

Supplementary Table 1. Univariate model to predict progression-free survival.

	HR, [95% CI]	P value
aMRD+ve/bmMRD+ve	2.31 [1.44-3.68]	<0.001
aMRD-ve/bmMRD+ve	1.31 [0.94-1.81]	0.109
ECOG PS ≥2	1.70 [1.11-2.60]	0.014
Hemoglobin ≤10 g/dL	1.49 [1.12-2.00]	0.007
CICr ≥2 mg/dL and/or GF ≤40 ml/min	1.53 [1.08-2.17]	0.017
Calcium ≥11 mg/dL	1.70 [1.16-2.49]	0.007
Soft tissue plasmacytoma	0.68 [0.25-1.84]	0.451
High-risk cytogenetic	1.62 [1.16-2.26]	0.005
PCs in BM ≥50%	1.22 [0.90-1.66]	0.218
LDH elevated	1.77 [1.25-2.52]	0.001
ISS II-III	1.75 [1.33-2.32]	<0.001
Not induction treatment with PI plus IMiD plus/minus anti-CD38	1.99 [1.54-2.57]	<0.001
ASCT in 1st line	0.90 [0.58-1.29]	0.461
Melphalan as conditioning	0.90 [0.37-2.19]	0.916
Not receiving maintenance therapy	1.91 [1.46-2.50]	<0.001
Not receiving consolidation therapy	1.20 [0.89-1.62]	0.242

Abbreviations: ASCT: autologous stem cell transplantation; aMRD: minimal residual disease in apheresis product; BM: bone marrow; bmMRD: minimal residual disease in bone marrow; CI: confidence interval; CICr: clearance creatinine; ECOG: Eastern Cooperative Oncology Group; GF: glomerular filtrate; IMiD: immunomodulator; HR: hazard ratio; ISS: International Staging System; LDH: lactate dehydrogenase; PC: plasma cell; PI: proteasome inhibitor; PS: performance status; -ve: negative; +ve: positive.

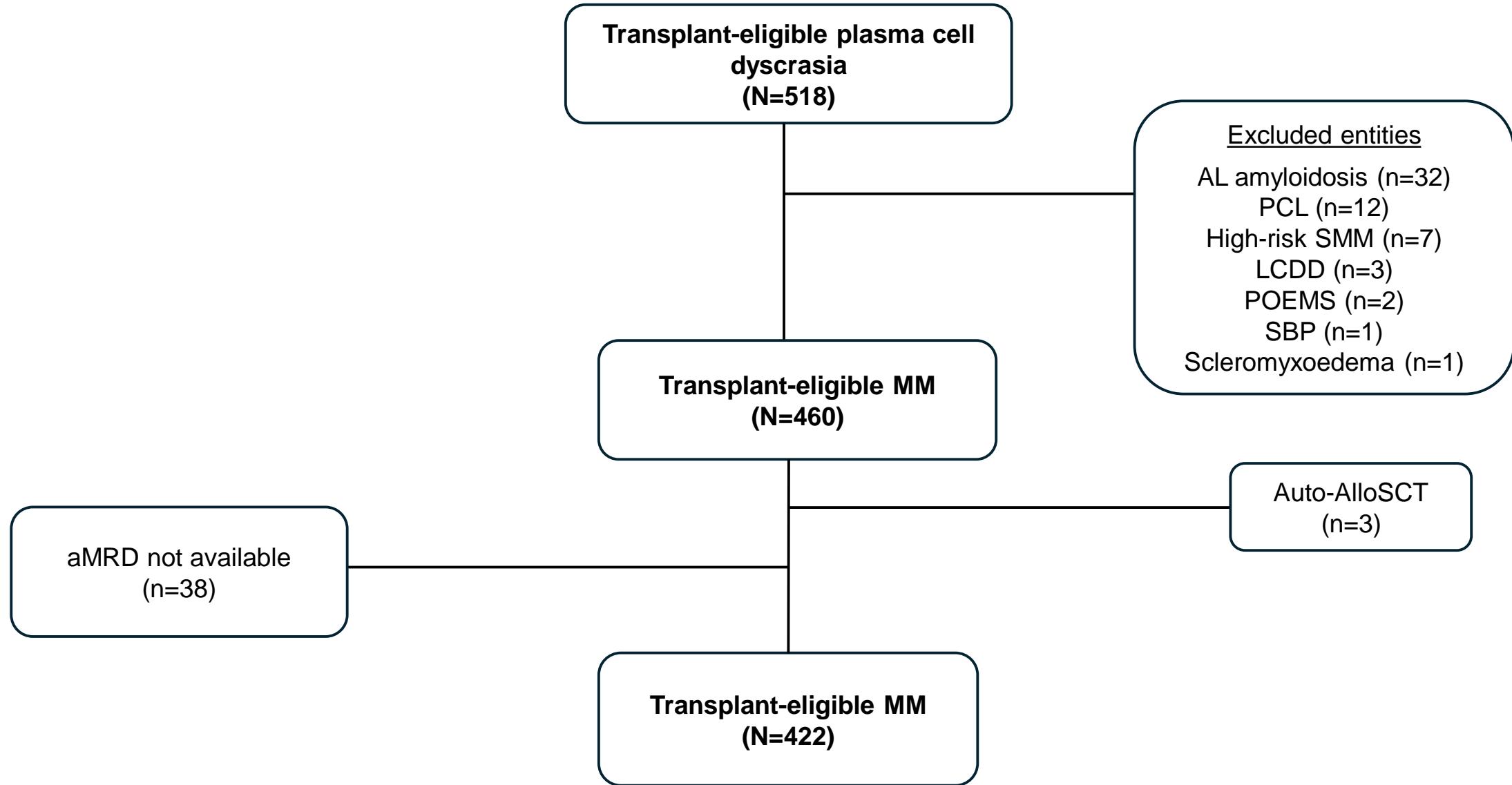
*High-risk cytogenetic was defined as the detection of t(4;14) and/or t(14;16) and/or del(17p).

