Competing risks analysis in Nephrology research: An example in peritoneal dialysis

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Abstract

In clinical and epidemiological research, increasing importance has been given to the competing risk approach and this methodology has been referred as the rule rather than the exception in follow-up studies [1]. It is an extension of classical survival analysis.
In the competing risks framework, patients may fail to one of the K possible causes. A competing risk is an event whose occurrence either precludes the occurrence of another event under examination or fundamentally alters the probability of occurrence of this other event [2].
In the presence of competing risks, two types of analysis can be performed: modelling the cause-specific hazard and modelling the hazard of the subdistribution [3,4]. The context of the research question is the main determinant for the choice of an appropriate statistical model. When the hazard of the subdistribution is analyzed, the goal is to compare the probability of the event of interest and therefore can be translated into actual numbers of patients with this event. Comparing the cause-specific hazards gives an insight into the biological process [3,4,5].
In peritoneal dialysis programs, several endpoints can be observed: death, transfer to haemodialysis and renal transplantation. In our study, we were interested in modelling the time from the entrance in the peritoneal dialysis program until the occurrence of the event of interest, death, in the presence of competing risks (transfer to haemodialysis and renal transplantation). Data from all patients included in the peritoneal dialysis program (Hospital Geral de Santo Antnio, Centro Hospitalar do Porto, Porto, Portugal) between October 1985 and June 2011 were analyzed. Regression models based on cause-specific hazard and hazard of the subdistribution were performed, considering time-independent (gender, age, diabetes and first treatment) and time-dependent covariates (hospitalizations and peritonitis) and the estimates obtained by such models were examined and discussed.

Keywords: competing risks, cause-specific hazard, hazard of the subdistribution, peritoneal dialysis
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