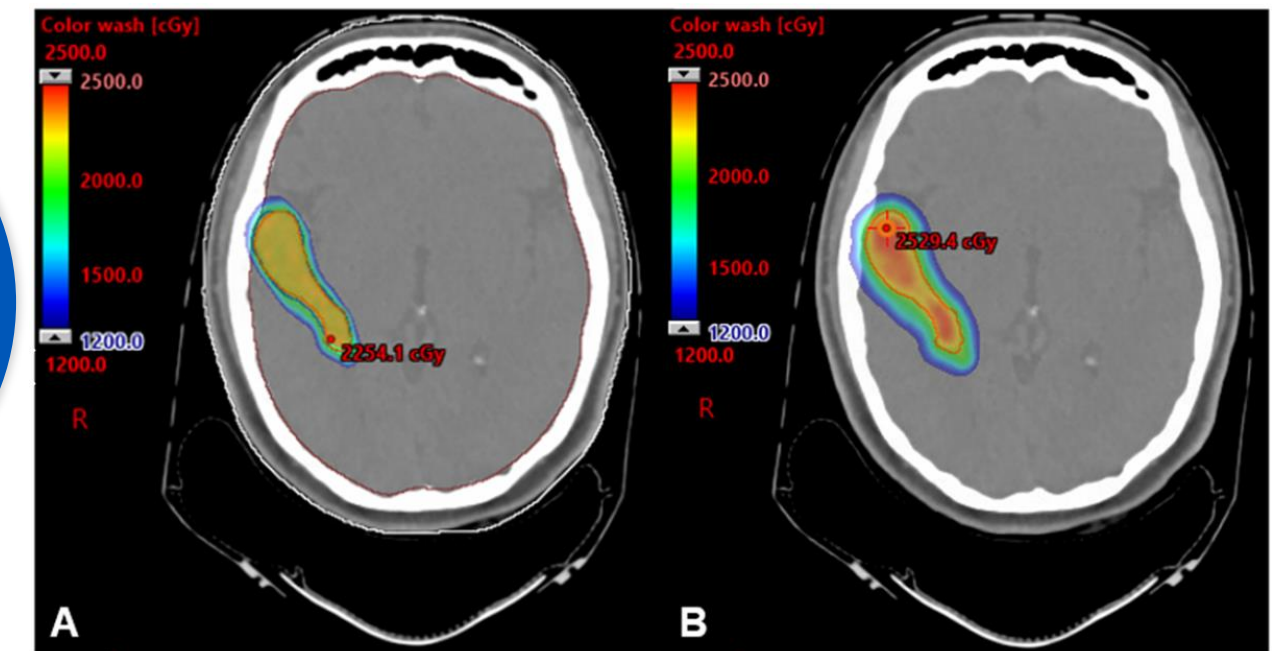
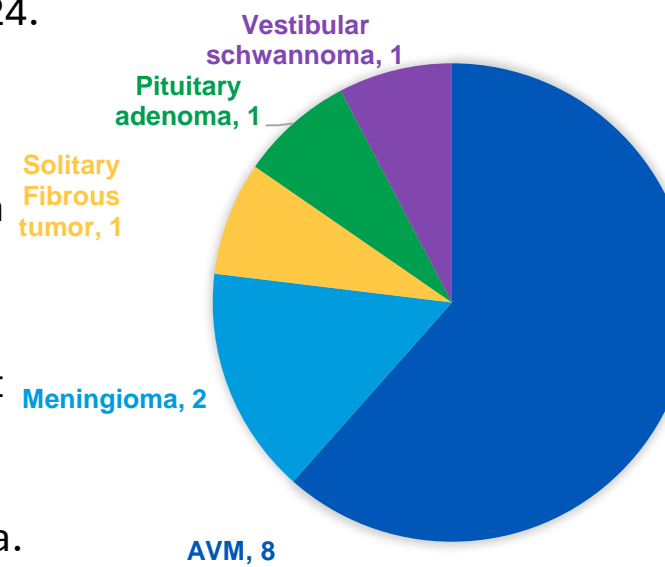


## INTRODUCTION

- Proton-based Stereotactic Radiosurgery (SRS) can offer dosimetric advantages over traditional photon-based SRS.
- Previously published series demonstrated the feasibility and safety of proton SRS delivered using passive scattering.
- Proton SRS using pencil-beam scanning technology may offer additional dosimetric and clinical advantages.

## RESULTS

- 15 courses of proton SRS (13 patients) treated between June 2023 and August 2024.
- 2 patients received staged treatments for Arteriovenous Malformations (AVM).
- Only acute toxicity was perilesional edema on imaging detected in 3 patients (CTCAE grades 1-2).
- Almost two-thirds (62%) of patients did not receive prophylactic steroids during treatment, including 2 out of the 3 patients that went on to develop perilesional edema.

