Clinical Efficacy of a Daratumumab-Based Regimen in Relapsed or Refractory Acute Leukemia—A Systematic Review

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Introduction

- Relapsed or refractory (R/R) acute leukemia, encompassing both acute myeloid leukemia (AML) and acute lymphoblastic leukemia (ALL), poses a significant therapeutic challenge due to limited effective treatment options and poor survival outcomes.
- CD38, a transmembrane glycoprotein, is commonly overexpressed on leukemic blasts, providing a rationale for the use of Daratumumab, an anti-CD38 monoclonal antibody approved for multiple myeloma, in R/R acute leukemia.
- This systematic review aimed to evaluate the clinical efficacy and safety of Daratumumab-based regimens in patients with R/R acute leukemia.

Methods

- A comprehensive literature search was performed across PubMed and Google Scholar to May 2025.
- Studies were included if they reported clinical outcomes of daratumumab used alone or in combination for R/R AML or ALL.
- Data on patient demographics, treatment regimens, response rates, and adverse events were extracted.
- Quality assessment was conducted using modified Newcastle-Ottawa Scale. Descriptive synthesis was used due to heterogeneity and limited number of studies.

Results

Nine studies were included in this review, assessing daratumumab-based regimens in relapsed or refractory (R/R) acute leukemias, including B-cell lymphoblastic leukemia, T-cell ALL, early T-cell precursor ALL, and AML.

Patients ranged from children to adults, often with heavily pre-treated or post-transplant disease.

Daratumumab was administered either as monotherapy or combined with agents such as vincristine, prednisone, doxorubicin, asparaginase, venetoclax, and cytarabine, typically at 16 mg/kg intravenously weekly or biweekly.

Overall response rates (ORRs) ranged from 20% in adult cohorts to 75% in pediatric ALL.

Multiple studies reported complete remission and minimal residual disease (MRD) negativity, with responses occurring within 2–6 infusions.

In several cases, daratumumab enabled a successful transition to allogeneic hematopoietic stem cell transplantation.

Common adverse events included infusion reactions, cytopenias, and infections like sepsis and cytomegalovirus reactivation.

No treatment-related mortality was reported. Daratumumab demonstrated promising efficacy and tolerability, especially in CD38-positive leukemias.

Conclusion

Daratumumab-based therapy shows promising efficacy in R/R acute leukemia, especially in CD38+ and treatment-refractory cases. While the data are limited and heterogeneous, early clinical responses and MRD clearance suggest a valuable role in future therapeutic algorithms. Larger, controlled trials are needed to confirm these findings and optimize regimen design.

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