Radiochirurgia adiuvante dopo chirurgia "conservativa": un approccio efficace per i tumori cerebrali complessi

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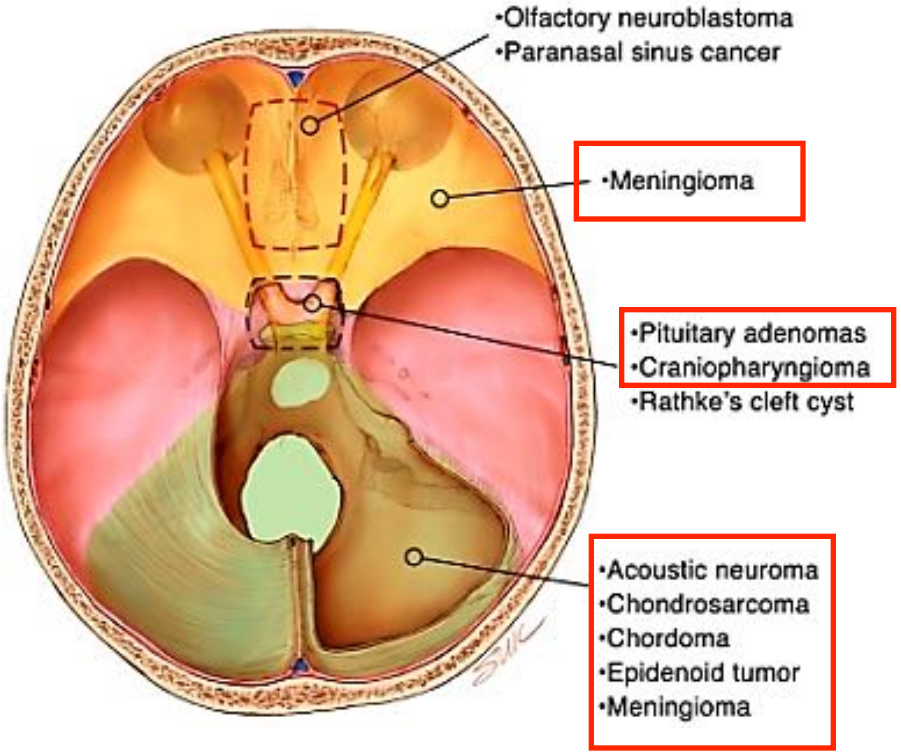
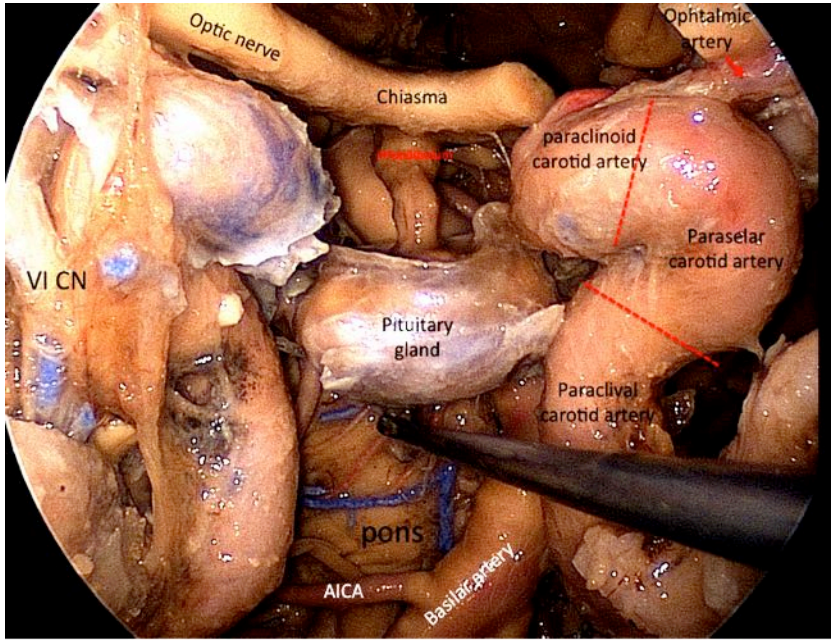
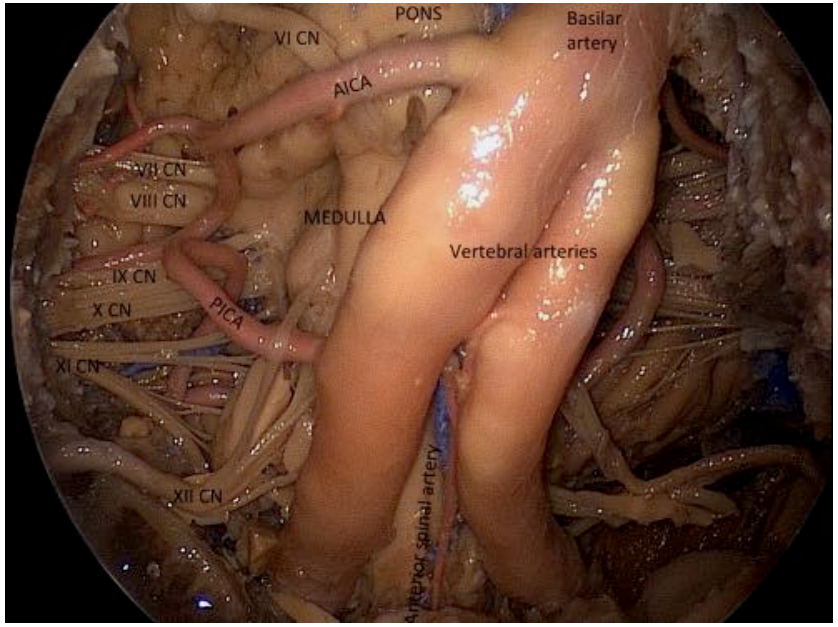
AIRO, Rome 18-11-2012 BrainLab Symposium

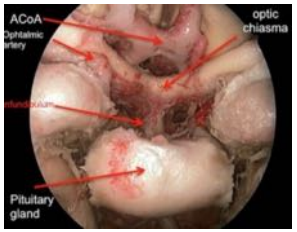
Skull base tumors







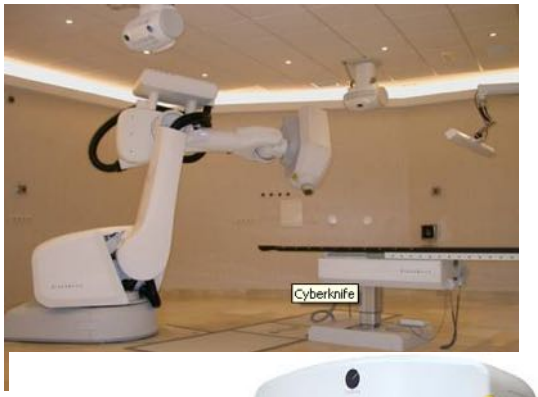
Skull base surgery



- ✓ *Surgical resection has long been standard care for cranial base tumors.*
- ✓ *While extensive surgery is curative in selected patients, because of the complexity of anatomy of this region postoperative morbidity remains high (up to 50%).*
- ✓ *Subtotal or partial resection is associated with less morbidity, however with a high tendency for regrowth.*
- ✓ *Local control following incomplete excision of a benign skull base tumor can be improved with SRT with a reported 5-year progression-free survival in the region of 80-100%*

SRS/SRT for skull base tumors

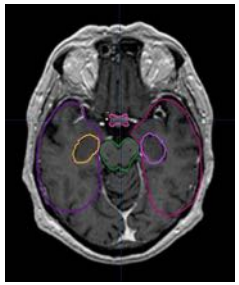
- *Pituitary adenomas*
- *90-95% at 5 years / 90-100% at 5 years*
- *Meningiomas*
- *90-100% at 5 years / 90-100% at 5 years*
- *Acoustic neuromas*
- *90-100% at 5 years / 90-100% at 5 years*
- *Craniopharyngiomas*
- *50-80% at 5 years / 90-100% at 5 years*

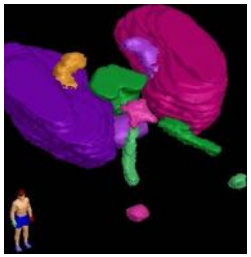


Minniti et al, Rev Endocr Metab Disord. 2009,
Minniti et al , Rad Oncol 2009 and 2011,
Minniti et al , Neurosurgical Rev 2009,

"conservative" surgery followed by adjuvant SRT/SRS in 64 patients with skull base tumors

- *18 meningiomas*
- *13 acoustic neuromas*
- *22 pituitary adenomas*
- *11 craniopharyngiomas*





Combined approaches to skull base tumors

36 TSS/EES

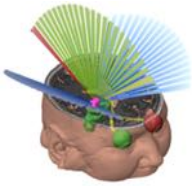
28 open surgery

Characteristics of 64 patients with large skull base tumors treated withsurgery and stereotactic irradiation

Sex	24M\40 F
Median age (range)	56 yrs (34-74)
KPS	
70-80	34
90-100	30
Surgery	
TSS/EES	36
open	28
Neurologic deficits	28
Hypopituitarism	21
Radiation technique	
SRS	25
SRT	39
Gross tumour volume (GTV)	
Median	7.4 cm^3
Range	0.4 – 34.9 cm^3
Planning target volume (PTV)	
Median	10.6 cm^3
Range	1.5 –62.7 cm^3

