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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.

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Methods and Materials

From 1994 to 2005, 22 children with pathologically proven, localized, intracranial ependymoma 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

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The 3-year overall survival rate was $87\% \pm 9\%$. The 3-year local control rate was $68\% \pm 12\%$. 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

Article Outline

[Introduction](#)

[Methods and Materials](#)

[Patients](#)

[Workup and treatment](#)

[Treatment with IMRT](#)

[Follow-up and statistical analysis](#)

[Results](#)

[Discussion](#)

[Conclusion](#)

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