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Purpose/Objective:

Failure pattern of tumor control after stereotactic radiosurgery/stereotactic radiotherapy (SRS/SRT) for pituitary neuro-endocrine tumors (Pit-NETs) was investigated.



Materials & Methods GKRS & CKRS for Pit-NETs

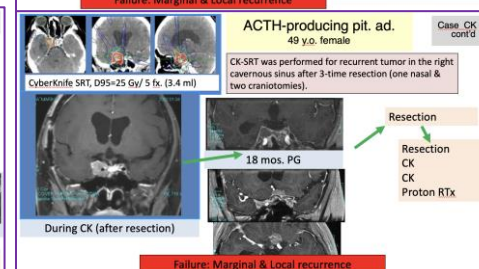
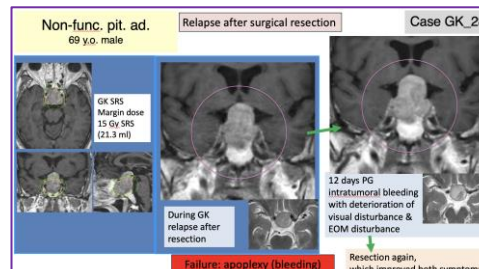
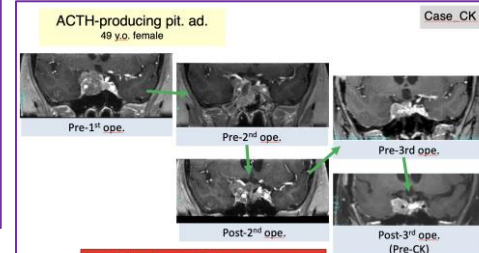
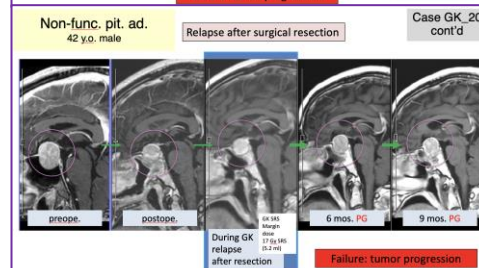
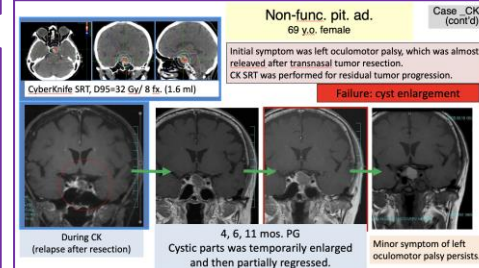
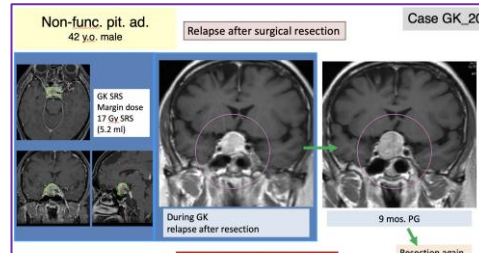
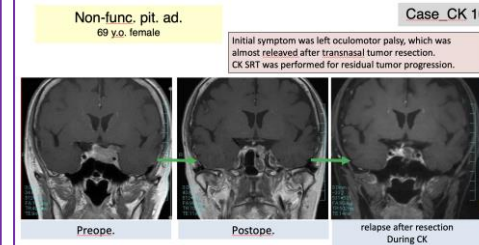
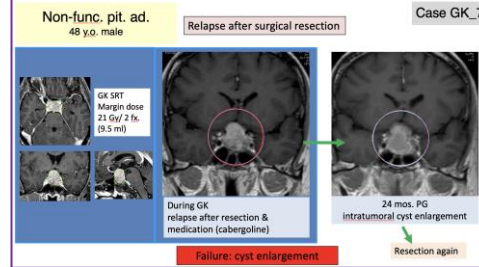
Results (non-func. & func.)

50 cases: 21 males & 29 females
 Age: 25 to 90 (mean 61.1) yrs.
 Target volume: 0.08 to 21.3 (mean 5.6, median 3.4) ml
 Prescription dose:
 8 – 20 (median 15) Gy SRS in 27 (all GK)
 15 – 45 (median 25.5) Gy in 2 -10 fx. in 23 (10 GK & 13 CK)
 FU: median 19 (0.5 – 95) mos.
 Crude control rate 90% (45/50) : func. & non-func.
 Progression only in 5
 solid progression 2 (→ resection)
 (→ resection, RTx)
 bleeding 1 (→ resection)
 cyst enlargement 2 (→ resection)
 (→ observation)

