

**MM
2023**

- 1 Diagnosis, first line – M.C. Vekemans
- 2 **First relapse - M.C. Vekemans**
- 3 Second relapse and beyond - N. Kint

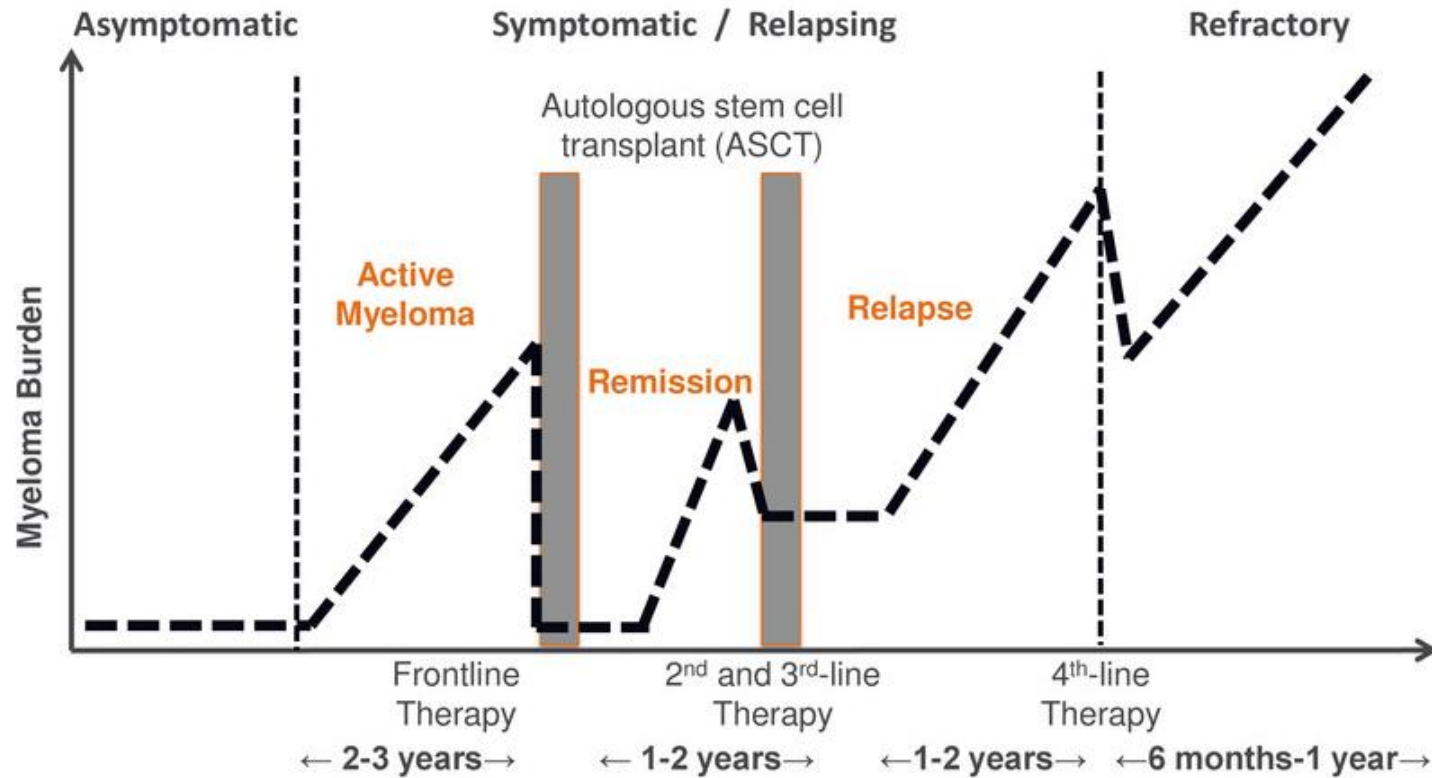
BHS Course
22 April 2023

Disclosures

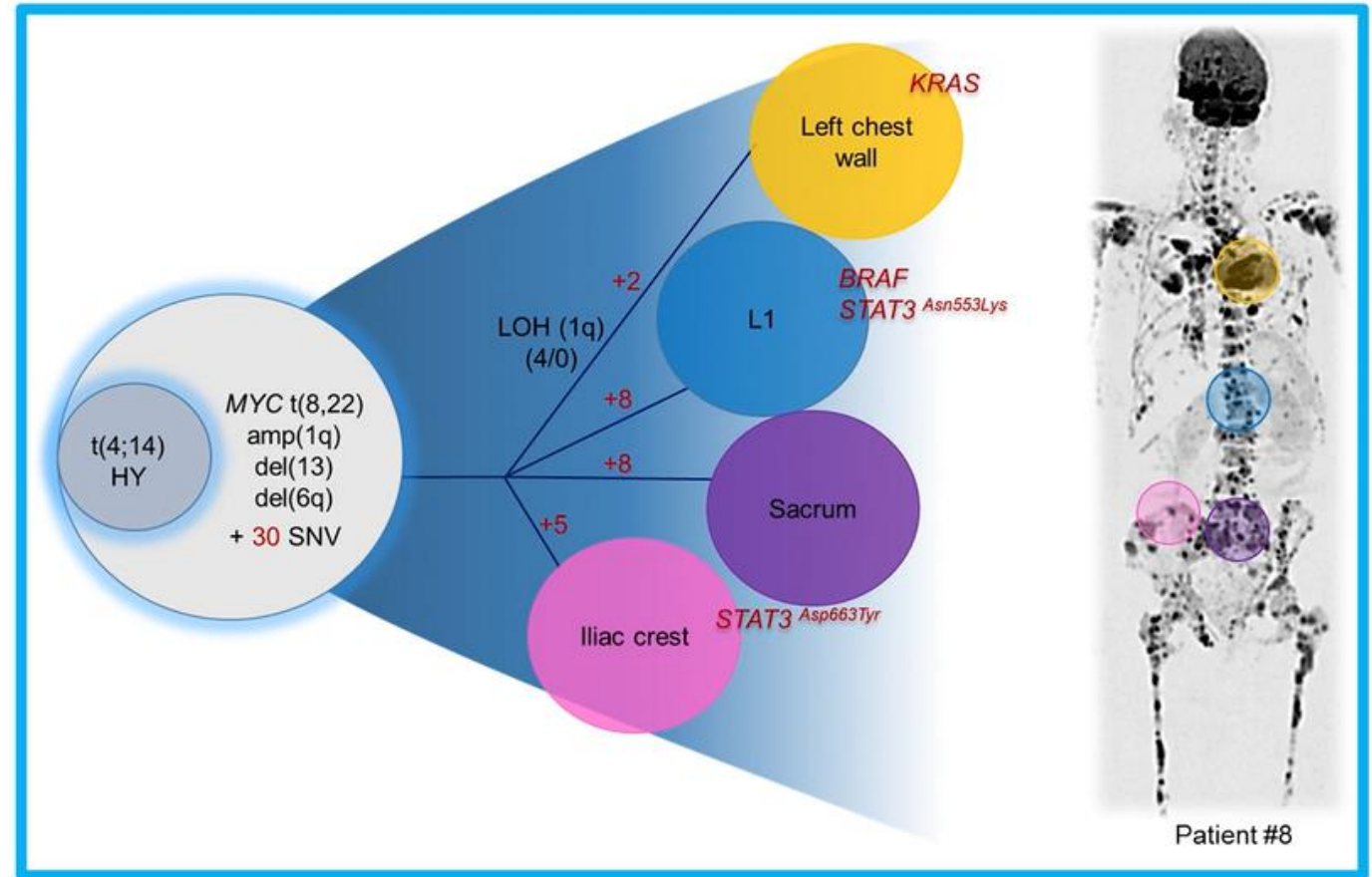
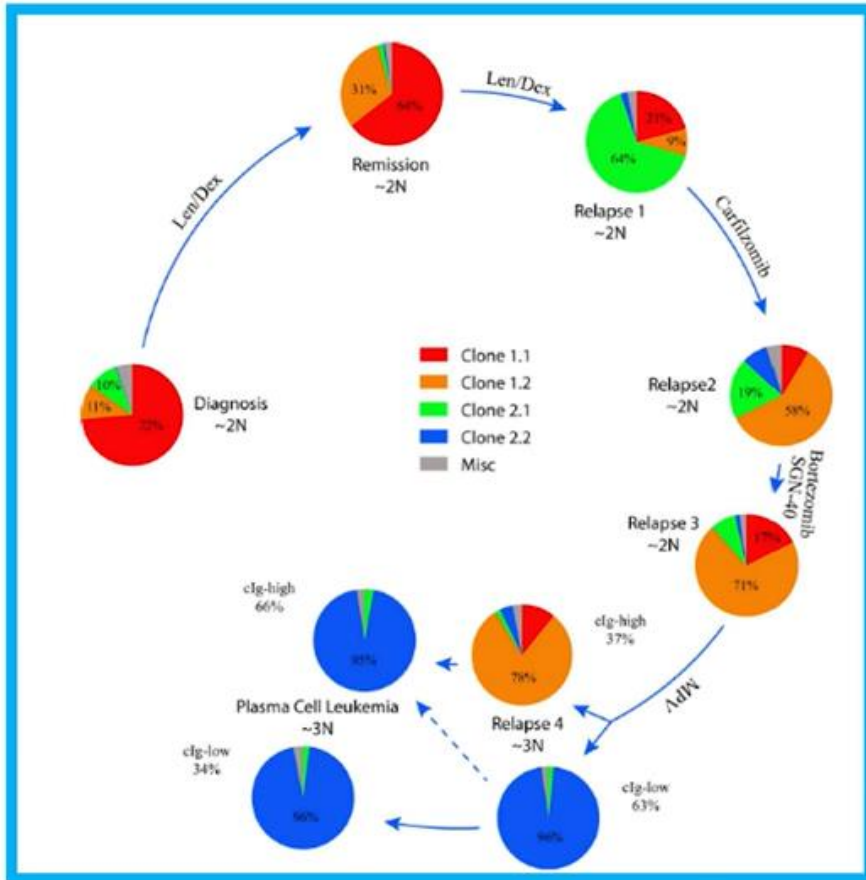
Advisory board of BMS-Celgene, Janssens, Sanofi, Amgen, Takeda, Pfizer, GSK



Natural course of MM



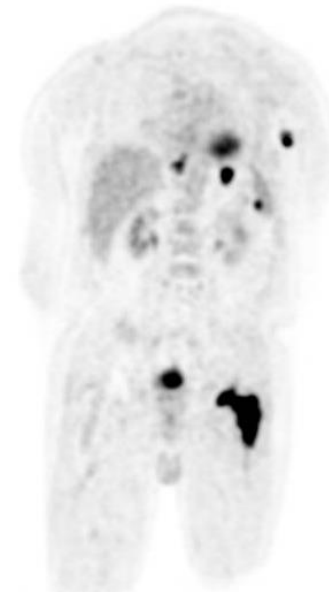
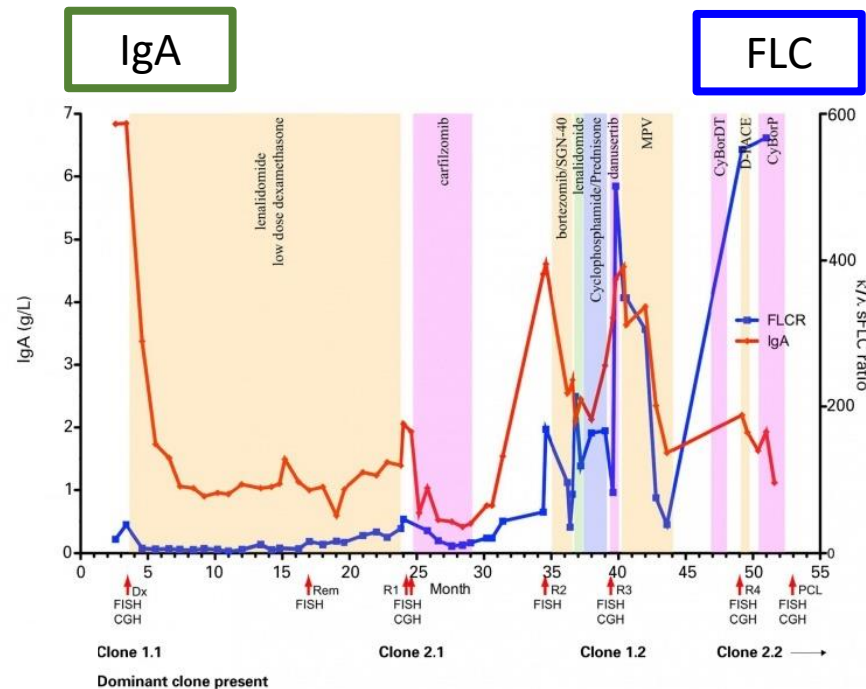
Increasing clonal heterogeneity when MM relapses



Nature of relapse

Shift on presentation

- Intact Ig to light chain only
- Non secretory relapse
- Extramedullary disease



Agenda

1

Definition

2

Context of relapse

3

Indication of therapy and work up at relapse

4

ASCT

5

ESMO guidelines

Definition of relapse

Progressive disease⁴

Any one or more of the following criteria:

- Increase of 25% from lowest confirmed response value in one or more of the following criteria:
 - Serum M protein (absolute increase must be ≥ 0.5 g/dL)
 - Urine M protein (absolute increase must be ≥ 200 mg/24 hours)
 - In patients without measurable serum and urine M protein levels, the difference between involved and uninvolved FLC levels (absolute increase must be > 10 mg/dL)
 - In patients without measurable serum and urine M protein levels and without measurable involved FLC levels, BM plasma cell percentage irrespective of baseline status (absolute increase must be $\geq 10\%$)
- Serum M protein increase ≥ 1 g/dL, if the lowest M component was ≥ 5 g/dL
- Appearance of a new lesion(s), $\geq 50\%$ increase from nadir in SPD* of > 1 lesion, or $\geq 50\%$ increase in the longest diameter of a previous lesion > 1 cm in short axis
- $\geq 50\%$ increase in circulating plasma cells (minimum of 200 cells/ μ L) if this is the only measure of disease)

Refractory⁵

Disease that becomes non-responsive or progressive on therapy or within 60 days of the last treatment in patients who had achieved an MR⁺ or better on prior therapy.

