

PREOP-1 : A feasibility trial of preoperative radiosurgery for brain metastases

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Purpose

- Leptomeningeal relapse is a frequent pattern of failure (16-22% at 12 months) after resection of a brain metastasis and postoperative radiosurgery (SRS) or fractionated stereotactic radiotherapy (FSRT)
- Retrospective data suggest preoperative SRS can achieve local cavity control rates equivalent to postoperative fractionated stereotactic radiotherapy (FSRT) but with a much lower (0-7%) incidence of leptomeningeal disease at 12 months than postoperative FSRT (16-22%)¹
- We present the final results of a single centre, prospective feasibility trial of SRS prior to neurosurgical resection of a brain metastasis

Materials and Methods

- Eligibility criteria included:
 - brain metastasis (BM) up to 4 cm diameter for resection
 - up to 3 other BMs for radiosurgery
 - anticipated gross tumour resection
 - an estimated prognosis of at least 6 months
 - no contraindication to steroids or MRI
- SRS (Novalis Stx) was scheduled up to and including the day of elective neurosurgery

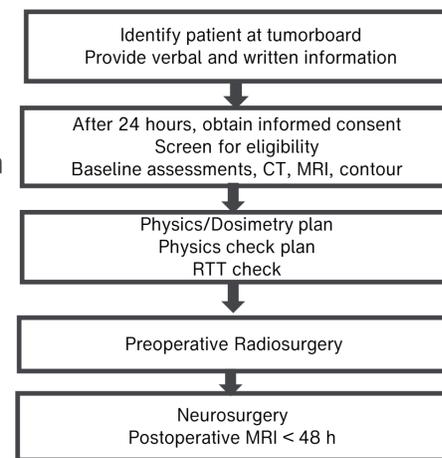


Figure 1. Preoperative SRS workflow

Results

- One patient went directly to surgery due to earlier theatre availability and received postop FSRT. He developed 2 small leptomeningeal metastases six months later. To date these have been salvaged with SRS
- There was one grade 2 toxicity (alopecia at 3 months) which recovered by 6 months

Patient characteristics and dosimetric features (n=12)	Median (range)
Age	65 (51-77)
Number of brain metastases (BM)	1 (1-3)
Symptomatic BM for SRS/resection	8: 4
Synchronous systemic treatment Y:N	10: 2
Gross tumour volume (GTV) (cm ³)	9.6 (4.1 to 16.3)
Planning tumour volume (PTV) (cm ³)	12.7 (9-26)
Median radiosurgery dose (Gy)	16.0 (14-19)
Volume of structure 'brain -GTV' receiving 10 Gy (cm ³)	12.7 (7.5-21.5)
Number of working days from referral to SRS (n=12)	6.5 (1-10)
Number of working days from SRS to resection (n=12)	1.0 (0-5)
Salvage SRS/WBRT (n=6)	2
Neurological death	0/12

Table 1. Demographics and dosimetric features of 13 patients planned for Preoperative SRS

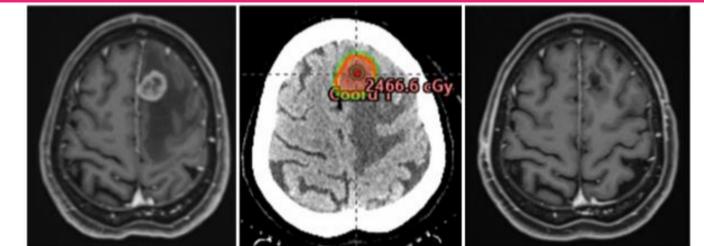


Figure 2. Radiological outcome at 12 months in a patient irradiated with 1 x 17 Gy <@ 70% isodose prior to resection

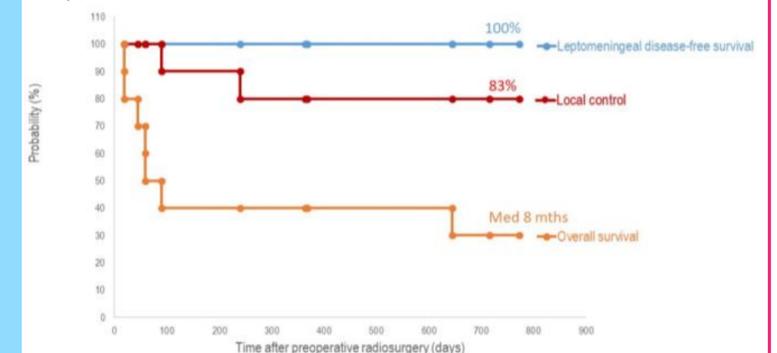


Figure 3. There were no leptomeningeal relapses in patients treated with preoperative SRS and cavity local control rate (83%) were equivalent to postoperative FSRT

Conclusion

- Pre-operative SRS was feasible in 12/13 patients and safe in 12/12 patients without delay to neurosurgery or any intracranial complications
- This concept is being evaluated in the experimental arm of the first international multicentre trial, randomising between preoperative SRS and postoperative FSRT to the cavity (PREOP-2, NCT05124236)

References

Prabhu RD, Dhakal R Vaslow ZK, et al.Preoperative Radiosurgery for Resected Brain Metastases: The PROPS-BM Multicenter Cohort Study. Int. Radiat. Oncol. Biol. Phys. 2021

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