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**Abstract**

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## Initial Experience with Self-Shielding Gyroscopic Stereotactic Radiosurgery for Spinal Tumors

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### Abstract

Objectives:

The ZAP-X is the newest cranial stereotactic radiosurgery (SRS) platform. There are no reports describing its use or outcomes for spinal tumors (STs). We report our initial experience using this system to treat spinal tumors at Jersey Shore University Medical Center with the intention to expand the existing base of literature on this novel therapy. In this case study, dosimetric parameters are analyzed for ZAP-X ST SRS along with initial clinical outcomes.

Methods:

Three patients were treated with ZAP-X ST SRS. Patient 1 was a 39 year old female with a 3.00 cm<sup>3</sup> C2-C3 schwannoma treated with 3 fractions for 24 Gy to the 56% isodose line using 8 isocenters. Patient 2 was an 83 year old female with a 0.61 cm<sup>3</sup> C1 meningioma treated with 5 fractions for 30 Gy to the 66% isodose line using 16 isocenters. Patient 3 was a 59 year old male with a 6.29 cm<sup>3</sup> C1-C2 prostate cancer metastasis treated with 5 fractions for 30 Gy to the 63% isodose line using 13 isocenters. Forward planning was performed, limiting the dose to the spinal cord, brainstem, cochleae, eyes, optic chiasm, optic nerves, and oral cavity.

Results:

Important dosimetric parameters for patients 1, 2, and 3 were: maximum dose to 0.035 cm<sup>3</sup> of spinal cord = 1048.2, 2633.4, 2548.5 cGy; spinal cord volume receiving 2200 cGy = 0, 0.106, 0.153 cm<sup>3</sup>; conformity index = 1.158, 1.167, 1.066; gradient index = 2.987, 3.536, 2.578; number of beams = 212, 280, 357; average treatment time = 44.3 ± 0.6, 61 ± 5, 64 ± 5 minutes. Three months post-treatment, patient 1 had complete resolution of symptoms, while patient 3 tolerated treatment well with no complications. Patient 2 tolerated treatment well but expired from complications due to diabetic ketoacidosis and lung cancer.

Conclusion(s):

This case series demonstrates ZAP-X can be effectively used for the treatment of STs. More data is needed to show the efficacy of ZAP-X compared to other SRS modalities.