

Bispecifics in AL Amyloidosis

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Mrs NK, 81F

- HPC

- Fatigue
- LOW 10kg over 3 years > 36kg
- Diarrhoea
- Occ abdominal pain
- Anorexia, dysphagia, early satiety
- SOBOE
- Occ chest tightness
- No orthostatic sx
- Peripheral neuropathy

- PMH

- RA on prednisolone 2.5mg
- Iron deficiency anaemia
- Melanoma right leg 2006
- Numerous BCCs and SCCs
- OA

- SH

- Retired councillor
- Fully independent
- Home with husband, 2 children, 4 grandchildren
- Non-smoker, a glass of wine with dinner
- Active social life!

Diagnosis

- Baseline LLC 5814 mg/L, KLC 19.4 mg/L, no intact paraprotein
- BMAT: 15% plasma cells, 1q+, Congo Red positive (lambda) in connective tissue
- Normal FBE, renal function, Ca, skeletal imaging
- No albuminuria/ proteinuria
- NT-proBNP 7313 ng/L, troponin 85 ng/L
- ECHO: IVS 17mm, PW 18mm, EF 55%, GLS -10%
- CMR c/w adv cardiac amyloidosis
- Scopes: amyloid in vessels of stomach, duodenum and colon, some amyloid in gastric lamina propria

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- Systemic light chain (AL) amyloidosis with cardiac, GI and autonomic involvement

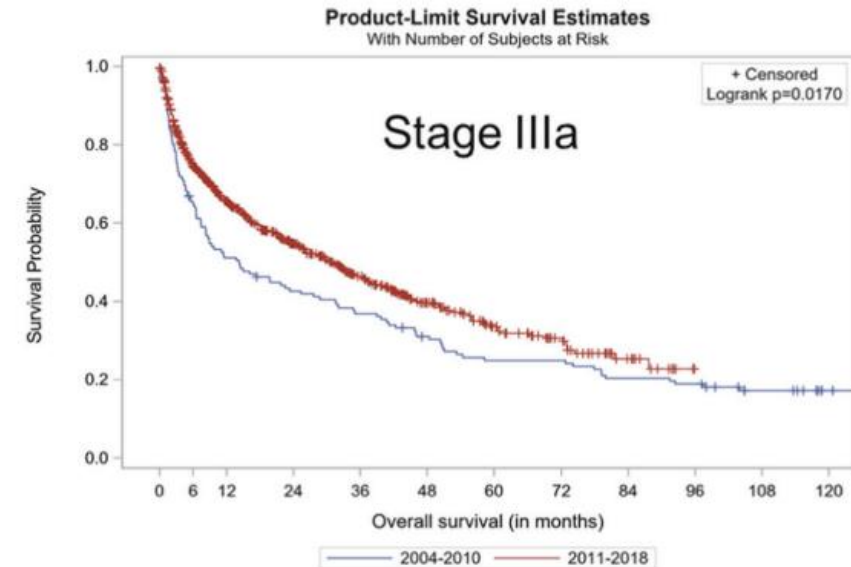
Table 1. Prognostic Models in AL Amyloidosis

Prognostic Model	NT-proBNP	Cardiac Troponin	dFLC	Stage	Median OS by Stage
Mayo 2004 model ⁴³	≥332 ng/L	cTnT ≥0.035 µg/L or cTnI ≥0.1 µg/L	NA	I: no marker above threshold II: 1 marker above threshold III: 2 markers above threshold	I: 26.4 mo (HR, ref) II: 10.5 mo (HR, 2.5 mo) III: 3.5 mo (HR, 6.7 mo)
European modification of Mayo 2004 model ^{28,44}	≥332 ng/L (>8,500 ng/L identifies higher risk)	cTnT ≥0.035 µg/L or cTnI ≥0.1 µg/L	NA	I: no marker above threshold II: 1 marker above threshold IIIa: 2 markers above threshold; NT-proBNP 332–8,500 ng/L IIIb: 2 markers above threshold and NT-proBNP >8,500 ng/L	I: Median OS, NR; 10-y OS, 57% (HR, ref) II: 67 mo (HR, 2.5 mo) IIIa: 15 mo (HR, 4.9 mo) IIIb: 4 mo (HR, 11.1 mo)
Mayo 2012 model ⁴⁵	≥1,800 pg/mL	cTnT ≥0.025 µg/L or cTnI ≥0.1 µg/L	≥18 mg/dL	I: no marker above threshold II: 1 marker above threshold III: 2 markers above threshold IV: 3 markers above threshold	I: 94.1 mo (HR, ref) II: 40.3 mo (HR, 1.7 mo) III: 14 mo (HR, 4.1 mo) IV: 5.8 mo (HR, 6.3 mo)

Diagnosis

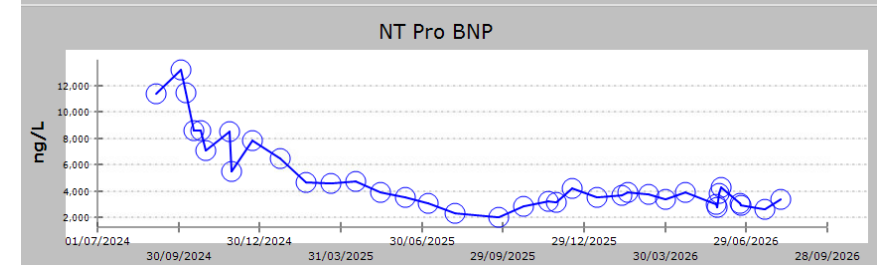
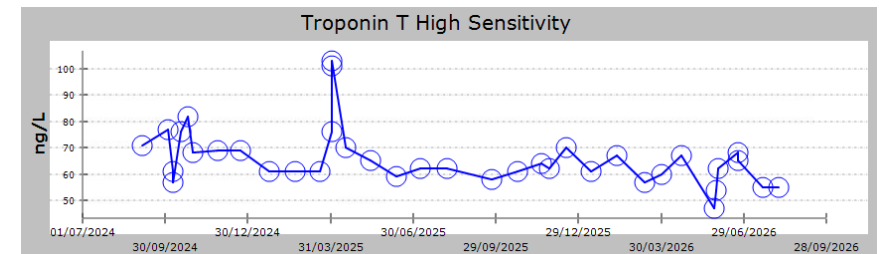
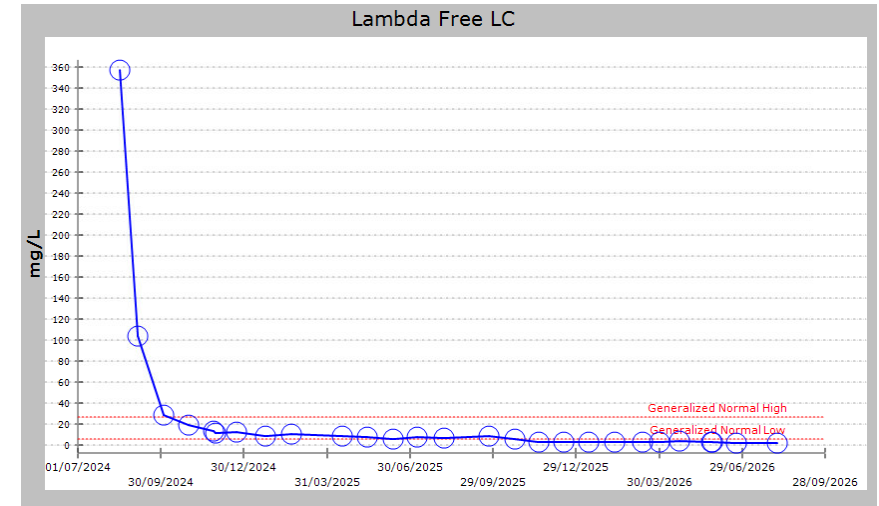
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- Systemic light chain (AL) amyloidosis with cardiac, GI and autonomic involvement
- Mayo stage IIIa



Treatment

1. D-VCD +/- CAEL-101 (mAb targeting amyloid fibrils) x 7 cycles → PR
2. PCD → MR, poorly tolerated (diarrhoea)
3. M24-209 clinical trial (BCMA-targeting bispecific etentamig) Aug 2024 – Aug 2026
 - Haematological response:
 - VGPR by C3
 - iFLC<20 by C4
 - dFLC<10 by C5
 - Cardiac response by C5
 - No CRS or ICANS
 - 3 LRTIs and 2 URTIs (in 2 years)



Why T-cell redirecting therapy in AL amyloidosis?