Primary refractory³

Refractory disease in patients who have never achieved an MR with any therapy. These include patients who never achieve an MR or better, for whom there is no significant change in the M protein concentration and no evidence of clinical progression.

Indication of therapy

2 clear scenarios

Fast, symptomatic relapse

- Symptoms
- Rapidly progressing disease
- High tumor burden
- Organ involvement
- HR cytogenetics
- Poor PS



**Prompt treatment
initiation**

Slow, asymptomatic relapse

- No symptoms
- Slowly progressive disease
- Low tumor burden
- LR cytogenetics
- Good PS

**Patients with biochemical
progression only may not need
immediate therapy**

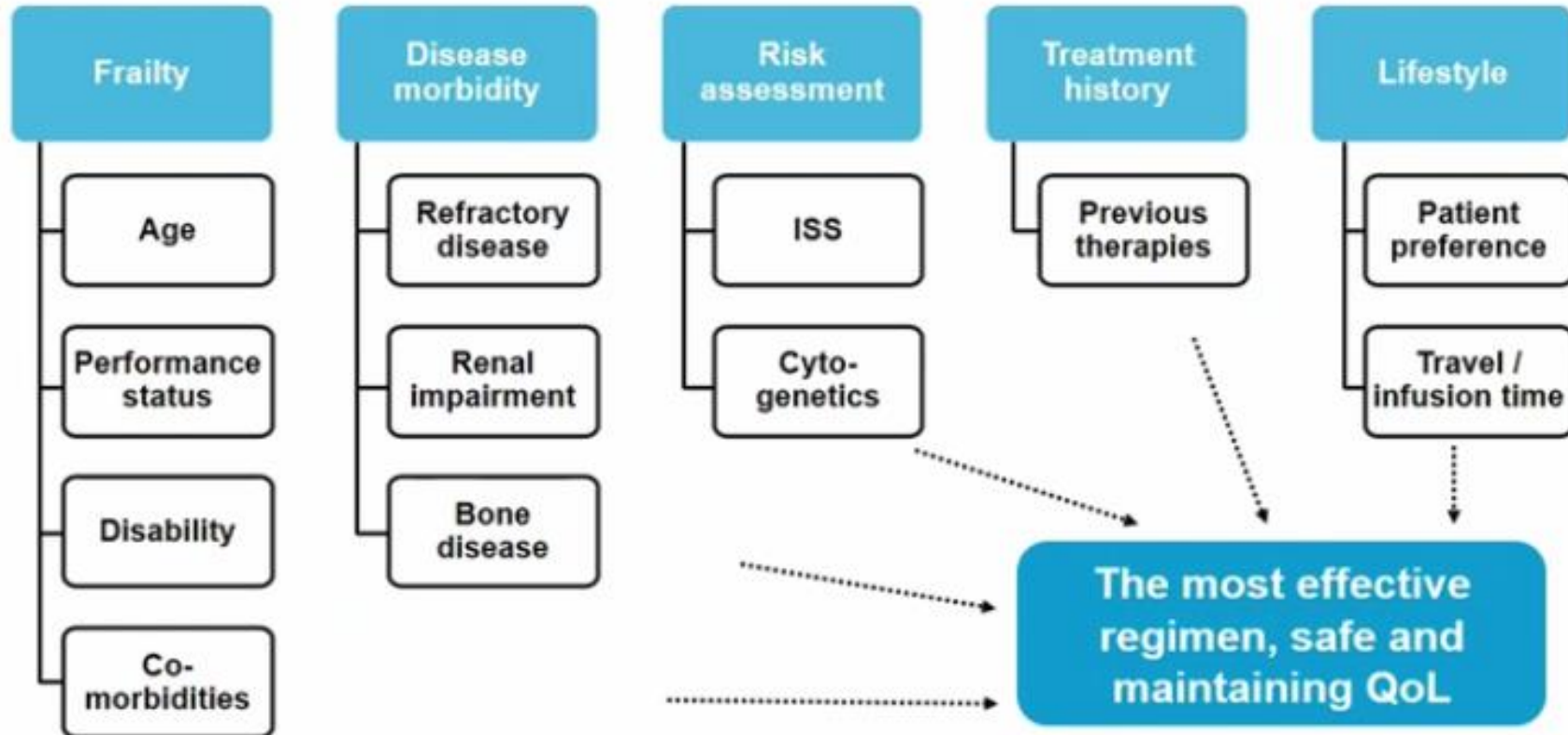
Observation

!
avoid
irreversible
organ damage
or disease related
complications

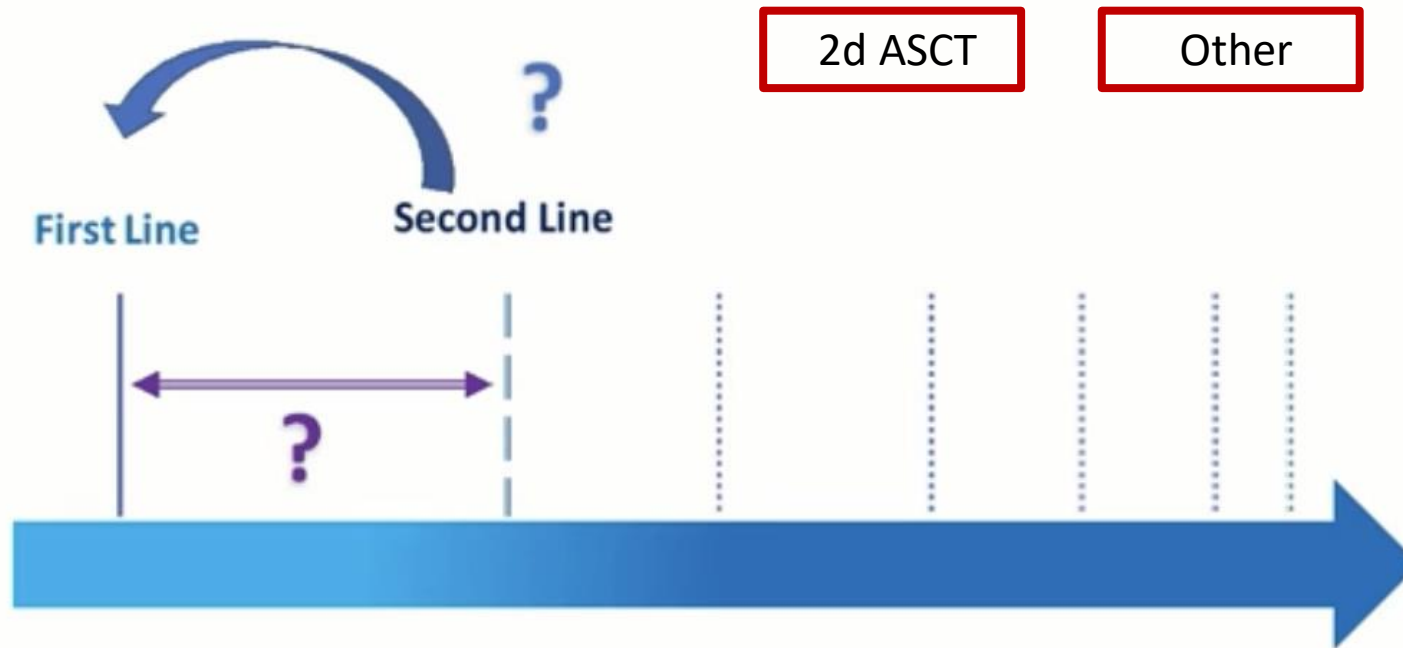
Patient evaluation at relapse

Biology	Complete blood count Renal and liver function Serum and urine paraprotein
Bone marrow	Not mandatory but recommended (cytopenias, non secretory MM) FISH at physician discretion
Lytic bone lesions	WBLD-CT (standard) (conventional X-ray) MRI (greater details (focal lesions), cord compression) PET-CT

Factors to consider at relapse



Factors to consider at relapse



How to select the best treatment ?

Second ASCT

ORIGINAL ARTICLE

Early relapse after autologous hematopoietic cell transplantation remains a poor prognostic factor in multiple myeloma but outcomes have improved over time

SK Kumar¹, A Dispenzieri¹, R Fraser², F Mingwei², G Akpek³, R Comell⁴, M Kharfan-Dabaja⁵, C Freytes⁶, S Hashmi¹, G Hildebrandt⁷, L Holmberg⁸, R Kyle¹, H Lazarus⁹, C Lee¹⁰, J Mikhael¹¹, T Nishihori⁵, J Tay¹², S Usmani¹³, D Vesole¹⁴, R Vij¹⁵, B Wirk¹⁶, A Krishnan¹⁷, C Gasparetto¹⁸, T Mark¹⁹, Y Nieto^{11,20}, P Hari² and A D'Souza²

- 3256 MM patients relapsing after ASCT
- Proportion of patients relapsing early was stable over time

Duration of initial response remains a strong prognostic factor of OS

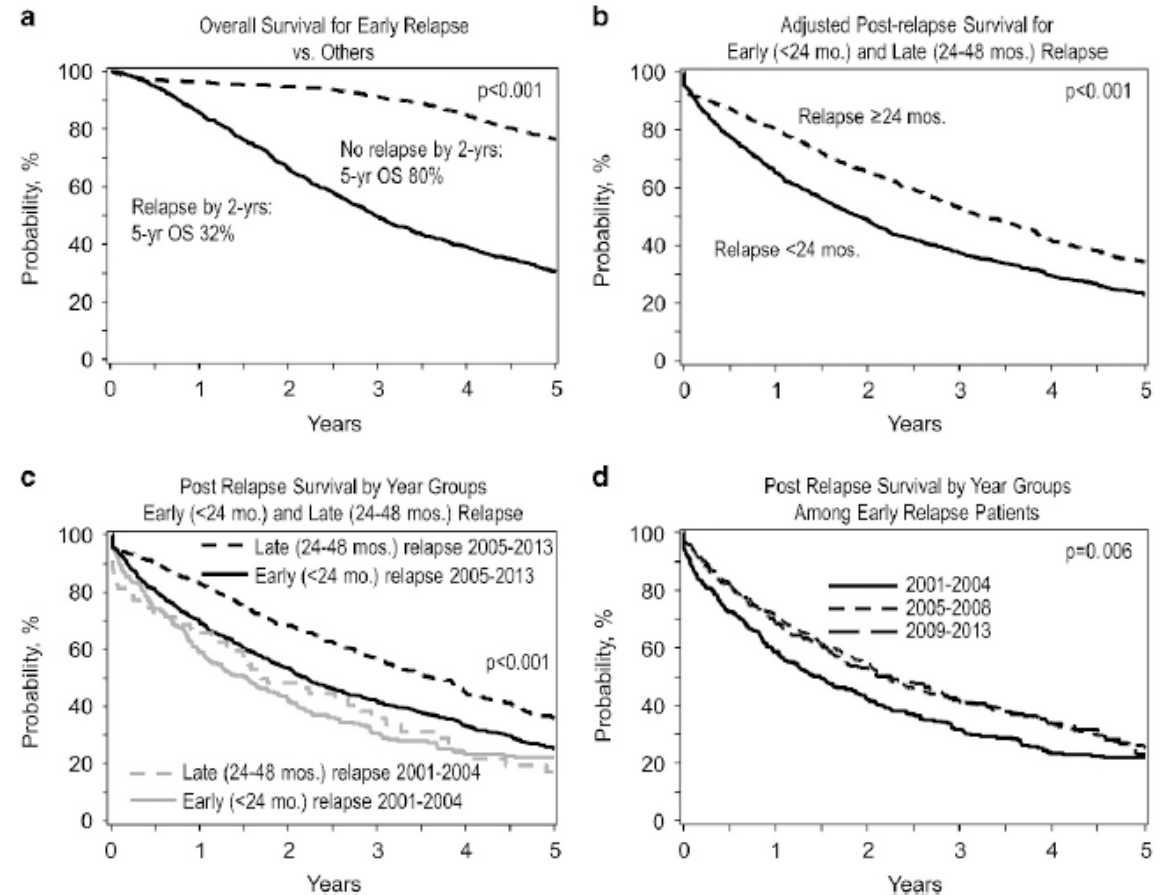
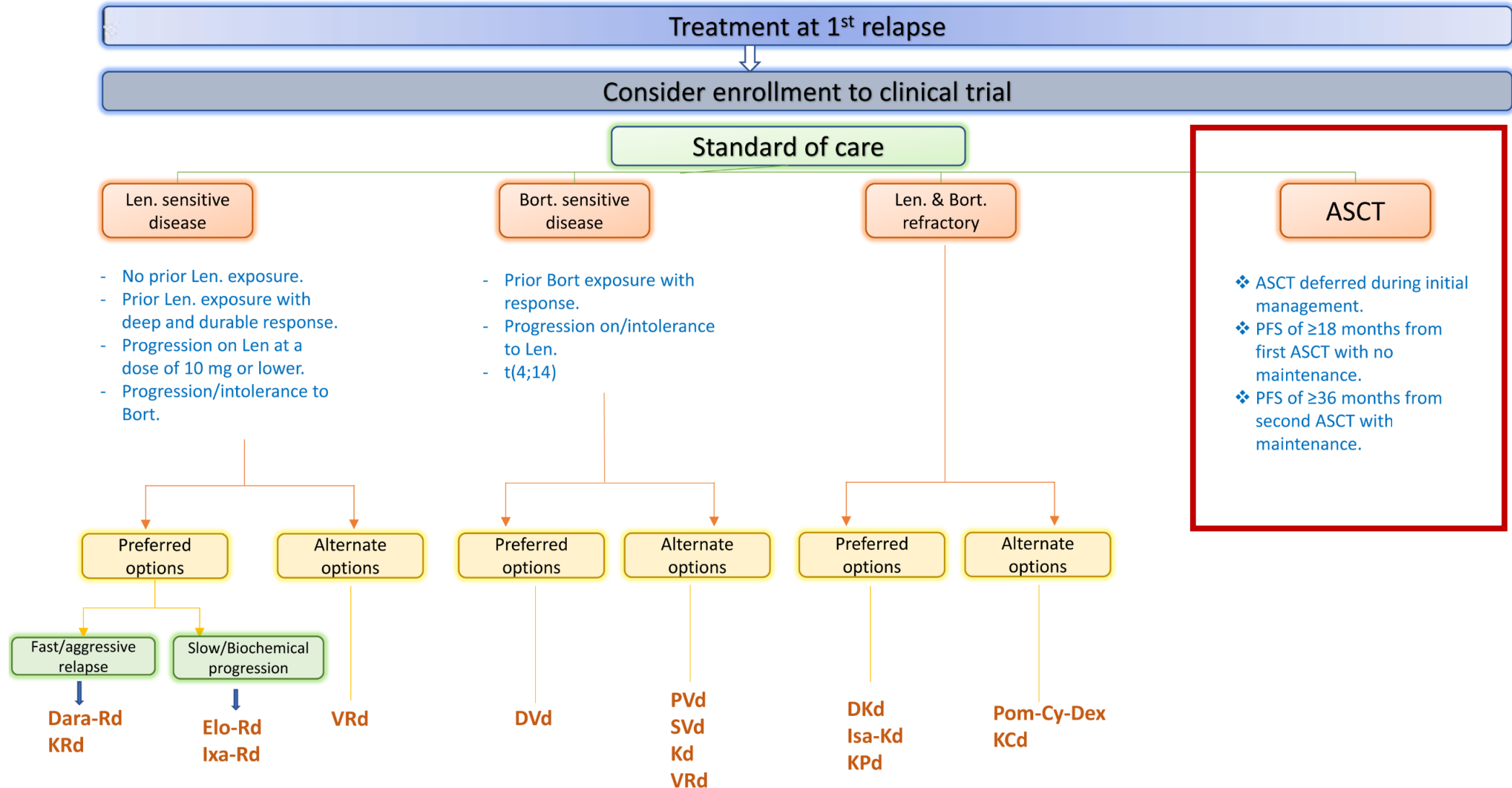


