Statistical Analysis in an Ovarian Cancer Study

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Abstract

In this talk, I will share some experience about statistical analysis of ovarian cancer data. While ovarian cancer is not the most common gynecologic malignancy, it is the most lethal. The first part of my talk is on the correlation of the risk factors and survival. The traditional Cox proportional hazards model has been used to identify independent risk factors without considering their time effect. The objective of this study was to explore whether the risk factors in ovarian cancer had time-varying effects on survival. We shared the R package on internet to download.

Second, in ovarian cancer study, cancer antigen125 (CA125) is an important tumor marker, measured repeatedly (longitudinally) when patients revisit the hospital. Nonlinear mixed-effects models are often used to analyze patients' longitudinal CA125 profiles; however, the validity of analysis relies heavily on the normal assumptions for errors and random effects. Moreover, due to the heterogeneity of nonlinear trends of CA125 profiles, different types of trends need to be considered.

We proposed a new nonlinear mixed-effects model that took into account the heterogeneity issue and that contained non-normal errors and random effects whose distributions come from a distribution family including a group of heavy-tailed and skewed distributions. In this presentation, I will show you the comparison between the new model and the traditional nonlinear mixed-effects model in modeling the CA125 profiles of ovarian cancer patients.