55.7		0.54(0.54-0.65)
Light rick	20/40	556	26/11	42 E		0.65 (0.20.1.06)
Standard rick	105/271	55.0	147/270	42.5		0.03 (0.39-1.00)
Stanuaru TISK	103/2/1	INE	14/12/9	03.5		0.04 (0.50-0.82)
o o o o o o o o o o o o o o o o o o o	27/127	NE	40/122	NE		0.60/0.45 1.00
1	3//12/	NE	49/123	INE ER D		0.69 (0.45-1.06)
1	/0/1/8	INE C1 O	10/18/	58.5		0.62 (0.47-0.84)
22	37/63	61.9	43/59	39.0		0.84 (0.41-1.00)

Favors D-Rd Favors Rd

OS by MRD Status

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No. at risk																
VMP MRD negative	25	25	25	25	25	24	23	22	19	17	15	15	12	9	3	0
D-VMP MRD negative	99	99	98	96	92	88	84	80	76	70	67	64	64	45	10	0
VMP MRD positive	331	299	286	266	243	218	193	175	148	131	118	109	100	61	12	0
D-VMP MRD positive	251	228	220	205	196	187	174	164	151	135	116	106	98	67	14	0

MAIA



No. at risk																
Rd MRD negative	41	41	41	41	40	39	36	35	34	32	32	29	14	3	0	0
D-Rd MRD negative	118	117	117	116	115	114	113	110	107	106	99	86	55	22	3	0
Rd MRD positive	328	302	283	267	254	231	215	197	180	163	151	125	83	32	3	0
D-Rd MRD positive	250	229	221	212	190	183	167	156	142	140	129	104	73	34	7	0

Daratumumab plus lenalidomide and dexamethasone (D-Rd) vs lenalidomide and dexamethasone (Rd) in transplant-ineligible newly diagnosed multiple myeloma (NDMM): frailty subgroup analysis of MAIA



Frail

Rd (total non-frail) 200 188 173 159 142 134 124 117 115 104 105 100 183 176 171 168 161 157 151

HR 0.62; 95% CI, 0.45-0.85; P = 0.003

%

Patients at ris



Safety

	Total I (n=	Non-frail =395)	Frail (n=334)		
n (%)	D-Rd (n=196)	Rd (n=199)	D-Rd (n=168)	Rd (n=166)	
Patients with a TEAE with outcome of death	7 (4)	7 (4)	20 (12)	20 (12)	
Patients with a serious TEAE	123 (63)	126 (63)	125 (74)	121 (73)	
Treatment discontinuations due to TEAEs	13 (7)	31 (16)	17 (10)	32 (19)	
Deaths	26 (13)	46 (23)	57 (34)	57 (34)	

Our findings, although based on a retrospective assessment of frailty, support the clinical benefit of D-Rd in patients with transplant-ineligible NDMM enrolled in MAIA, regardless of frailty status

Facon et al. Leukemia published online Jan 2, 2022

VRD- A SOC for those who do not have access to CD38 ? SWOG 0777: PFS with RVd versus Rd

Age (years)	RVd	Rd
< 65	48	34
≥ 65	34	24
> 75	34	17

Median PFS (months)¹

Long term FU^2 OS in pts \geq 65 years: HR 0.769, p 0.168



1. Durie B et al. Blood 2018;132:1992; 2. Durie B et al. Blood Cancer J 2020;10:53

Modified RVd (RVd-lite) in TNE Patients



RVd-lite is Investigational only, not approved.

^a The first 10 patients received bortezomib i.v. for cycle 1 only followed by s.c. administration; subsequent patients received bortezomib

s.c.; $^{b}6\%$ of patients received < 4 cycles of therapy and were therefore not evaluable.

AE, adverse event; CR, complete response; d, dexamethasone; ECOG PS, Eastern Cooperative Oncology Group Performance status; ISS, International Staging System; MR, minimal response; ORR, overall response rate; PFS, progression-free survival; R, lenalidomide; sCR, stringent complete response; TTR, time to response; V, bortezomib; VGPR, very good partial response

O'Donnell EK et al. Br J Haematol 2018;182:222-30. O'Donnell EK et al. ASH 2019; abstract 3178.

