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Outcomes of Venetoclax-Based Chemotherapy in Adult Relapsed/Refractory Acute Lymphoblastic Leukemia: A Systematic Review and Meta-Analysis

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INTRODUCTION

Relapsed or refractory acute lymphoblastic leukemia (R/R ALL) remains a challenging hematologic malignancy with poor outcomes, particularly in heavily pretreated adult populations. Venetoclax-based chemotherapy has recently shown promise as a salvage strategy, owing to its synergistic activity with standard cytotoxic agents and its ability to target apoptotic pathways in leukemic cells. However, its overall clinical benefit has not yet been clearly defined. This meta-analysis was conducted to evaluate the efficacy of venetoclax-based chemotherapy in adult patients with R/R ALL.

METHODS

Among 840 citations, six studies (2 prospective, 4 retrospective) were identified as of March 2026, including a total of 84 participants. The participants were aged ≥ 18 and diagnosed with acute lymphoblastic lymphoma with at least 1 prior line of therapy. They were given 100-400mg/day venetoclax in combination with various chemotherapy regimens.

RESULTS

The pooled overall response rate was 74% (95% CI: 53%–91%), with a pooled complete remission rate of 58% (95% CI: 38%–77%) and a pooled complete remission with incomplete hematologic recovery rate of 9% (95% CI: 3%–17%), suggesting a substantial overall antileukemic activity of venetoclax-based chemotherapy in patients with R/R ALL. The pooled MRD-negative rate was 59% (95% CI: 30%–85%) across 5 studies, suggesting that more than half of responding patients may achieve deep molecular remission. Three studies involving 35 patients were included in the analysis of subsequent allogeneic hematopoietic stem cell transplantation (HSCT). The pooled HSCT rate was 52% (95% CI: 30%–74%), indicating that venetoclax-based chemotherapy may effectively serve as a bridge to potentially curative allogeneic HSCT.

CONCLUSION

Venetoclax-based chemotherapy demonstrated meaningful clinical activity in R/R ALL, suggesting its role as an effective salvage strategy and bridge to transplantation. Further studies are warranted to optimize treatment protocols, reduce outcome variability, and confirm long-term survival benefits.