Conformal Beam

52



Dynamic Conformal Arc

12

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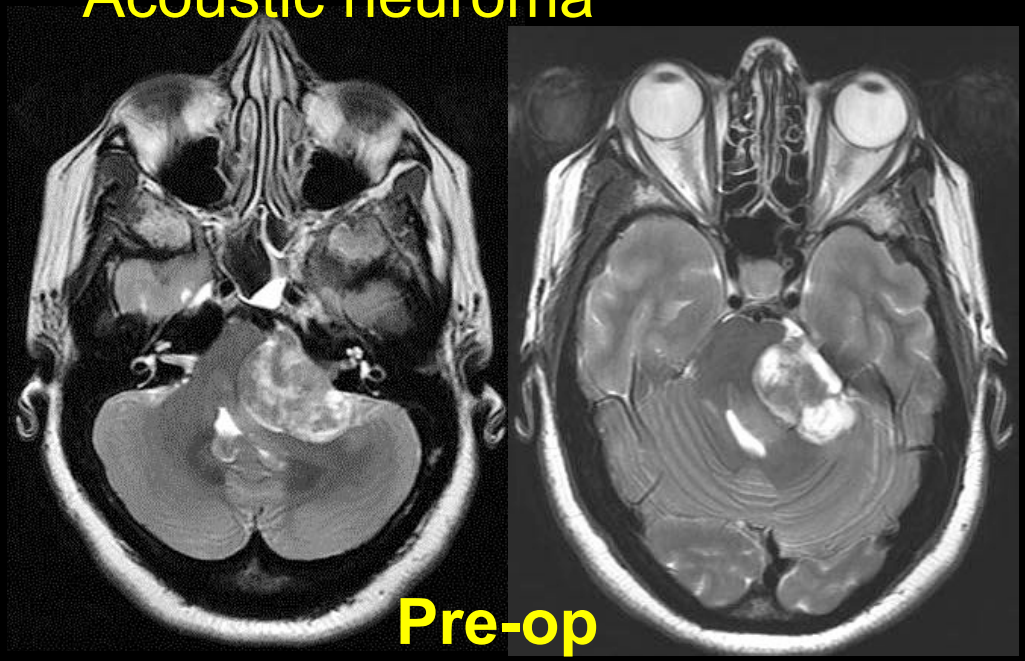
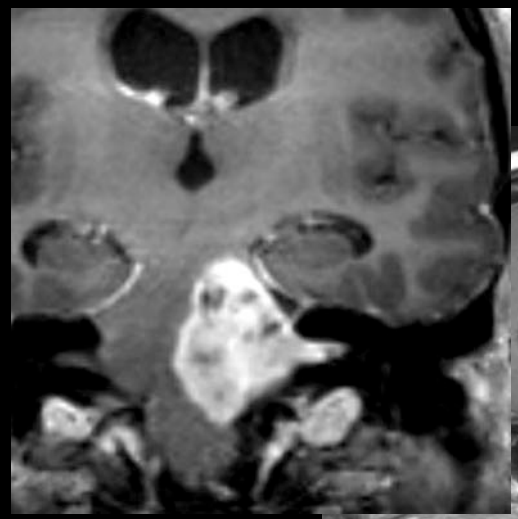
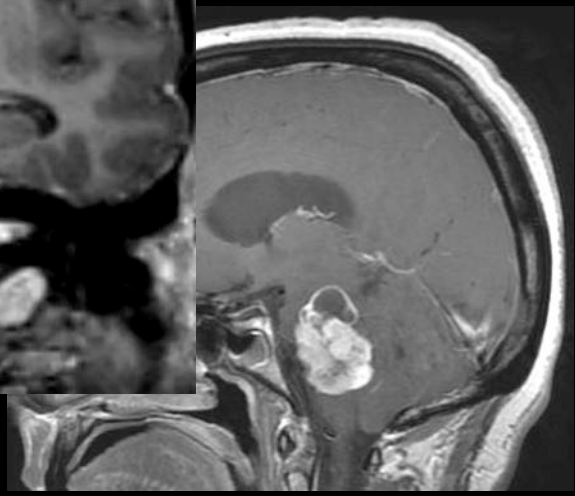
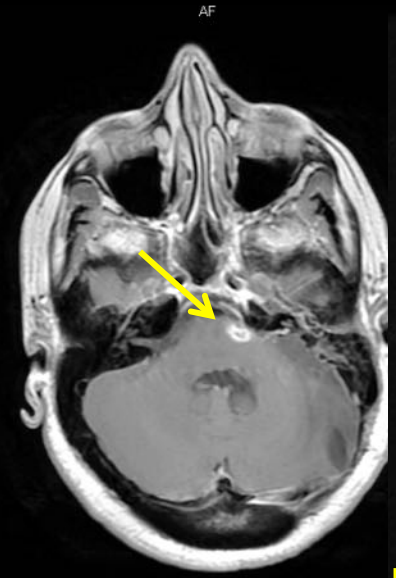
Acoustic neuroma