Supplementary Table 2. Univariate model to predict early relapse/early death due to myeloma.

	OR, [95% CI]	P value
aMRD+ve/bmMRD+ve	4.84 [1.70-13.76]	0.003
aMRD-ve/bmMRD+ve	1.87 [0.80-4.38]	0.150
ECOG PS ≥2	2.56 [1.06-6.17]	0.036
Hemoglobin ≤10 g/dL	1.40 [0.73-2.67]	0.315
ClCr ≥2 mg/dL and/or GF ≤40 ml/min	1.76 [0.85-3.66]	0.129
Calcium ≥11 mg/dL	1.71 [0.75-3.90]	0.203
Soft tissue plasmacytoma	0.99 [0.12-8.37]	0.990
High-risk cytogenetic	1.11 [0.51-2.44]	0.792
PCs in BM ≥50%	1.26 [0.62-2.54]	0.530
LDH elevated	3.16 [1.48-6.73]	0.003
ISS II-III	2.00 [1.04-3.86]	0.038
Not induction treatment with PI plus IMiD plus/minus anti-CD38	2.75 [1.52-4.97]	<0.001
ASCT >1st line	1.72 [0.51-5.84]	0.386
Melphalan as conditioning	1.59 [0.47-5.44]	0.458
Not receiving maintenance therapy	3.23 [1.77-5.92]	<0.001
Not receiving consolidation therapy	1.70 [0.84-3.43]	0.143

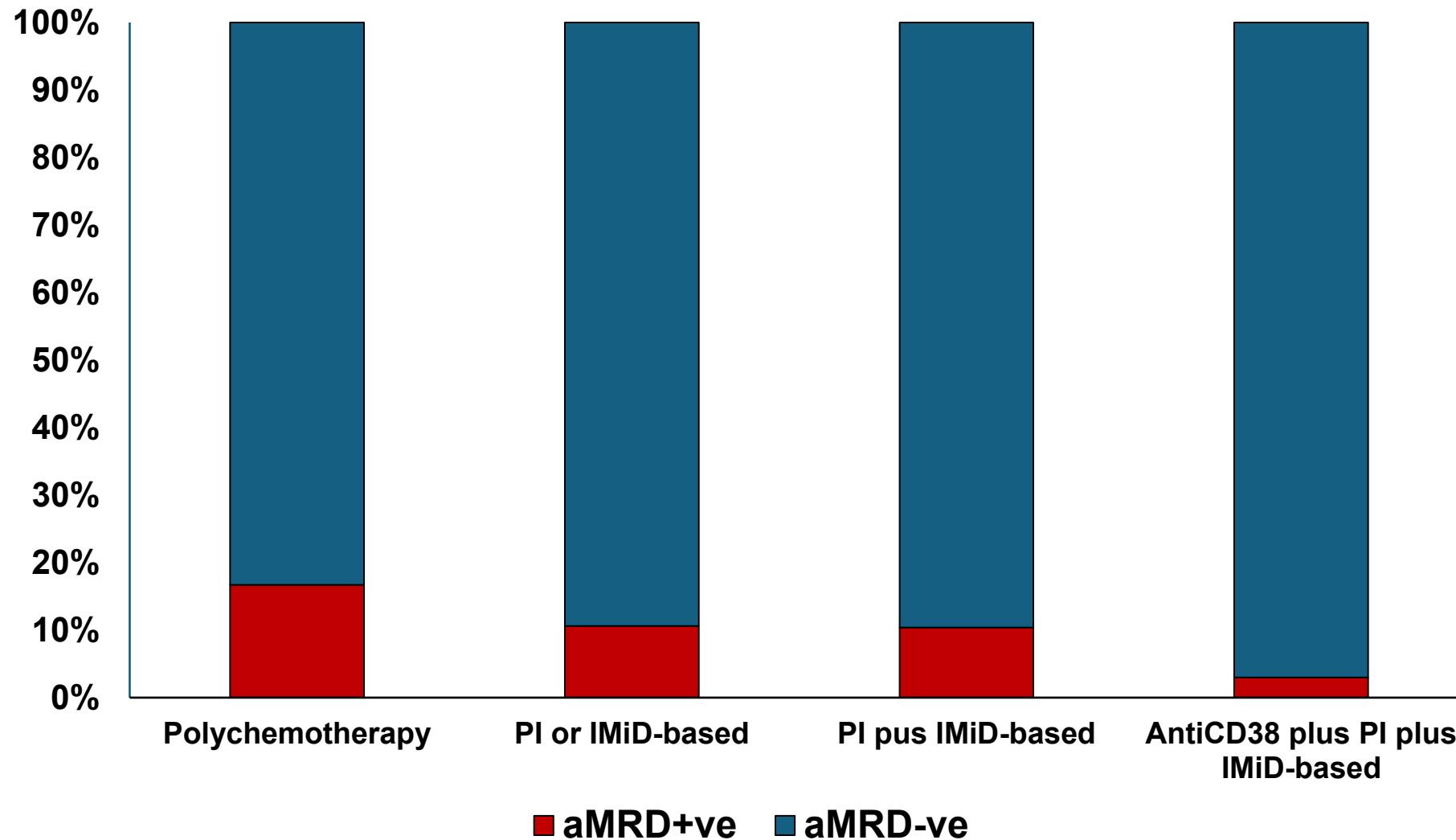
Abbreviations: ASCT: autologous stem cell transplantation; aMRD: minimal residual disease in apheresis product; BM: bone marrow; bmMRD: minimal residual disease in bone marrow; CI: confidence interval; ClCr: clearance creatinine; ECOG: Eastern Cooperative Oncology Group; GF: glomerular filtrate; IMiD: immunomodulator; ISS: International Staging System; LDH: lactate dehydrogenase; OR: odds ratio; PC: plasma cell; PI: proteasome inhibitor; PS: performance status; -ve: negative; +ve: positive.