1. Depth and speed of clonal response are critical determinants of survival

- Ongoing tissue deposition of amyloid fibrils + direct toxicity of circulating free light chains
- Achieving **$\geq$ VGPR**, and ideally **dFLC <10 mg/L / iFLC $\leq$ 20 mg/L** is associated with improved organ responses and survival

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2. **Unmet need in RR AL amyloidosis**

- 40% of the patients will not achieve CR with D-VCd
- Late line options are increasingly limited by organ toxicity, PBS constraints and absence of clinical trials

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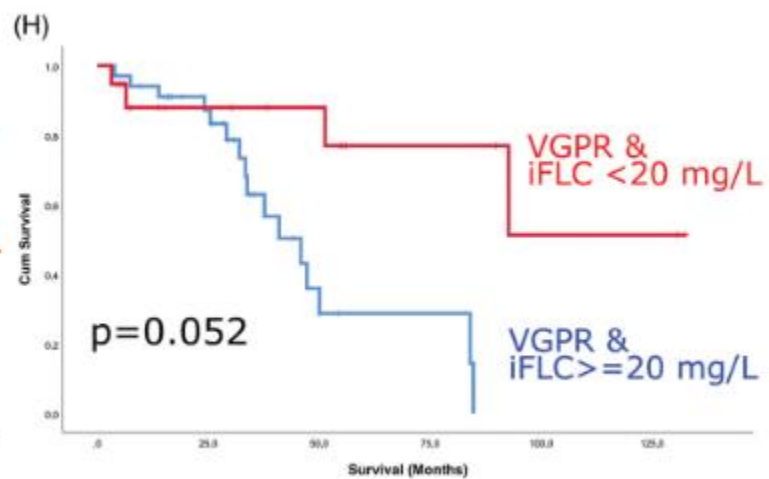
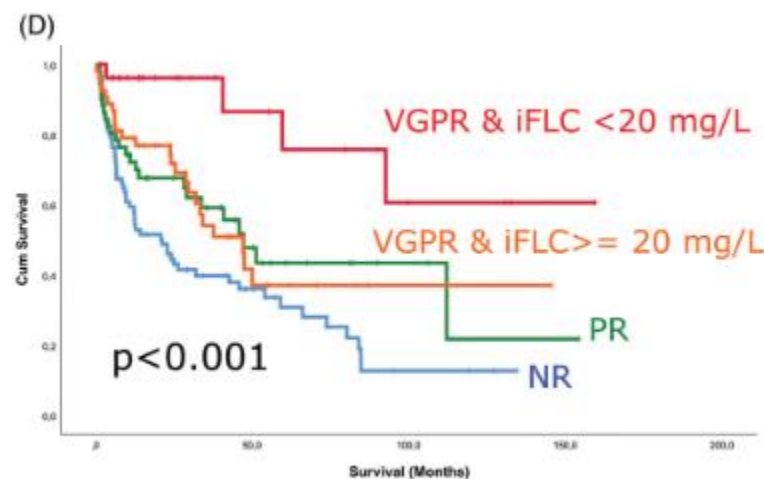
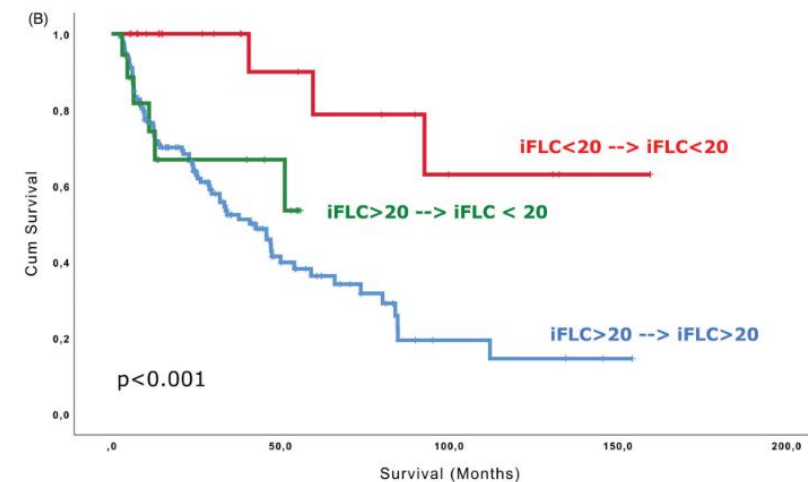
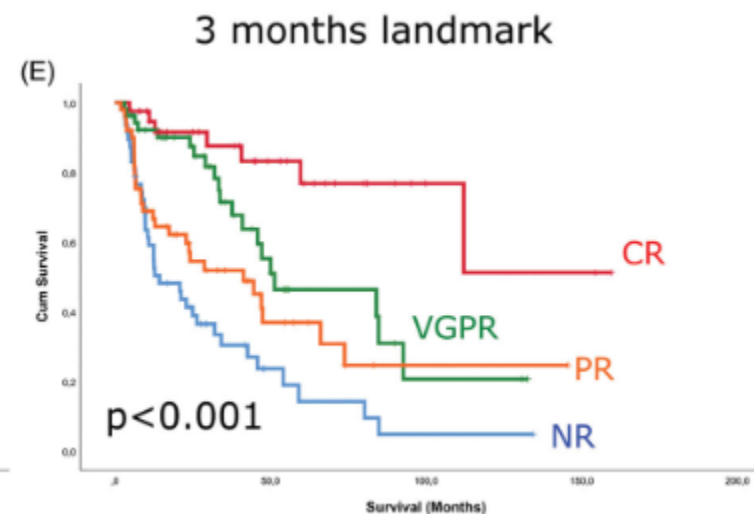
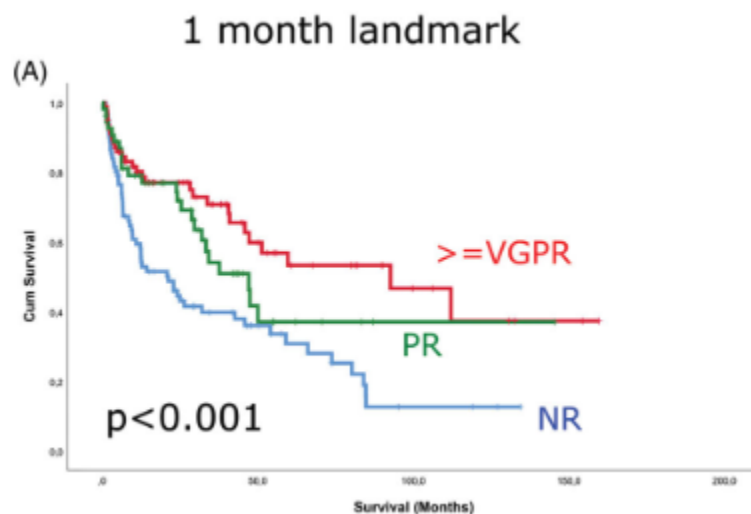
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3. **Low tumour burden plasma cell clone may be more susceptible to TCE + translate to less risk of complications**

Table 2. Validated criteria for response assessment in light chain amyloidosis

Response criteria	Definition
<i>Hematologic response</i>	
Complete response	Negative serum and urine immunofixation and normal FLC ratio
Very good partial response	dFLC <40 mg/L
Partial response	dFLC decrease >50% compared to baseline
No response	All other patients
<i>Patients with dFLC <50 mg/l</i>	
Complete response	Negative serum and urine immunofixation and normal FLC ratio
Low-dFLC-response	dFLC <10 mg/l
<i>Cardiac response</i>	Decrease of NT-proBNP by >30% and 300 ng/l (if baseline NT-proBNP >650 ng/l), or at least a 2-point decrease of NYHA class (if baseline NYHA class is III or IV)
<i>Renal response</i>	At least 30% decrease in proteinuria or drop below 0.5 g/24 h, in the absence of renal progression defined as a >25% decrease in eGFR

Timing and impact of a deep response on the outcome of patients with AL amyloidosis



If you haven't reached a VGPR by 1 month, you have only 25% chance of reaching it by 3 months

Guidelines for non-transplant chemotherapy for treatment of systemic AL amyloidosis: EHA-ISA working group

Ashutosh D. Wechalekar , M. Teresa Cibeira  ORCID Icon, Simon D. Gibbs, Arnaud Jaccard, Shaji Kumar  ORCID Icon, Giampaolo Merlini, [...show all](#)

Pages 3-17 | Received 14 Mar 2022, Accepted 21 Jun 2022, Published online: 15 Jul 2022

Recommendations on goals of clone directed treatments in AL amyloidosis:

- *Goal of treatment is to achieve a complete haematologic response (Grade B, Level IIb) with iFLC <20 mg/L or dFLC <10 mg/L (Grade B; Level III)*
- *Patients achieving less than a very good partial response by cycle 3 or less than a partial response by cycle 2 should be considered for treatment modification (Grade C; Level IV)*

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In a multivariate model, difference in involved amyloidogenic and uninvolved serum free light chains (dFLC) at diagnosis (dFLC >400 mg/l, odds ratio [OR] 4.051, $p < 0.005$) and no response at 1 month (OR 4.787, $p < 0.005$) were significant predictors of no improvement in response. Only 5% of patients with a dFLC of >400 mg/l and no response at 1 month improved their response ($p < 0.005$). We suggest that these patients should switch treatment early, subject to their functional status.

