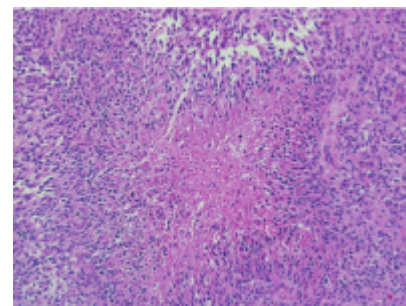


Intracranial ependymoma treatment



The low prevalence of [intracranial ependymoma](#) in [adults](#) limits the ability to perform [clinical trials](#). Therefore, [treatment](#) decisions are based on small, mostly [retrospective](#) studies and the role of [chemotherapy](#) has remained unclear.

[Gross total resection](#) (GTR) is considered the cornerstone of therapy ^{1) 2)}.

Adjuvant radiotherapy is often delivered to improve long-term disease control. Over the years, radiation treatment for ependymoma has evolved from cranio spinal radiation (CSI) ^{3) 4)} to focal radiation ^{5) 6)}

The major consensus was reached that treatment decisions for ependymoma (outside of clinical trials) should not be based on grading (II vs III). Supratentorial and posterior fossa ependymomas are distinct diseases, although the impact on therapy is still evolving. Molecular subgrouping should be part of all clinical trials henceforth ⁷⁾.

Stereotactic Radiosurgery

Seven centers participating in the [International Radiosurgery Research Foundation](#) identified 89 intracranial ependymoma patients who underwent [SRS](#) (113 tumors). The median patient age was 16.3 yr (2.9-80). All patients underwent previous surgical resection and radiation therapy (RT) of their ependymomas and 40 underwent previous chemotherapy. Grade 2 ependymomas were present in 42 patients (52 tumors) and grade 3 ependymomas in 48 patients (61 tumors). The median tumor volume was 2.2 cc (0.03-36.8) and the median margin dose was 15 Gy (9-24).

Forty-seven (53%) patients were alive and 42 (47%) patients died at the last follow-up. The overall survival after SRS was 86% at 1 yr, 50% at 3 yr, and 44% at 5 yr. Smaller total tumor volume was associated with longer overall survival ($P = .006$). Twenty-two patients (grade 2: $n = 9$, grade 3: $n = 13$) developed additional recurrent ependymomas in the craniospinal axis. The progression-free survival after SRS was 71% at 1 yr, 56% at 3 yr, and 48% at 5 yr. Adult age, female sex, and smaller tumor volume indicated significantly better progression-free survival. Symptomatic adverse radiation effects were seen in 7 patients (8%).

SRS provides another management option for residual or recurrent progressive intracranial ependymoma patients who have failed initial surgery and RT ⁸⁾.

Chemotherapy

see [Chemotherapy for intracranial ependymoma](#).

MRI-guided laser-induced thermal therapy (MRgLITT)

Although control of intracranial ependymomas is highly correlated with degree of resection, it is unknown if the same is true for MRI-guided laser-induced thermal therapy (MRgLITT).

The largest single-center experience utilizing MRgLITT for recurrent ependymomas are five tumors in 4 patients were treated with the Visualase Thermal Therapy System. Two tumors were treated similarly on recurrence. Ablation was performed using a 980-nm diode laser with a real-time image acquisition system. Single-plane real-time thermal damage estimate (TDE) were calculated and compared with the original lesion area to compute percentage area ablated (PAA). Volumetric analysis was performed, and percentage volume ablated (PVA) was estimated and correlated with the TDE. Tumor control was correlated with the TDE and volumetric data during treatment.

Nine ablations were performed on 5 tumors, 2 of which had multiple recurrences. The average pretreatment lesion volume was $8.4 \pm 6.3 \text{ cm}^3$, and the average largest 2D area was $5.3 \pm 2.7 \text{ cm}^2$. The averaged TDE was $3.9 \pm 2.1 \text{ cm}^2$, average PAA was $80.1\% \pm 34.3\%$, and average PVA was $64.4\% \pm 23.5\%$. For subtotal ablations, average recurrence time was 4.4 ± 5.3 months; 1 adult case remains recurrence-free at 40 months. Using TDEs, the correlation between recurrence time and PAA was $r = 0.93$ ($p = 0.01$), and for PVA was $r = 0.88$ ($p = 0.02$). Furthermore, PVA and PAA were strongly correlated ($r = 0.88$, $p = 0.02$).

Through using the PAA, the real-time TDE correlated with the volume of ablation in this initial investigation. Furthermore, the TDE and volumetric data corresponded to the level of tumor control, with time to recurrence dependent on ablation completeness. MRgLITT may have a role in the management of recurrent ependymomas, especially with recent software advances ⁹⁾.

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