*High-risk cytogenetic was defined as the detection of t(4;14) and/or t(14;16) and/or del(17p).



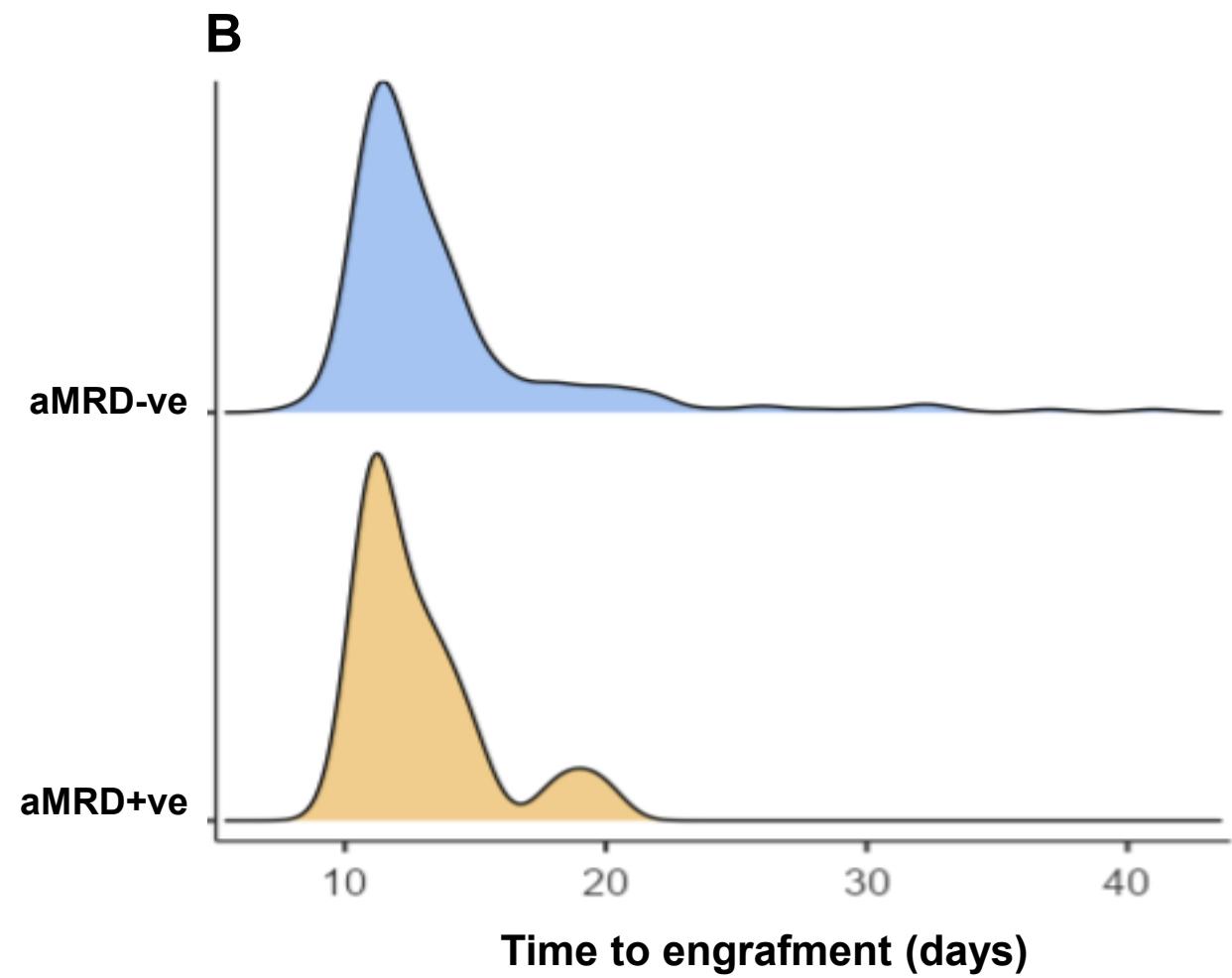
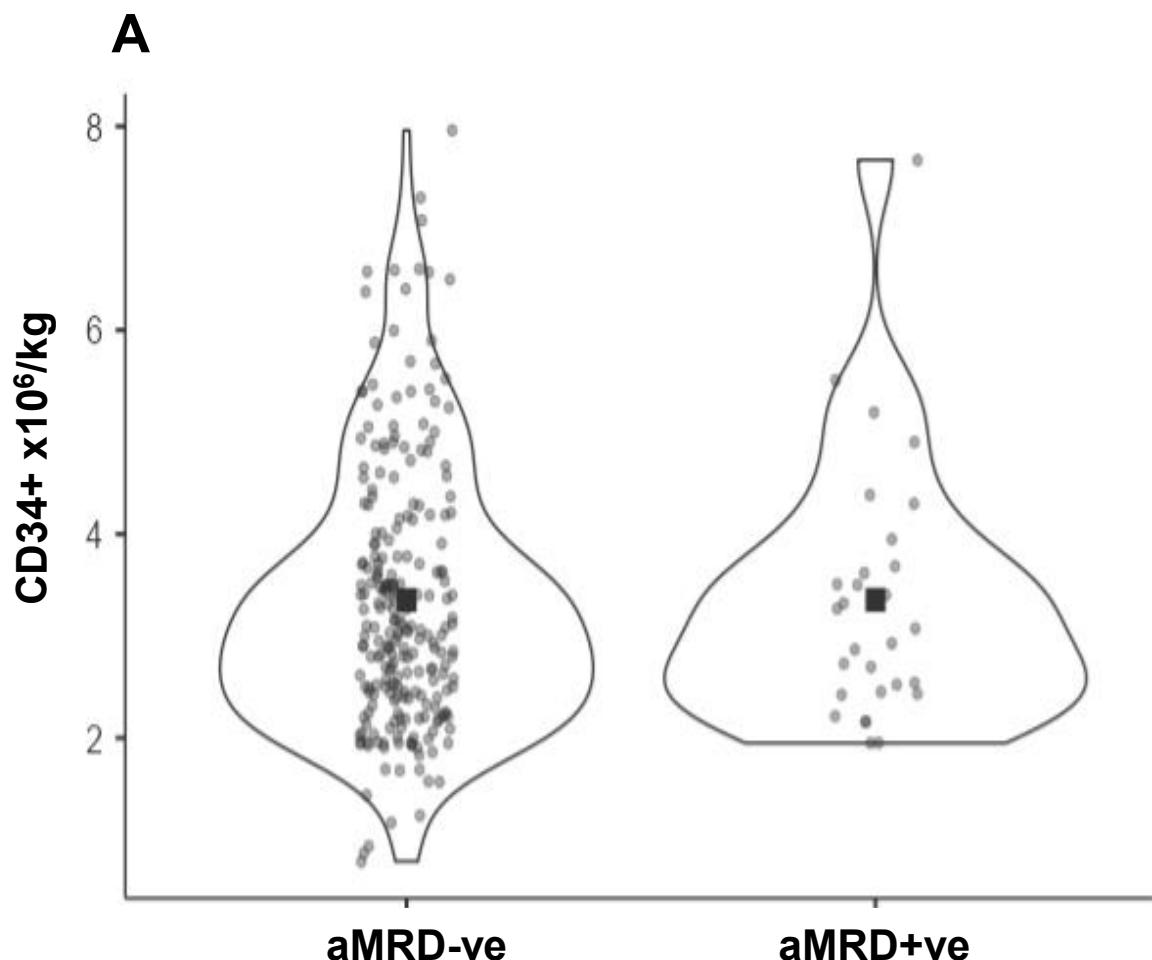
Supplementary Figure 1. CONSORT diagram.

Captions: Allo: allogeneic; Auto: autologous; aMRD: minimal residual disease in apheresis product; LCDD: Light chain deposition disease; MGUS: Monoclonal gammopathy of undetermined significance; MM: Multiple myeloma; PCL: Plasma cell leukemia; SCT: Stem cell transplantation; SBP: Solitary bone plasmacytoma; SMM: Smoldering multiple myeloma;