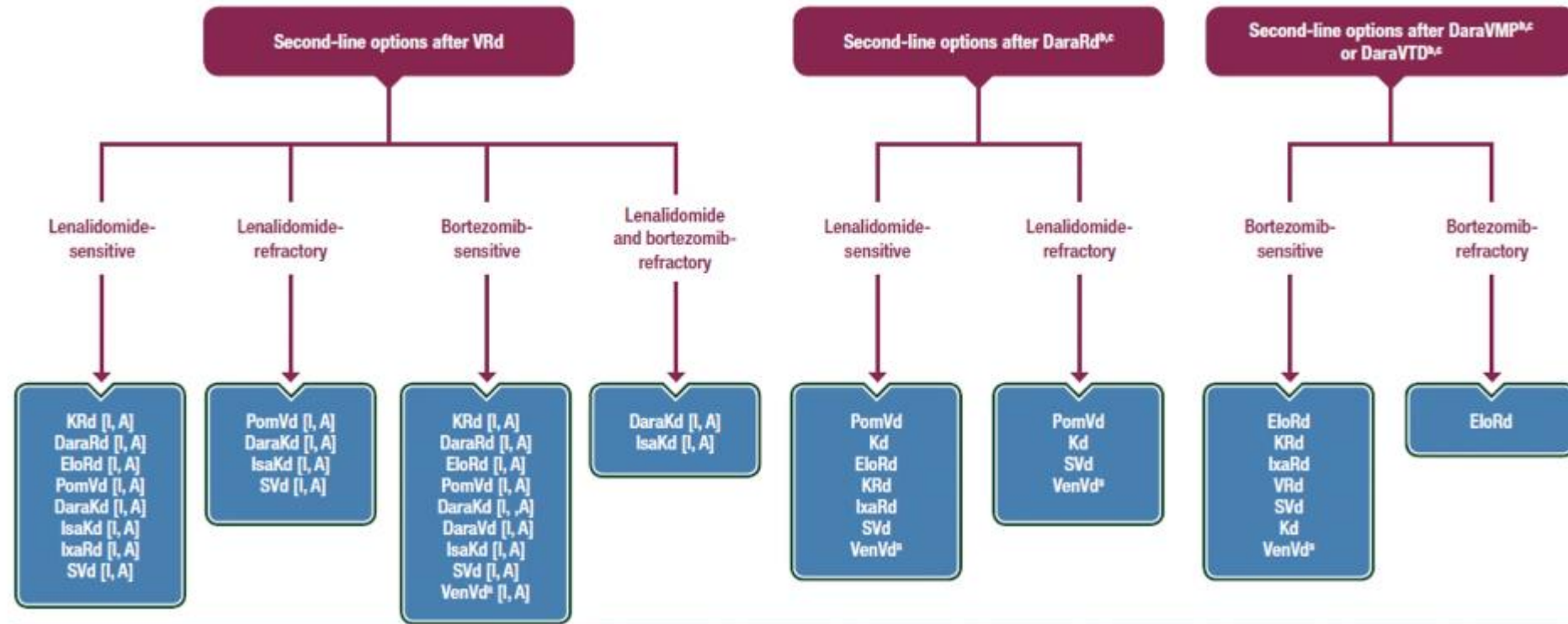
Figure 2. (a) Overall survival from diagnosis among patients with early relapse (< 24 months) and late relapse (> 24 months). (b) Post-relapse survival for early relapse patients (relapse within 24 months) compared to those with a late relapse. (c) Post-relapse survival for early relapse patients who relapsed within 24 months grouped by relapse year 2005. (d) Post-relapse survival for early relapse patients who relapsed within 24 months, grouped by the date of AHCT (2001–2004, 2005–2008, 2009–2013).

Second ASCT



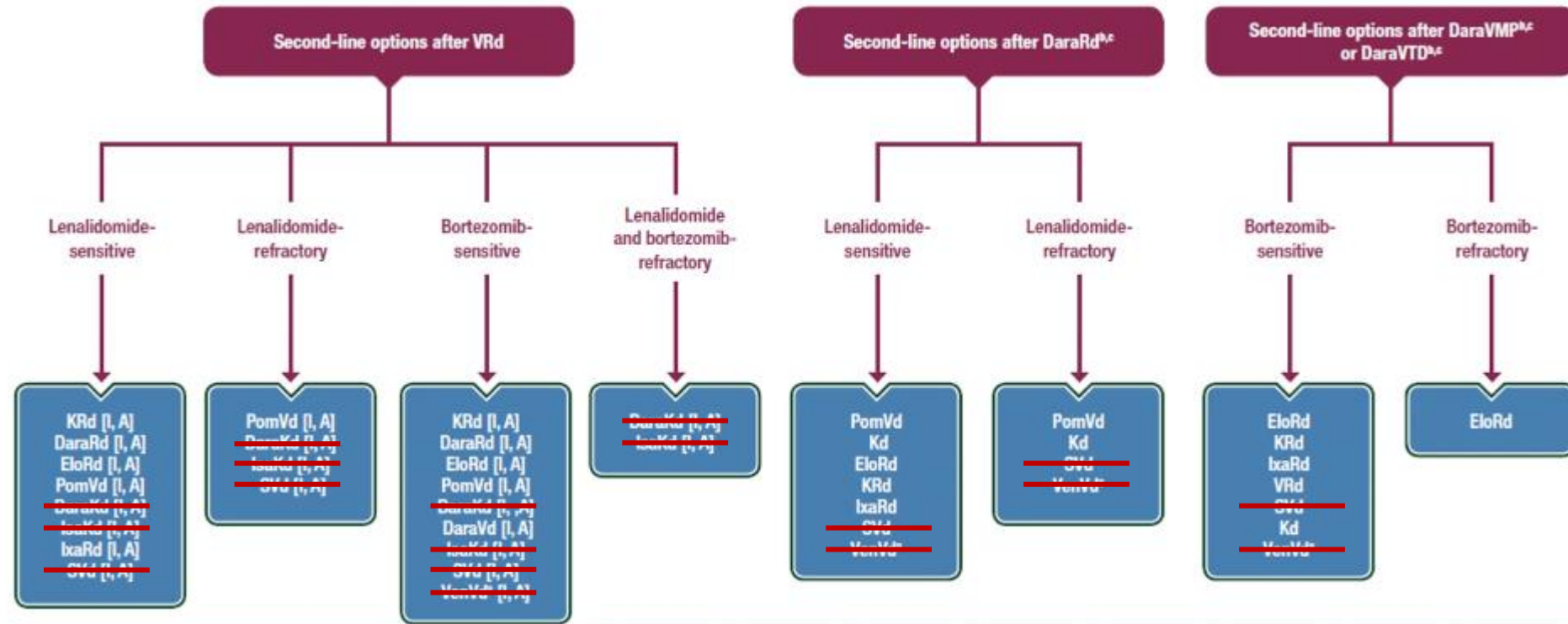
First relapse

Treatment options ESMO 2021



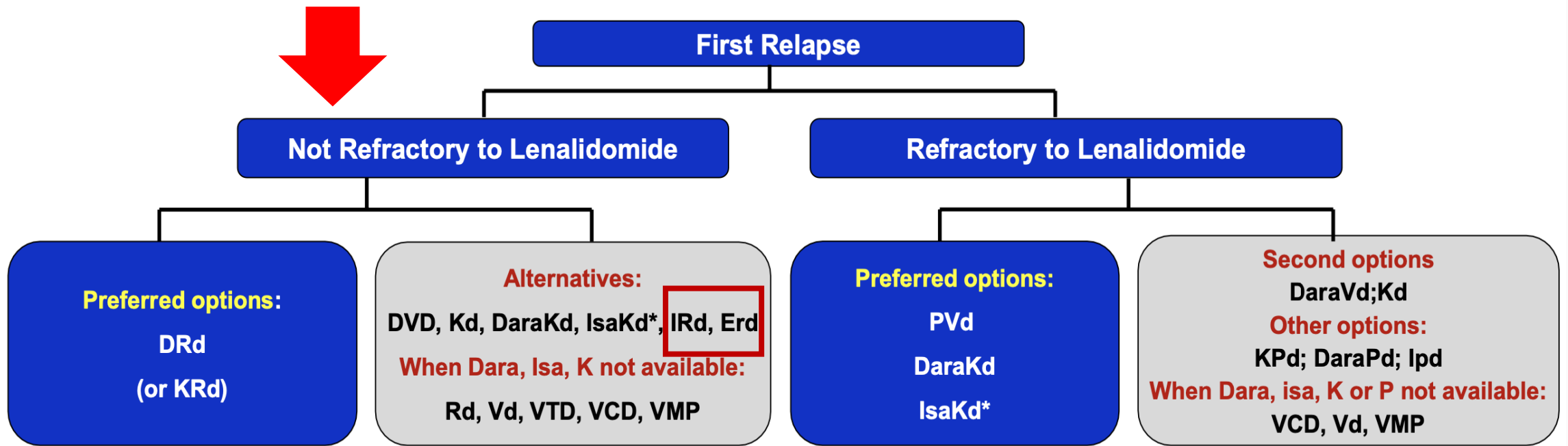
First relapse

Treatment options ESMO 2021



First relapse

IMW recommendations



Consider salvage auto transplant in eligible patients

First relapse

LEN-based studies

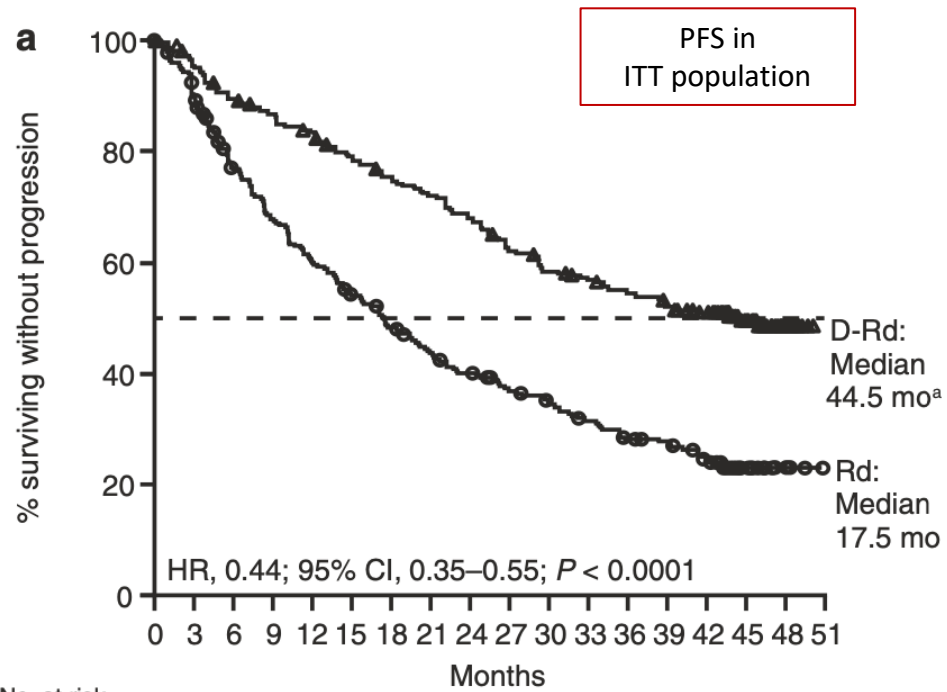


	POLLUX DRd vs. Rd	ASPIRE KRd vs. Rd	ELOQUENT2 EloRd vs. Rd	TOURMALINE IRd vs. Rd
Prior LOT	1 (1-11)	2 (1-3)	2 (1-4)	(1-3)
PFS HR (95% CI)	0.37 (0.27-0.52)	0.69 (0.57-0.83)	0.73 (0.60-0.83)	0.74 (0.59-0.94)
\geq CR	43 vs. 19%	32 vs. 14%	14 vs. 7%	12 vs. 7%
PFS months	44.5 vs. 17.5	26.3 vs. 17.6	19.4 vs. 14.9	20.6 vs. 14.7

