Clinical Investigation

Intensity-Modulated Radiation Therapy in Childhood Ependymoma

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Purpose

To determine the patterns of failure after intensity-modulated radiation therapy (IMRT) for localized intracranial ependymoma.

Methods and Materials

From 1994 to 2005, 22 children with pathologically proven, localized, intracranial ependymomas were treated with adjuvant IMRT. Of the patients, 12 (55%) had an infratentorial tumor and 14 (64%) had anaplastic histology. Five patients had a subtotal resection (STR), as evidenced by postoperative magnetic resonance imaging. The clinical target volume encompassed the tumor bed and any residual disease plus margin (median dose 54 Gy). Median follow-up for surviving patients was 39.8 months.

Results

To be continued...
The 3-year overall survival rate was 87% ± 9%. The 3-year local control rate was 68% ± 12%. There were six local recurrences, all in the high-dose region of the treatment field. Median time to recurrence was 21.7 months. Of the 5 STR patients, 4 experienced recurrence and 3 died. Patients with a gross total resection had significantly better local control ($p = 0.024$) and overall survival ($p = 0.008$) than those with an STR. At last follow-up, no patient had developed visual loss, brain necrosis, myelitis, or a second malignancy.

**Conclusions**

Treatment with IMRT provides local control and survival rates comparable with those in historic publications using larger treatment volumes. All failures were within the high-dose region, suggesting that IMRT does not diminish local control. The degree of surgical resection was shown to be significant for local control and survival.

**Author Keywords:** Intensity-modulated radiation therapy; Ependymoma; Pediatric; Intracranial; Radiotherapy

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