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Effectiveness and Safety of CyberKnife Radiosurgery in the Multimodal Management of Patients with Acromegaly: A Single-Center Experience

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Abstract

Objectives:

This study aimed to investigate the effectiveness and safety of CyberKnife radiosurgery in GH-secreting pituitary adenomas.

Methods:

We conducted this observational, retrospective study involved acromegaly patients exhibiting persistent biochemical activity following surgical treatment, who subsequently underwent CKRS. GH and insulin-like growth factor 1 (IGF-1) levels were assessed at baseline, every year after CKRS, and at the conclusion of follow-up.

Results:

13 patients were included, with a median follow-up of 50 months (CI 95% 31.8-73.9). A biologically equivalent dose, equivalent to a single fraction of 16 Gy (12.6-19.6), was prescriped over 2-5 sessions of CKRS. Among the series, four patients underwent a two-staged treatment due to the tumor's proximity to the optic nerve. The biochemical remission rate was 46.2%, 23.1% achieved biochemical control. A progressive and statistically significant decrease was observed in the comparison of the concentrations of random GH and IGF-1. MRI examinations revealed a reduction in the volume of pituitary tumors in these patients following treatment. However, one patient died twenty months post-CKRS due to a cardiac event related to complications of acromegaly. A serious adverse event (SAE) of limited abduction of the eyeball on the affected side was observed in a single patient. In addition to that, no patients developed new-onset pituitary dysfunction or visual defects.

Conclusion(s):

Fractionated CyberKnife radiosurgery, in conjunction with medical therapy, demonstrates effective tumor control for GH-secreting pituitary tumors that experience postoperative persistence, representing a safe and promising therapeutic option.