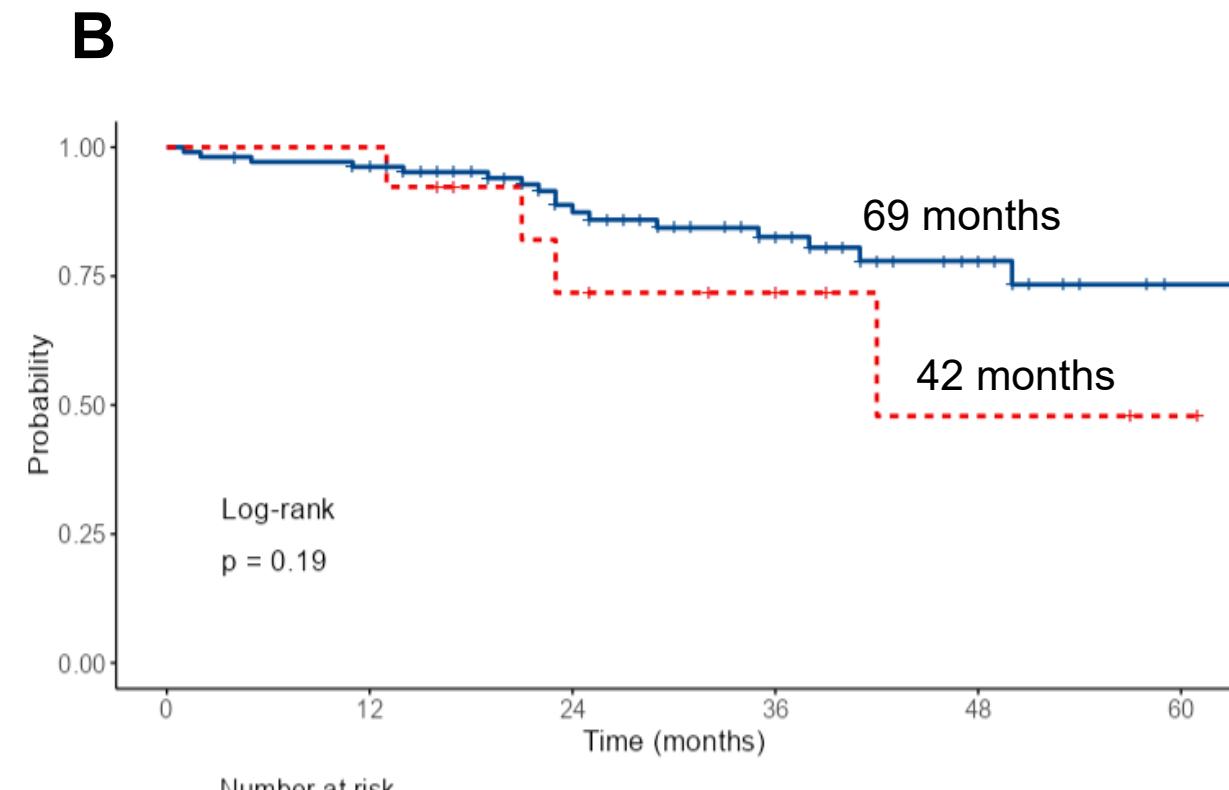
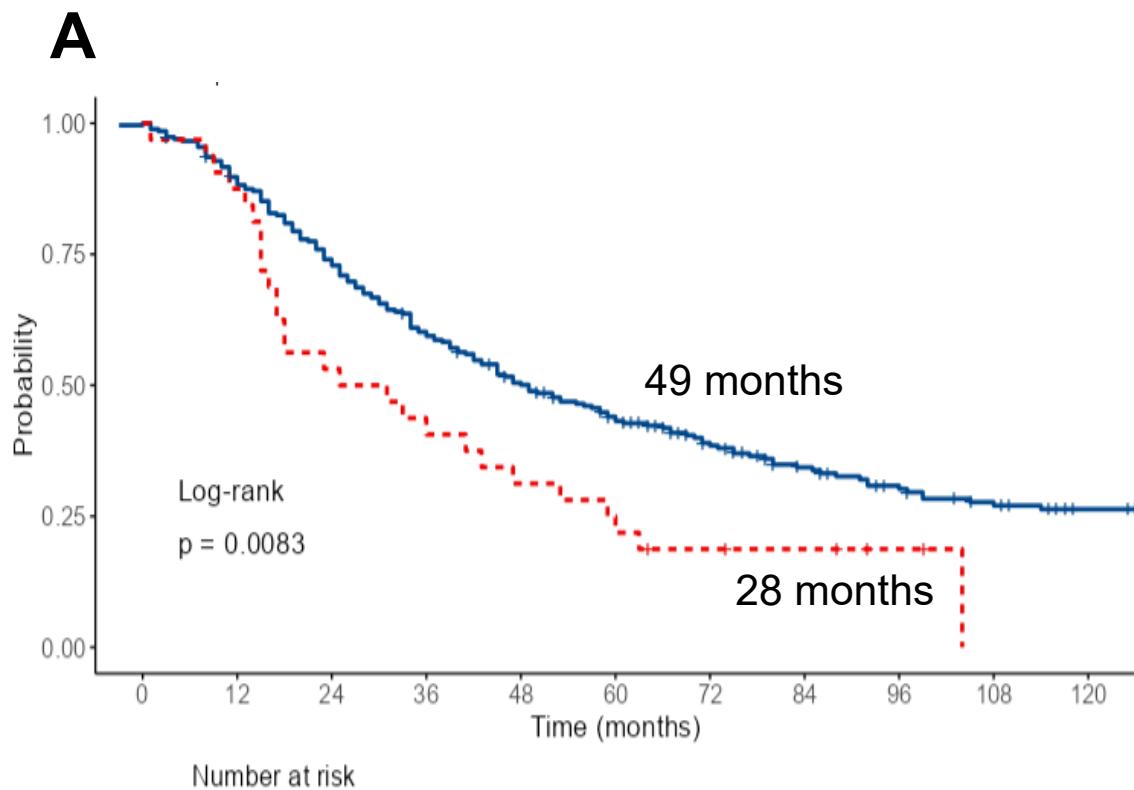
Supplementary Figure 2. Measurable residual disease in apheresis product according to induction treatment.