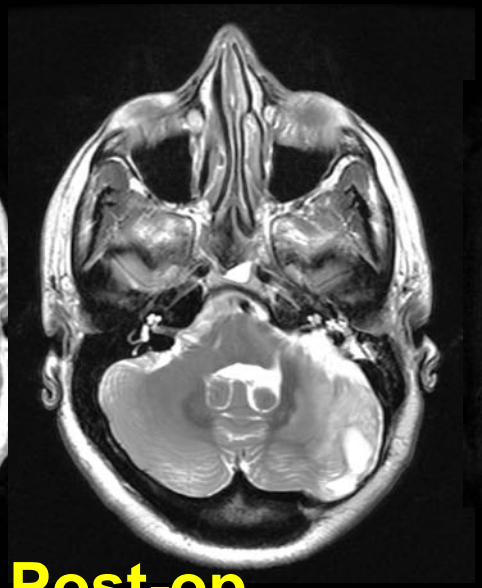


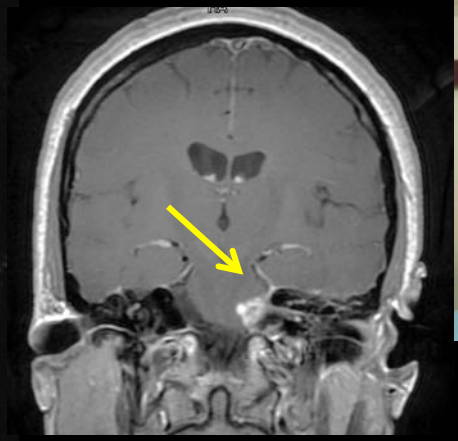




Pre-op

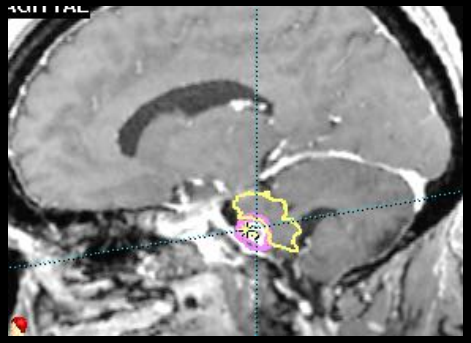


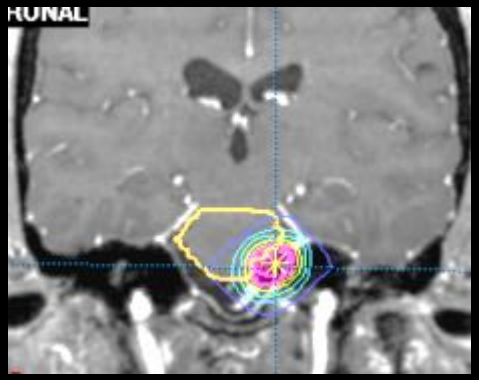


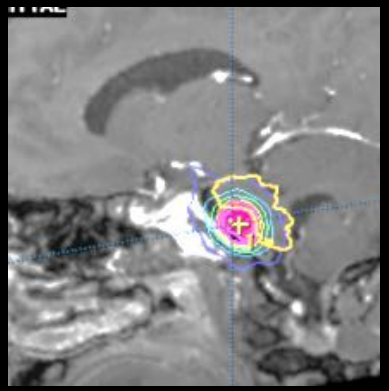


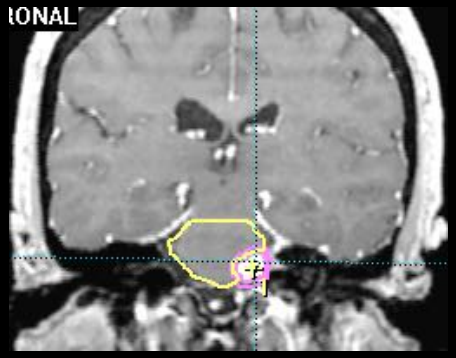
Post-op

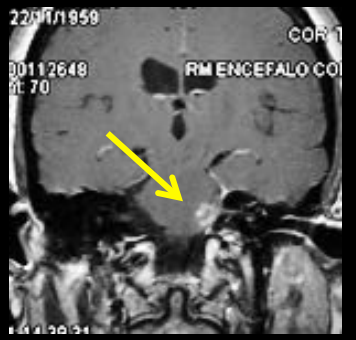
SRS for residual acoustic neuroma

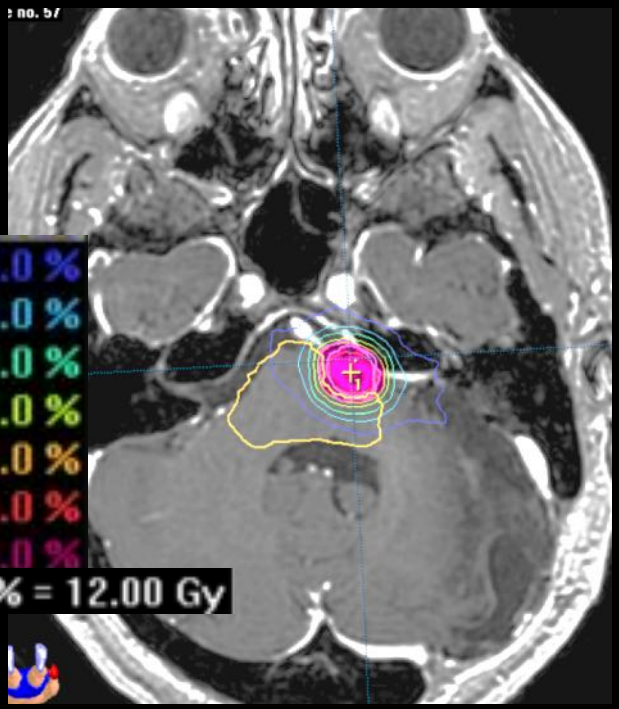






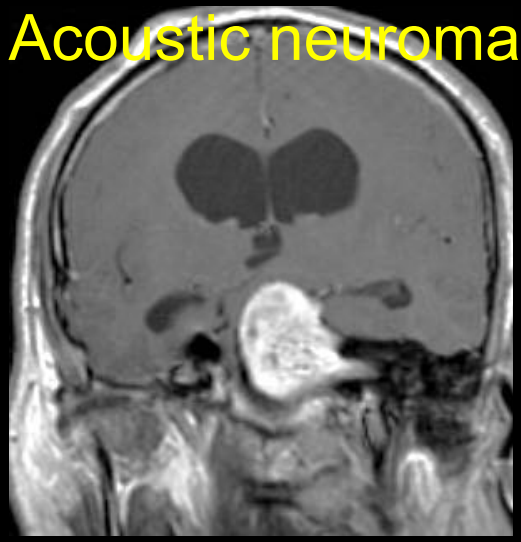


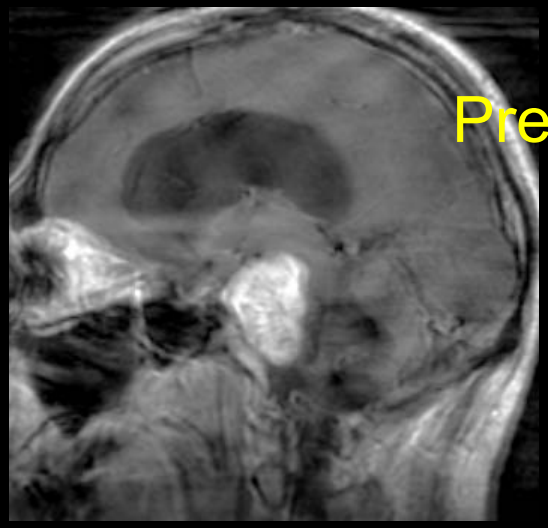




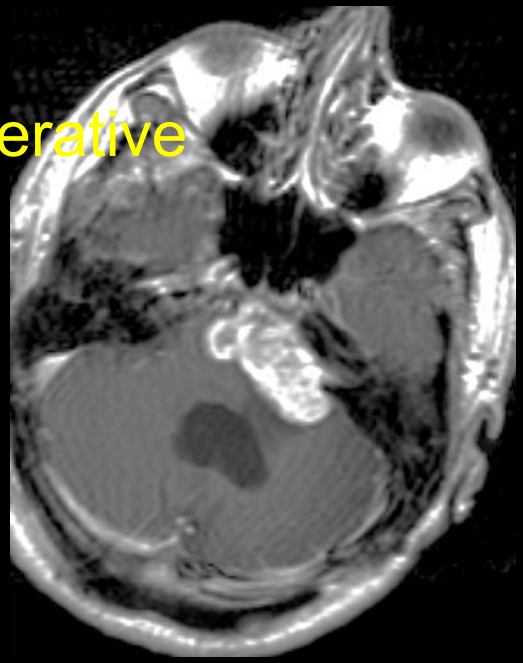
POST SRS (1 year)

Acoustic neuroma

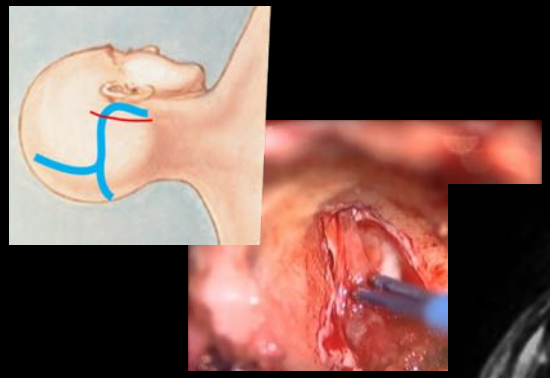


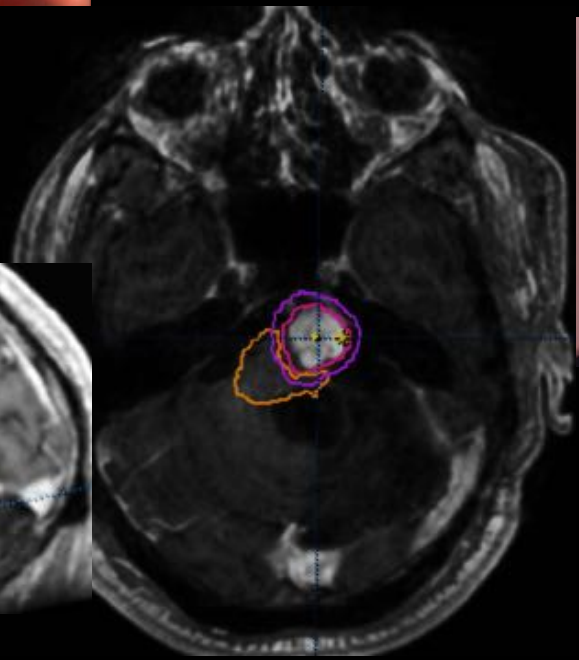


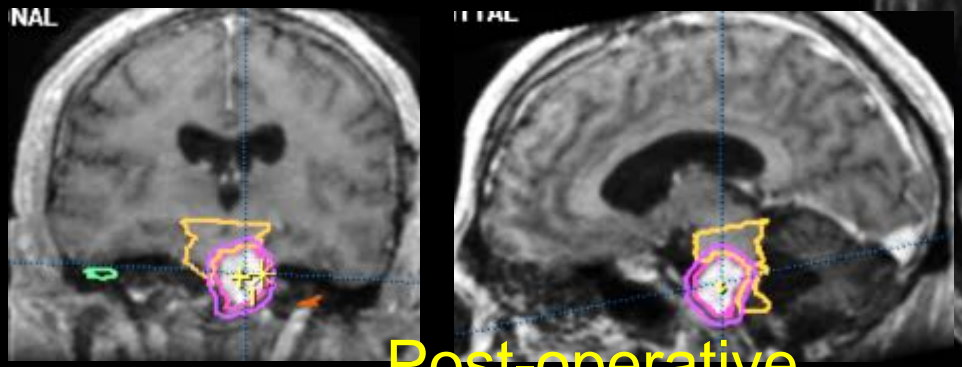
Pre-operative



Surgery with neurofisiologic monitoring of cranial nerves, motor and sensitive paths