Discontinuation Strategies (1)

IFM 2017-03 for frail NDMM patients - A dexamethasone sparing study





Randomization will be stratified by International Staging System (I vs II vs III) and age (<80 vs ≥80

In Arm A low-dose dex (20mg/week) during Cycle 1 and 2 then methylprednisolone (with SC dara)

LT, long term; OS, overall survival; PD, progressive disease; PFS, progression-free survival; Q, every; SC, subcutaneous; Tx, treatment

https://clinicaltrials.gov/ct2/show/NCT03993912 Manier et al ASH 2022

IFM 2017-03 – Patients characteristics

Characteristics	DR group (N=199)	Rd group (N=94)	IFM frailty	score	IMWG frailty score
Median age (range) - yr	81 (68-92)	81 (68-90)	ii wi maney	30010	
Age category – no. (%)					
65 to < 70 yr	2 (1%)	2 (2%)			0 = fit – (2%)
70 to < 75 yr	30 (15%)	13 (14%)			
75 to < 80 yr	49 (25%)	19 (20%)			1 internedicte (040/
≥ 80 yr	118 (59%)	61(65%)	2 = frail		1 = Intermediate - (21%)
Sex - no. (%)					
Female	101 (51%)	48 (51%)			
Male	98 (49%)	46 (49%)			
ECOG – no. (%)					
0	21 (10%)	9 (10%)			
1	93 (46%)	47 (50%)			
2	86 (44%)	38 (40%)	3 = frail		
Charlson – no. (%)					
≤1	113 (58%)	57 (61%)			>2 - frail - (77%)
>1	87 (42%)	37 (39%)			22 = 11an - (1776)
IFM frailty score – no. (%)					
≤1	0	0			
2	57 (29%)	35 (37%)			
3	81 (41%)	26 (28%)	4/5 = frail		
4	44 (22%)	24 (26%)			
5	17 (9%)	9 (10%)			

IFM 2017-03 – Best response rate



IFM 2017-03 – Most common grade ≥3 AEs

	DR group (n=199) Grade ≥ 3	Rd group (n=94) Grade ≥ 3	P value
All grade ≥ 3 AEs, % (n)	82% (164)	68% (64)	0.010
SAE, % (n)	55% (109)	63% (59)	0.21
Hematologic, % (n)	55% (109)	26% (24)	<0.0001
anemia	11% (21)	2% (2)	0.010
neutropenia	46% (91)	18% (17)	<0.0001
thrombocytopenia	9% (18)	3% (3)	0.089
Infection, % (n)	13% (26)	18% (17)	0.29
non-COVID infections			
pneumonia	3% (5)	7% (7)	0.060
COVID	5% (9)	4% (4)	1

	DR group (n=199)	Rd group (n=94)	P value
Treatment discontinuation for AE, % (n)	14% (27)	16% (15)	0.65

Treatment Landscape and Perspective in Newly Diagnosed Transplant-Ineligible Patients: Regimens, Date of Approval (EMA), and Overall Survival



*Publication date, not an approval date; *NCT03319667 and NCT03652064.

CAR-T, chimeric antigen receptor T cell; Dara, daratumumab; DRd, daratumumab-lenalidomide-dexamethasone; D-VMP, daratumumab plus bortezomib-melphalan-prednisone; EMA, European Medicines Agency; IMiD, immunomodulatory drug; Isa, isatuximab; MP, melphalan-prednisone; MPT, melphalan-prednisone-thalidomide; MRD, minimal residual disease; Rd, lenalidomide-dexamethasone; VMP, bortezomib-melphalan-prednisone; VRd, bortezomib-lenalidomide-dexamethasone.

Facon, Leleu, Manier, Blood 2023 in press

IMROZ (EFC12522) and CEPHEUS (MMY3019): study designs



No cross-trial comparison is intended with this data.

CR, complete response; d, dexamethasone; HDT-ASCT, high-dose therapy and autologous stem cell transplantation; ISA, isatuximab; MRD, minimal residual disease; ORR, overall response rate; OS, overall survival; PFS, progression-free survival; QoL, quality of life; R, lenalidomide; SC subcutaneous; VGPR, very good partial response; V, bortezomib

Available from: https://clinicaltrials.gov/ct2/show/NCT03319667. Accessed June 2019.
 Available from: https://clinicaltrials.gov/ct2/show/NCT03652064. Accessed June 2019.

Frontline immunotherapies for TNE MM Patients

MajesTEC-7

MagnetisMM-6

Conclusion

- CD38 Abs- containing regimens are now SOC for elderly patients with NDMM.
- DRd is currently the most effective regimen and has an acceptable safety profile including for frail patients
- VRD remains a SOC if there is no access to CD38 Abs.
- Excluding patients from receiving CD38 Abs-based immunotherapy because of age and/or frailty is questionable because CD38 Abs are effective, manageable, and improve QoL.
- Planned/Ongoing studies investigating CART and Bispecific Abs