A UK consensus algorithm for early treatment modification in ND AL amyloidosis:

Rapid and deep haematological responses are fundamental to achieving organ recovery and improving survival in AL amyloidosis

Ongoing studies with BCMA BsAbs in AL

Teclistamab in RR AL (EMN40)

NCT06649695

- R/R AL after 1 line
- Measurable dLFC >20 mg/L

C1 with step up doses (d1,4) and weekly (d8 & 15) (SQ)

C2-3
3 mg/kg q
4 weeks

C4-6

C7-12

EOT

Primary end point: CR or better (MRD⁻)

Abbv 383 (etentamig) phase 1b study in RR AL

NCT06158854

- RR AL , stage 1, 2, or 3a
- Measurable disease (dFLC) ≥50 mg/L
- previous exposure to a PI and anti-CD38

C1 with step up doses (d1,4)

C2-24
Monthly IV

EOT

Linvoseltamab Phase 1/2 in Patients With RR AL

NCT06292780

- RR AL , stage 1, 2, or 3a
- Measurable disease (dFLC) ≥ 50 mg/L
- Previous exposure to a proteasome inhibitor (PI) and an anti-CD38 monoclonal antibody

Phase 1

C1 with step up doses (IV)

C2-12/24
Q1-4 weeks SQ
(80 or 240 mg)

EOT

Phase 2

C1 with step up doses (IV)

Randomized to dose
C2-12/24
Q2-3 weeks SQ

EOT

Elranatamab Phase 1/2 in Patients With RR AL

- RR AL , stage 1, 2, or 3a
- Measurable disease (dFLC) ≥20 mg/L for phase 1, ≥40 mg/L for phase 2

NCT06569147

Phase 1/2

C1 with step up doses (SQ), and
d8,15,22

If <VGPR C3-6 weekly
If ≥ VGPR C3-6 D1,15

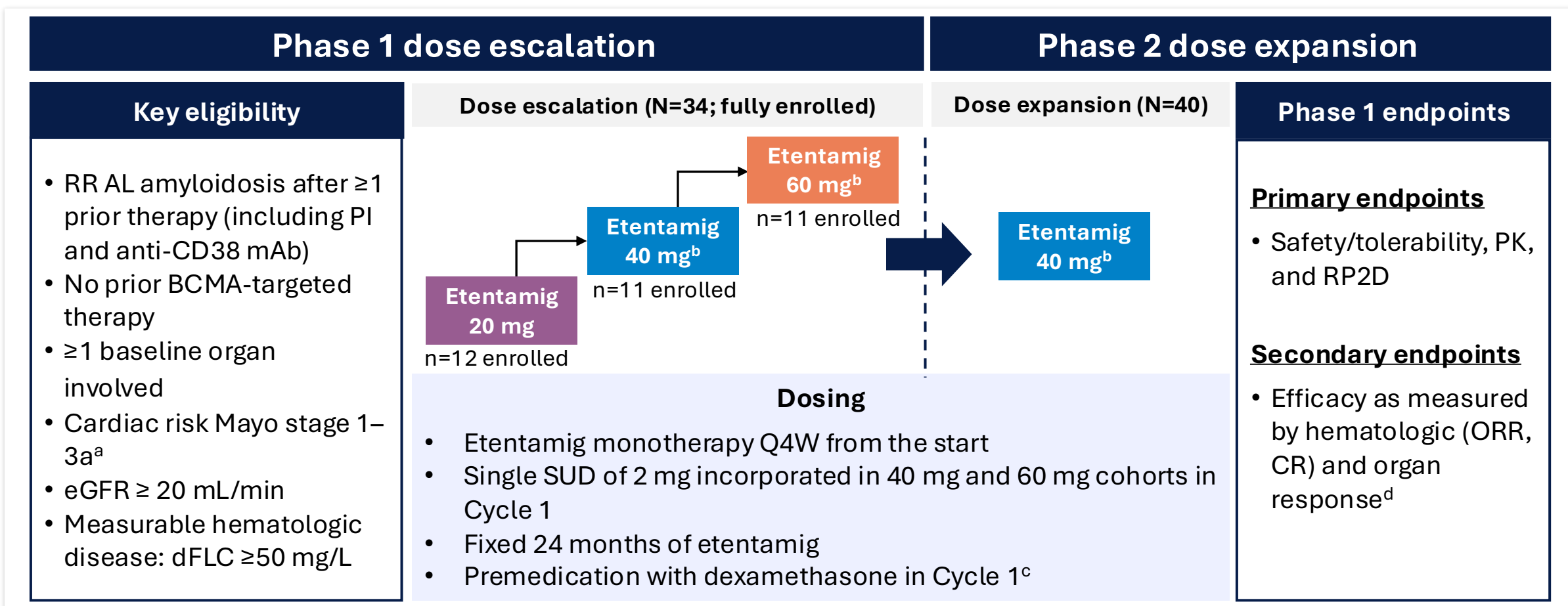
EOT

Phase 1/2 Dose Escalation and Expansion Study of Etentamig in Patients With Relapsed or Refractory Light Chain Amyloidosis

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Global phase 1/2 study evaluating safety and efficacy of etentamig monotherapy in patients with RR AL amyloidosis



Ongoing study has fully enrolled to both dose escalation and expansion phases

^aEuropean Modification of the Mayo Stage (2013). ^bCohorts with SUD incorporated on C1D1 and full dose on C1D4. ^cDexamethasone can be tapered after C1 if no CRS or ICANS are observed. ^dResponses are investigator assessed per consensus guidelines (Comenzo, et al. *Leukemia*. 2012; 26(11):2317–2325; Palladini G, et al. *Amyloid*. 2021[Epub];28(1):1–2). AL, amyloid light-chain; BCMA, B-cell maturation antigen; C, cycle; CR, complete response; CRS, cytokine release syndrome; D, day; dFLC, difference between the involved and uninvolved free light chains; eGFR, estimated glomerular filtration rate; ICANS, immune effector cell-associated neurotoxicity syndrome; mAb, monoclonal antibody; ORR, overall response rate; PI, protease inhibitors; PK, pharmacokinetic; Q4W, every 4 weeks; RP2D, recommended phase 2 dose; RR, relapsed/refractory; SUD, step-up dosing.

Baseline characteristics were generally well-balanced

	20 mg Q4W (n=12)	40 mg Q4W (n=11)	60 mg Q4W (n=11)	Total (N=34)
Age , median years (range)	72 (56–85)	74 (49–82)	66 (54–84)	70 (49–85)
Sex , Male	5 (41.7)	9 (81.8)	4 (36.4)	18 (52.9)
Race , n (%)				
White	6 (54.5)	10 (90.9)	9 (81.8)	25 (75.8)
Black	1 (9.1)	0	1 (9.1)	2 (6.1)
Asian	4 (36.4)	1 (9.1)	1 (9.1)	6 (18.2)
Time from initial diagnosis , median years (range)	3.6 (0–12)	5.2 (0–13)	4.8 (0–21)	4.5 (0–21)
Number of prior LoT , median (range)	2 (1–6)	2 (1–8)	2 (1–4)	2 (1–8)
Prior Dara-CyBorD , n (%)	6 (50.0)	8 (72.7)	9 (81.8)	23 (67.6)
Daratumumab refractory , n (%)	8 (66.7)	7 (63.6)	8 (72.7)	23 (67.6)
Had prior SCT (yes), n (%)	4 (33.3)	2 (18.2)	1 (9.1)	7 (20.6)
dFLC , median mg/L (range)	110.5 (56.6–617.5)	91.4 (55.9–345.3)	118.8 (49.0–862.5)	108.9 (49.0–862.5)
Organ involvement at enrollment , n (%)				
Cardiac	10 (83.3)	9 (81.8)	9 (90.0)	28 (84.8)
Renal	3 (25.0)	6 (54.5)	4 (40.0)	13 (39.4)
Hepatic	1 (8.3)	2 (18.2)	0	3 (9.1)
Other ^a	4 (33.3)	3 (27.3)	0	8 (24.2)
Cardiac Risk Stage 3a at enrollment , n (%)	3 (25.0)	2 (18.2)	3 (27.3)	8 (23.5)
NT-proBNP , median ng/L (range)	548.1 (158.0–6827.2)	665.0 (118.4–1658.2)	414.5 (101.5–4982.9)	595.6 (101.5–6827.2)
Renal Risk Stage III at enrollment , n (%)	1 (9)	0	1 (9)	2 (5.6)

^aIn the 20 mg cohort, 1 patient each involving GI tract, gallbladder, GI/autonomic nervous system, lymph node/macroglossia; In the 40 mg cohort, 1 patient with GI tract and 2 patients with neurological involvement. Dara-CyBorD; daratumumab-cyclophosphamide, bortezomib, and dexamethasone; dFLC, difference between the involved and uninvolved free light chains; ECOG-PS, Eastern Cooperative Oncology Group performance status; GI, gastrointestinal; LoT, line of therapy; NT-proBNP, N-terminal pro-brain natriuretic peptide; Q4W, every 4 weeks; SCT, stem cell transplant.

