

## Management Of Residual Growth Hormone Secreting Pituitary Adenomas

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Surgery is generally the first step in the management of growth hormone (GH) secreting pituitary adenomas. Invasive large tumors with high GH levels regardless of surgical technique continue to be predictors of poor outcome. Surgical remission rates using the revised 2010 Cortina criteria vary from 25 to 55%. An increasing number of patients will require either a second surgery, radiation or medical therapy or all three to achieve biochemical remission. Between 2005 and 2017 we treated 272 patients with GH secreting pituitary macroadenomas following a standard protocol. Our preferred approach is the endoscopic binostril transsphenoidal technique. All patients had GH levels done the morning after surgery and on the 7<sup>th</sup> postoperative day. Subsequently at the 3-6 month follow-up a nadir GH level <0.4 ng/ml and a normal IGF-1 level determined remission. In patients with residual disease if the GH level is <5 ng/ml and the magnetic resonance imaging (MRI) showed a doubtful lesion we kept them on cabergoline. If the MRI showed residual tumor close to the chiasm the patient was given stereotactic radiotherapy (SRT), if the residual tumor was accessible surgically we advised a second surgery. If the residue was in the cavernous sinus we treated this with linear accelerator based stereotactic radiosurgery. All patients with residual disease were kept on cabergoline after adjuvant radiation. 23 patients had a second surgery, 12 of whom required either SRS or SRT for persistent disease. 38 patients had SRS after their first surgery and 1 patient had SRT after the first surgery. The target volume for SRS was 0.79 cm<sup>3</sup> (0.2 to 2.62 cm<sup>3</sup>) with a mean dose of 16 Gy treated to the 80% isodose line. The remission rate with SRS was 25.8% with a mean follow-up of 3.2 +/- 1.7 years. Hypocortisolism and hypothyroidism occurred in 23% and 15% respectively. No patient developed visual dysfunction after SRS. In conclusion, the majority of patients with GH adenomas need adjuvant therapy after surgery. Linac based SRS provided remission rates of 25% at 3 years with low complication rates indicating that a higher dose may be necessary to improve outcomes.