Corticotroph adenoma radiosurgery

Stereotactic radiosurgery (SRS) is used to manage patients with Cushing's disease (CD) who have failed surgical/medical management. As many patients with recurrent/persistent CD lack an identifiable adenoma on neuro-imaging, whole-sellar SRS has been increasingly employed.

Case series

2018

An international, multicenter, retrospective cohort-design was used to define clinical/endocrine outcomes for patients undergoing whole-sellar SRS for CD. Propensity-score matching was used to compare patients undergoing whole-sellar SRS versus patients who underwent discreet-adenoma-targeted SRS.

68 patients underwent whole-sellar SRS with a mean endocrine follow-up of 5.3 years. The mean treatment volume was 2.6cm3 and the mean margin dose was 22.4Gy. The 5-year actuarial remission rate was 75.9%. The median time to remission was 12-months. Treatment volumes greater than 1.6cm3 were associated with shorter times to remission ($p<0.05$). The 5-year recurrence-free survival rate was 86.0%. Decreased margin and maximum treatment doses were associated with recurrence ($p<0.05$). New pituitary hormone deficiency occurred in 15 patients (22.7%). An additional 210 patients were identified who underwent adenoma-targeted SRS. There was no difference in remission rate, time to remission, recurrence-free survival or new endocrinopathy development between patients who underwent whole-sellar SRS versus discreet adenoma-targeted SRS.

Whole-sellar GKRS is effective at controlling CD when an adenoma is not clearly defined on imaging or when an invasive adenoma is suspected at the time of initial surgery. Patients who receive whole-sellar SRS have outcomes and rates of new pituitary-hormone deficiency similar to patients who undergo discrete-adenoma-targeted GKRS [1)].

2002

Eleven patients with ACTH-producing pituitary neuroendocrine tumors after bilateral adrenalectomy underwent radiosurgery between 1990 and 1999. Nine patients had documented tumor growth, hyperpigmentation, and elevated ACTH levels (median 920 ng/mL) at the time of radiosurgery. Five of these patients had tumor enlargement despite prior fractionated radiotherapy (median dose 50 Gy). Two patients were treated prophylactically within 1 month of their adrenalectomies to prevent future tumor growth. The median follow-up was 37 months (range 22-74).

Tumor growth control was achieved in 9 patients (82%); 2 patients had had continued tumor growth after radiosurgery. The ACTH levels decreased a median of 66% (range -99% to +27%); 4 patients had normal ACTH levels. Three patients had radiation-related complications, including diplopia (n = 2), ipsilateral blindness (n = 1), testosterone/growth hormone deficiency (n = 1), and asymptomatic temporal lobe radiation necrosis (n = 1): all had received prior radiotherapy. One patient who had undergone three prior resections and radiotherapy died 59 months after radiosurgery despite two additional attempts at tumor resection.

Although the experience is limited, it appears that radiosurgery provides tumor control for most patients with ACTH-producing pituitary neuroendocrine tumors who have undergone bilateral adrenalectomy [2].

1)

Shepard MJ, Mehta GU, Xu Z, Kano H, Sisterson N, Su YH, Krsek M, Nabeel AM, El-Shehaby A, Kareem KA, Martinez-Moreno N, Mathieu D, McShane BJ, Blas K, Kondziolka D, Grills I, Lee JY, Martinez-Alvarez R, Reda WA, Liscak R, Lee CC, Lunsford LD, Lee Vance M, Sheehan JP. Technique of Whole-Sellar Stereotactic Radiosurgery for Cushing's Disease: Results from a Multicenter, International Cohort Study. World Neurosurg. 2018 May 18. pii: S1878-8750(18)31020-9. doi: 10.1016/j.wneu.2018.05.067. [Epub ahead of print] PubMed PMID: 29783006.

2)

Pollock BE, Young WF Jr. Stereotactic radiosurgery for patients with ACTH-producing pituitary neuroendocrine tumors after prior adrenalectomy. Int J Radiat Oncol Biol Phys. 2002 Nov 1;54(3):839-41. PubMed PMID: 12377337.