JOINT MODELLING OF RECURRING AND TERMINATING EVENT : APPLICATION TO CANCER

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The observation of repeated events for subjects in cohort studies could be terminated by loss to follow-up, end-of-study, or a major failure event such as death. The major failure event could be correlated with recurrent events, and, as a result, the assumption of independent censoring required by most statistical analysis is violated. Recently joint modelling for two survival processes have received considerable attention because it allows to study the joint evolution other time of two processes and gives unbiased and efficient parameters.

A general joint frailties modelling of recurrent event processes and failure times is used to study the association between the intensity of the recurrent event process and the hazard of the failure time.

The most commonly used estimation procedure in the joint models for survival events are the EM algorithm. We show how maximum penalized likelihood estimation can be applied to nonparametric estimation of the continuous hazard functions in a joint frailty model with right censored and left truncated data. We report the results of some simulation studies. As an illustration, such approach is applied to a prospective cohort with recurrent events of follicular lymphomas, jointly modelled with death.