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Clinical original contribution

Radiation therapy for pituitary adenoma: Treatment outcome and prognostic factors $\hat{\sim} \dagger$

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Abstract

Purpose: Radiation therapy is often an integral part of postoperative treatment in patients with nonfunctional pituitary adenomas. The Princess Margaret Hospital (PMH) experience was reviewed and analyzed to establish the role of radiation therapy in local control relative to its complications, and to see if subgroups of patients with a greater or lesser risk of recurrence postsurgery can be defined.

Methods and Materials: Records of 160 patients with nonfunctional pituitary adenoma treated between 1972 and 1986 were reviewed retrospectively. The review focused on 128 patients treated with surgery and postoperative radiation as initial therapy. The median total dose was 45 Gy. Local tumor control was defined as lack of progression or

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factors were analyzed for prognostic significance in local tumor control: age, sex, direction of tumor extension, radiation dose, and preoperative tumor size as reflected by the radiation field size. Complications including hypopituitarism and second tumors were analyzed. Hypopituitarism was defined as requirement for permanent hormone replacement therapy.

Results: With a median follow-up duration of 8.3 years, the 10-year actuarial local control rate was 87% for the entire 160 patients and 91% for the 128 patients given postoperative radiation as initial treatment. For the 29 patients referred for treatment of recurrent tumor, the 10-year local control rate was 78%. Prognostic factors for local control identified in univariate analysis included age ($p = 0.005$) and radiation field size ($p = 0.0001$). Older patients and those with larger tumors requiring large radiation portals were less likely to achieve durable local control. These two factors remained significant in a multivariate analysis ($p < 0.005$). The major complication, hypopituitarism requiring hormonal replacement with thyroxine, glucocorticoid, and sex hormone was observed to date in 65% (100 out of 155), 68% (105 out of 154), and 67% (85 out of 127) of evaluable patients, respectively. Radiation was the contributing cause of the hypopituitarism in only 23%, 16%, and 13%, respectively. There were no cases of brain necrosis or radiation damage to the optic pathways. Two patients developed a fatal in-field glioma of the brain stem at 10 and 15 years following radiation.

Conclusion: Postoperative external beam radiation therapy is highly effective in preventing recurrence of hormonally inactive pituitary adenomas. Hypopituitarism is commonly observed, but radiation can only be incriminated as the contributing cause in approximately one-fifth of the cases. Treatment of patients at the time of recurrence gave comparable local control rates to those irradiated initially. Favorable patients (age ≈ 50 , with small tumors removed totally) probably can be safely observed postoperatively with radiation reserved for recurrence.



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Keywords

Pituitary adenoma; Treatment; Radiation therapy; Hypopituitarism

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