HR PFS of 0.37, the lowest hazard ratio ever seen in a myeloma trial to date

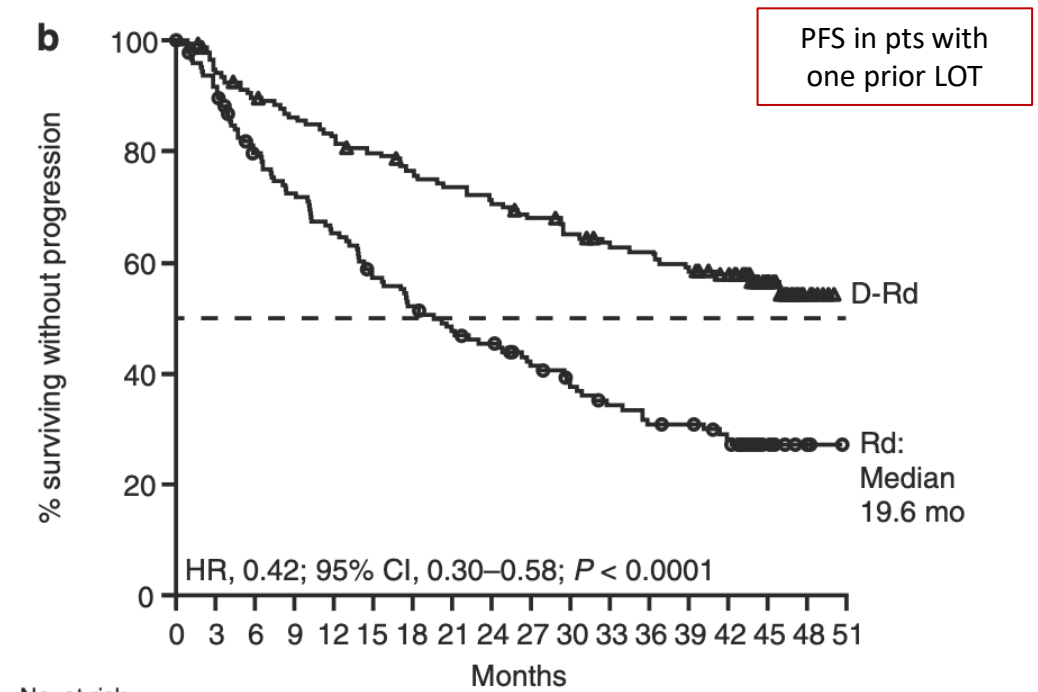
POLLUX

LEN-based studies



No. at risk

Rd	283	249	206	181	160	144	127	112	102	91	83	75	66	63	53	20	4	0
D-Rd	286	266	249	238	229	215	204	195	184	168	156	151	143	135	123	54	11	0

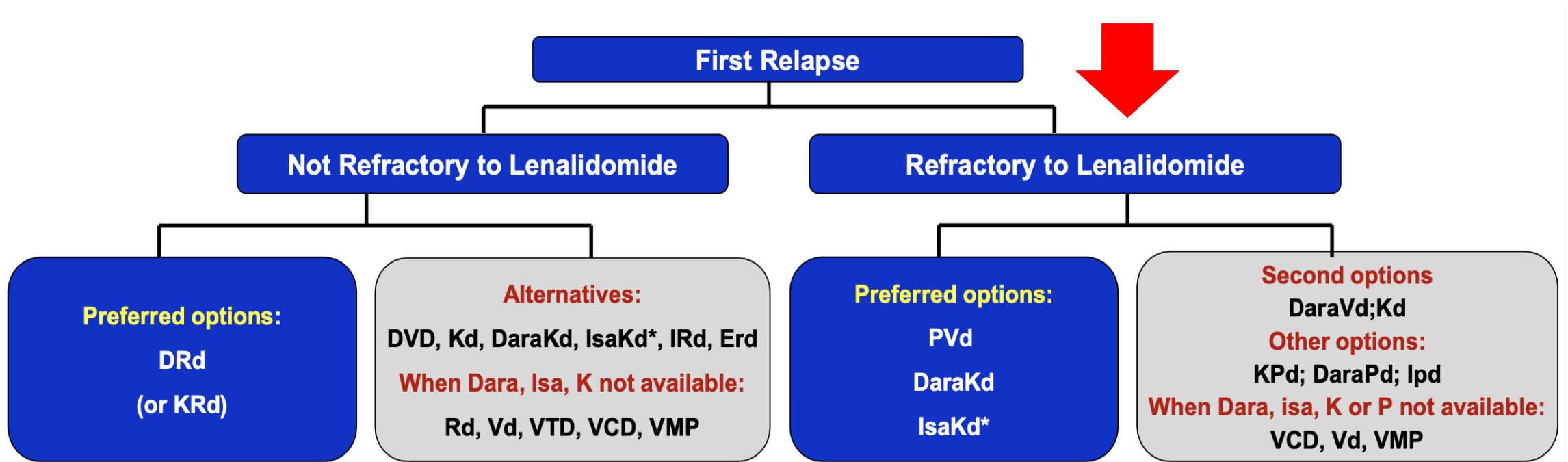


No. at risk

Rd	146	132	110	100	90	78	71	64	60	52	45	40	36	35	30	11	3	0
D-Rd	149	137	129	123	118	113	107	103	99	94	89	85	83	79	71	31	7	0

First relapse

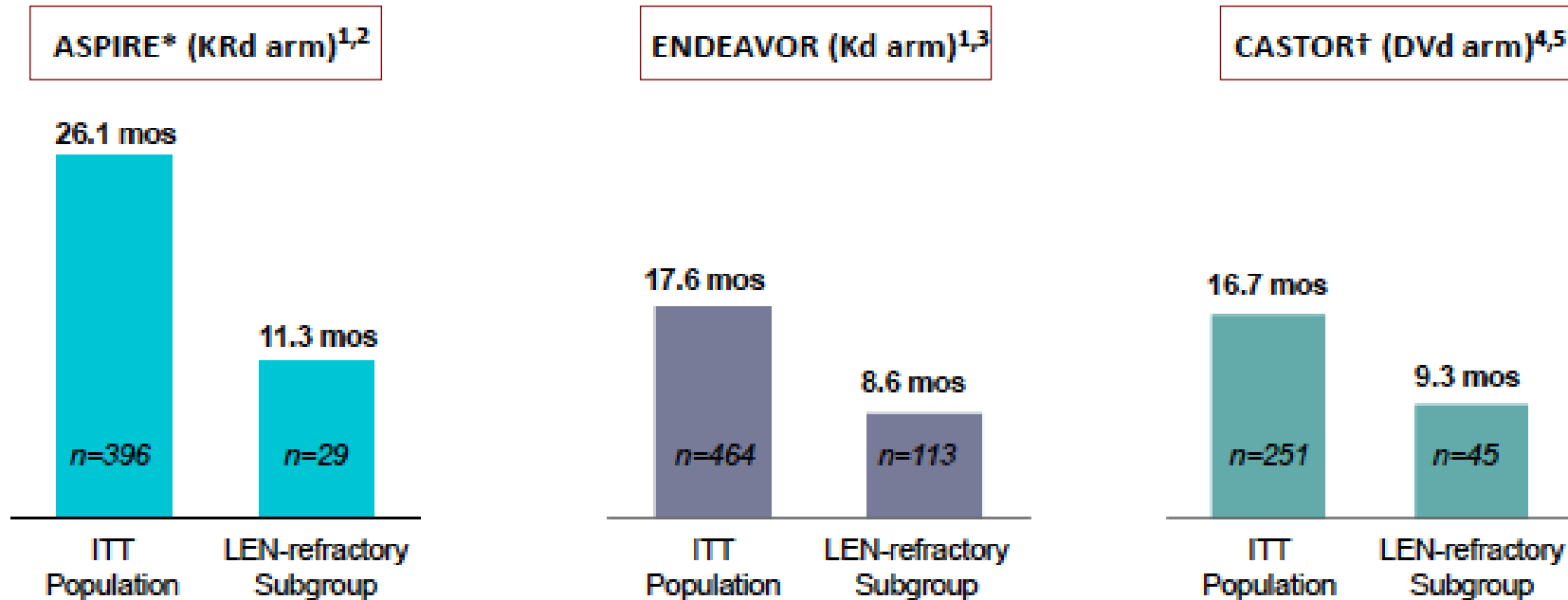
IMW recommendations



Consider salvage auto transplant in eligible patients

LEN-refractory

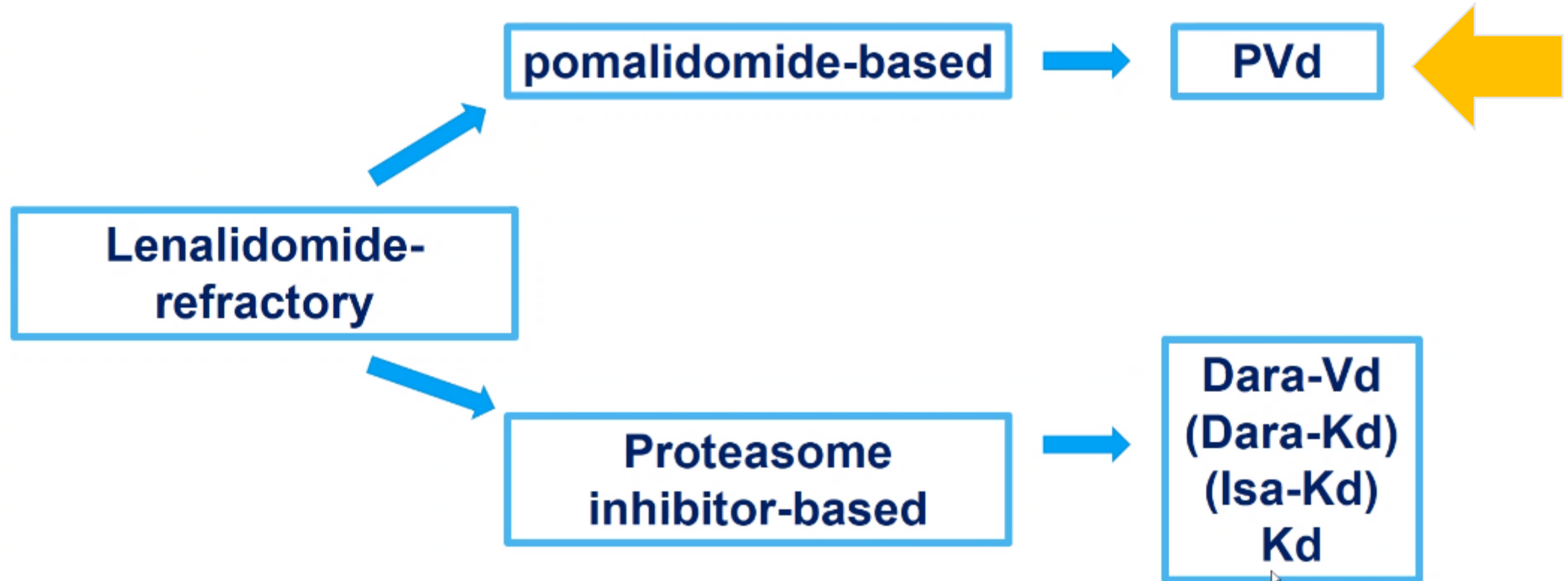
Outcome is poor



After LEN exposure (1-3 prior lines), mPFS in LEN-ref RRMM is **low**

LEN-refractory

POM-based studies



LEN-refractory

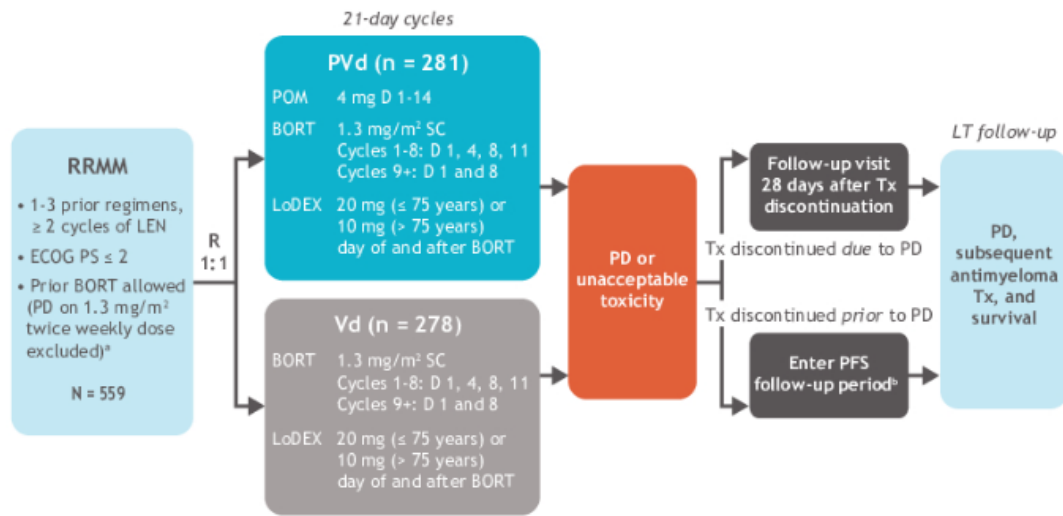
OPTIMISMM

PVd vs. Vd

Pomalidomide, bortezomib, and dexamethasone for patients with relapsed or refractory multiple myeloma previously treated with lenalidomide (OPTIMISMM): a randomised, open-label, phase 3 trial