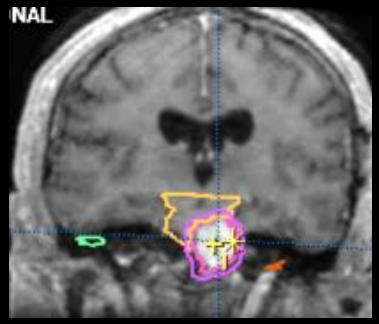


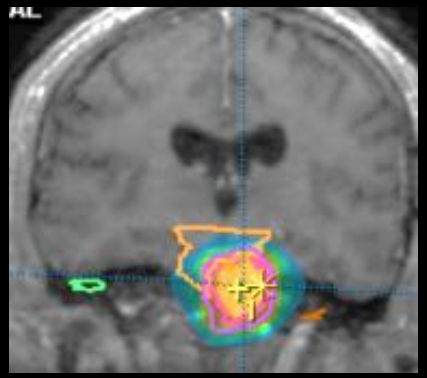


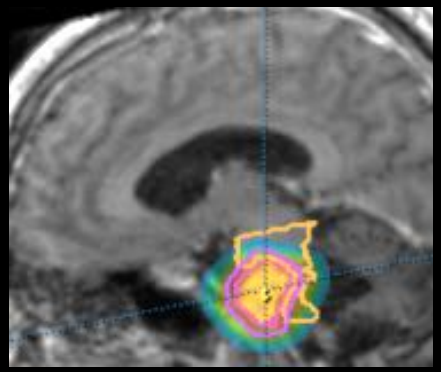


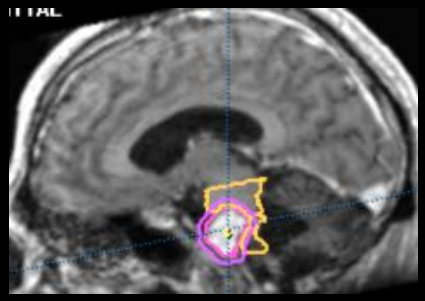
Post-operative

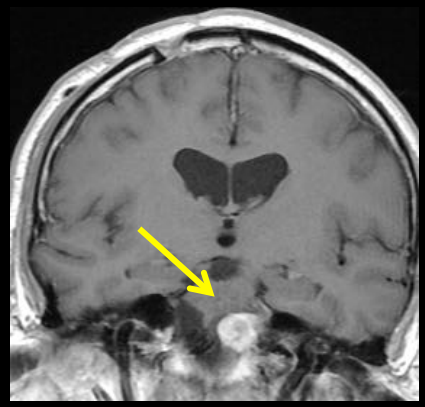
SRT for residual acoustic neuroma

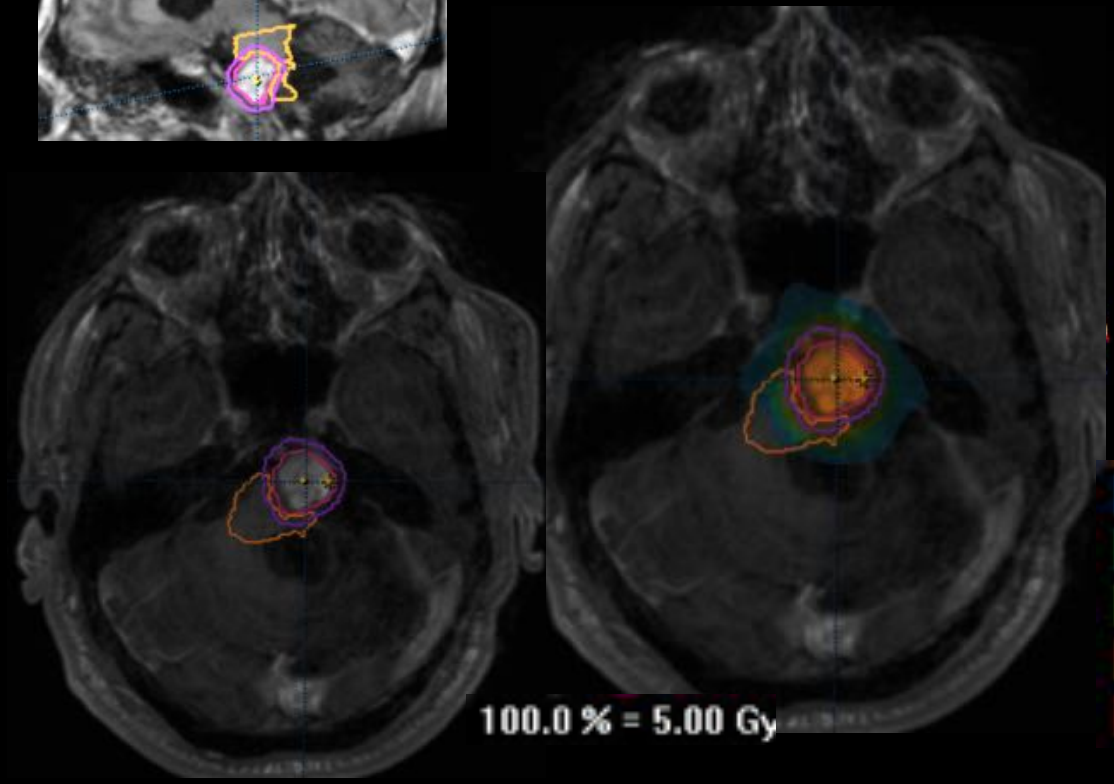


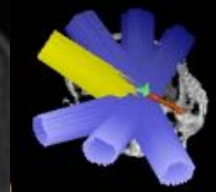






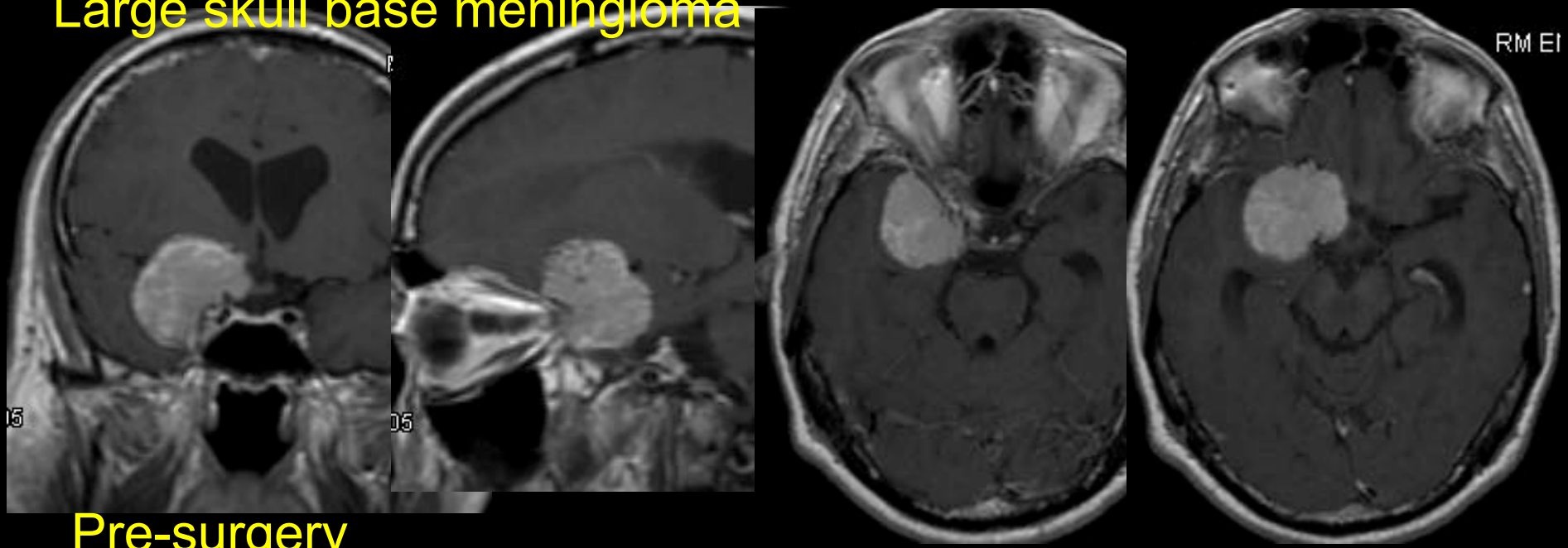




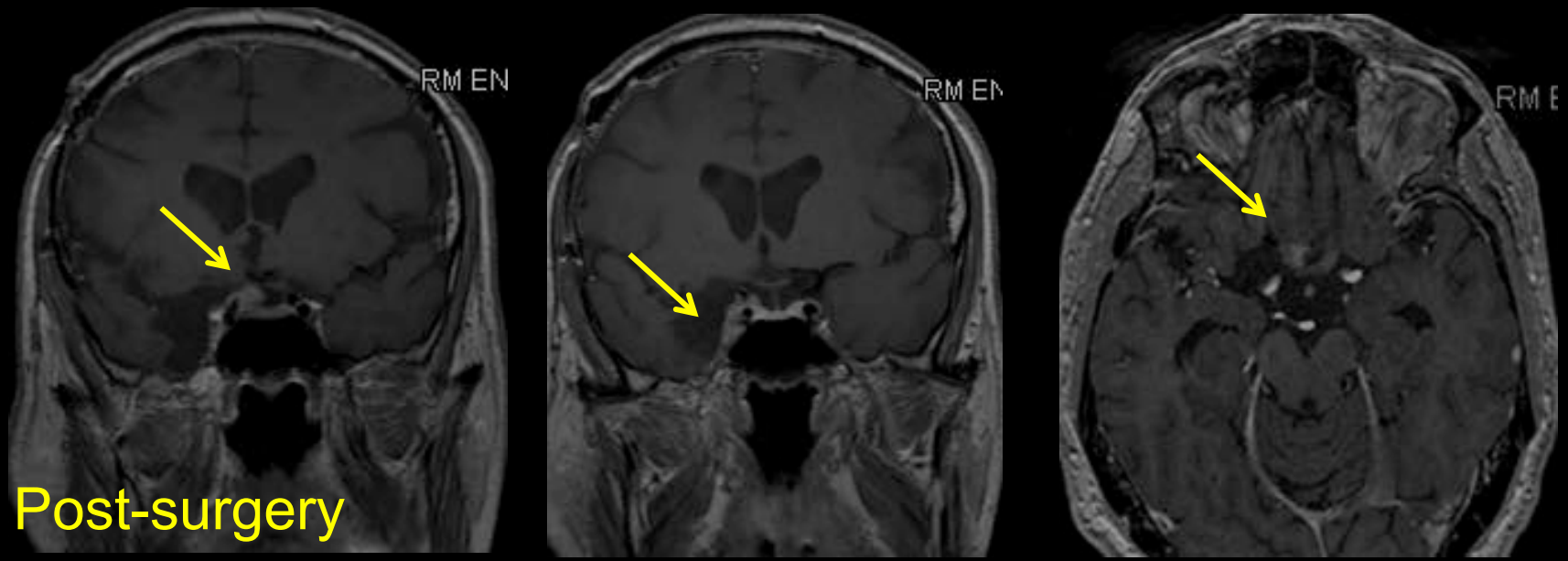


POST SRT (18 months)

