CASE REPORT

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RADIATION THERAPY FOR RECURRENT ORBITAL HEMANGIOMA

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Abstract: Background. Surgical resection and corticosteroid therapy have traditionally been the preferred methods of treatment for orbital hemangioma. Radiation therapy is not usually indicated because of the potential for ocular complications. With modern radiation techniques, however, patients may experience substantial clinical improvement without significant radiation-induced morbidity.

Methods. A case of unresectable, recurrent orbital hemangioma is described. The clinical presentation, management protocol using radiation therapy, and 5-year follow-up are reviewed.

Results. The patient was initially seen with left orbital pain, diplopia, proptosis, and conjunctival edema caused by a recurrent left orbital hemangioma after failed previous surgery. CT scan and angiogram revealed a large, irregular, multilocular mass in the left orbit consistent with hemangioma. The patient was treated with a total of 2000 cGy in 10 treatments. Five-year follow-up revealed a stable, regressed hemangioma with no radiation complications.

Conclusions. Radiation therapy may be used if appropriately indicated for function-threatening orbital hemangioma. © 2003 Wiley Periodicals, Inc. Head Neck 25: 412–415, 2003

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Cavernous hemangiomas are the most common primary orbital tumor. They have been diagnosed with increasing frequency by CT and MRI scan, presenting in childhood through middle age with proptosis or ocular pain.1,2 Spontaneous regression of hemangioma occurs more frequently in children, whereas adults often require intervention to improve symptoms.

The pathogenesis of hemangioma is, to date, obscure. The lesion evolves with a rapid proliferation phase of pericyte and endothelial cell hyperplasia and then enters a slow, steady regression phase.3 Mechanical and hormonal factors have been postulated as possible contributors, and genetic linkage has been demonstrated in several familial cases.4 Twin studies have not revealed any strong genetic predisposition to hemangioma.5 The most common treatment for cavernous hemangiomas that have not spontaneously regressed is surgical resection, after which recurrences are relatively uncommon. Other modalities such as radiation therapy and steroids have been used in hemangioma treatment when surgery is not feasible.
A case of recurrent orbital hemangioma is presented in which the patient underwent radiation therapy, resulting in tumor regression with symptomatic relief and minimal side effects.

**CASE REPORT**

A 54-year-old man was seen with gradually increasing left orbital pain, diplopia, proptosis, and conjunctival edema (Figure 1). No decrease in visual acuity was noted. The patient had undergone resection of a left orbital hemangioma at 9 months of age and external radiation therapy to the left orbit at age 4. At age 21, he underwent re-resection of the left orbital hemangioma after significant epistaxis in his teen years. A strong family history was noted with two of his nine grandchildren having been diagnosed with facial hemangiomas.

CT scan on presentation revealed a large, irregular, multilocular mass in the left orbit (Figure 2). Radiation-induced sarcoma was excluded by angiographic findings, which were consistent with hemangioma. The mass included intraconal and extraconal components, as well as invasion into the left nasal cavity, left ethmoid sinus, and left anterior cranial fossa. A much smaller right orbital hemangioma was identified in an intraconal location. A course of prednisone was begun, which improved the left orbital pain. Surgery was

**FIGURE 1.** Patient demonstrating left proptosis and left conjunctival edema.

**FIGURE 2.** CT scan of patient on presentation showing large, multilocular mass within left posterior orbit that occupies left ethmoid sinus, left nasal cavity, and left anterior cranial fossa.

**FIGURE 3.** Patient after treatment with a total of 2000 cGy in 10 treatments. Left orbital proptosis and conjunctival edema are significantly diminished.
not considered advisable because of the extensive nature of the mass, and radiation therapy was instituted. The patient was treated with a total of 2000 cGy in 10 treatments through right anterior oblique and left anterior oblique radiation fields. He tolerated the treatment well with no changes in vision.

During therapy, the patient reported intermittent headaches and dryness and irritation of the eye. The conjunctival dryness was alleviated by a temporary tarsorrhaphy until 2 weeks after treatment. Over the course of the next 2 months, the patient’s proptosis decreased from 28 mm to 23 mm, and extraocular movements improved in all directions except medially. The conjunctiva was diffusely thickened with diplopia only on left lateral gaze. The physical examination has remained unchanged over a 5-year period with no further complaints or complications (Figure 3).

CT scan of the head and orbits 6 months after radiation revealed substantial regression in both the intraconal and extraconal components of the left orbital involvement and the left nasal cavity and left ethmoid sinus components (Figure 4). CT scans performed at 6-month intervals for the next 5 years confirmed a reduced, stable left hemangioma.

DISCUSSION
A variety of therapies have been used to treat orbital hemangiomas, including surgical resection, radiation therapy, corticosteroids, radon seed implantation, ligation of blood vessels, and injection of sclerosing solutions. The choice of treatment has depended on not only the characteristics of the lesion but also the age of the patient. In cases involving children, many clinicians have chosen to wait for spontaneous regression, which often occurs before age 5 in both capillary and cavernous orbital hemangiomas.

For well-circumscribed lesions, surgical resection has been the most effective therapy, although subtotal excision in combination with radiation therapy has proven to be effective.6 Stereotactic radiosurgery has been used to treat cerebral hemangiomas with mixed results.7

More poorly defined lesions have traditionally been treated with steroids to shrink tumors and provide symptomatic relief.8 The use of corticosteroids has, however, been found to have an unpredictable therapeutic response, with occasional rebound growth after cessation of therapy.9 Treatment with multiple rounds of steroids has led to permanent regression of tumors but with a variety of systemic complications.9

Radiation therapy of capillary hemangiomas and other benign orbital tumors has been disfavored historically because of the high incidence of late ocular radiation complications and the possibility of inducing secondary malignancy. Studies of orbital capillary hemangiomas treated with radium needles or radiation therapy have noted that radiation dose correlates with the onset of cataracts and posterior capsular opacities later in adulthood.10 Cancers induced by irradiation of the head and neck have primarily involved the skin and thyroid tissue,11,12 and occasional sarcomas have been reported as a long-term complication of radiation therapy.13 Radiation-induced sarcoma of the head and neck is rare, but radiation-induced sarcomas have been associated with a poor prognosis14 and thus may present an increased mortality risk in an aging population. As a result of these observations, radiation has been traditionally reserved for large, complicated tumors refractory to steroid treatment. Radiation therapy has been used in conjunction with corticosteroids and has led to tumor regression and improved cosmetic results after 5 years follow-up.15 In this treatment, prednisone is used initially and followed by radiation therapy to prevent rebound tumor growth.9,10

Despite reports of long-term complications, radiation therapy has been successfully used to shrink orbital hemangiomas to reduce symptoms, particularly in patients with compromised extra-

FIGURE 4. CT scan demonstrating significant intraconal and extraconal regression of left orbital hemangioma 6 months after radiation treatment.
ocular function. Furthermore, improved success has been noted with more recent radiation techniques. This treatment may be more applicable to orbital hemangiomas in older patients in whom there is less concern about effects of radiation on normal growing tissues. Our patient seems to have experienced substantial clinical and radiologic improvement without apparent complications. Radiation therapy, therefore, may be used to provide durable regression of hemangioma in situations in which surgery is not advisable.

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