CNS 2018 ANNUAL MEETING
HOUSTON, TEXAS
OCTOBER 6-10, 2018

Between-hospital Variation in Mortality and Survival after Glioblastoma Surgery

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Introduction

To measure between-hospital variation in risk-standardized survival outcome after glioblastoma surgery and to explore the association between survival and hospital characteristics in conjunction with patient-related risk factors.

Methods

Data of 2,409 adults with first-time glioblastoma surgery at 14 hospitals were obtained from a comprehensive, prospective population-based Quality Registry for Neurological Surgery in the Netherlands between 2011 and 2014. We compared the observed survival with patient-specific risk-standardized expected early (30-day) mortality and expected late (2-year) survival, based on patient age, performance status, and year of treatment. Summarized outcomes per hospital were analyzed in funnel plots. Hospital characteristics were analyzed in logistic regression and Cox proportional hazards models.

Results

Overall 30-day mortality was 5.2% and overall 2-year survival was 13.5%. Median overall survival varied between 4.8 and 14.9 months among hospitals, and biopsy percentages ranged between 16% and 73%. One hospital had lower than expected early mortality, and four hospitals had lower than expected late survival. Higher hospital volume was related with lower early mortality (P=0.031). A 10% increase in volume was associated with 3.9% relative decrease in early mortality, but not with overall survival. Patient-related risk factors (lower age; better performance; more recent years of treatment) were significantly associated with longer overall survival. Of the hospital characteristics, longer overall survival was associated with lower biopsy percentage (HR: 2.09, 1.34-3.26, P=0.001), and not with academic setting (HR: 0.951, 0.858-1.05), nor with hospital volume (HR: 0.954, 0.866-1.05).

Conclusions

Hospitals vary more in late survival than early mortality after glioblastoma surgery. Widely varying biopsy percentages indicate treatment variation. Patient-related factors have a stronger association with overall survival than hospital-related factors.

Learning Objectives

- to utilize quality registry data at population level

- to understand patient-related and hospital-related determinants of glioblastoma survival

- to apply community outcome results to patient care

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