Large skull base meningioma

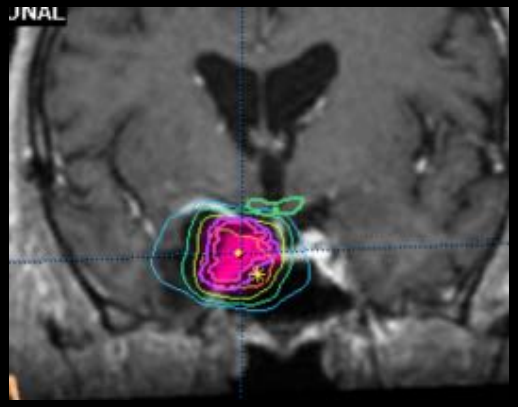


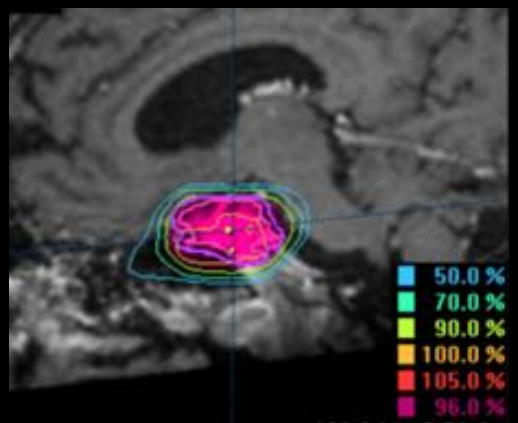
Pre-surgery

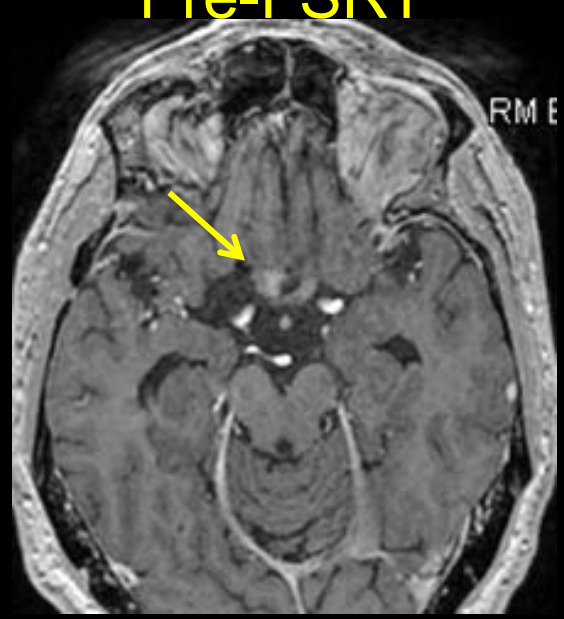


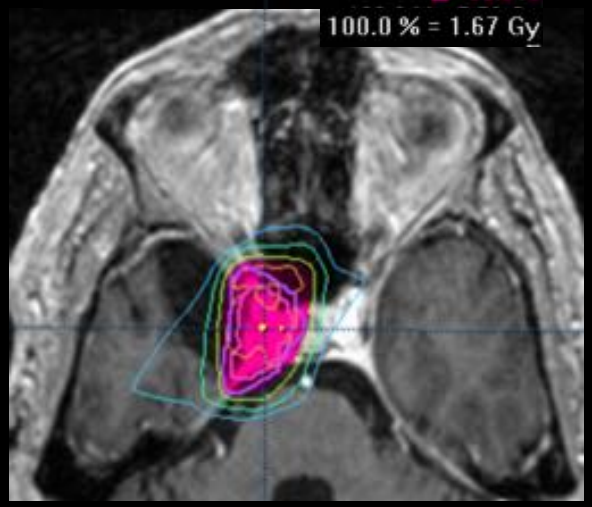
Post-surgery

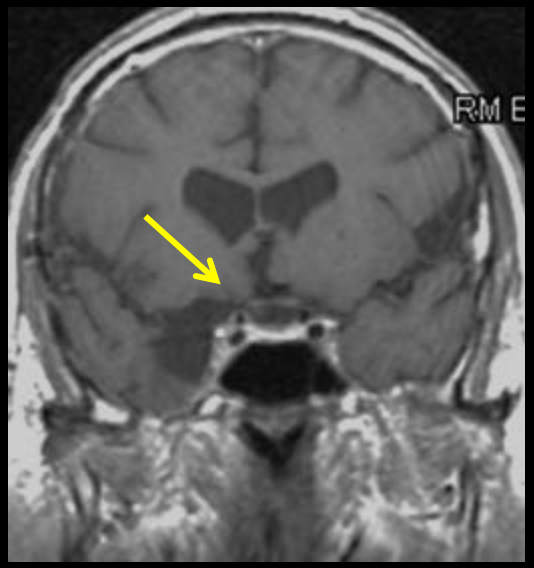
Pre-FSRT



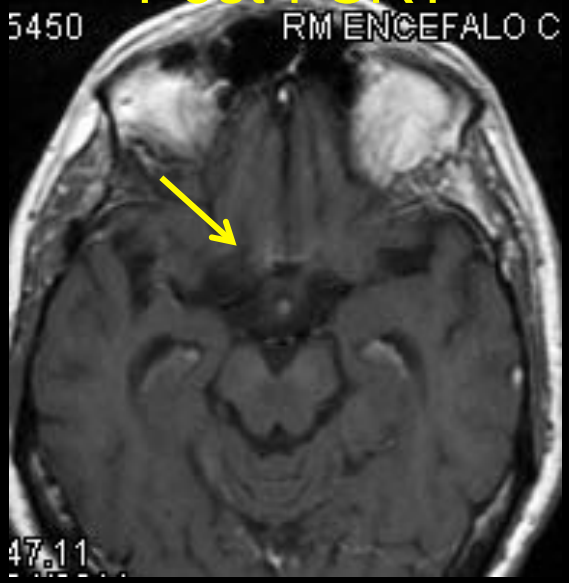




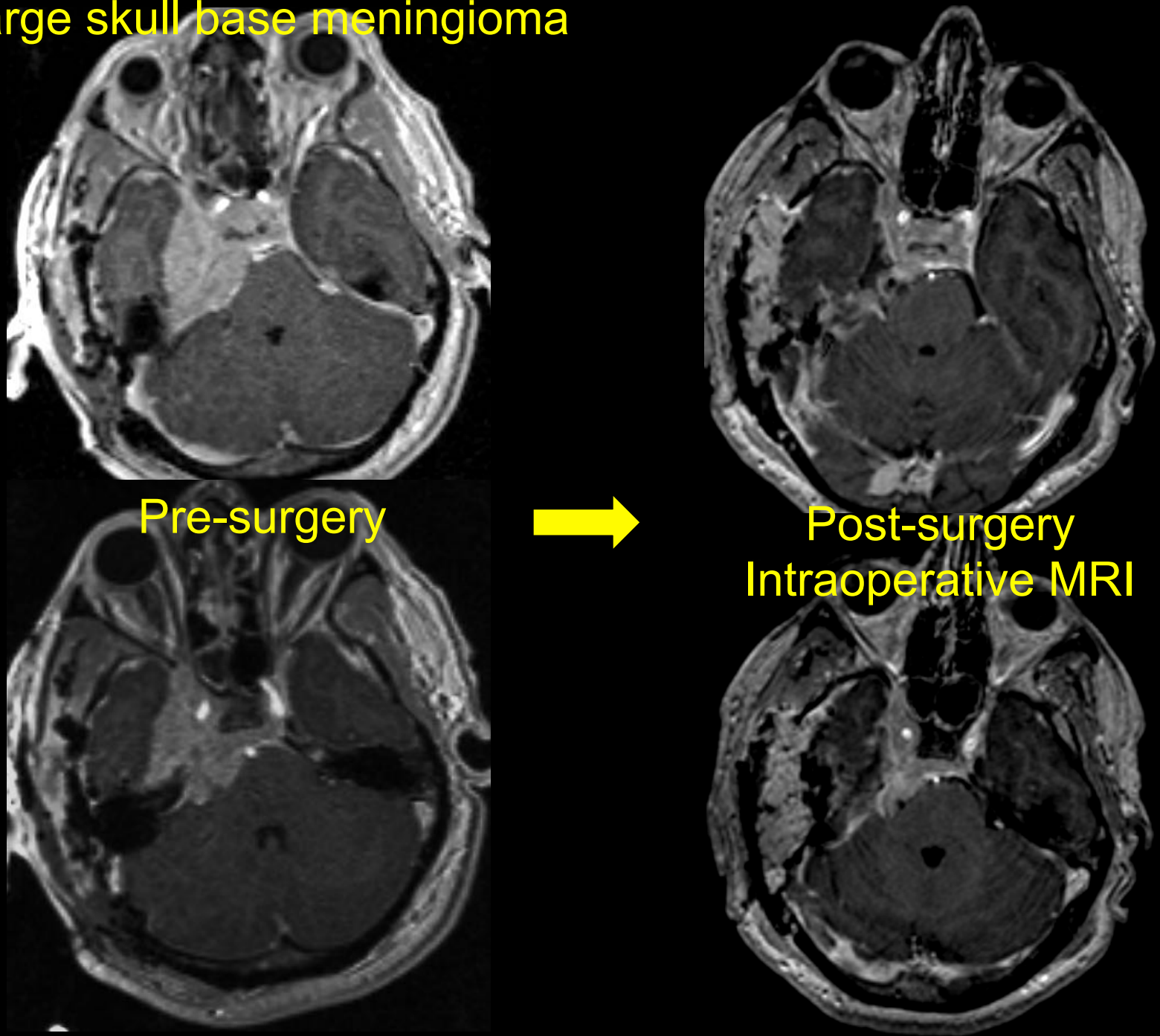


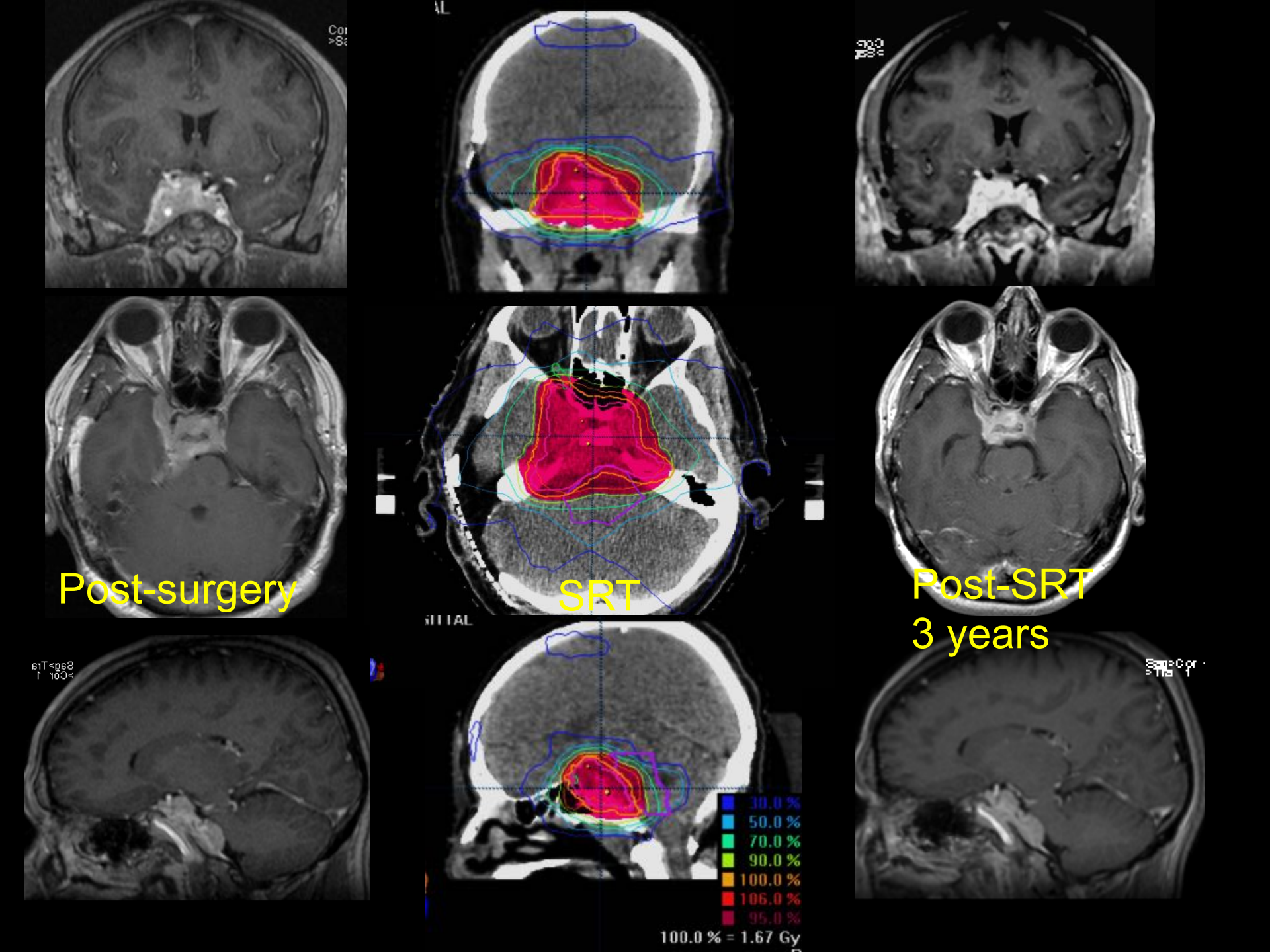