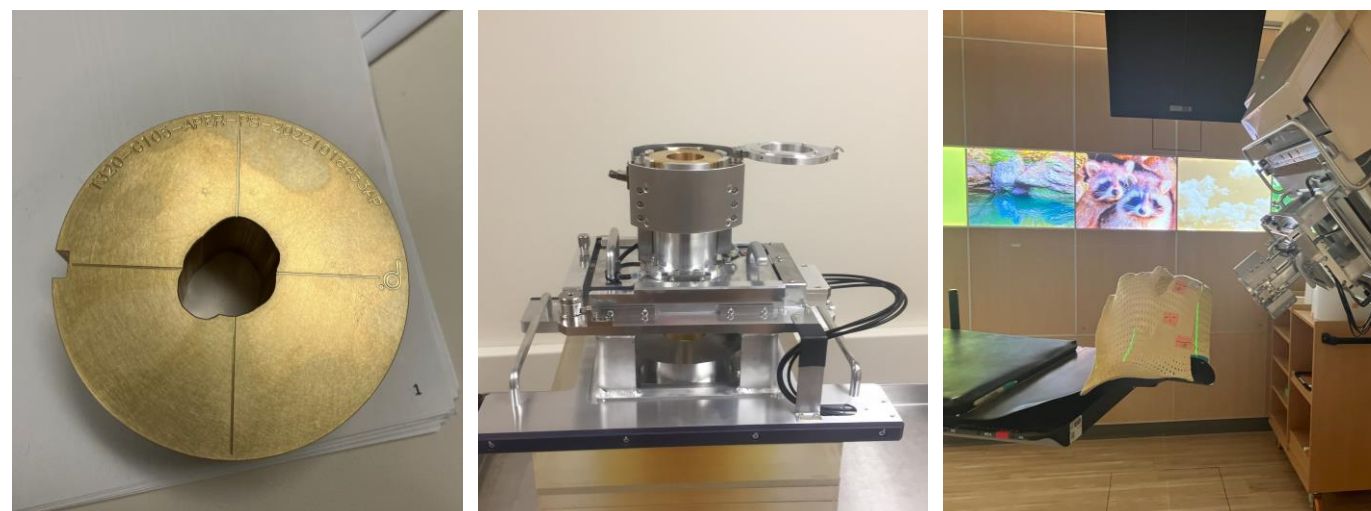


**Figure 1.** Color wash dose distribution for the AVM (8.3 cm<sup>3</sup>) with the largest V12 dose difference between the (A) proton SRS and (B) five-field VMAT comparison plans.

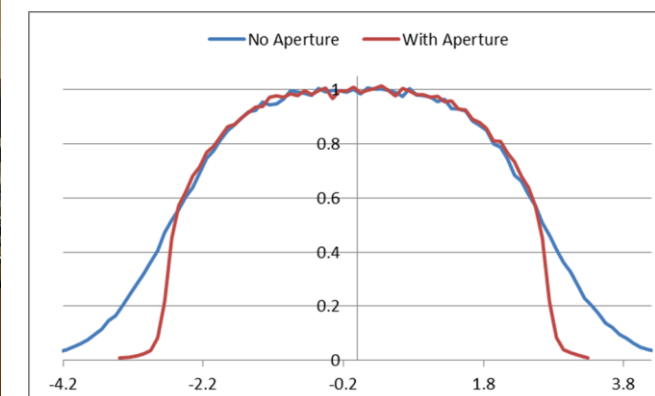
## PROTON SRS TECHNIQUE

- Proton SRS was planned with pencil-beam spot scanning with multifield optimization.
- Plans were delivered using patient-specific brass apertures to reduce lateral penumbra for enhanced healthy tissue sparing.
- A built-in range shifter facilitated treatment at shallower depths.
- Fiducial markers in the skull were used to ensure treatment setup accuracy.

<b>SRS dose range</b>	17-20Gy (25/5 for fractionated SRS)
<b>Target volume (median, range)</b>	6.09 cm <sup>3</sup> (0.39-30.6 cm <sup>3</sup> )
<b>Conformality index (median, range)</b>	1.393 (0.641-2.912)
<b>Homogeneity index (median, range)</b>	1.166 (1.063-2.070)
<b>V12</b>	7.175 cm <sup>3</sup> (2.252-59.31cm <sup>3</sup> )



Patient specific aperture



## CONCLUSIONS

- Proton SRS delivered with pencil-beam scanning can decrease brain V12 dose compared to photon SRS.
- Peri-lesional edema can occur shortly after proton SRS in a small proportion of patients.
- Prophylactic steroid administration may be helpful in reducing this risk.