Promising safety profile of etentamig is observed with longer follow-up

	20 mg Q4W (n=12)		40 mg Q4W (n=11)		60 mg Q4W (n=11)		Total (N=34)	
	Any Grade	Grade 3/4	Any Grade	Grade 3/4	Any Grade	Grade 3/4	Any Grade	Grade 3/4
Any TEAE (≥15%)	12 (100.0)	7 (58.3)	10 (90.9)	5 (45.5)	11 (100.0)	6 (54.5)	33 (97.1)	18 (52.9)
Hypogammaglobulinemia	4 (33.3)	0	2 (18.2)	0	4 (36.4)	0	10 (29.4)	0
Upper respiratory tract infection	4 (33.3)	1 (8.3)	2 (18.2)	0	3 (27.3)	0	9 (26.5)	1 (2.9)
Cough	3 (25.0)	0	3 (27.3)	0	2 (18.2)	0	8 (23.5)	0
AST elevation	1 (8.3)	0	2 (18.2)	1 (9.1)	3 (27.3)	0	6 (17.6)	1 (2.9)
Blood creatinine increased	2 (16.7)	0	1 (9.1)	0	3 (27.3)	0	6 (17.6)	0
Diarrhea	1 (8.3)	0	3 (27.3)	0	2 (18.2)	0	6 (17.6)	0
Peripheral edema	2 (16.7)	0	3 (27.3)	0	1 (9.1)	0	6 (17.6)	0
Any Infection TEAEs	9 (75.0)	1 (8.3)	8 (72.7)	1 (9.1)	9 (81.8)	0	26 (76.5)	2 (5.9)
Hematologic TEAE (≥2%)								
Anemia	0	0	0	0	4 (36.4)	1 (9.1)	4 (11.8)	1 (2.9)
Neutropenia ^a	1 (8.3)	1 (8.3)	1 (9.1)	1 (9.1)	2 (18.2)	1 (9.1)	4 (11.8)	3 (8.8)
Lymphopenia ^b	1 (8.3)	1 (8.3)	0	0	2 (18.2)	2 (18.2)	3 (8.8)	3 (8.8)
Thrombocytopenia ^c	1 (8.3)	0	0	0	0	0	1 (2.9)	0

**At 40 mg, 1 patient experienced a Grade 3 infection (No Grade 4)
No fatal events occurred across dosing cohorts**

Data are displayed as n (%) unless stated otherwise. No new DLTs.

^aCombined neutropenia and neutrophil count reduced.

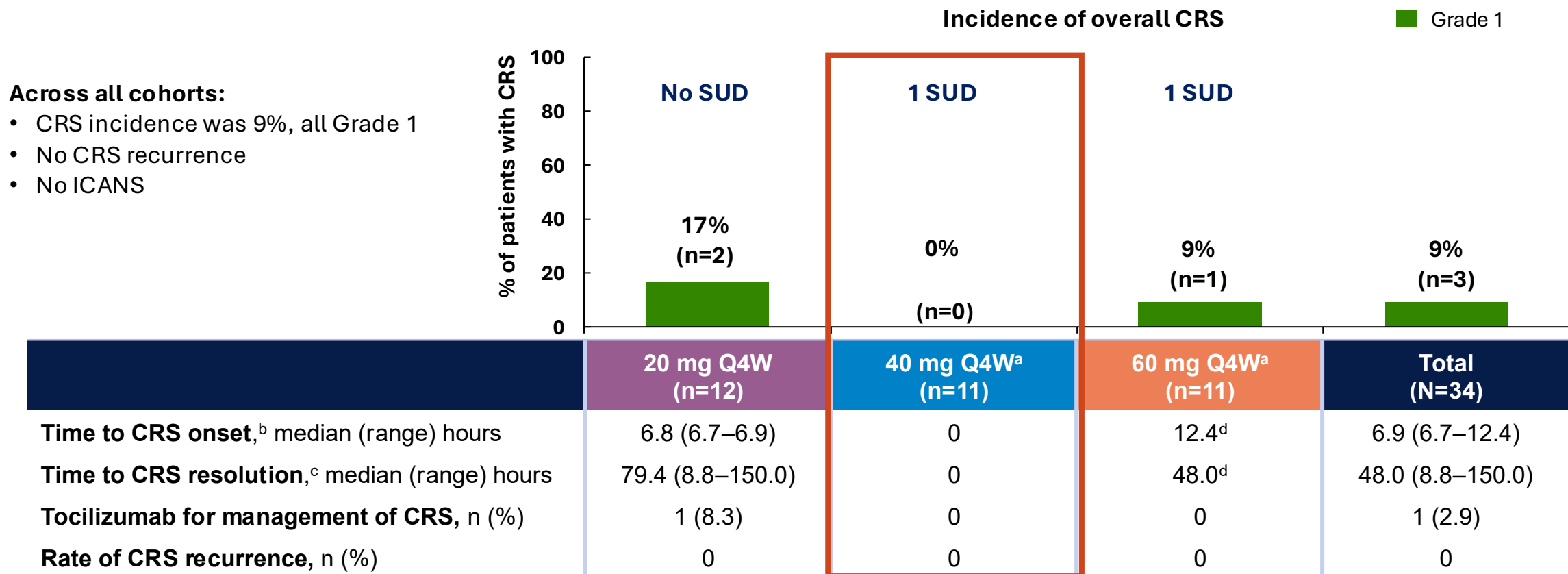
^bCombined lymphopenia and lymphocyte count reduced.

^cCombined thrombocytopenia and platelet count reduced.

AST, aspartate aminotransferase; DLT, dose limiting toxicity; Q4W, every 4 weeks; TEAE, treatment emergent adverse event.

(Data cut 22 Nov 2025)

No case of CRS or ICANS occurred at RP2D of 40 mg



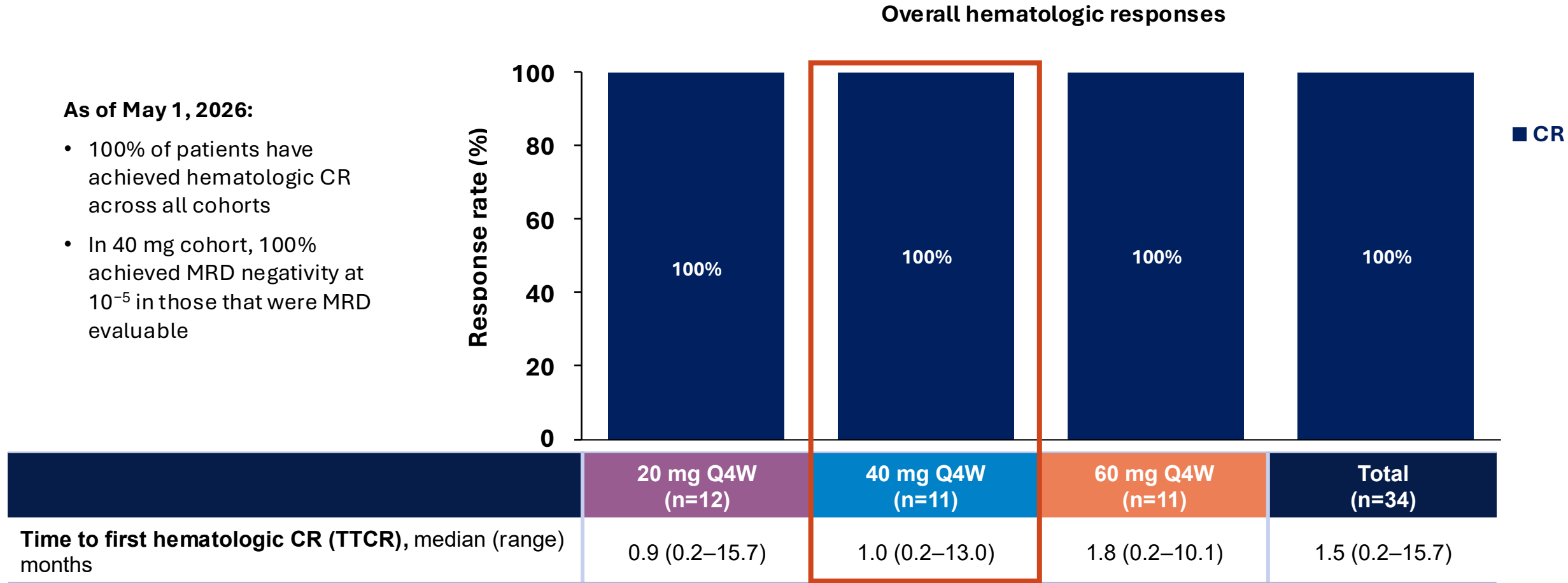
At 40 mg with 1 SUD, NO CRS was observed without use of prophylactic tocilizumab

