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Title: Inverse Probability of Treatment Weighting with Time-to-event Outcomes

Summary:

The Data Studio Workshop brings together a biomedical investigator with a group of experts for an in-depth session to solicit advice about statistical and study design issues that arise while planning or conducting a research project. This week, the investigator(s) will discuss the following project with the group.

Oxaliplatin, a third-generation platinum agent, is a key drug for chemotherapy in patients with colorectal, pancreatic, and gastric cancer. The major toxicity and/or adverse reactions induced by oxaliplatin include severe chronic neurotoxicity, which is observed in 44% to 50% of patients and also impairs the patients quality of life. My collaborator hypothesized that inhibition of the renin-angiotensin system (RAS) may produce a preventive effect on oxaliplatin-induced neuropathy and performed a retrospective observational study to clarify whether RAS inhibitors prevent oxaliplatin-induced peripheral neuropathy.

The primary end point was the time to first incidence of severe peripheral neuropathy at any point during or after the administration of oxaliplatin. To account for the effect of potential confounding factors, a multivariable Cox proportional hazards model was performed to estimate the difference between the RAS and non-RAS groups. Furthermore, to assess the robustness of the result in this observational study, inverse probability of treatment weighting (IPTW) using the propensity score was considered to estimate causal effect of the RAS treatment.

Questions:

1. How to conduct time-to-event data visualization following the IPTW analysis.
   (a) Xie and Liu (Stat Med, 2015;24:3089-3110) proposed an adjusted Kaplan-Meier plot and a modified log-rank test using the weight. These methods can be performed using SAS. However, a question arose because the results among multivariable Cox model, IPTW-based Cox model, and modified log-rank test were inconsistent.
   (b) Instead of the adjusted Kaplan-Meier plot, adjusted time-to-event curves from the IPTW-based Cox model can be illustrated.

2. Validity of applying IPTW time-to-event analysis in this study size (n = 150).
   (a) 34 pts in RAS group vs. 116 pts in non-RAS group (5 events vs. 54 events)
Zoom Meeting Information

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