Post-FSRT

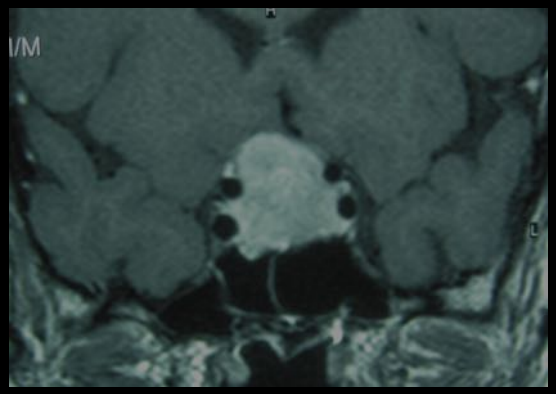


Large skull base meningioma

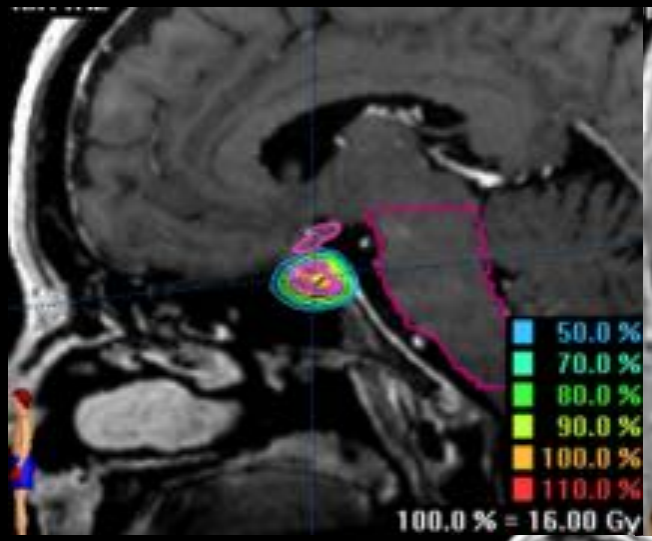


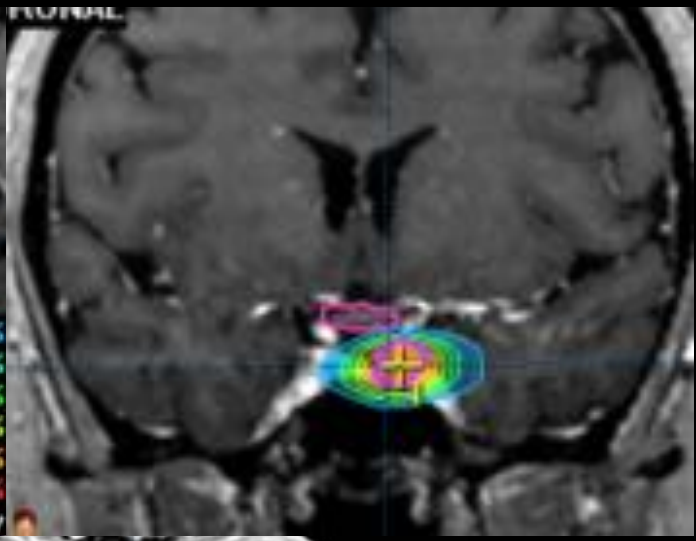

Post-surgery
SRT
Post-SRT
3 years
30.0 %
50.0 %
70.0 %
90.0 %
100.0 %
106.0 %
95.0 %
100.0 % = 1.67 Gy

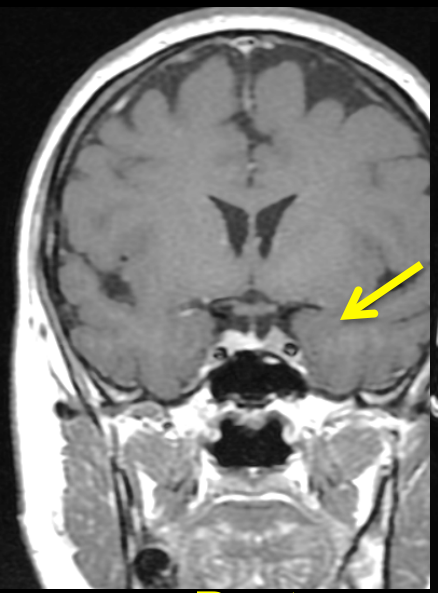
Surgery followed by SRS for an ACTH-secreting pituitary adenoma