Captions: aMRD: Measurable residual disease in apheresis product; PI: proteasome inhibitor; IMiD: immunomodulator; +ve: positive; -ve: negative.



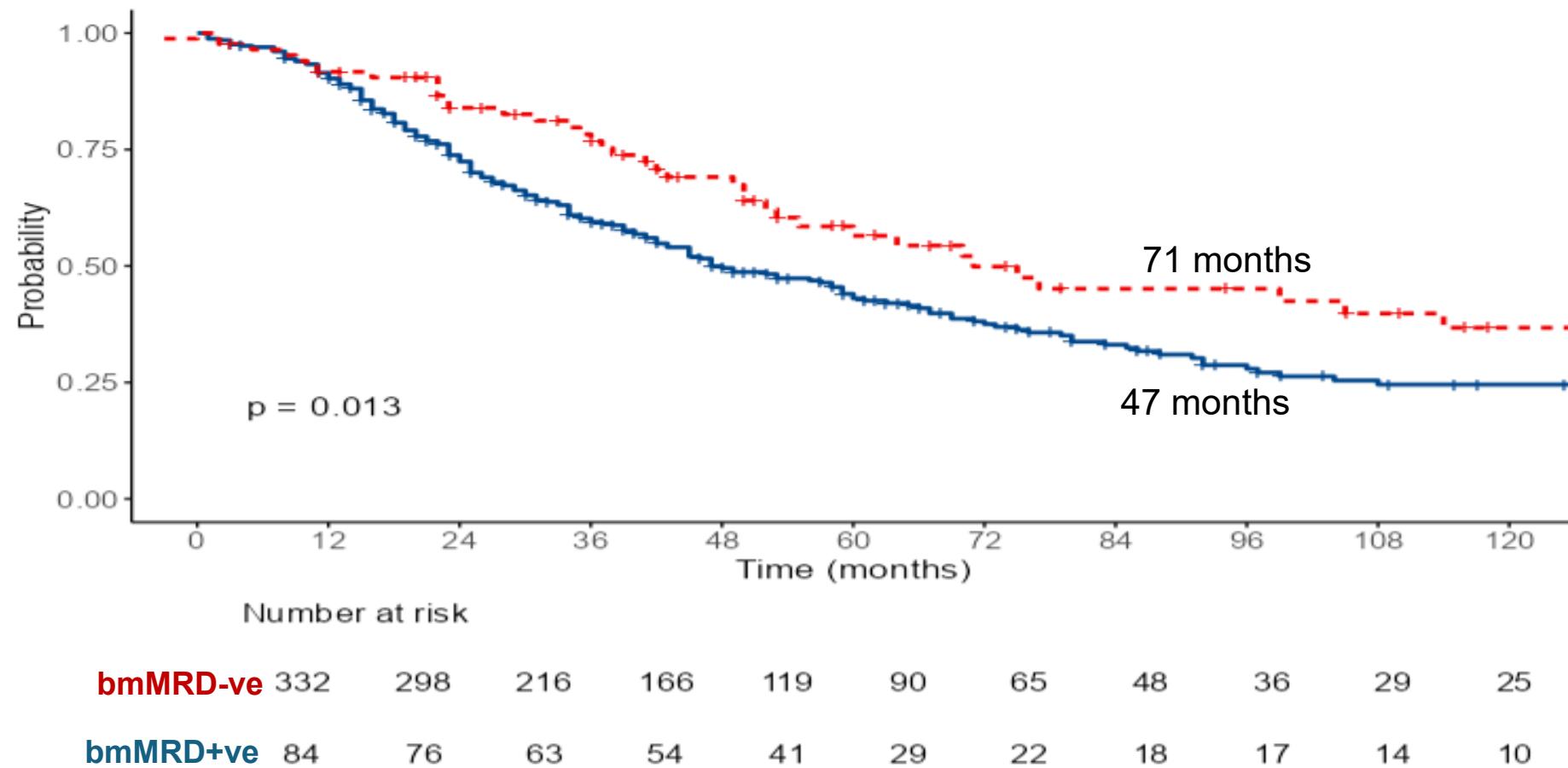
Supplementary Figure 3. Engraftment outcomes: A) CD34+ cell dose infused; B) Time to engraftment.

Captions: aMRD: measurable residual disease in apheresis product; +ve: positive; -ve: negative.