Paul G Richardson, Albert Oriol, Meral Beksas, Anna Marina Liberati, Monica Galli, Fredrik Schjesvold, Jindrika Lindsay, Katja Weisel, Darrell White, Thierry Facon, Jesus San Miguel, Kazutaka Sunami, Peter O'Gorman, Pieter Sonneveld, Pawel Rabak, Sergey Semochkin, Steve Schey, Xin Yu, Thomas Doer, Amine Bensmaine, Tsvetan Bjuykov, Teresa Peluso, Mohamed Zaki, Kenneth Anderson, Meletios Dimopoulos, on behalf of the OPTIMISMM trial investigators



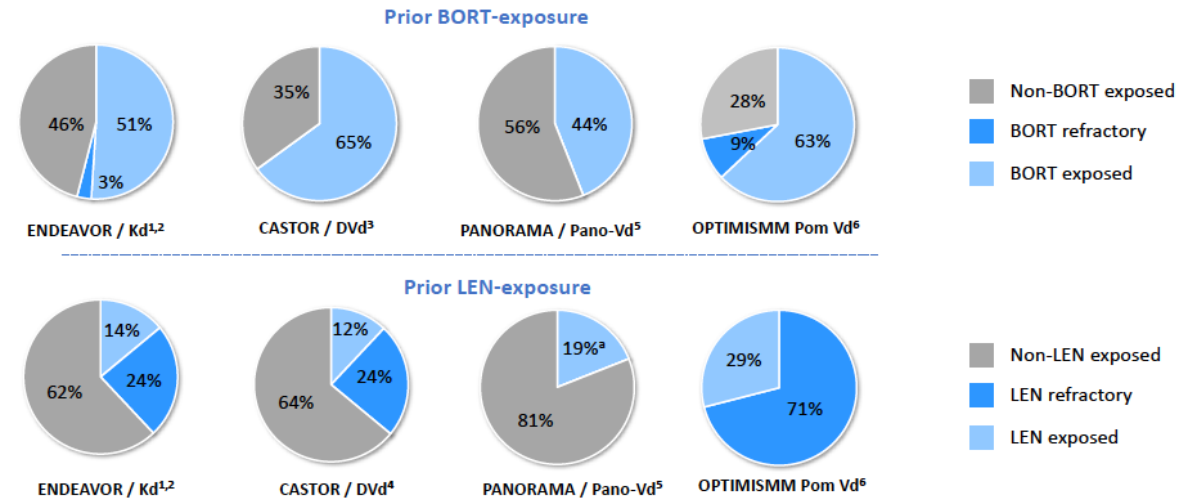
Stratification

- Age (≤ 75 y vs > 75 y)
- Prior regimens (1 vs > 1)
- B2-microglobulin at screening (< 3.5 mg/L vs ≥ 3.5 to ≤ 5.5 mg/L vs > 5.5 mg/L)

Study endpoints^c

- Primary: PFS
- Secondary: OS, ORR by IMWG criteria, DOR, safety
- Key exploratory: TTR, PFS2, efficacy analysis in subgroups^d, and HRQoL

NCT01734928

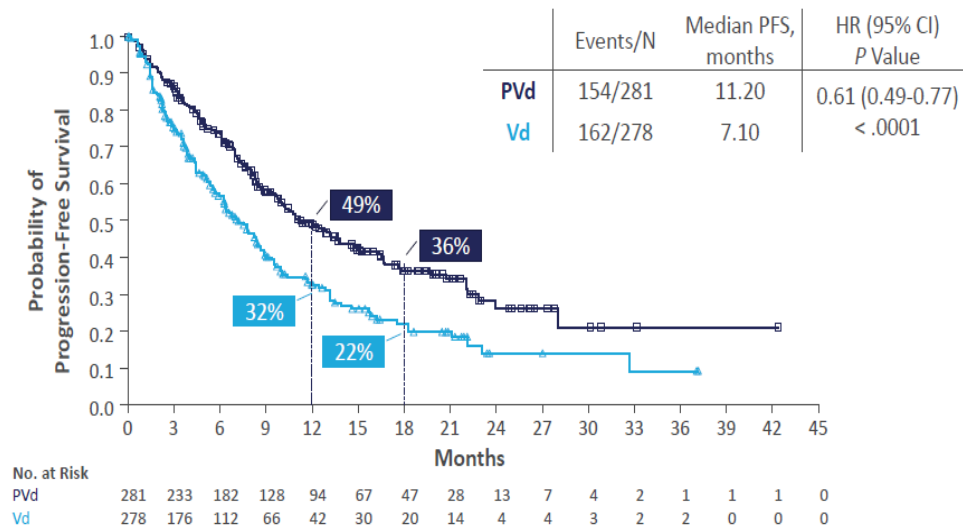


LEN-refractory

OPTIMISMM

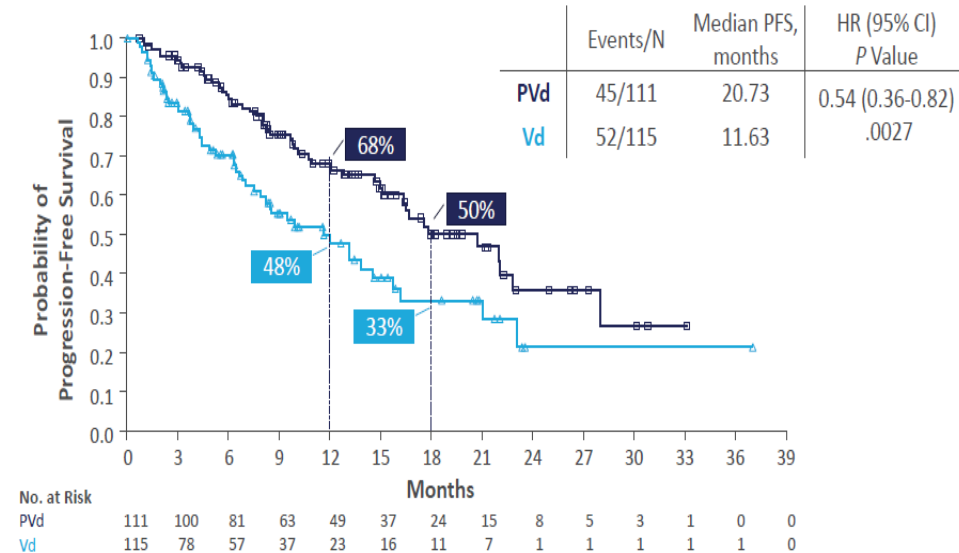
PVd vs. Vd

PFS in the ITT population



Reduction of the risk of progression/death by **39%** compared with Vd

PFS in patients with 1 prior line of therapy



Reduction of the risk of progression/death by **46%** compared with Vd

LEN-refractory

OPTIMISMM

PVd vs. Vd

	Pomalidomide, bortezomib, and dexamethasone group (n=281)	Bortezomib and dexamethasone group (n=278)
Overall response*	231 (82.2% [77.2-86.5])	139 (50.0% [44.0-56.0])
Stringent complete response	9 (3.2% [1.5-6.0])	2 (0.7% [0.1-2.6])
Complete response	35 (12.5% [8.8-16.9])	9 (3.2% [1.5-6.1])
Very good partial response	104 (37.0% [31.4-42.9])	40 (14.4% [10.5-19.1])
Partial response	83 (29.5% [24.3-35.2])	88 (31.7% [26.2-37.5])
Stable disease	32 (11.4% [7.9-15.7])	106 (38.1% [32.4-44.1])
Progressive disease	11 (3.9% [2.0-6.9])	16 (5.8% [3.3-9.2])
Not assessable	7 (2.5% [1.0-5.1])	17 (6.1% [3.6-9.6])

Data are n (% [95% CI]). *Defined as patients who achieved either a partial response or a complete response.

Table 2: Responses in the intention-to-treat population

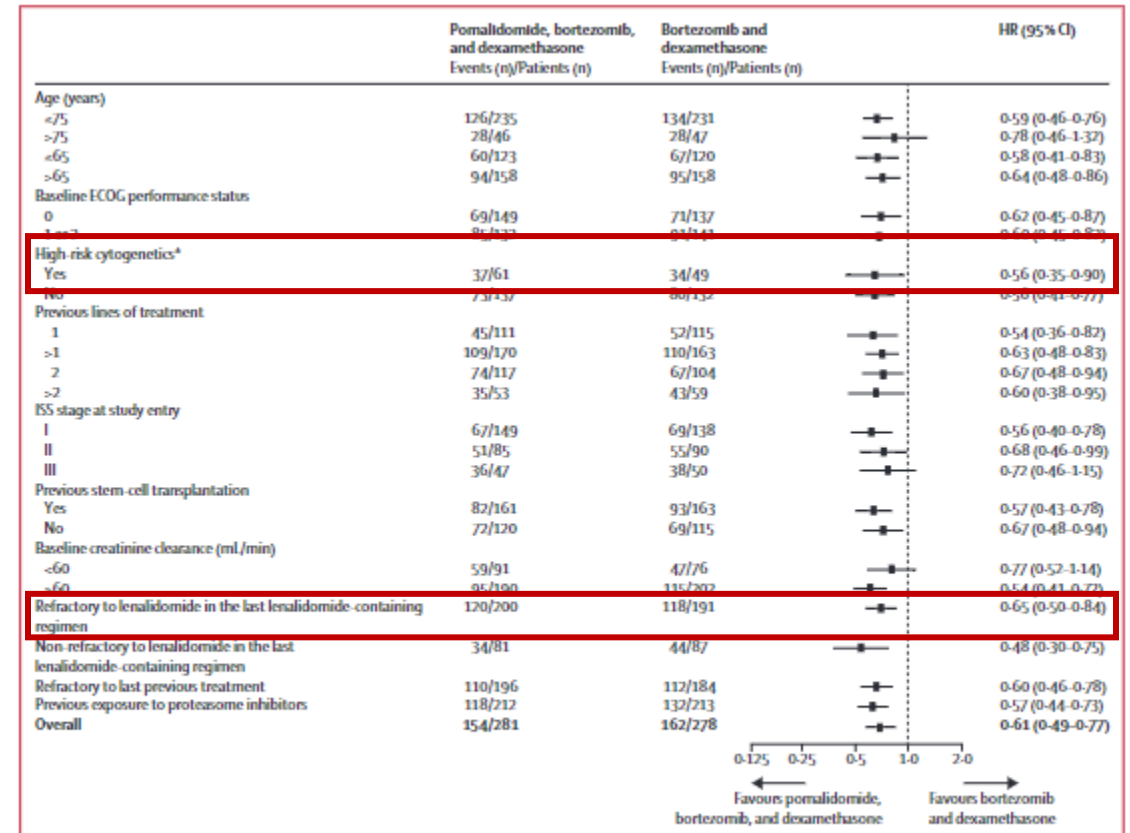
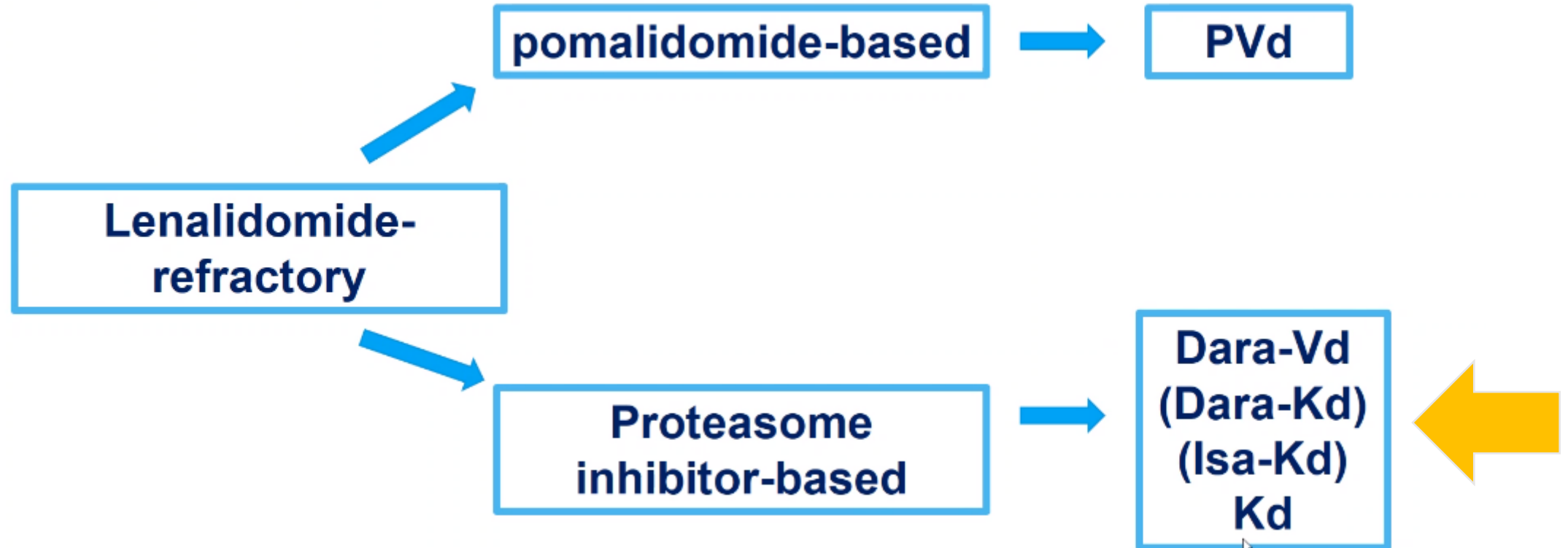


Figure 3: Prespecified subgroup analyses for progression-free survival
 HR=hazard ratio. ECOG=Eastern Cooperative Oncology Group. ISS=International Staging System. *Defined as at least one high-risk abnormality—del(17p), t(4;14), or t(14;16).

