Use of Modified Probability Interval Method for Efficacy and Toxicity Assessments in Early Phase Trials

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Abstract

In recent years, to accelerate the drug development process, combinations of phase I and II clinical trials are being increasingly applied. A combined phase I/II clinical trial aims to assess drug safety and efficacy in one trial. In this study, we extend modified toxicity probability interval methods, such as the modified toxicity probability interval (mTPI) and mTPI-2, to assess toxicity and efficacy simultaneously. The proposed modified toxicity and efficacy probability interval designs used pre-specified scores of toxicity and efficacy to provide an optimal dose to a phase I/II clinical trial. An adoptive cell therapy example was used to illustrate the proposed designs through comparisons between a numerical study and simulation studies. An R code was provided for design generation, clinical trial implementation and examination of the operating characteristics of the generated design.

Keywords: Bayes rule; modified toxicity and efficacy probability interval design; phase I/II clinical trial