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The role of reoperation in pediatric cerebellar pilocytic astrocytoma

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Abstract

Objective: Cerebellar pilocytic astrocytomas (cPAs) in childhood have long been recognized to have a good prognosis after total resection, but the outcome after incomplete resective surgery remains largely unpredictable, with the incidence of radiological progressive disease ranging from 18% to 100%. It has been traditionally thought that gross-total resection was required for long-term survival, and small residuals were classically resected in a subsequent operation.

Methods: The authors analyzed their pediatric low-grade glioma (PLGG) database for cases treated between 1985 and 2020 and filtered for intracranial PAs, to determine what clinical or radiological factors precipitated revisional resective surgery in their single quaternary care center cohort.

Results: Using the pediatric low-grade glioma database, 283 patients were identified to have a histopathological diagnosis of intracranial PA between 1985 and 2020, of which 200 lesions were within the cerebellum (70.7%). The majority of patients with cPA were between 1 and 10 years of age (n = 145, 72.5%) without gender predominance (M/F = 99:101), usually presenting with 1 lesion (n = 197, 98.5%). Gross-total resection was achieved in 74.5% (n = 149) of initial surgeries for cPA. In patients with subtotal resection, the mean largest diameter of the postoperative residual tumor was 1.06 cm (range 0-2.95 cm). Seven patients with subtotal resection did not require a second resective intervention. In 31 patients the neuro-oncology multidisciplinary team recommended a second resection at a mean time interval of 22.9 months (range 0.13-81.6 months) from the initial surgery. Proportionally, the children who underwent multiple resections were also more likely to receive adjuvant chemo/radiotherapy. Functionally, the children in the multiple operation cohort experienced more complications of therapy including ongoing endocrinopathy, treatment-associated hearing deficit, and neurocognitive deficits.

Conclusions: Residual disease in cPA should be maintained under clinicocoradiological surveillance postoperatively with adoption of a more conservative approach when residual disease is not significantly changing over time.

Keywords: oncology; pediatric pilocytic astrocytoma; recurrent; reoperation; residual.