Body mass index in glioblastoma

Underweight could decrease the risk of developing glioma. Excess Body mass index (BMI) was considered as a risk factor for developing glioma. But this outcome needs more prospective studies to further confirm the study [1)].

Correlation of body mass index (BMI) with clinical outcome in patients with glioblastoma is not well documented. Hence, Wiedmann et al., studied the association between survival and pretreatment BMI in glioblastoma patients.

In this retrospective study, only patients with histopathology-confirmed glioblastoma were included. Their BMIs were calculated from height and weight measurements and recorded in medical records at their first examination. Treatment plans for all patients consisted of concurrent radiation therapy and temozolomide, followed by maintenance therapy with temozolomide. The primary endpoint was overall survival (OS). Univariate and multivariate Cox proportional hazards models were used to estimate the mortality risk associated with BMI as a continuous and categorical variable. A BMI of 18.5 to 24.9 kg/m2 was classified as normal, 25.0 to 29.9 kg/m2 as overweight, and ≥30.0 kg/m2 as obese.

Data from 392 patients treated from January 2008 through June 2016 were analyzed. At a median follow-up of 48.6 months, the median OS was 13.5 months in normal subjects, 15.4 months in overweight subjects, and 15.1 months in obese subjects. A total of 81% of the patients died. The hazard ratios for overweight and obese patients were 0.70 (95% confidence interval, 0.54-0.92; P = .009) and 0.66 (95% confidence interval, 0.45-0.98; P = .04), respectively, when adjusted for age, Karnofsky performance score, and extent of resection. Sex, diabetes, and hypertension had no significant interactions.

Patients with elevated BMIs had significantly better OS in our series of patients. The mechanism of this interaction needs to be explored further to understand this association [2)].

---

prospective cohort study includes 1.8 million Norwegian women and men between ages 14 and 80 years at baseline. Body weight and height were measured, and incident cases of glioma were identified by linkage to the National Cancer Registry. Cox regression analyses were performed to evaluate risk for different glioma subgroups in relation to anthropometric measures.

RESULTS: During 54 million person-years of follow-up, 4,382 gliomas were identified. Overweight and obesity were not associated with risk for any glioma subgroup. Height was positively associated with risk for GBM and all other gliomas (hazard ratio [HR] per 10 cm increase: 1.24; 95% confidence interval [CI], 1.17-1.31 and 1.18; 95% CI, 1.09-1.29) but not with the proxy for isocitrate dehydrogenase (IDH)-mutant glioma (HR, 1.09; 95% CI, 0.98-1.21). In further subgroup analyses, the effect of height on glioma risk varied significantly with positive associations for oligoastrocytoma (HR, 1.74; 95% CI, 1.20-2.53) and malignant glioma not otherwise specified (NOS) (HR, 1.42; 95% CI, 1.16-1.76, but not with diffuse astrocytoma (WHO grades II and III) or oligodendroglioma.

CONCLUSION: This epidemiologic study consolidates height as a risk factor for GBM and other gliomas. It further indicates that this association is not universal for gliomas but may differ between different glioma subgroups [3)].

1,259 patients with previously untreated GBM were recruited between 1991 and 2008. Height and weight were self-reported or abstracted from medical records at study entry and used to calculate body mass index (BMI) [weight (kg)/[height (m)](2). Cox proportional models were used to estimate the risk of death associated with BMI as a continuous variable or categorized using established criteria (normal weight, 18.5-24.9 kg/m(2); overweight, 25.0-29.9 kg/m(2); obese, ≥ 30.0 kg/m(2)).

RESULTS: Median follow-up was 40 months, and 1,069 (85%) deaths were observed during this period. For all patients, minimal adjusted analyses indicated no significant association between BMI treated as a continuous variable and survival. Compared with patients with a BMI 18.5-24.9 kg/m(2), the minimally adjusted HR for overall survival was 1.08 (95% CI, 0.94-1.24) for a BMI 25-29.9 kg/m(2) and 1.08 (95% CI, 0.91-28) for a BMI ≥ 30.0 kg/m(2). After additional adjustment for adjuvant therapy, the HR for those with a BMI of 25.0-29.9 kg/m(2) was 1.14 (95% CI, 0.99-1.32) and 1.09 (95% CI, 0.91-1.30) for those with a BMI ≥ 30.0 kg/m(2). No significant interactions were revealed for BMI and any demographic variables.

CONCLUSION: BMI was not associated with survival in newly diagnosed and previously untreated patients with GBM. Further research investigating the prognostic significance of alternative, quantitative measures of body habitus, and functional performance are required [4].

1)
Dai, Z., Huang, Q. and Liu, H. (2018). Different body mass index grade on the risk of developing glioma: a meta-analysis.
2)
Potharaju M, Mangaleswaran B, Mathavan A, John R, Thamburaj V, Ghosh S, Ganesh S, Kalvakonda C, Loganathan M, Bapu S, Devi R, Verma RS. Body Mass Index as a Prognostic Marker in Glioblastoma Multiforme: A Clinical Outcome. Int J Radiat Oncol Biol Phys. 2018 Sep 1;102(1):204-209. doi: 10.1016/j.ijrobp.2018.05.024. Epub 2018 May 17. PubMed PMID: 30102196.
3)
Wiedmann MKH, Brunborg C, Di Ieva A, Lindemann K, Johannesen TB, Vatten L, Helseth E, Zwart JA. The impact of body mass index and height on the risk for glioblastoma and other glioma subgroups: a large prospective cohort study. Neuro Oncol. 2017 Jul 1;19(7):976-985. doi: 10.1093/neuonc/now272. PubMed PMID: 28040713; PubMed Central PMCID: PMC5570185.
4)
Jones LW, Ali-Osman F, Lipp E, Marcello JE, McCarthy B, McCoy L, Rice T, Wrensch M, Il'yasova D. Association between body mass index and mortality in patients with glioblastoma mutliforme. Cancer Causes Control. 2010 Dec;21(12):2195-201. doi: 10.1007/s10552-010-9639-x. Epub 2010 Sep 14. PubMed PMID: 20838873; PubMed Central PMCID: PMC3312598.