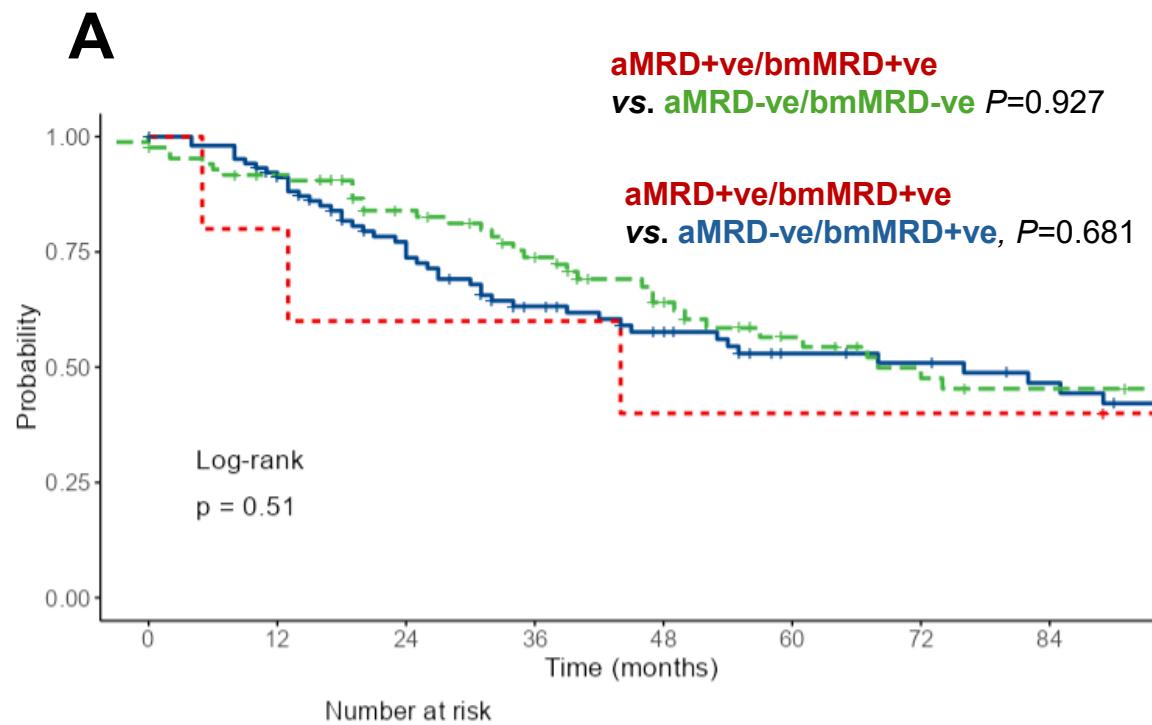
Supplementary Figure 4. Progression-free survival according aMRD and sensitivity threshold: A) Sensitivity 10^{-4} ; and B) Sensitivity 10^{-5} .

Captions: aMRD: measurable residual disease in apheresis product; +ve: positive; -ve: negative

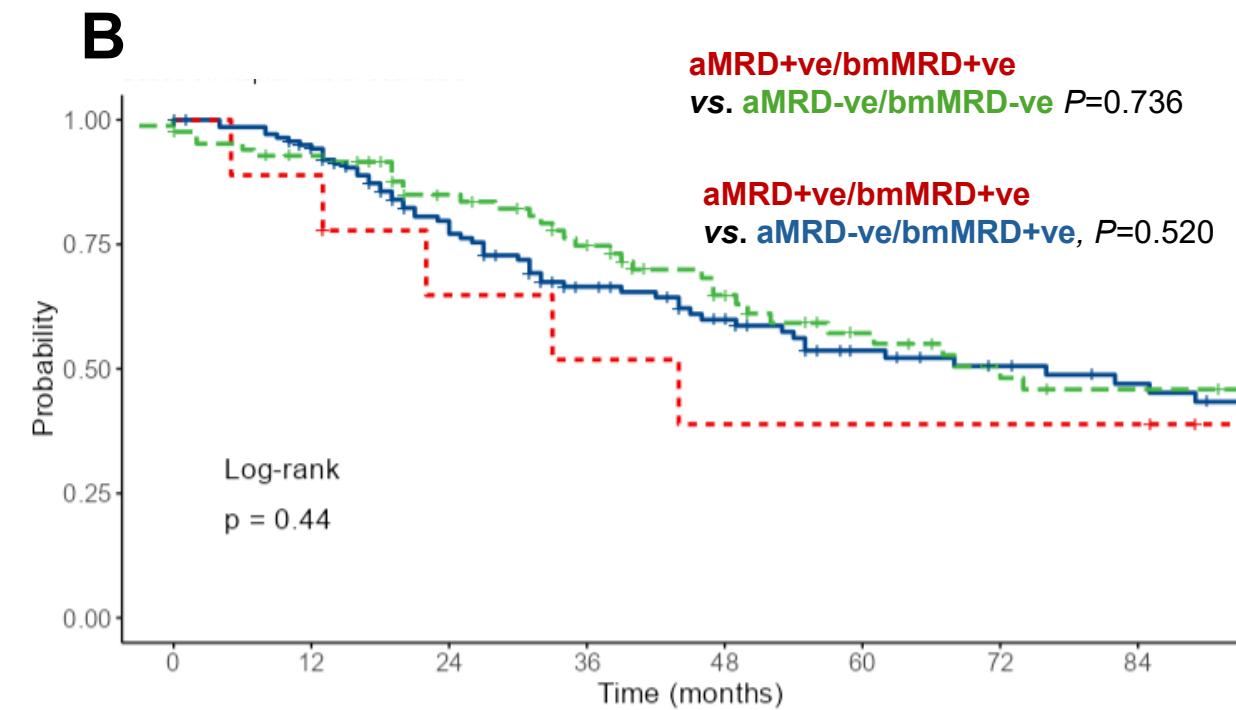


Supplementary Figure 5. Progression-free survival according minimal residual disease in bone marrow prior to ASCT

