Efficacy and Safety of Ponatinib and Blinatumomab Combination Therapy in Philadelphia Chromosome-Positive Acute Lymphoblastic Leukemia: A Systematic Review and Meta-Analysis

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Background

- Philadelphia chromosome-positive acute lymphoblastic leukemia (Ph+ ALL) accounts for 20-30% of adult ALL cases globally, with high mortality due to its aggressive nature.
- Despite advances, traditional therapies combining tyrosine kinase inhibitors (TKIs) and chemotherapy have significant toxicity.
- Recently, ponatinib—a third-generation TKI—and blinatumomab, a bispecific T-cell engager, have shown promise in reducing mortality and treatment-related toxicity.

Methods

- Outcomes were pooled as untransformed proportions using a random-effects model.
- Meta-analyses were conducted using R Studio 5.3.
- A total of 7 studies fulfilling predefined selection criteria were included in the meta-analysis.

Databases searched

PubMed® Cochrane Embase® ClinicalTrials.gov A service of the U.S. National Institutes of Health

Screening and Data Extraction

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Statistical Analysis

- **Software:** Statistical analyses were conducted using R Studio 5.3.
- **Effect Measures:**
- *Proportions* with 95% CIs for sensitivity and specificity were pooled.
- Sensitivity and subgroup analyses were performed to address heterogeneity.
- An I^2 value of >50% was considered significant heterogeneity.

Results

- There was statistically significant pooled prevalence of
- Event-free survival 0.62 (95% CI 0.35-0.89, I2=94.15%, P=0.00)
- Hematologic response (CR) 0.51 (95% CI 0.26-0.75, I2=96.99%, P=0.00)
- Negative measurable disease residue 0.78 (95% CI 0.67-0.89, I2=75.91, P=0.006)
- Overall survival (OS) 0.84 (0.75-0.93, I2=79.7%, P=0.00)
- Relapse 0.11 (95% CI 0.03-0.19, I2=82%, P=0.00),
- complete molecular response 0.87 (95% CI 0.79-0.96, I2=76.06%, P=0.00)
- Grade 1-4 adverse events 0.16 (95% CI 0.05-0.28, I2=77.51%, P=0.004).

Conclusion

- The combination of ponatinib and blinatumomab demonstrates promising efficacy in achieving event-free survival, overall survival, and complete molecular response in Ph+ ALL, with manageable adverse events.
- Robust studies with larger sample sizes are required to establish conclusive evidence.

References