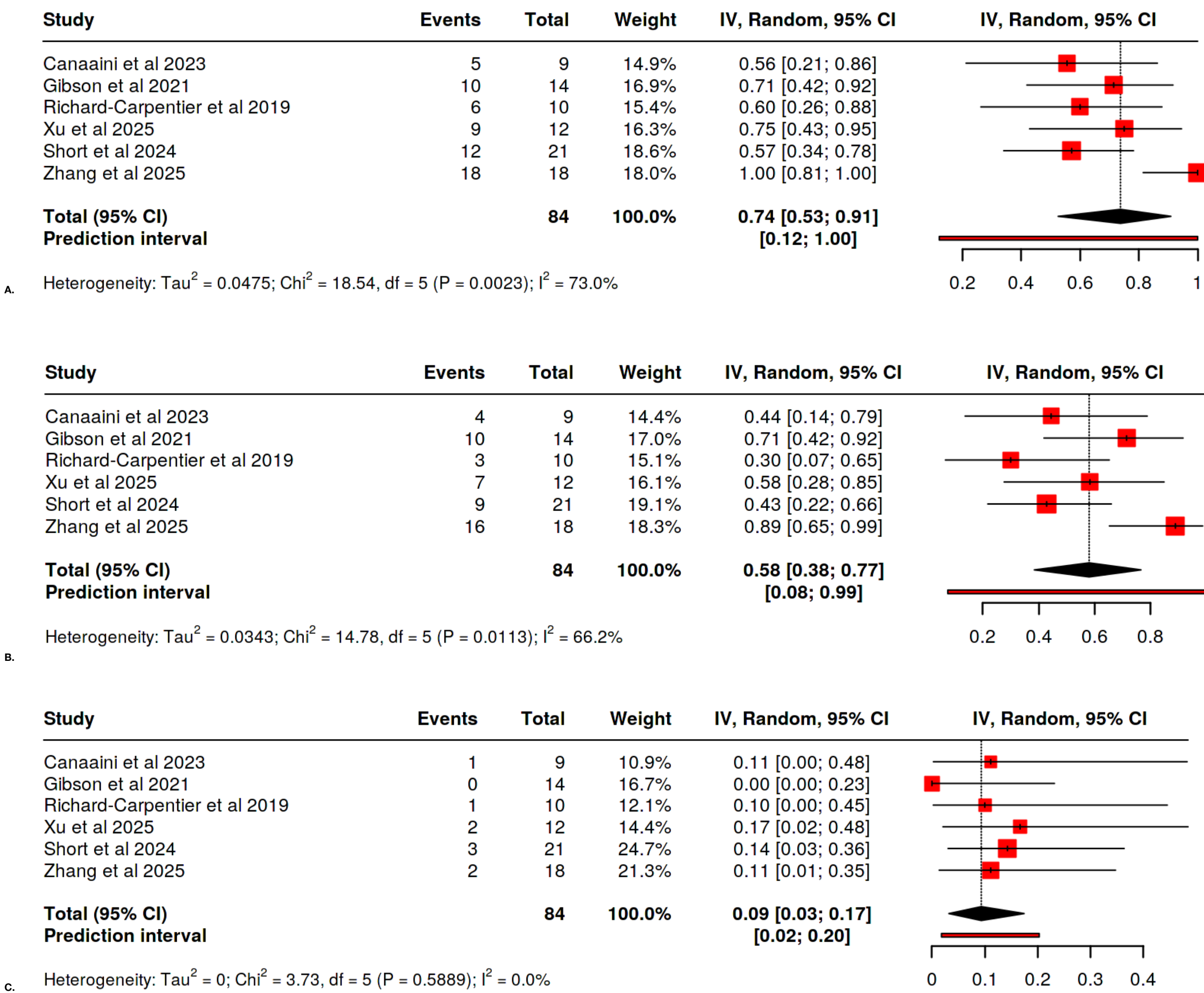


Figure 1. Response Rates of Venetoclax-Based Chemotherapy in Adult Relapsed/Refractory Acute Lymphoblastic Leukemia. A. Overall response rate. B. Complete remission rate. C. Complete remission with incomplete hematologic recovery rate.

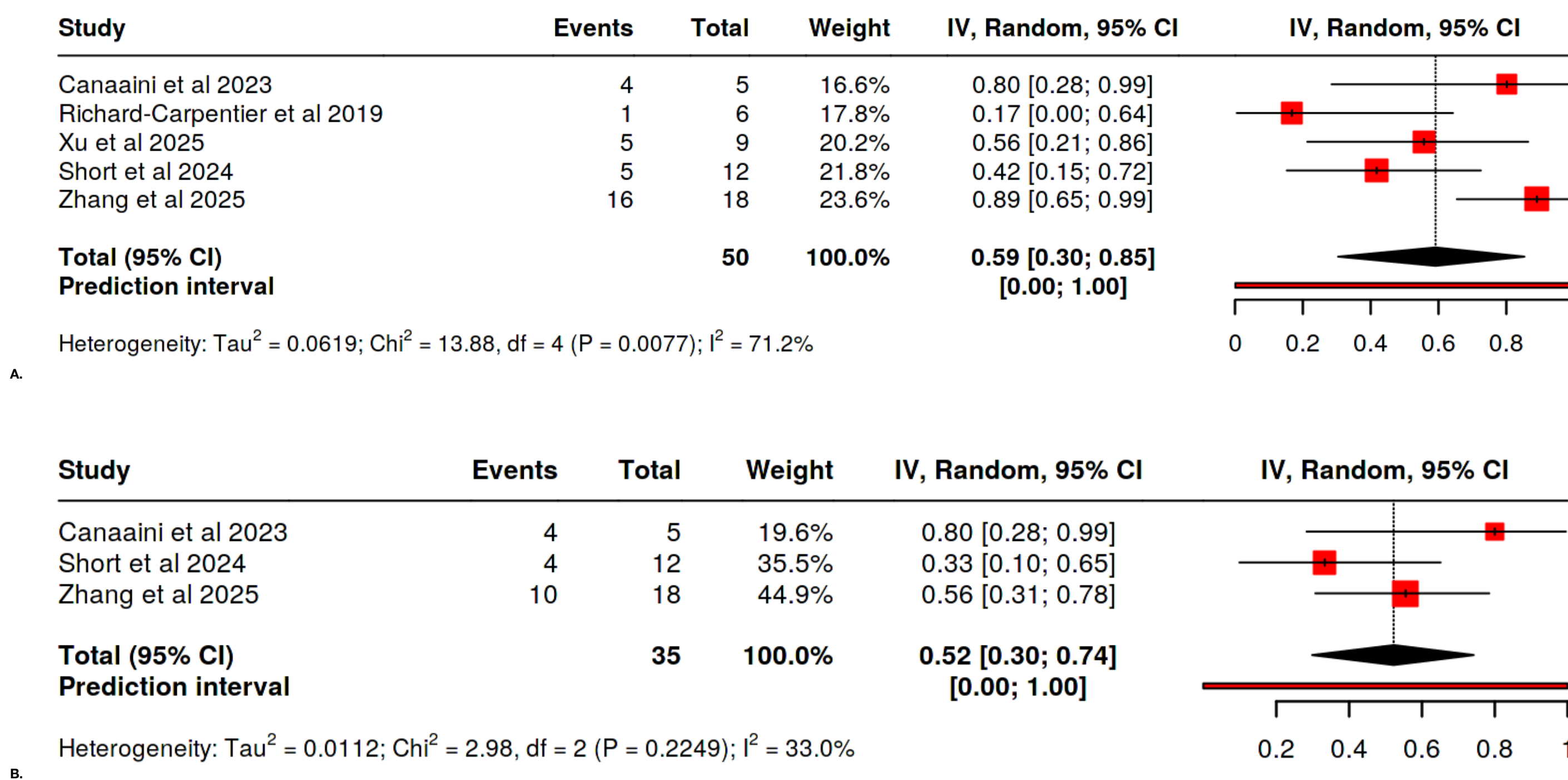


Figure 2. MRD Negativity (A) and Hematopoietic Stem Cell Transplantation Rates (B) of Adult Relapsed/Refractory Acute Lymphoblastic Leukemia after Achieving Response from Venetoclax-Based Chemotherapy

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