^aSUD on Day 1 was implemented for 40 mg and 60 mg cohorts during Cycle 1. ^bTime to onset of AE is calculated by (start date/time of AE – date/time of last previous dose). ^cTime to resolution of AE is calculated as (end date/time of AE – start date/time of AE). ^dn=1; individual value presented as median (range) not calculable.

AE, adverse event; CRS, cytokine release syndrome; ICANS, immune effector-cell associated neurotoxicity syndrome; Q4W, every 4 weeks; RP2D, recommended phase 2 dose; SUD, step-up dosing.

(Data cut 22 Nov 2025)

Etentamig led to deep hematologic responses across all dose levels



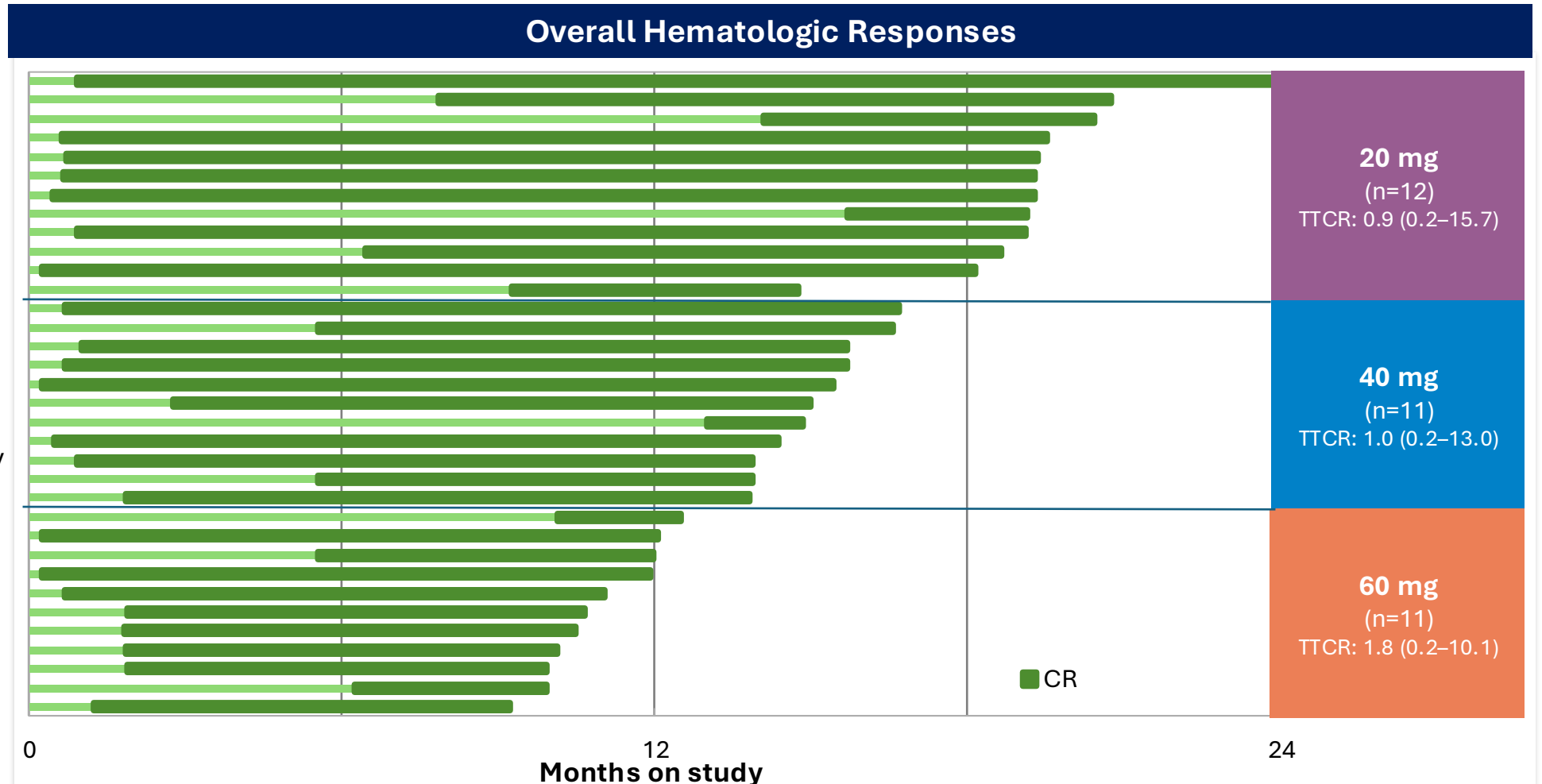
Overall hematologic CR rate was 100% with no cases of hematologic progression

CR assessed per IACC criteria (Palladini G, et al. *Amyloid*. 2021[Epub];28(1):1–2): Normalization of free light chain levels and ratio; and negative serum and urine immunofixation. CR, complete response; MRD, minimal residual disease; Q4W, every 4 weeks.

Etentamig led to deep hematologic responses across all dose levels

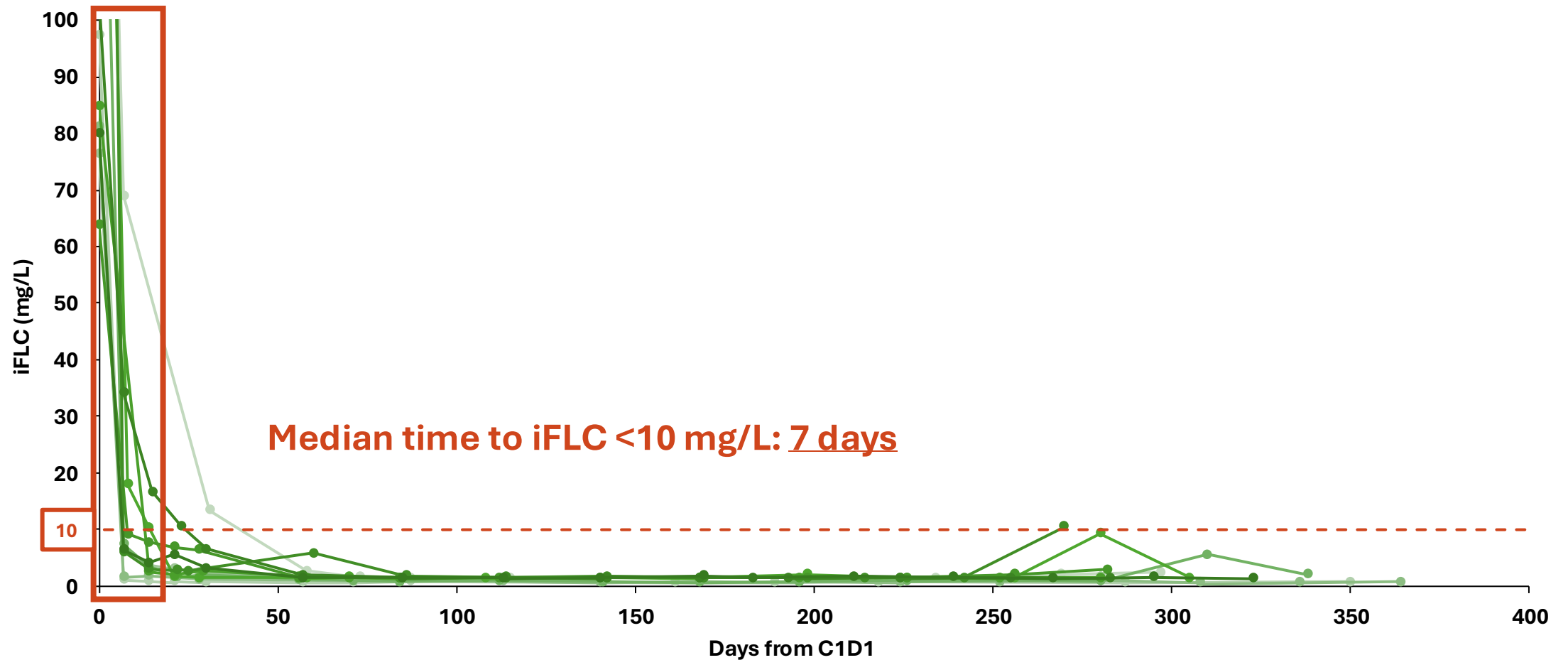
As of May 1, 2026:

- 100% of patients have achieved hematologic CR across all cohorts
- In 40 mg cohort, 100% achieved MRD negativity at 10^{-5} in those that were MRD evaluable



Overall hematologic CR rate was 100% with no cases of hematologic progression

Etentamig 40 mg led to rapid decrease of iFLC to <10 mg/L



Rapid and profound iFLC reduction can be achieved in 1 week after the initial 40 mg dose

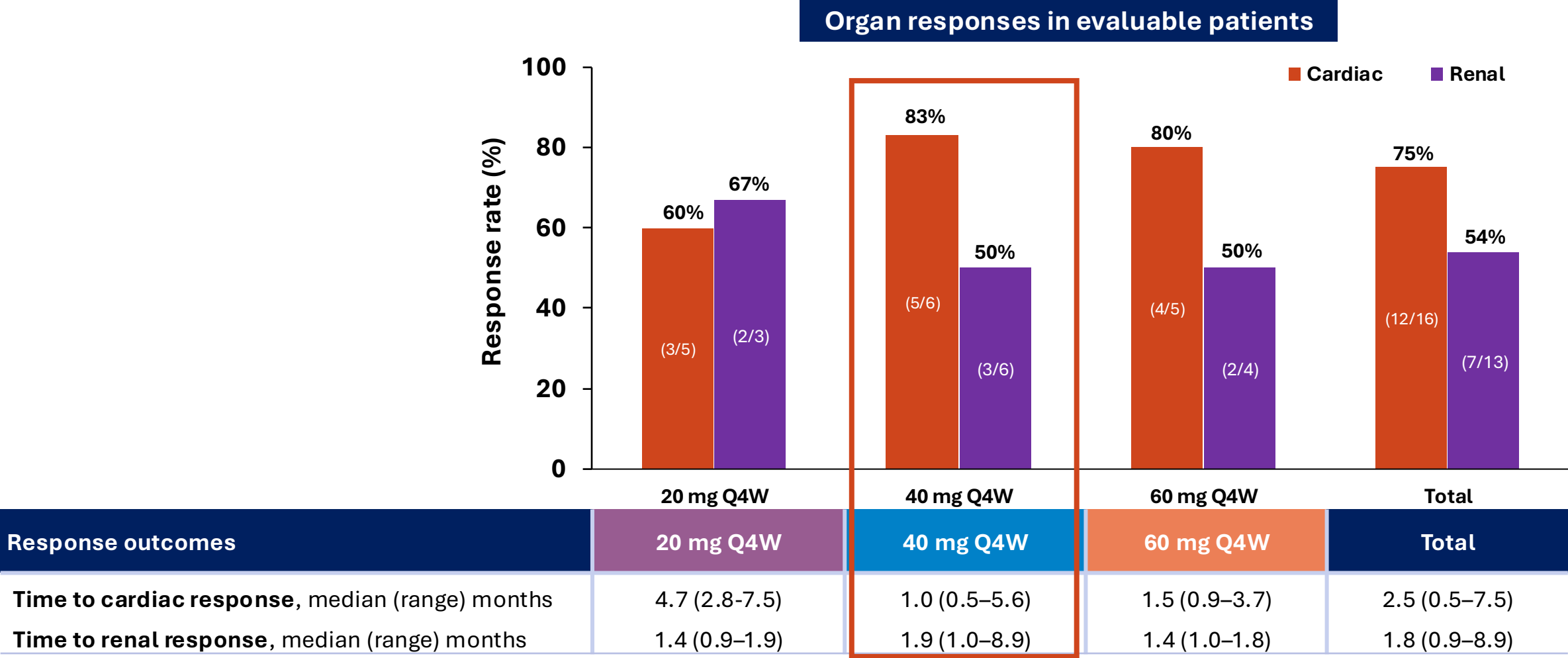
Range for time to iFLC is 7–58 days.

iFLC <10 mg/L threshold per Godara A et al. *Am J Hematol*. 2020 96(1):E20-23.

C, cycle; D, day; iFLC, involved free light chain.

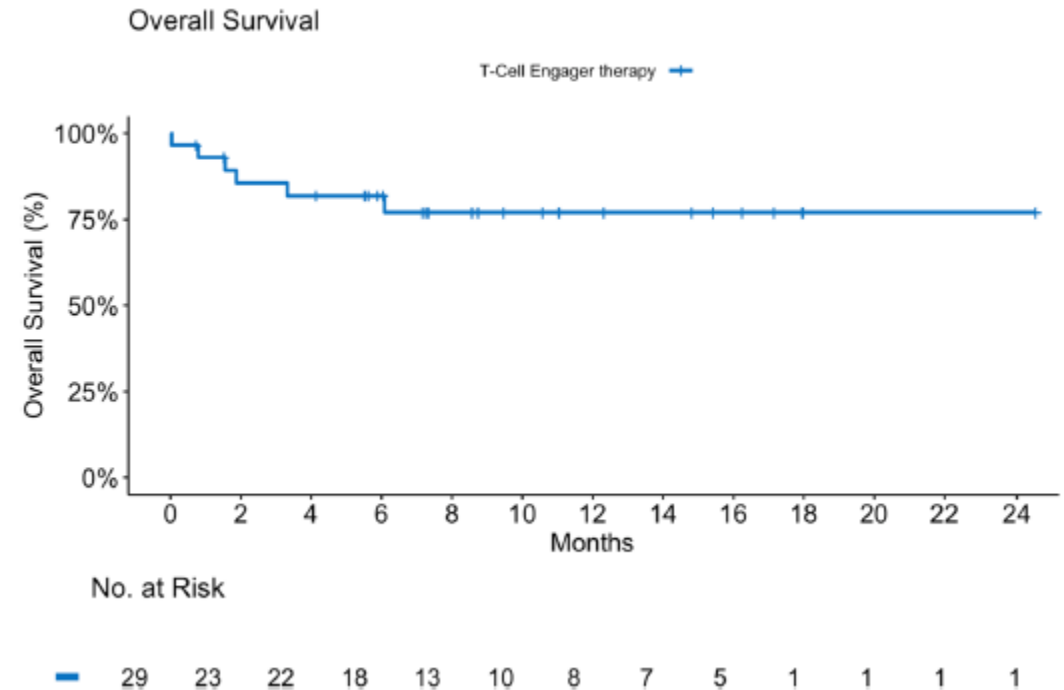
(Data cut 22 Nov 2025)

Etentamig led to rapid and robust organ responses



In conclusion

- TCEs are highly effective, tolerable and feasible in RR AL amyloidosis
- Real-world data are a little more sobering
- Optimal treatment duration, sequencing and combination strategies remain to be worked out
- Frontline studies upcoming:
 - Enlight: elranatamab monotherapy
 - M25-586: etentamig v D-VCD



Rees et al, AJH 2025

“As the light chains are now at remission levels, I am looking forward to getting stronger, being the gardener I once was and rejoining our walking group.

I recently walked up the steep rocky slope to the top of Mt Tinbeerwah in Queensland - and I must say, I was very pleased with myself!