Dx.: Non-functioning 39
 ACTH secreting 4
 GH secreting 5
 PRL secreting 2

Results (func. Pit-NETs) only

11 cases
 Dx.:
 ACTH secreting 4
 GH secreting 5
 PRL secreting 2
 FU: median 23 (2 – 63) mos.
 Crude control rate 91% (10/11)
 Response rate (tumor regression) 55% (6/11)
 Decrease of serum hormone
 2/4 in ACTH, 3/5 in GH, 2/2 in PRL



Recent review papers on radiotherapy for pit-NETs

Mantzaris G. et al. "Stereotactic radiosurgery and fractionated radiation therapy in the management of pituitary tumors." Neuro-Oncology Advances 2025; 7(51): 58-68
 Hemaidia R-M. et al. "Radiation therapy in functioning and no functioning pituitary neuroendocrine tumor: systematic review of the recent literature after 2011." Front in Endocrinology 2024; 15: 1468724

Non-func. PitNET

| Mantzaris G. et al. | Hemaidia R-M. et al. |
|------------------------------|--------------------------|
| Tumor control | Tumor control |
| Crude: 86.5 - 100% | Crude: 83 - 97% |
| 5-yr: 88 - 100% | |
| 10-yr: 74 - 100% | |
| Side effects | Side effects |
| Hypopituitarism: 4.1 - 27.5% | Hypopituitarism: 3 - 39% |
| OPN: 1 - 6.6% | OPN: 0 - 6% |
| Other CN: 0 - 2.7% | Other CN: 0 - 3.9% |

ACTH-secre. PitNET

| Mantzaris G. et al. | Hemaidia R-M. et al. |
|---------------------------|---------------------------|
| Endocrine control | Tumor control |
| Crude: 52 - 87% | Crude: 91 - 100% |
| 5-yr: 55 - 91.7% | Endocrine control |
| 10-yr: 64 - 84% | Crude: 52 - 80.7% |
| Rec.: 0 - 18% | Side effects |
| Side effects | Hypopituitarism: 25 - 73% |
| Hypopituitarism: 25 - 73% | OPN: 0 - 2.5% |
| OPN: 0 - 2.5% | Other CN: 0 - 2.9% |
| Other CN: 0 - 2.5% | |

GH-secre. PitNET

| Mantzaris G. et al. | Hemaidia R-M. et al. |
|--|----------------------------|
| Endocrine control (without medication) | Tumor control |
| Crude: 33 - 64% | Crude: 83.3 - 100% |
| 5-yr: 20.3 - 69.9% | Endocrine control |
| 10-yr: 44.9 - 60% | Crude: 23 - 92% |
| Rec.: 0 - 9% | Side effects |
| Side effects | Hypopituitarism: 8.6 - 46% |
| Hypopituitarism: 8.6 - 62% | OPN: 0 - 10% |
| OPN: 0 - 3.5% | Other CN: 0 - 4.3% |
| Other CN: 0 - 0.8% | |

PRL-secre. PitNET

| Mantzaris G. et al. | Hemaidia R-M. et al. |
|--|------------------------------|
| Endocrine control (without medication) | Tumor control |
| Crude: 23.3 - 57% | Crude: 92.1 - 100% |
| 5-yr: 10 - 41% | Endocrine control |
| 10-yr: 25% | Crude: 50 - 82.1% |
| Rec.: 0 - 5% | Side effects |
| Side effects | Hypopituitarism: 8.3 - 26.3% |
| Hypopituitarism: 25 - 35% | OPN: 0 - 3.5% |
| OPN: 0 - 3% | Other CN: 0% |
| Other CN: 0% | |

Results:

A median follow-up period of 19 months, ranged from 0.5 to 95 months was obtained after GKRS in 37 cases. The control rate of the treated tumors was 92% (34/37). Only three cases were followed by repeat surgery. No significant adverse effects were observed. In analyses with a subgroup of eight patients with hormone-secreting Pit-NETs. The control rate was 90% (45/50) in tumor size. Serum ACTH level was decreased in 2 of 4 cases, GH was decreased in 3 of 5, and PRL was decreased in 2 of 2. Failure pattern in five cases were assessed. Solid tumor progression was observed in two cases. Cyst enlargement was developed in two and apoplectic intratumoral hemorrhage was seen in one.

Conclusions:

Tumor control was good after SRS/SRT for both functioning and non-functioning Pit-NETs. Decrease of elevated serum hormones, with improvement of subjective symptoms, was often obtained in localized residual or recurrent functioning Pit-NETs, though normalization of hormone levels was still difficult. Cyst enlargement and apoplexy has to be considered as well as a solid tumor progression including marginal failure.