Conditional probability of survival in patients with newly diagnosed glioblastoma.

Polley MY, Lamborn KR, Chang SM, Butowski N, Clarke JL, Prados M.

Biometric Research Branch, National Cancer Institute, National Institute of Health, Room 8124, Executive Plaza North, 6130 Executive Blvd, Rockville, MD 20892; polleymc@mail.nih.gov.

Abstract

PURPOSE The disease outcome for patients with cancer is typically described in terms of estimated survival from diagnosis. Conditional probability offers more relevant information regarding survival for patients once they have survived for some time. We report conditional survival probabilities on the basis of 498 patients with glioblastoma multiforme receiving radiation and chemotherapy. For 1-year survivors, we evaluated variables that may inform subsequent survival. Motivated by the trend in data, we also evaluated the assumption of constant hazard. PATIENTS AND METHODS Patients enrolled onto seven phase II protocols between 1975 and 2007 were included. Conditional survival probabilities and 95% CIs were calculated. The Cox proportional hazards model was used to evaluate prognostic values of age, Karnofsky performance score (KPS), and prior progression 1-year post diagnosis. To assess the constant hazard assumption, we used a likelihood-ratio test to compare the Weibull and exponential distributions. Results The probabilities of surviving an additional year given survival to 1, 2, 3, and 4 years were 35%, 49%, 69%, and 93%, respectively. For patients who survived for 1 year, lower KPS and progression were significantly predictive of shorter survival (both P < .001), but age was not (hazard ratio, 1.22 for a 10-year increase; P = .25). The Weibull distribution fits the data significantly better than exponential (P = .02), suggesting nonconstant hazard. CONCLUSION Conditional probabilities provide encouraging information regarding life expectancy to survivors of glioblastoma multiforme. Our data also showed that the constant hazard assumption may be violated in modern brain tumor trials. For single-arm trials, we advise using individual patient data from historical data sets for efficacy comparisons.

PMID: 21969507 [PubMed - in process]

LinkOut - more resources