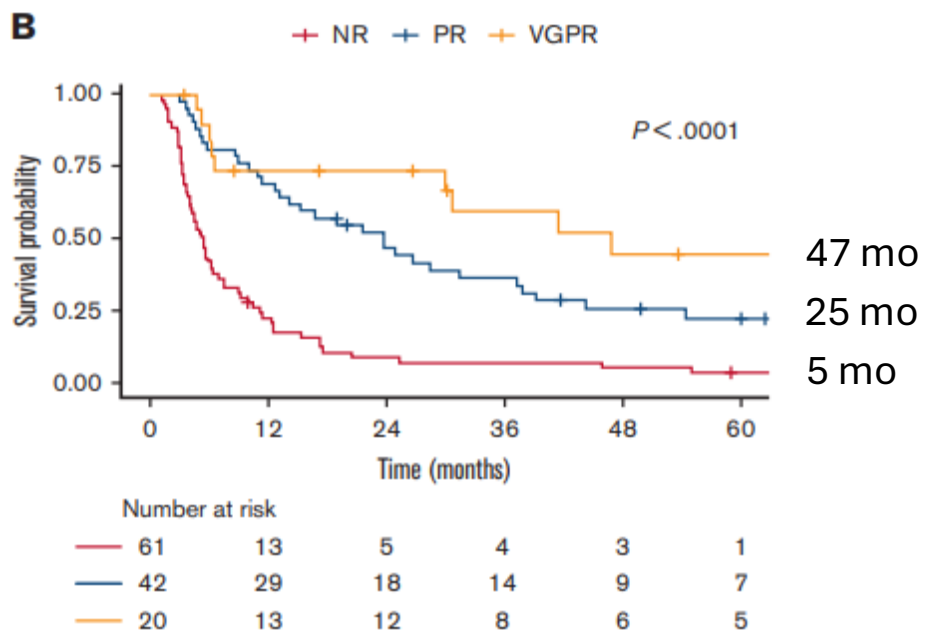
I believe I have been extremely fortunate to be on the clinical trial; the success it has been for me has enabled me to enjoy life again. One day at a time is my motto.”

Patient photographs and quotation used with permission

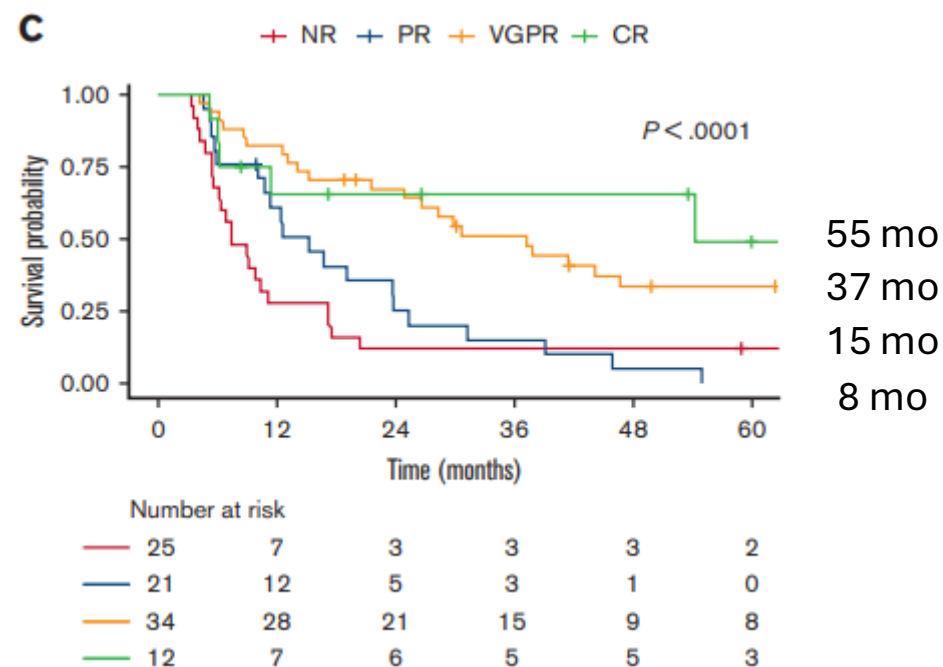


Impact of haematologic responses on survival in stage IIIb AL amyloidosis

Responses at 1 month

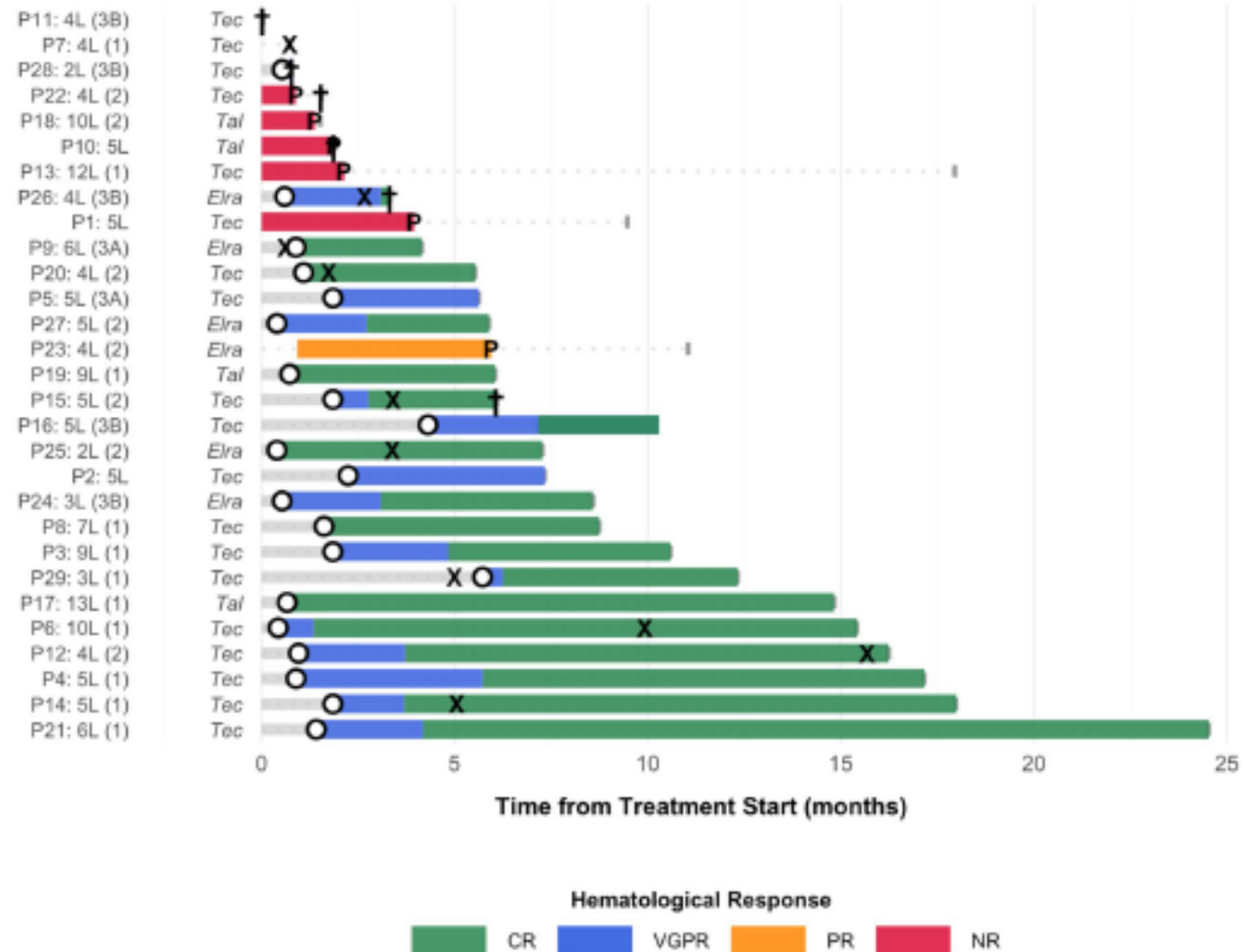


Responses at 3 months



Treatment Response Timeline: AL Amyloidosis Patients on T-cell Engagers

○ = VGPR milestone • P = Progression • X = Discontinuation • † = Death



Real-World Safety and Efficacy of BCMA Bispecific Antibodies in Relapsed AL Amyloidosis

Table. Baseline Characteristics

	N=20
Male, n (%)	9 (45)
Age at bispecific antibody initiation, median (range)	73 (60–83)
Involved light chain (κ/λ), n (%)	4/16 (20)
Plasma cell BM involvement, %	10
dFLC at bispecific antibody initiation, median (range)	68.5 (1.8–963.5)
Prior LOT, median (range)	4 (3–10)
Cardiac involvement, n (%)	14 (70)
Stage I	2 (10)
Stage II	0
Stage IIIA	9 (45)
Stage IIIB	3 (15)
Bispecific antibody received, n (%)	
Teclistamab	11 (55)
Elranatamab	9 (45)

Real-World Safety and Efficacy of BCMA Bispecific Antibodies in Relapsed AL Amyloidosis