MAIA - Subgroup Analysis of PFS

- A total of 737 patients were randomly assigned to either D-Rd (n = 368) or Rd (n = 369) and were included in the intent-to-treat (ITT) population
- Most subgroups had a similar number of patients in each treatment arm
- After a median followup of 64.5 months, PFS favored D-Rd versus Rd in most subgroups (Figure 1)

FIGURE 1: Subgroup analysis of PFS in the ITT population

	D	-Rd	I	Rd		
	n/N	Median PFS (mo)	n/N	Median PFS (mo)	– HR (95% CI) ^a
ITT (overall)	176/368	61.9	228/369	34.4	+●+	0.55 (0.45-0.67)
Baseline characteristic						. ,
Age ≥75 years	87/160	54.3	106/161	31.4	⊢ ●	0.59 (0.44-0.79)
ISS stage III	61/107	42.4	73/110	24.2	⊢• i	0.61 (0.43-0.86)
Renal insufficiency	82/162	56.7	92/142	29.7		0.55 (0.41-0.75)
Extramedullary plasmacytomas	7/15	57.5	5/9	19.4	⊢ − − − − − − − − − −	0.47 (0.15-1.50)
Cytogenetic risk					I	
Standard cytogenetic risk	126/271	63.8	174/279	34.4	He-I	0.51 (0.41-0.64)
High cytogenetic risk	28/48	45.3	31/44	29.6	⊢ ● I	0.57 (0.34-0.96)
Revised standard cytogenetic risk	78/176	NR	115/187	35.1		0.50 (0.37-0.66)
Revised high cytogenetic risk	82/156	56.0	96/152	30.7	⊢● →	0.59 (0.44-0.80)
Gain(1q21)	20/53	NR	28/44	37.8	⊢ − ●−−1	0.43 (0.24-0.76)
Amp(1q21)	48/74	40.0	45/76	26.1		0.81 (0.54-1.21)
Gain(1q21) or amp(1q21)	68/127	53.2	73/120	32.3		0.63 (0.46-0.88)
1 HRCA	68/137	61.4	86/137	31.2		0.55 (0.40-0.76)
≥2 HRCAs	14/19	24.9	10/15	24.0	⊢ 	0.92 (0.40-2.10)
Isolated gain(1q21)	16/47	NR	27/42	37.8		0.36 (0.19-0.67)
Isolated amp(1q21)	38/61	42.8	38/65	28.9	⊢ _●_ ↓ _	0.78 (0.50-1.22)
Isolated gain(1q21) or amp(1q21)	54/108	61.4	65/107	37.1	⊢ ● → !	0.58 (0.40-0.83)
Gain(1q21) or amp(1q21) plus ≥1 HRCA	14/19	24.9	8/13	24.0	⊢	1.03 (0.42-2.48)
					[
					0.1 1 10)
					$\longleftarrow \longrightarrow$	

Favors D-Rd Favors Rd

PFS, progression-free survival; ITT, intent-to-treat; D-Rd, daratumumab plus lenalidomide/dexamethasone; Rd, lenalidomide/dexamethasone; HR, hazard ratio; CI, confidence interval; ISS, International Staging System; NR, not reached; HRCA, high-risk cytogenetic abnormality.

^aHR and 95% CI from a Cox proportional hazards model with treatment as the sole explanatory variable. HR <1 indicates an advantage for D-Rd.

IFM 2021-01 – study design

Phase 2

 \geq 30% CRS grade \geq 3 \geq 50% infection grade \geq 3 (except COVID) ORR \leq 50%

PFS in MAIA, patients < 70 y

• The PFS benefit of D-Rd versus Rd was most pronounced in the subgroup of patients aged <70 years

FIGURE 1: PFS with D-Rd and Rd for (A) subgroups of patients aged <70 years and ≥70 to <75 years and (B) the overall subgroup of patients aged <75 years

MAIA: LS Mean Change From Baseline in EORTC QLQ-C30 Scores Over Time in Frail TNE Patients With NDMM

Median follow-up, 64.5 months

More patients remained on D-Rd²/₂'s Rd after cycle 42

- Patients treated with D-Rd showed large reductions in pain from baseline (>20-point change)
- Pain symptoms improved more with D-Rd vs Rd

- Fatigue moderately improved with D-Rd and Rd
- The triplet regimen D-Rd did not increase fatigue

Improvement

VRd or Rd in L1 – TNT according to age RWE – IFM real life registry

TNT median, months

• Rd

- 29.4 mo. [14,4-ND] < 75 y (n=50)
- 29.5 mo. [20,1-ND] ≥ 75 y (n=110)

• VRd

- 34.7 mo. [27,8 ND] <75 y (n=127)
- 17.1 mo. [9,3-ND] ≥ 75 y (n=30)