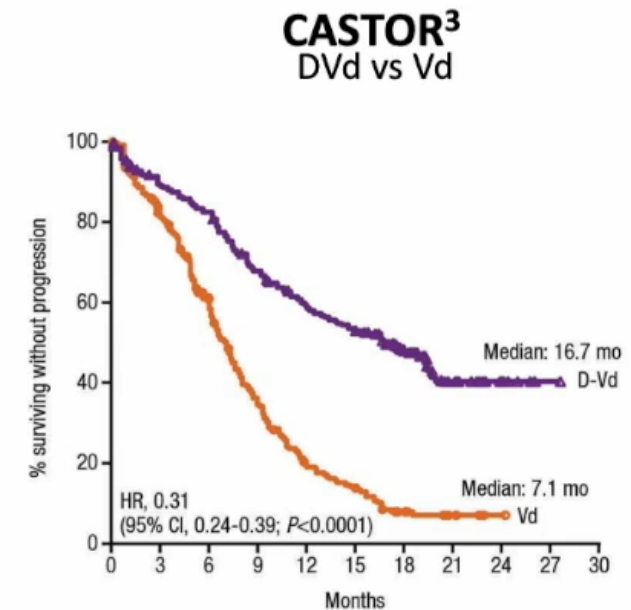
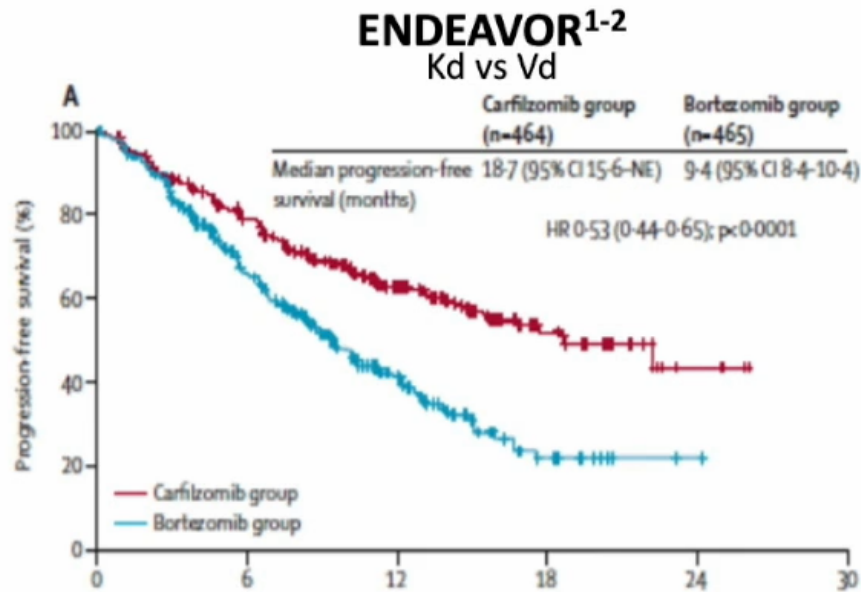
LEN-refractory

PI-based studies



LEN-refractory

PI-based studies

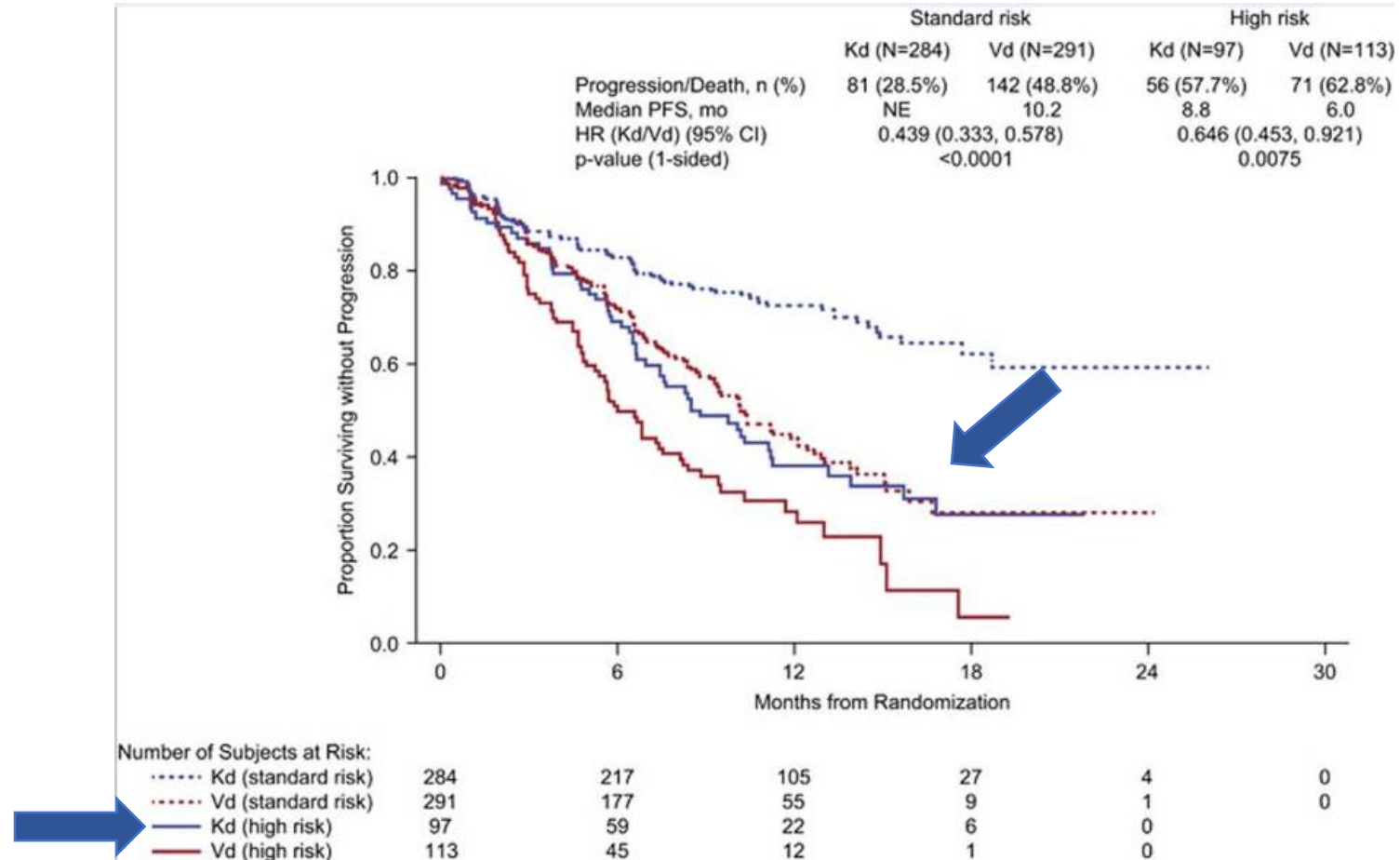


	ENDEAVOR ¹⁻² Kd vs Vd	CASTOR ³ DVd vs Vd
≥ VGPR	54% vs 29%	63% vs 29%
Median PFS (months)	18.7 vs 9.4, HR 0.53	16.7 vs 7.1, HR 0.31
Median OS (months)	47.8 vs 38.8, HR 0.76	NR
Prior Lena refractory	24% vs 26%	24% vs 33%
Median PFS, (months)	8.6 vs 6.6, HR NR	7.8 vs 4.9, HR 0.44

LEN-refractory

ENDEAVOR

Kd vs. Vd



LEN-refractory

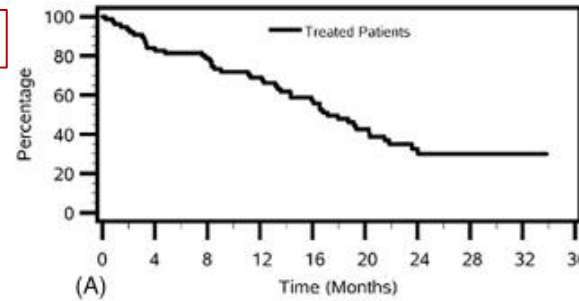
MCRN-003

KCd

Weekly carfilzomib plus cyclophosphamide and dexamethasone in the treatment of relapsed/refractory multiple myeloma: Final results from the MCRN-003/MYX.1 single arm phase II trial

Christopher P. Vener¹ | Richard LeBlanc² | Irwindeep Sandhu¹ | Darrell White³ | Andrew R. Belch¹ | Donna E. Reece⁴ | Christine Chen⁴ | Sean Dolan⁵ | Marc Lalancette⁶ | Martha Louzada⁷ | Andrea Kew⁸ | Arleigh McCurdy⁸ | Bethany Monteith⁹ | Tony Reiman⁵ | Gail McDonald⁹ | Max Sherry⁹ | Engin Gul¹⁰ | Bingshu E. Chen⁹ | Annette E. Hay⁹

PFS



OS

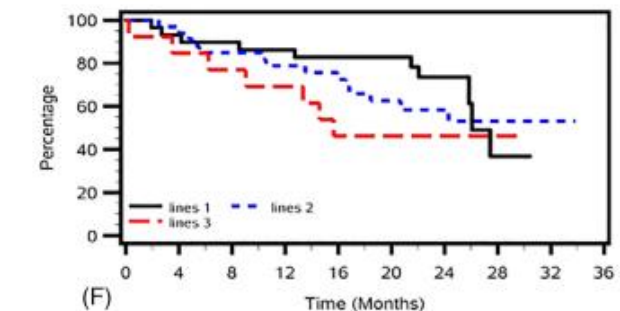
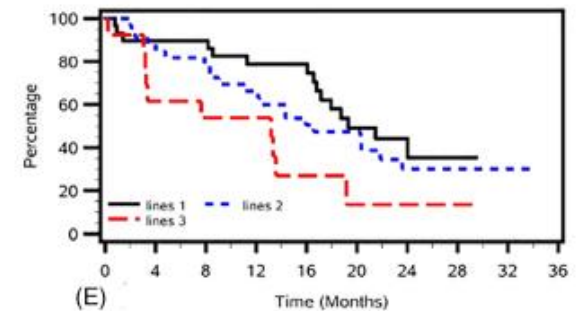
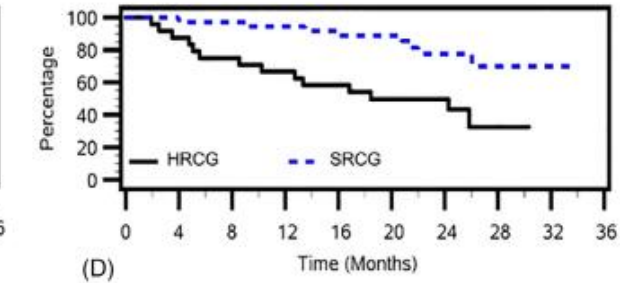
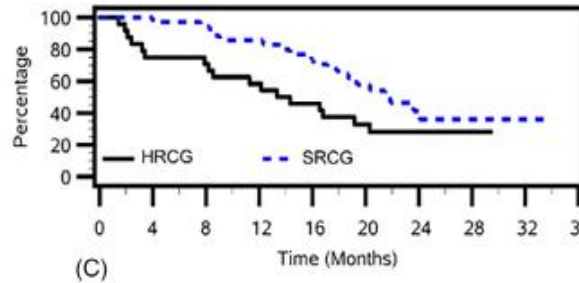
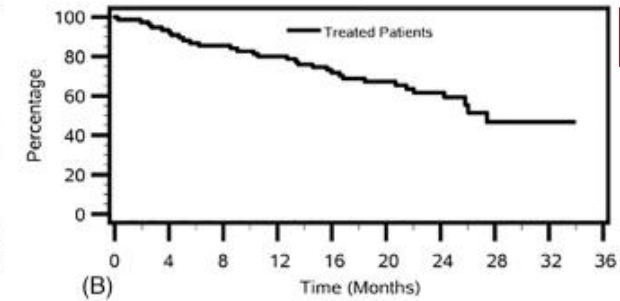
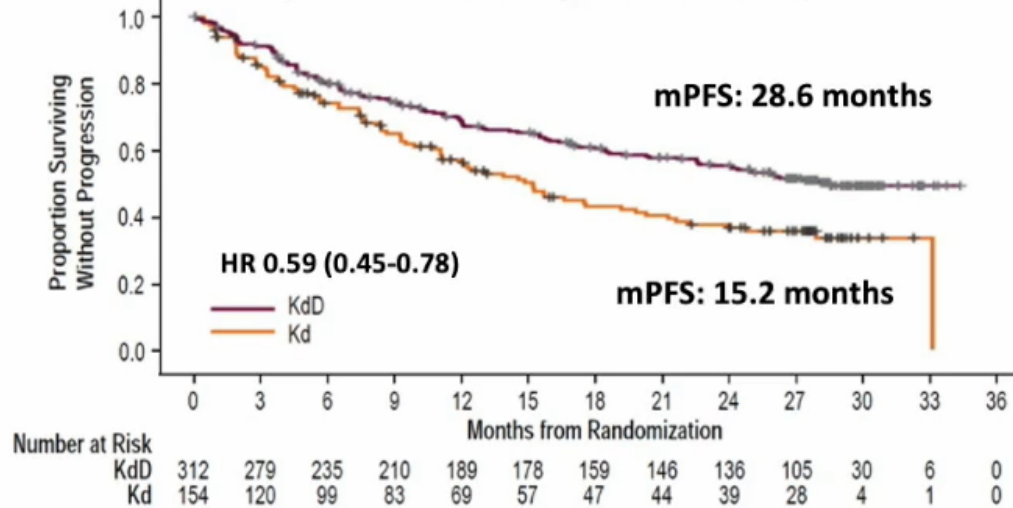


FIGURE 1 Survival outcomes in patients treated with the wKCD regimen examining both (A), progression free survival and (B), overall survival. Patients were further examined based on underlying cytogenetic risk with high risk patients conferring a worse outcome by (C), progression free survival and (D), overall survival. High risk cytogenetics (HRCG) are in solid black lines and standard risk cytogenetics (SRCG) are in dotted blue lines. Lastly, both (E), progression free and (F), overall survival were examined based on prior line of therapy at study entry. Line one patients are in black solid lines, line two patients in dotted blue lines and line three patients are in dotted red lines [Color figure can be viewed at wileyonlinelibrary.com]

