

FRACTIONATED RADIATION FOR MENINGIOMAS

by Gil Lederman M.D.

There has been a sea of change in the treatment of meningiomas in recent years. Once several years ago I had a patient who brought me a copy of a Merck Manual, a well-known medical manual used by patients and physicians alike. He copied the page stating that radiation did not work for meningiomas. However, both before and after the publication of that article there has been multiple medical reports discussing radiation's benefit.

A recent paper in the International Journal of Radiation, Oncology, Biology and Physics evaluated twenty-eight patients treated for primary or recurrent meningiomas in the cavernous sinus. Since meningiomas are responsible for about one-sixth of all brain tumors they are a prominent source of diagnosis, treatment and, unfortunately, morbidity and sometimes mortality.

While many meningiomas are slow growing and can be resected, others are more difficult to attack surgically and likely to leave the patient significantly altered in function post-operatively. Furthermore many of these difficult-to-extricate meningiomas are incompletely removed and eventually will grow back. The time of regrowth depends on the growth rate. Some meningiomas indeed become aggressive or even malignant and can act like cancerous tumors.

Our center often sees recurrent meningiomas, that is tumors that have been previously treated. A significant share of those are indeed aggressive or malignant and are much more difficult to manage. Yet radiation has been shown to be of benefit. A significant site of meningiomas is the cavernous sinus.

Our center dwells on fractionated radiosurgeries using conventional doses; there is longer follow up with standard techniques. It is important to know the outcome since the effect on the tumor cells should be similar; a potential benefit of radiosurgery is relative protection of the healthy normal tissue.

Twenty-eight patients with cavernous sinus meningiomas were reported by McGuire et al in the International Journal of Radiation, Oncology, Biology and Physics. Patients ranged in age from seventeen to seventy-six years with a median of forty-three years. There were twenty-one women and seven men.

Not all patients underwent biopsy although in seven patients tumor was found to be invading adjacent bone or having excessive mitoses that is cell divisions suggestive of unusual or aggressive meningiomas. Radiation was given out with a median dose of 5310 cGy with a range of 3060 to 6000 cGy.

There were twenty-seven patients alive at reporting and twenty-two were imaged by CT or MRI within two years of the medical analysis. Follow up ranged 3 to 145 months with a median of 41 months. The authors defined late toxicity "as the onset or worsening of neurological symptoms beyond three months after the completion of radiotherapy not attributable to disease progression by radiographic or clinical criteria."

One of the twenty-eight patients died thus the eight year actuarial survival was 96%. However two other patients were alive with progressive disease producing an eight year progression free survival rate of 81%. One patient that died had a surgical resection yet the tumor recurred. The patient passed away eight months following radiation.

Side effects included short-term memory loss in one patient treated with standard techniques in 1985. Another patient developed fibrosis in the orbit 35 years after having radiation for an eye tumor.

While the authors believe that the ideal treatment is complete resection, complete resection is not always so wonderful. An analysis from Harvard of 225 patients showed that even those having a complete resection had a recurrence rate of 20% and if they did not have a complete resection 55% of the tumors recurred.

This delicate part of the brain is susceptible to significant side effects. One report quoted by the authors showed that twelve of forty-one patients had worsening neurologic effects related to surgery and ten more patients could not have complete resection. An additional report showed that 70% of the patients who were normal pre-operatively had new neurologic deficits. Even the University of Pittsburgh showed that nearly 40% of patients recur within five years after surgery.

All these studies suggest that surgery in a delicate part of the brain both is unlikely to be successful in removing the tumor and keeping the patient intact. A significant share of patients undergoing surgery will have recurrences of the meningioma and/or neurologic side effects.

The beauty of fractionated radiosurgery is that it allows standard doses of radiation to be delivered while administering doses to the tumor minimizing the harm to the healthy normal tissues. The more the normal tissues can be excluded from radiation field the more chance of avoiding the complications. Complications never reach zero. Best results use techniques to avoid healthy normal tissue.

Techniques have progressed significantly over the last twenty years. Twenty year data can show us that control rates can be high. New data should mimic those success rates while decreasing side effects. For the patient who brought in the Merck Manual an increasing array of literature shows that there are treatment options for patients with newly diagnosed or recurrent meningiomas. Obviously once a tumor recurs there are greater risks including development of a more aggressive type of tumor or possibly malignant tumor. Therefore it may be considered prudent to use the safest, more effective treatment early.