Table. Adverse Events

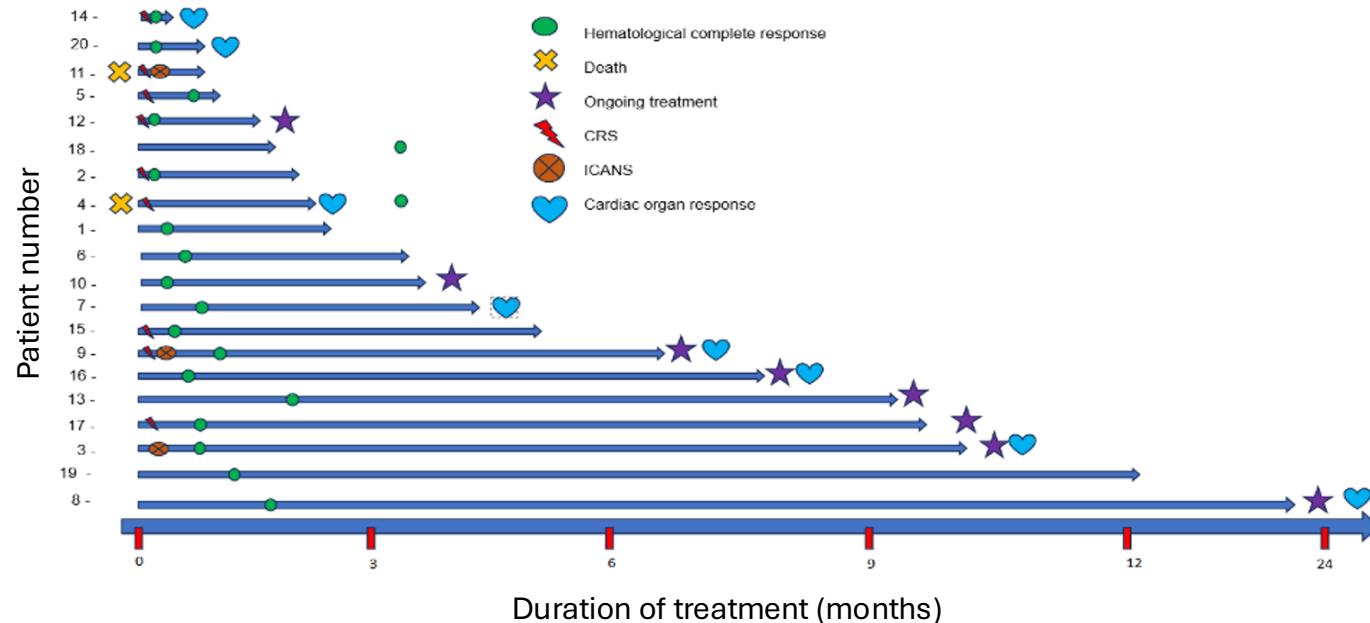
n (%)	N=20
Neutropenia	3 (15)
Infections	5 (25)
Cardiac AEs	2 (10)
CRS	10 (50)
Grade 1	6 (30)
Grade 2	3 (15)
Grade 3	1 (5)
ICANS	3 (15)
Grade 1	1 (5)
Grade 2	1 (5)
Grade 3	1 (5)
Deaths	2 (10)

Real-World Safety and Efficacy of BCMA Bispecific Antibodies in Relapsed AL Amyloidosis

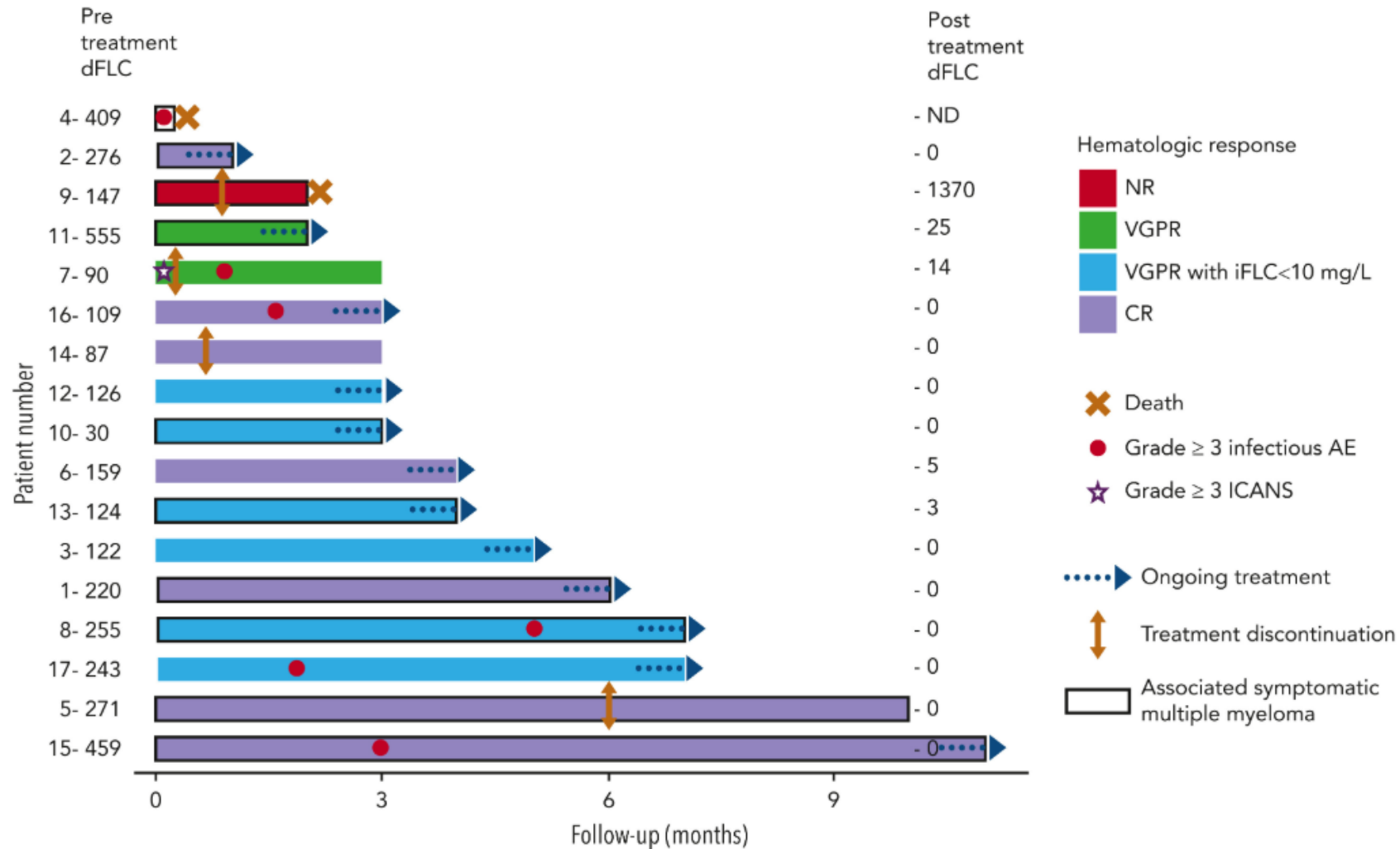
Efficacy

- Of the 19 patients evaluated:
 - ORR was 100%
 - hCR rate was 100%
- Median (range) time to first hematologic response and hCR were 0.5 (0.2–0.9) and 0.7 (0.2–1.9) months, respectively
- 8/14 patients with cardiac amyloid had evidence of organ recovery with a steady reduction in NT-proBNP
- Six patients with fixed-duration therapy stopped bispecific antibody treatment after achieving hCR and maintained disease control off treatment
 - Three patients were ~12 months from the last BCMA bispecific antibody dose

Longitudinal Follow-Up



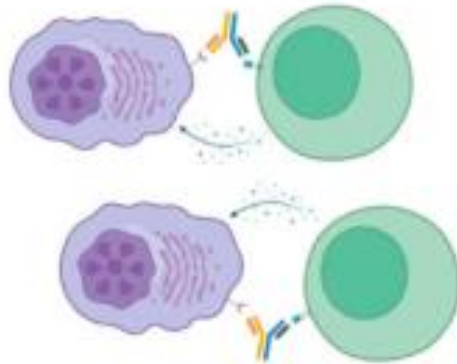
Teclistamab in RR AL amyloidosis



Elranatamab, a BCMA $\times$ CD3 Bispecific T Cell Engager, in Patients with Relapsed and/or Refractory AL Amyloidosis

Context of Research:

- There are no FDA approved therapies for relapsed/refractory (RR) AL amyloidosis



- Elranatamab is a BCMA $\times$ CD3 bispecific antibody that is effective in a related plasma cell disorder, multiple myeloma

Methods

- We retrospectively report on safety and efficacy of elranatamab in 9 consecutive patients with RR AL amyloidosis treated at two large, multidisciplinary amyloidosis programs in the USA

Main Findings

- Elranatamab led to high rates of hematological and organ response