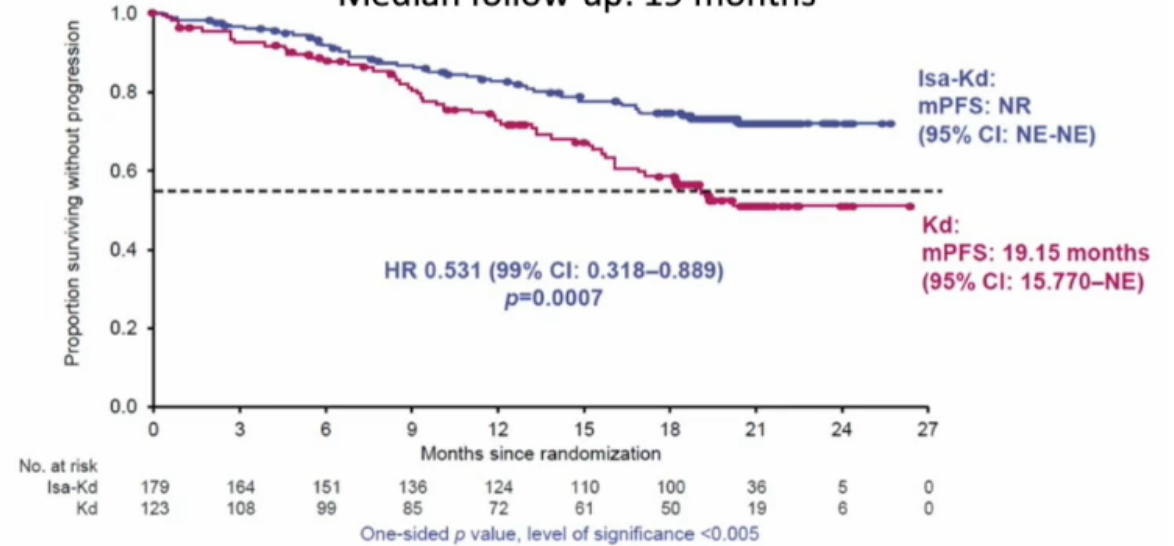
LEN-refractory

PI-based studies

CANDOR: DKd vs Kd
(Median follow-up: 27.8 months)



IKEMA: IsaKd vs Kd
Median follow-up: 19 months



Subgroup	KdD (n = 312)		Kd (n = 154)		KdD better ←	→ Kd better	Hazard ratio for KdD vs Kd (95% CI)
	Events/ Patients	Median PFS, months	Events/ Patients	Median PFS, months			
1 prior line of therapy							
Prior lenalidomide exposure	13/29	25.0	10/17	11.1	←	→	0.38 (0.15, 0.97)
Refractory to lenalidomide	10/19	25.0	5/6	9.3	←	→	0.11 (0.02, 0.52)
Lenalidomide naive	39/104	NE	20/50	NE	←	→	0.75 (0.44, 1.30)
≥2 prior lines of therapy							
Prior lenalidomide exposure	44/94	28.1	37/57	12.0	←	→	0.52 (0.33, 0.82)
Refractory to lenalidomide	36/80	28.1	30/49	12.0	←	→	0.52 (0.32, 0.86)
Lenalidomide naive	44/85	22.6	18/30	15.8	←	→	0.53 (0.30, 0.94)

Refractory to lenalidomide							
Yes	23/57	NC (12-88-NC)	25/42	15-70 (9-92-17-18)	←	→	0.60 (0.34-1.0)
No	25/122	NC (NC-NC)	30/81	NC (18-23-NC)	←	→	0.48 (0.28-0.8)
Refractory to lenalidomide at last regimen							
Yes	15/36	NC (11-43-NC)	17/31	16-16 (14-75-19-45)	←	→	0.69 (0.35-1.4)
No	33/143	NC (NC-NC)	38/92	NC (15-77-NC)	←	→	0.48 (0.30-0.8)
Age, years							
<65	25/88	NC (NC-NC)	26/66	NC (14-75-NC)	←	→	0.64 (0.37-1.1)
≥65	23/91	NC (NC-NC)	29/57	17-18 (13-41-NC)	←	→	0.43 (0.25-0.7)

LEN-refractory

CANDOR

DKd vs. Kd



Carfilzomib, dexamethasone, and daratumumab versus carfilzomib and dexamethasone for patients with relapsed or refractory multiple myeloma (CANDOR): results from a randomised, multicentre, open-label, phase 3 study

Meletios Dimopoulos, Hang Quach, Maria-Victoria Mateos, Ola Landgren, Xavier Leleu, David Siegel, Katja Weisel, Hui Yang, Zandra Klippel, Anita Zahltan-Kumeli, Saad Z Usmani

Randomized, multicenter, open-label study

28-day cycles until disease progression

Key inclusion criteria:

- Relapsed or refractory multiple myeloma
- 1–3 prior lines of therapy
- Partial response or better to ≥ 1 line

N = 466
Randomized
2:1

KdD (n = 312)
 Carfilzomib 56 mg/m² IV (30 min)
 Days 1, 2, 8, 9, 15, 16 (20 mg/m² days 1, 2, cycle 1 only)
 Dexamethasone 40 mg (20 mg for patients >75 years old) oral or IV once weekly
 Daratumumab 8 mg/kg IV days 1, 2, cycle 1; 16 mg/kg once weekly for remaining doses of cycle 1, 2, then every 2 weeks (cycles 3–6), then every 4 weeks

Kd (n = 154)
 Carfilzomib 56 mg/m² IV (30 min)
 Days 1, 2, 8, 9, 15, 16 (20 mg/m² days 1, 2, cycle 1 only)
 Dexamethasone 40 mg (20 mg for patients >75 years old) oral or IV once weekly

Primary endpoint: PFS

Key secondary endpoints: OS, ORR, safety

	Carfilzomib, dexamethasone, and daratumumab group (n=312)	Carfilzomib and dexamethasone group (n=154)
(Continued from previous page)		
Previous therapies		
Transplant	195 (63%)	75 (49%)
CD38 antibody therapy†	1 (<1%)	0
Proteasome inhibitor	290 (93%)	139 (90%)
Immunomodulatory drug	206 (66%)	110 (71%)
Bortezomib	287 (92%)	134 (87%)
Refractory to any previous bortezomib-including regimen‡	88 (28%)	47 (31%)
Lenalidomide	123 (39%)	74 (48%)
Refractory to any previous lenalidomide-including regimen‡	99 (32%)	55 (36%)

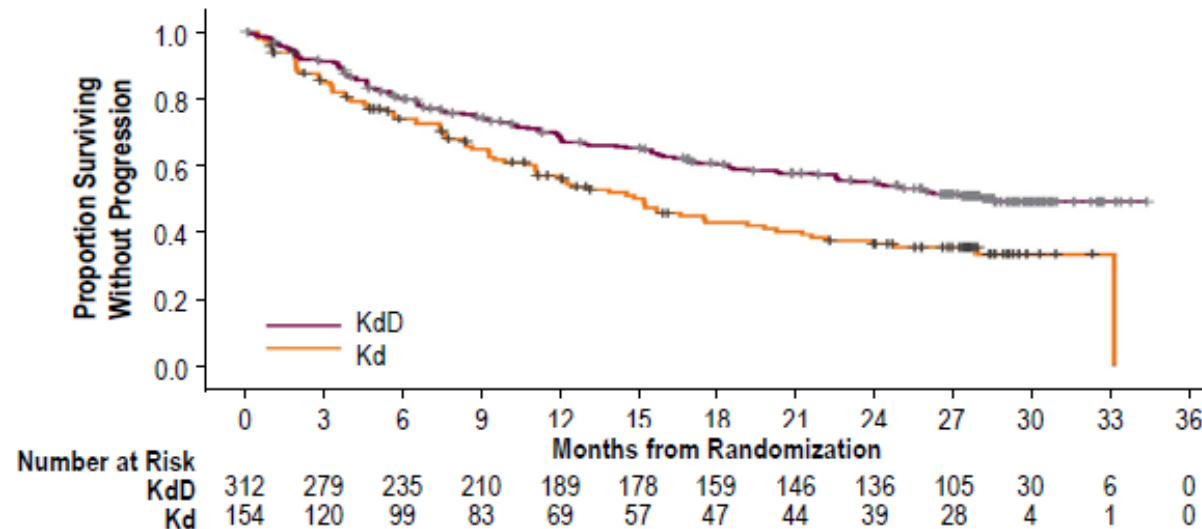
Data are median (IQR), n (%), or mean (SD). *Fluorescence in-situ hybridisation analysis was conducted by the central laboratory. The high-risk group consisted of patients with the genetic subtypes t(4;14), t(14;16), or deletion 17p. The standard-risk group consisted of patients without t(4; 14), t(14; 16), and deletion 17p. The unknown risk group consisted of patients with fluorescence in-situ hybridisation results that failed or were cancelled. †Based on the Interactive Voice and Web Response System at the time of randomisation. ‡Patients were considered refractory to a drug received in previous regimens if any of the following criteria were met: best response to any regimen containing the drug was stable disease or progressive disease; reason the drug was stopped was progression in any regimen; date of relapse or progression was after start date and within 60 days after stop date of the drug in any regimen.

Table 1: Baseline characteristics of the intention-to-treat population

LEN-refractory

CANDOR

DKd vs. Kd



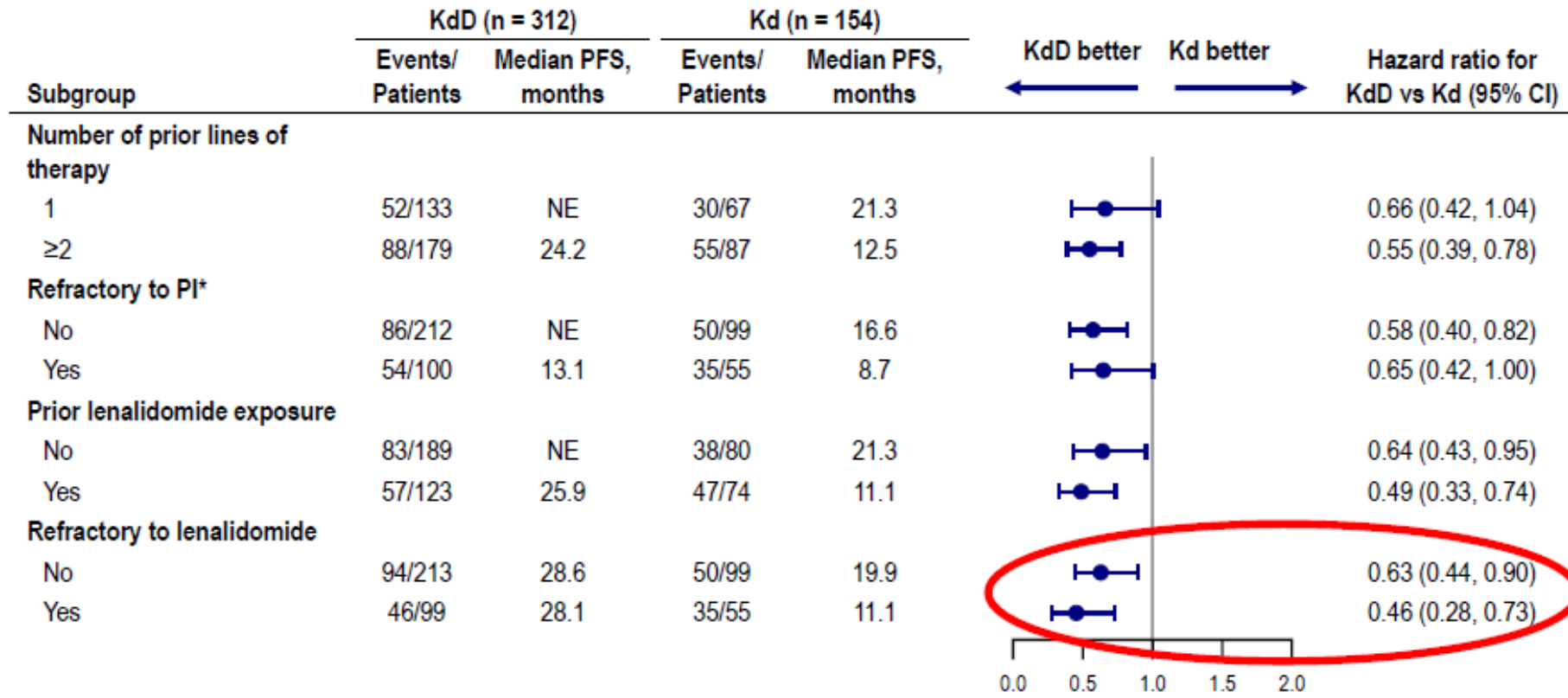
	KdD (n = 312)	Kd (n = 154)
Median treatment duration, months	18.3	9.3
Median PFS follow-up, months	27.8	27.0
Median PFS by ORCA, months	28.6	15.2
HR (KdD/Kd) (95% CI)	0.59 (0.45–0.78)	

41% reduction in risk of progression/death
13.4-month improvement in mPFS with DKd