Captions: bmMRD: minimal residual disease in bone marrow; +ve: positive; -ve: negative.



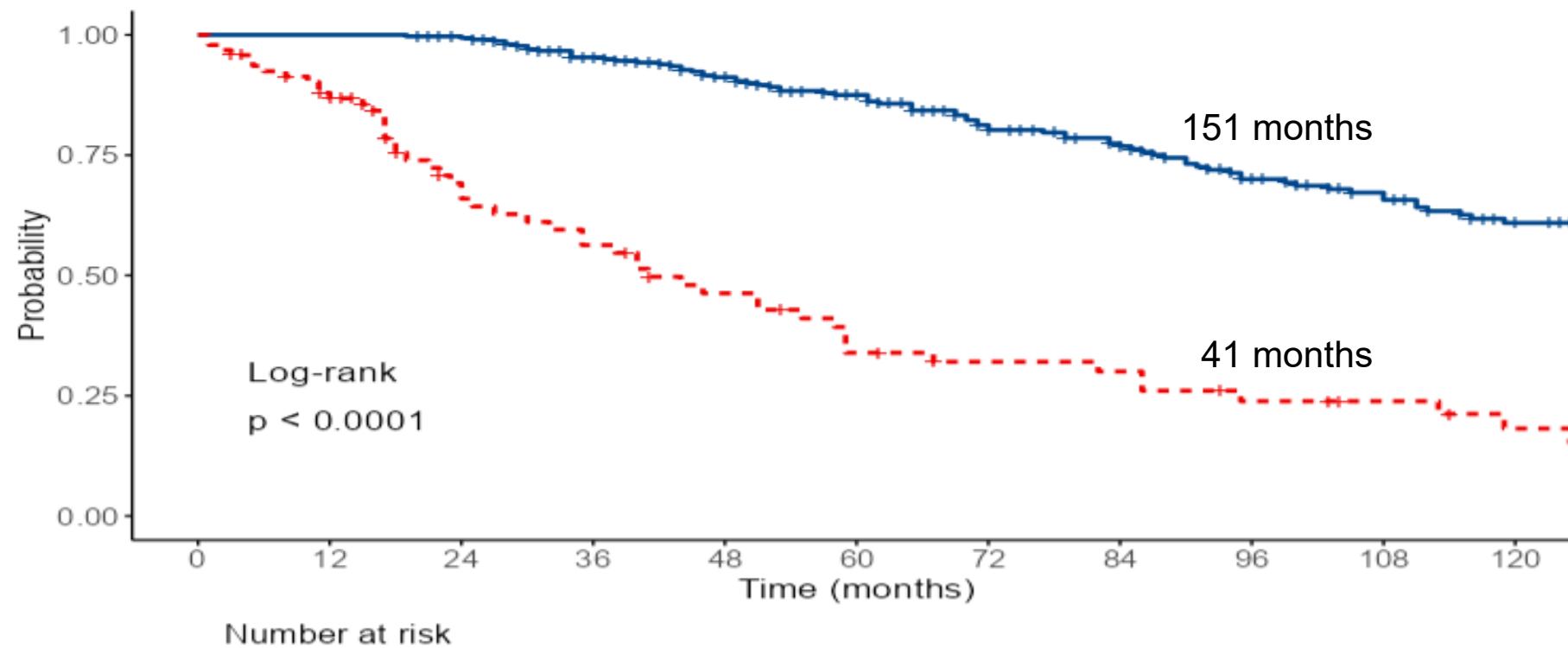
aMRD-ve/bmMRD+ve	104	91	67	48	39	28	25	21
aMRD+ve/bmMRD+ve	5	4	3	3	2	2	2	2
aMRD-ve/bmMRD-ve	84	75	61	49	37	27	22	19



aMRD-ve/bmMRD+ve	141	128	92	65	51	36	30	26
aMRD+ve/bmMRD+ve	9	8	5	4	3	3	3	3
aMRD-ve/bmMRD-ve	83	75	61	49	37	27	22	19

Supplementary figure 6. Progression-free survival in patients who achieved bmMRD-ve: A) At day 100 after ASCT; and B) During follow-up

Captions: ASCT: autologous stem cell transplantation; aMRD: measurable residual disease in apheresis product; bmMRD: measurable residual disease in bone marrow; +ve: positive; -ve: negative. ***Landmark: 100 days after ASCT.



Supplementary Figure 7. Overall survival according to early relapse after ASCT

Captions: ASCT: autologous stem cell transplantation.