Efficacy and Safety of CAR-T Cell Therapy in Plasma Cell Leukemia: A Systematic Review and Meta-Analysis

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Background

- Plasma cell leukemia (PCL) is a rare, aggressive plasma cell disorder with poor prognosis.
- CAR-T is effective in relapsed/refractory multiple myeloma, but evidence in PCL remains limited.

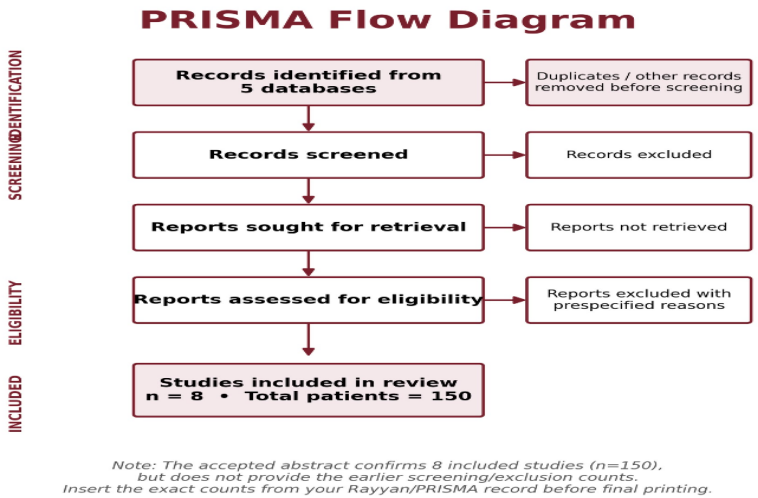
Objective

- To evaluate the efficacy and safety of CAR-T therapy in primary and secondary PCL.

Methods

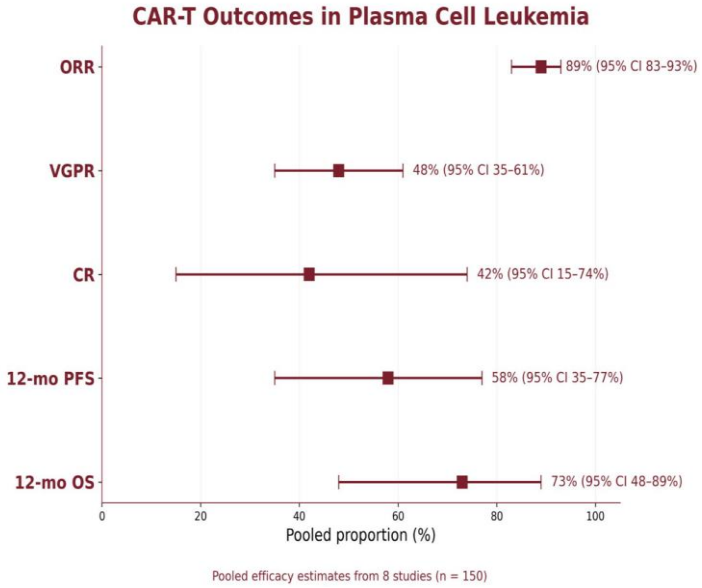
- Systematic review and meta-analysis following PRISMA guidelines.
- PubMed, Embase, Scopus, Web of Science, and Cochrane Library searched through February 2026.
- 8 studies; 150 patients included.
- Outcomes pooled using random-effects GLMM.* Risk of bias assessed using ROBINS-I.

PRISMA Flow Diagram



Results

- Patients were heavily pretreated, with frequent high-risk and triple-class refractory disease.
- CAR-T demonstrated high efficacy: ORR 89%, CR 42%, and VGPR 48%.
- 12-month PFS was 58% and 12-month OS was 73%.* Toxicity was manageable: grade ≥3 CRS 4%, grade ≥3 ICANS 3%, and TRM 3%.
- Infections occurred in 41% of patients.



Conclusion

- CAR-T therapy demonstrates promising efficacy with manageable toxicity in plasma cell leukemia.
- Durable responses were observed despite a heavily pretreated, high-risk population.
- Larger prospective studies with longer follow-up and dedicated primary vs secondary PCL analyses are needed.