Trends in secondary diagnosis of cerebral edema or brain compression in brain tumor patients in New York State, 2000-2012

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Introduction

Edema is a common consequence of brain tumors, but the impact on healthcare costs is unrecognized. We hypothesized that changes in reimbursement and documentation incentivized capture of the complexity of patients undergoing surgery by documenting secondary diagnoses. We examined temporal patterns of ICD-9 procedure/diagnosis codes unique to brain tumor surgery across New York State from 2000-2012.

Methods

The New York Statewide Planning and Research Cooperative System (SPARCS) database was queried to identify patients with ICD-9 primary diagnosis of brain tumor (191.0-192.1, 192.8-9, 225.0, or 237.5) and relevant primary procedure (01.13,closed brain biopsy; 01.14,copen brain biopsy; 01.51, excision of meninges; 01.53, lobectomy; 01.59, other brain resection). Secondary diagnoses of 348.5 (cerebral edema) or 348.4 (brain compression) were tabulated. Trends from 2000-2012 were tested for significance using chi squared and ANOVA analysis.

Results

A total of 18,927 admissions for brain tumor surgery from 2000-2012 were identified. The annual number remained constant, but there was significant increase in associated diagnosis of cerebral edema from 3.6% (2000) to 39.5% (2012). There was a marked inflection from 2008 (7.5%) to 2009 (16%) and again in 2011 (36%). Differences in the reported secondary diagnosis of compression were also significant (1.1% in 2000, 8.5% in 2012) but less profound.

Conclusions

There was a log order increase in proportion of tumor patients diagnosed with brain edema between 2000-2012. A less pronounced increase was observed with brain compression. Without a clear change in brain tumor biology from 2000-2012, the increase in brain edema secondary diagnosis may be linked to financial incentives and the ease of capturing data from electronic medical records. This may dramatically impact costs associated with brain tumor treatment, but its impact on quality and cost effectiveness remains unknown.