LEN-refractory

CANDOR

DKd vs. Kd



Consistent PFS benefit by prior therapy and refractory disease status

LEN-refractory

IKEMA

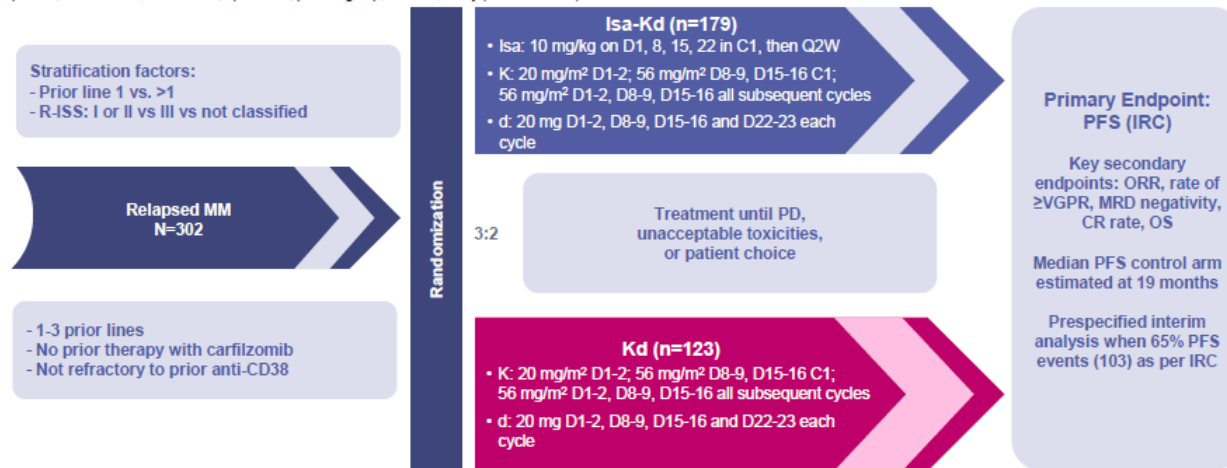
IsaKd vs. Kd

Isatuximab, carfilzomib, and dexamethasone in relapsed multiple myeloma (IKEMA): a multicentre, open-label, randomised phase 3 trial



Philippe Moreau*, Meletios-Athanasios Dimopoulos, Joseph Mikhael, Kwee Yong, Marcelo Capra, Thierry Facon, Roman Hajek, Ivan Spicka, Ross Baker, Kihyun Kim, Gracia Martinez, Chang-Ki Min, Ludek Pour, Xavier Leleu, Albert Oriol, Youngil Koh, Kenshi Suzuki, Marie-Laure Risse, Gaëlle Asset, Sandrine Macé, Thomas Martin*, on behalf of the IKEMA study group†

Prospective, multinational, randomized, open-label, parallel-group, two-arm, study (NCT03275285)



Number of previous lines of therapy

Median (IQR)	2 (1-2)	2 (1-3)
One	79 (44%)	55 (45%)
Two	64 (36%)	36 (29%)
Three	33 (18%)	30 (24%)
More than three	3 (2%)	2 (2%)
Autologous transplant	116 (65%)	69 (56%)

Main anti-myeloma therapies by class and agent

Alkylating agents	169 (94%)	101 (82%)
Proteasome inhibitors	166 (93%)	105 (85%)
Immunomodulators	136 (76%)	100 (81%)
Lenalidomide	72 (40%)	59 (48%)
Corticosteroids	179 (100%)	123 (100%)
Monoclonal antibodies	5 (3%)	1 (1%)
Daratumumab	1 (1%)	0
Refractory to immunomodulatory imide drug	78 (44%)	58 (47%)
Refractory to lenalidomide	57 (32%)	42 (34%)
Refractory to lenalidomide in last previous regimen	36 (20%)	31 (25%)
Refractory to proteasome inhibitor	56 (31%)	44 (36%)
Refractory to immunomodulatory imide drug and proteasome inhibitor	35 (20%)	27 (22%)
Refractory to last regimen	89 (50%)	73 (59%)

LEN-refractory

IKEMA

IsaKd vs. Kd

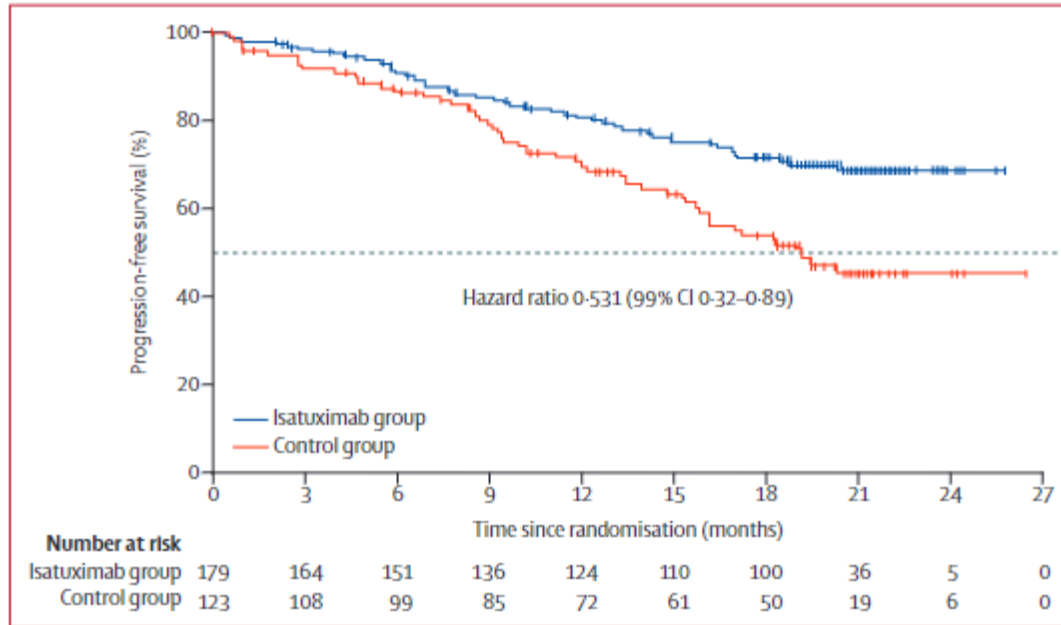
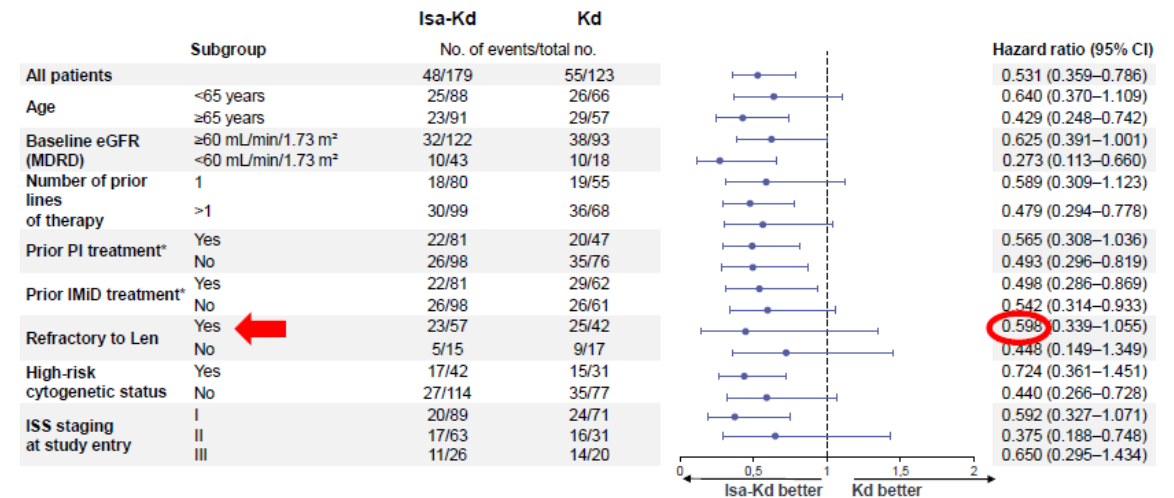


Figure 2: Progression-free survival
Kaplan-Meier analysis of progression-free survival among patients in the intention-to-treat population, as assessed by an independent response review committee. Median progression-free survival was not reached (95% CI not estimable) for the isatuximab group and 19.15 months (15.77-not estimable) in the control group. Hazard ratio and 99% CI are derived from Cox proportional hazards model stratified by number of previous lines of therapy and revised International Staging System stage. One sided p value calculated by log-rank test was 0.0007, which was below the nominal significance level at the interim analysis (0.005).

PFS subgroup analyses



Consistent treatment effect for Isa-Kd across all subgroups

LEN-refractory

IKEMA

IsaKd vs. Kd

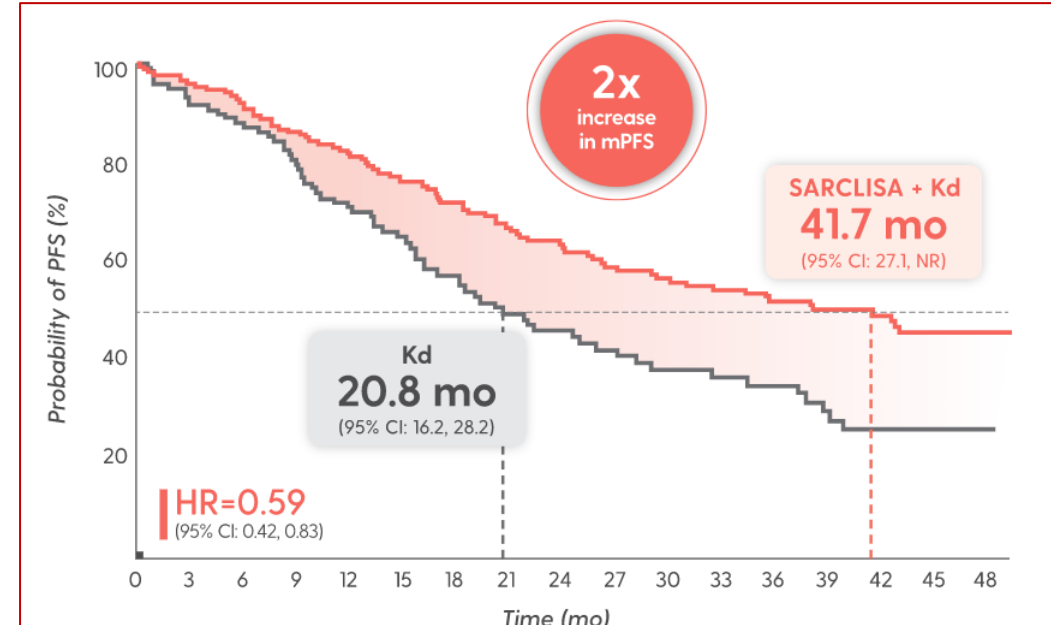
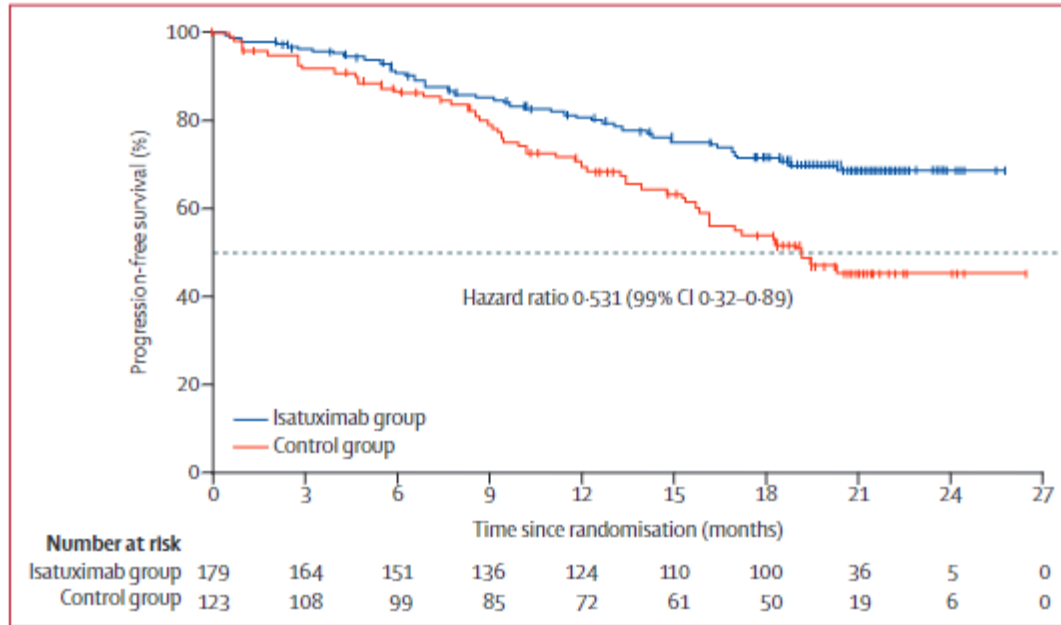


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Consistent treatment effect for Isa-Kd across all subgroups

First relapse

Treatment options ESMO 2021

	CANDOR DKd vs. Kd	IKEMA IsaKd vs. Kd	APOLLO DPd vs. Pd	OPTIMISMM PVd vs. Pd	ICARIA IsaPd vs. Pd	ELOQUENT 3 EloPd vs. Pd
Lines of therapy	At least 1	At least 1, median 2	At least 1, median 2	At least 1, median 2	At least 2, median 3	At least 2, median 3
PFS HR (95% CI)	0.59 (0.45-0.78)	0.54 (0.37-0.82)	0.63 (0.47-0.85)	0.61 (0.49-0.77)	0.596 (0.43-0.81)	0.59 (0.37-0.93)
PFS, months	28.6 vs. 15.2	35.2 vs. 19.2	12.4 vs. 6.9	11.2 vs. 7.2	11.5 vs. 6.5	11.5 vs. 6.5
PFS first relapse	NR vs. NR HR 0.67 (0.4-1.1)	NR vs. NR HR 0.59 (0.31-1.1)	14.1 vs. 12.6 HR 0.70 (0.3-1.6)	20.7 vs. 11.6		mOS, 29.8 vs. 17.4

Conclusions

- Treatment of RRMM remains **challenging**
- **Salvage ASCT** is an option for patients that received a prior ASCT followed by LEN maintenance and had an **initial remission duration > 36 months**
- **Patients who are refractory to LEN upfront** represent an **emerging population**
 - PVD is the approved indication with best results in terms of PFS as second-line therapy in LEN-refractory patients.
 - Dara-Kd and Isa-Kd have given the best reported PFS to date in LEN-refractory patients
- **Tolerability** is key to efficacy with 'real world data' of particular value