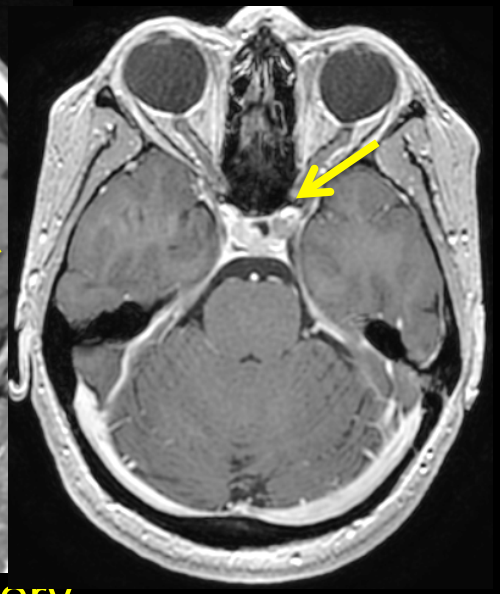


Pre-surgery

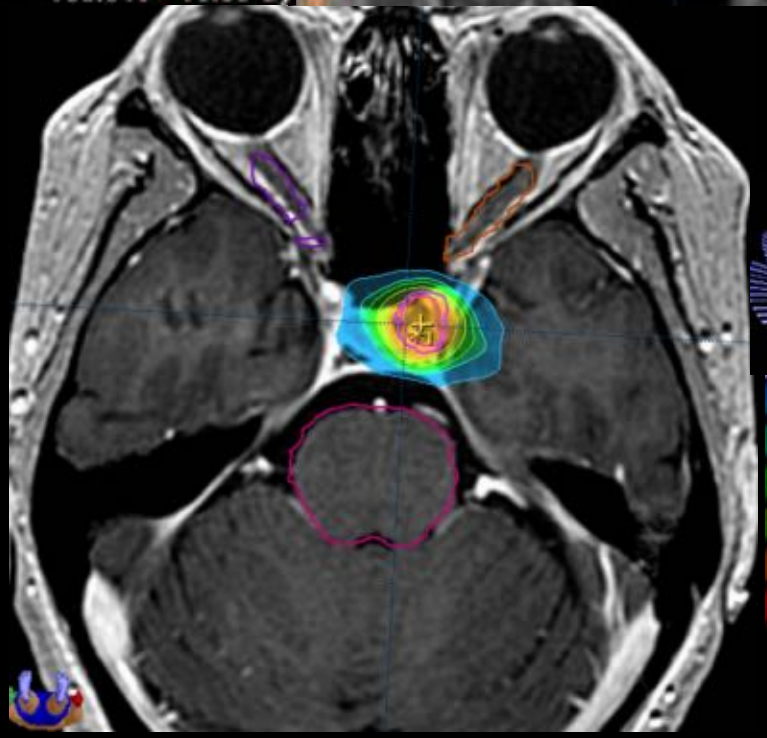




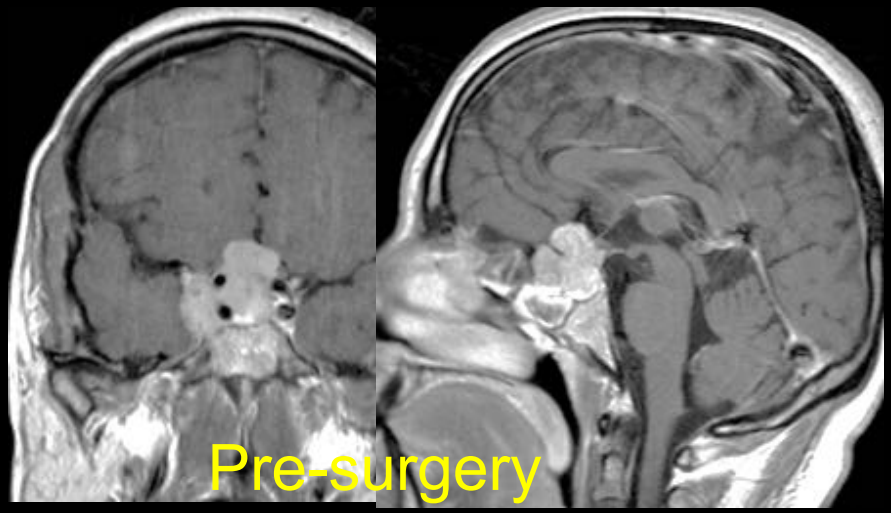




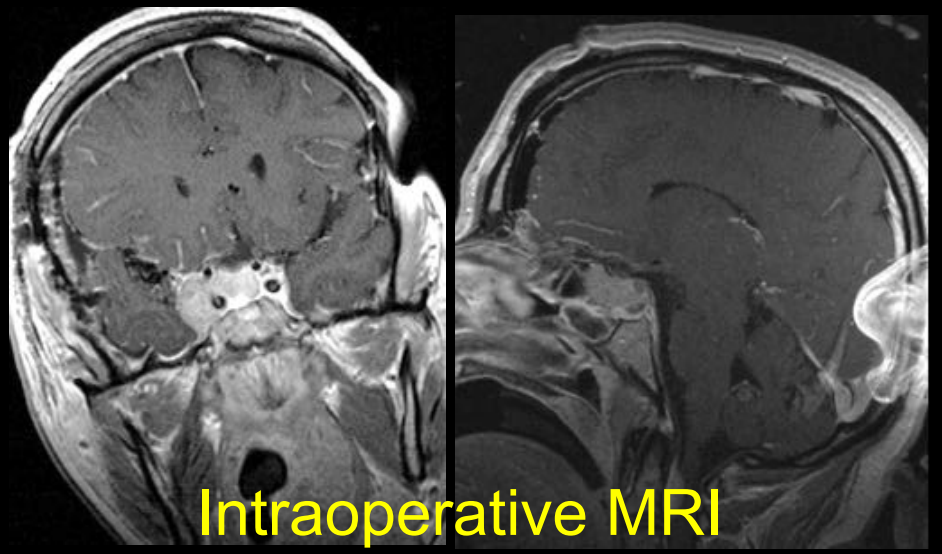
Post-surgery



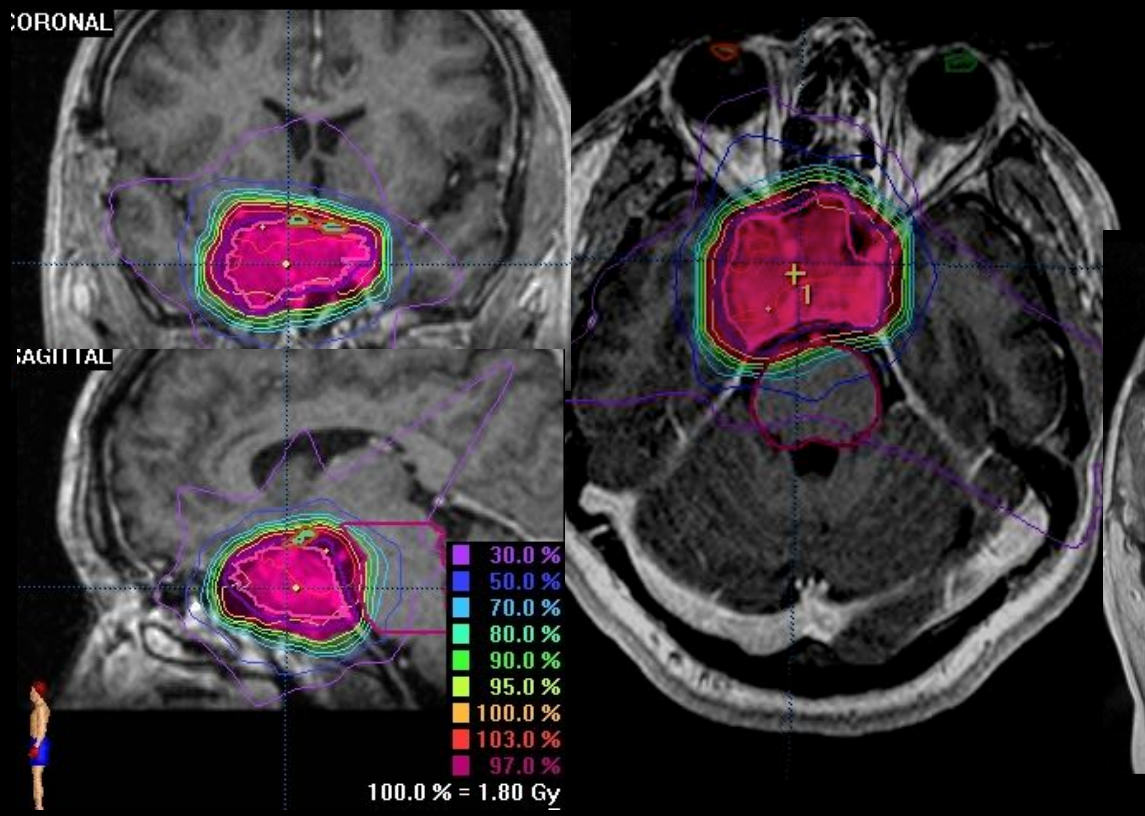
NF pituitary adenoma

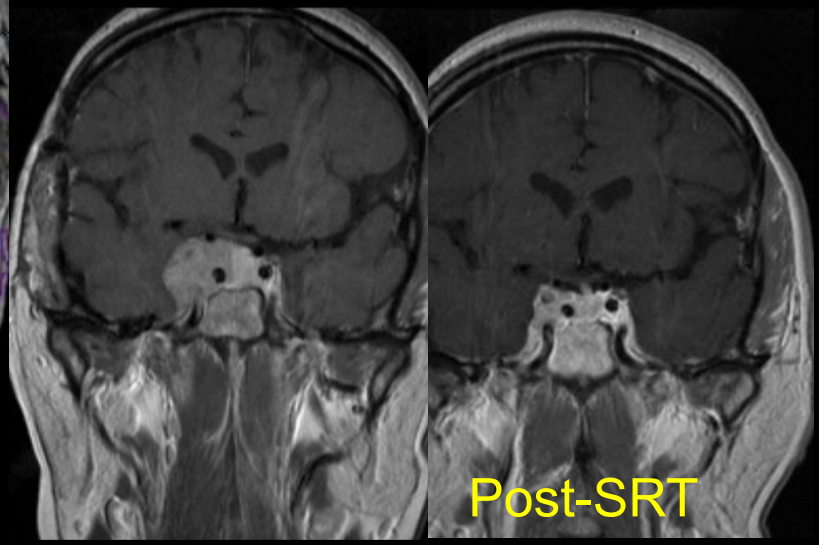


Pre-surgery



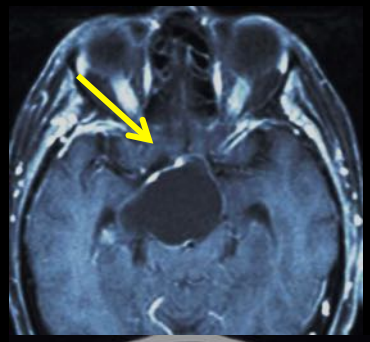
Intraoperative MRI

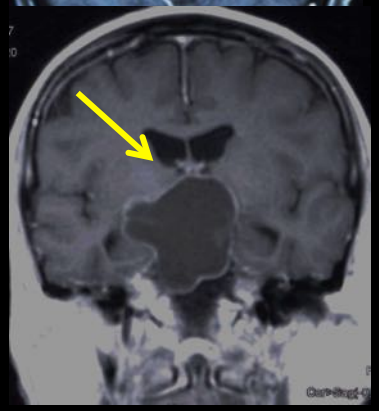


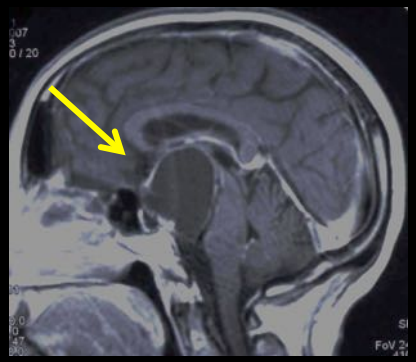


Post-SRT

craniopharyngioma

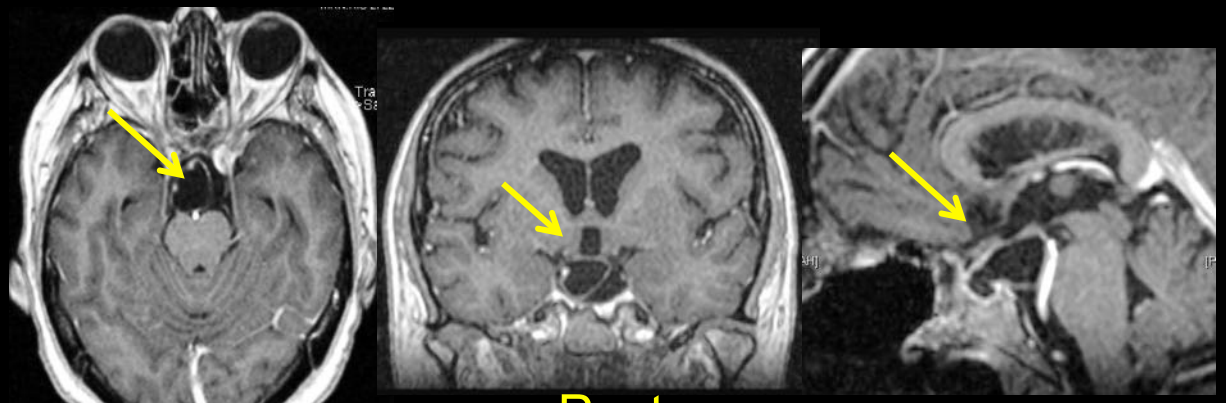




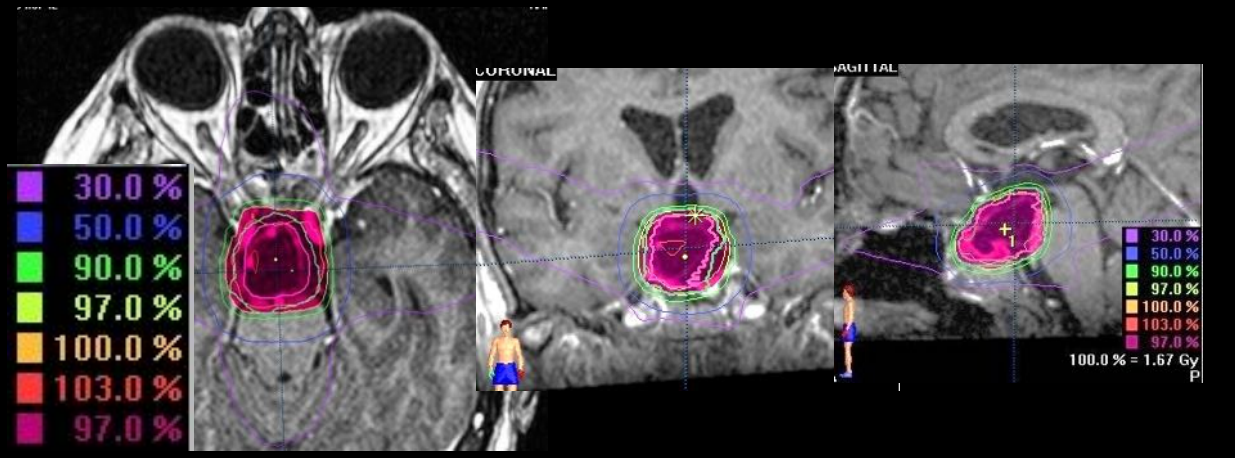


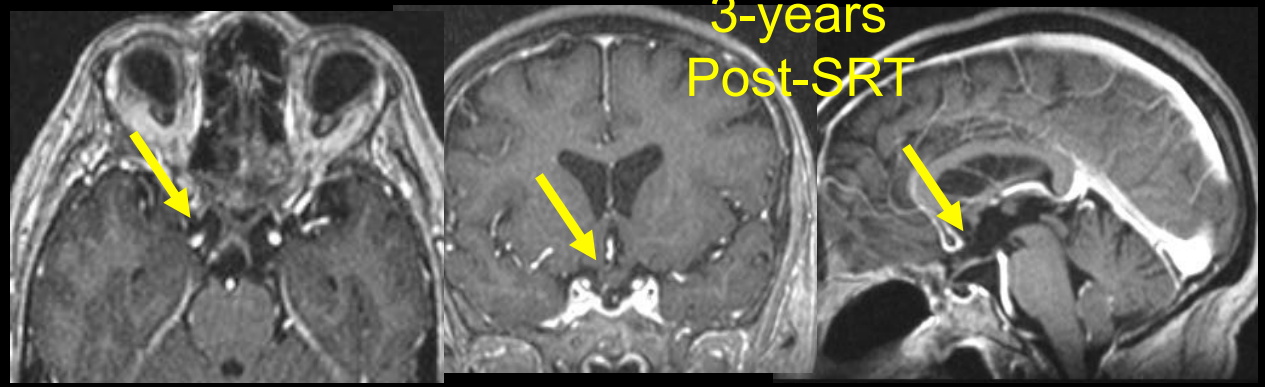
Pre-surgery

Endoscopic surgery



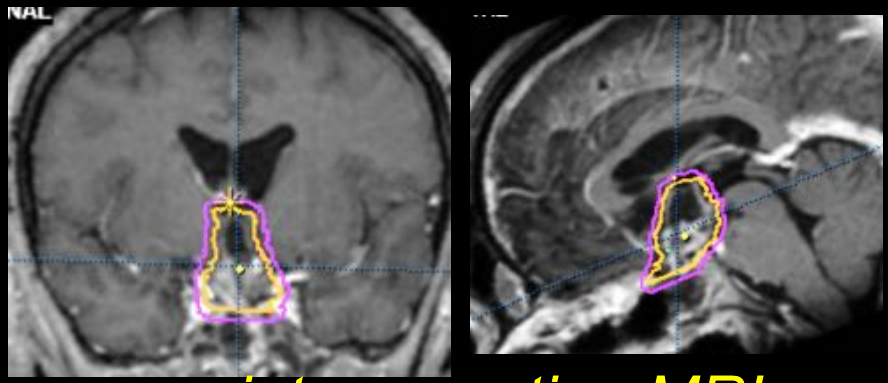
Post-surgery



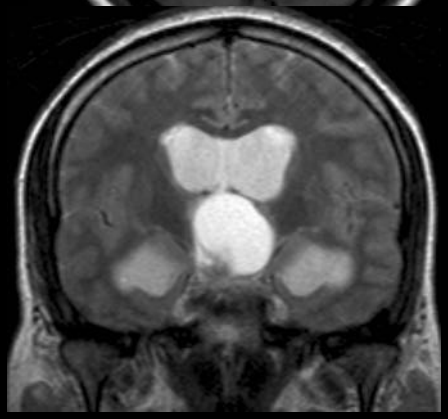


3-years Post-SRT

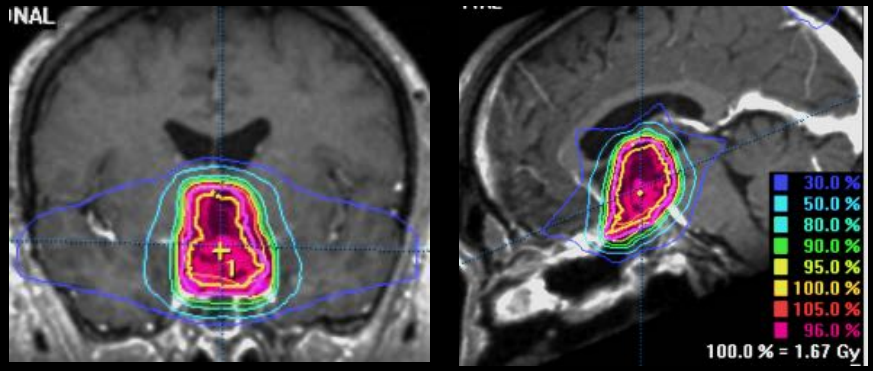
craniopharyngioma



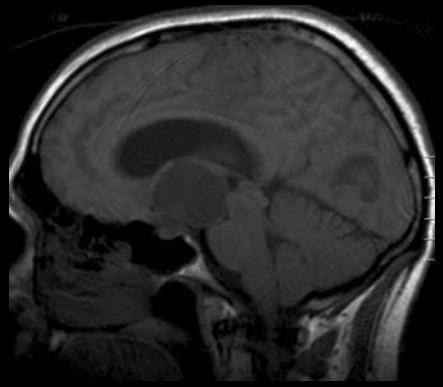
intraoperative-MRI



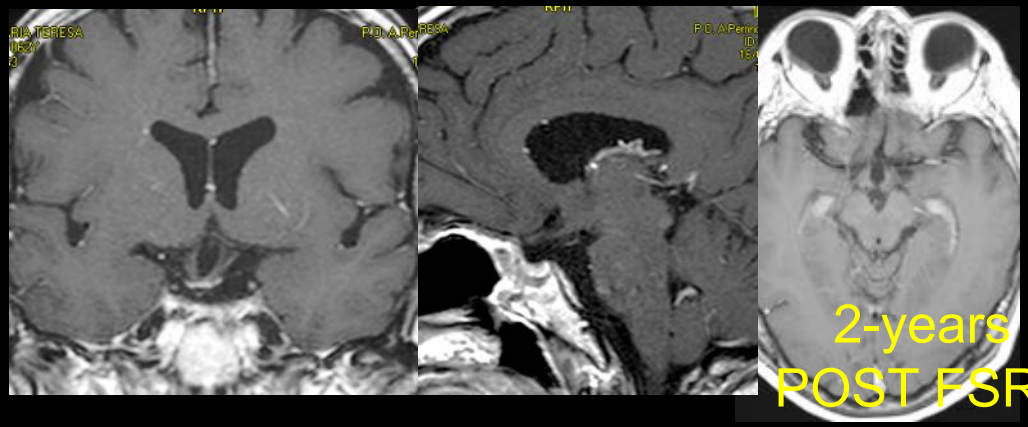
Endoscopic surgery



Postoperative SRT

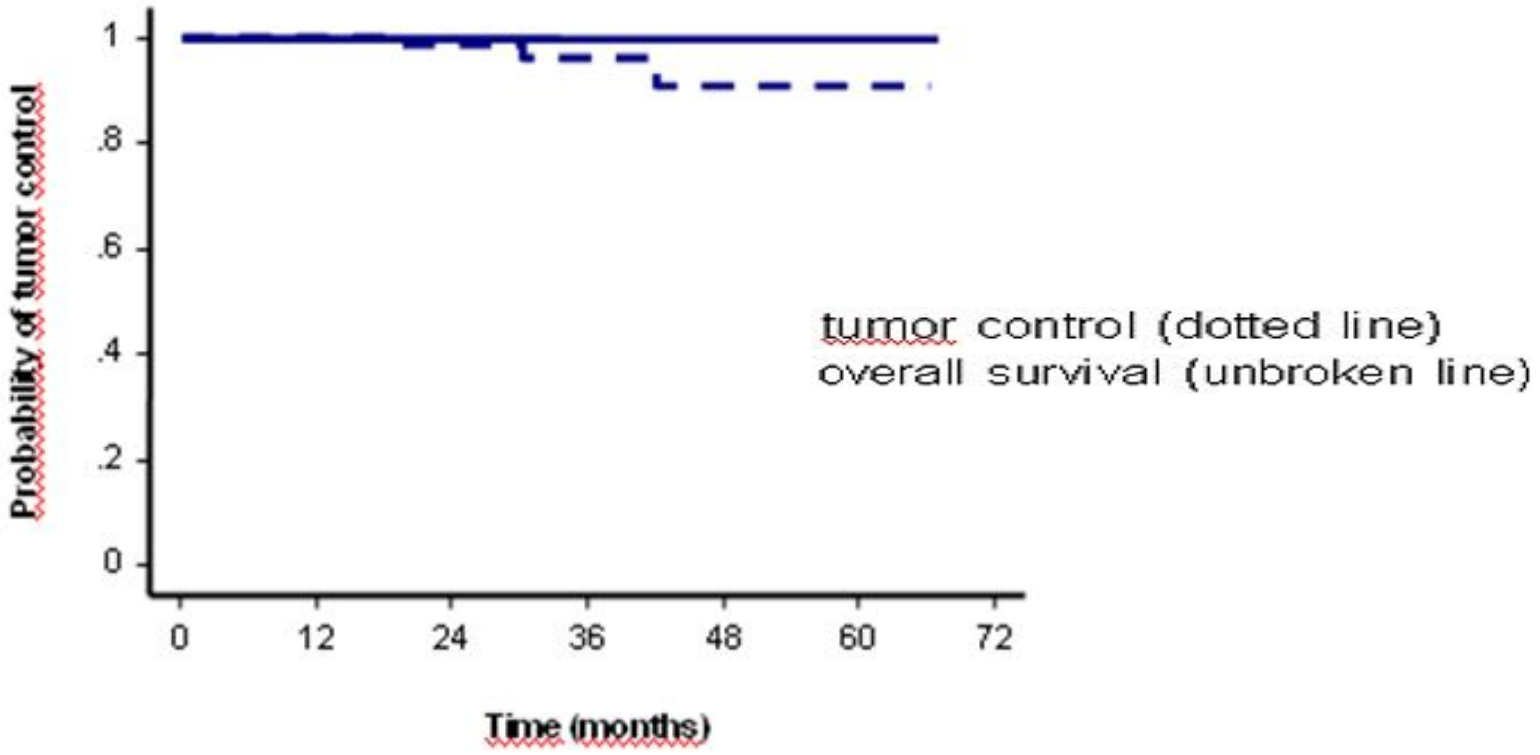


Pre-operative



2-years POST FSRT

Tumor control in 64 patients with skull base tumors
Treated with surgery followed by SRS/SRT



Neurological function

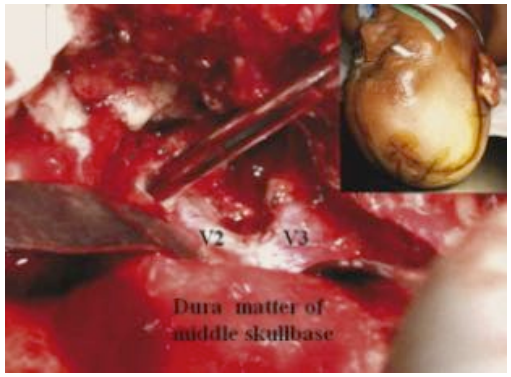
- *Neurological deficits were present in 28 patients before surgery and in 24 patients before irradiation*
