Estimating Survivorship for Monoclonal Gammopathy of Undetermined Significance

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Objective

The objective of this project is to study and compare the survivorships of individuals suffering from Monoclonal gammopathy of undetermined significance (MGUS) by several covariates such as age and sex.

MGUS is a condition where there is an abnormal protein in the blood (Monoclonal gammopathy, 2017). The monoclonal immunoglobulin (Ig), or M protein, is produced by the plasma cells in the bone marrow. In MGUS, the M protein can accumulate to such levels that it inhibits healthy cells and can lead to tissue damage. Although the condition is generally asymptomatic and very seldom problematic, MGUS can progress to more serious disorders such as blood cancer. In fact, the study done by van de Donk et al. (2014) found that MGUS will commonly precede multiple myeloma, a cancer of the plasma cells.

Dataset

The dataset that will be used for this project has been donated courtesy of Dr. Robert Kyle of the Mayo Clinic (Kyle et al., 2002). It contains 1341 records of de-identified data describing the natural history of patients with MGUS.

Each observation contains the following 10 variables:

1. **ID:** A numeric identifier for the patient
2. **Age:** The age of diagnosis in years
3. **Sex:** The gender of the patient
4. **HGB:** Hemoglobin values
5. **Creat:** Serum creatinine values
6. **MSpike:** Size of the monoclonal serum spike
7. **Ptime:** Time until progression to a plasma cell malignancy (PCM) or last contact, in months
8. **Pstat:** Binary indicator of a PCM event
9. **Futime:** Time until death or last contact, in months
10. **Death:** Binary indicator of a death event

Analysis

The analysis will be conducted using Kaplan-Meier to estimate survivorships by age groups, sex, hemoglobin values and serum creatinine values. For this analysis, the event of interest will be the development of a plasma cell malignancy. Analysis of time-to-death cannot be adequately carried out since the causes of death include other maladies unrelated to MGUS.

Differences between survival curves will be evaluated using the log-rank test. 95% confidence intervals will also be calculated.

References

Monoclonal gammopathy of undetermined significance (MGUS). (2017, July 29). Retrieved March 03, 2018, from https://www.mayoclinic.org/diseases-conditions/mgus/symptoms-causes/syc-20352362

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