Background: In cancer patients undergoing myelosuppressive chemotherapy, granulocyte colony-stimulating factor (G-CSF) reduces the risk of neutropenic complications and decreases need for dose reductions, allowing potential improvement of survival. A recent meta-analysis found that those receiving G-CSF have significantly improved overall survival (OS) versus those who do not. Deemed a “gold standard” approach for estimating probabilities of survival for time-to-event data, Kaplan-Meier (KM) estimates are a non-parametric method with no underlying distributional assumptions, allowing comparison between studies. Meta-analysis methods based on KM curves have been proposed. We present a new approach of pooling KM curves, improving their accuracy in assessing survival probabilities.

Methods: Our new approach pinpoints specific coordinates on KM curves using web-based digital graphics data extraction tools. When the amount of at risk patients during a specific time period is known, the number of patients experiencing events can be calculated, or if unknown, imputed by “borrowing” event percentages from a study with a similar KM survival profile. Using minimum squared distances between pairs, the similarity between two KM curves can be determined. Reconstructed event times can be used for meta-analyses, using fixed or random effect modeling with weights for each study.

Results: This approach was applied to 70 reports of OS in cancer patients receiving chemotherapy with or without G-CSF prophylaxis, including recent meta-analysis data. Preliminary results are in line with published data. Supporting reports of better survival in patients receiving G-CSF, the new approach provides synthesized KM curves, allowing comparisons of survival probabilities between treatments at any given time points.


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