- *At a median f-up of 41 months, 25% of patients had a clinical improvement of neurological deficits after SRT/SRT*
- *Vision improved in 4 patients and cranial nerve function in 2 patients*
- *Three patients deteriorated without evidence of tumor progression on imaging. One patient had a slight worsening of vision and two progressive hearing loss*

late toxicity

- *A development of new or worsening of pre-existing hypopituitarism occurred in 15% of patients after a median follow-up of 38 months, requiring hormone replacement therapy*
- *No clinically apparent neurocognitive dysfunction (Grade II RTOG memory impairment) was reported.*
- *No radiation necrosis, cerebrovascular accidents and second tumors were reported.*

Surgical morbidity in 64 patients with skull base tumors

- ✓ *Hipopituitarism 3*
- ✓ *CSF leak 3*
- ✓ *Cranial deficits 3*
- ✓ *Haemorraghe 2*



Conclusions

- *Planned pre-operative limited resection followed by SRT/SRS (as part of a combined strategy employed in our institution) represents a suitable option in patients with skull base tumors which is associated with high local control and preservation of neurologic function*

- *SRS is usually employed only for small (< 2.5-3 cm) lesions at least 3 mm away from the optic pathway and not involving large parts of the brainstem (if doses > 12 Gy are used).*

…thank you for your attention

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