

**Purpose:** We describe a whole spinal cord, cauda equine, and brainstem radiation treatment using an in-house developed tomotherapy approach for a unique patient diagnosed with an extramedullary spinal melanocytoma with leptomeningeal seeding, treated with 48.6 Gy in 28 fractions.

**Methods and Materials:** Given that the prescribed dose is within the range of tolerance to the spinal cord, tomotherapy was chosen to take advantage of the superior dose uniformity achievable with this technology and ability to deliver modulated radiotherapy in a single treatment to a long volume. The patient was treated supine and immobilized with a thermoplastic mask for the head and shoulders and a long Vac-Lok bag for the body. The CTV consisted of the entire spinal cord, thecal sac to the level of S2 and brainstem. A 1 cm margin was applied to create the PTV. Jaws, pitch and the modulation factor were set to 5 cm, 0.43 and 2.5, respectively. Before each treatment, the treated volume was imaged for setup verification using the integrated megavoltage CT (MVCT). Weekly the patient was also imaged post-treatment to confirm setup stability.

**Results:** The patient is finishing treatment at the time of abstract submission. A highly conformal dose distribution was created with doses to the organs at risk within their tolerance limits. The beam on time was 17 minutes. Patient setup proved to be trouble-free and reproducible. The total patient-on-the-bed time was approximately one hour. The 1 cm PTV margin was adequate according to pre- and post-treatment MVCT image analysis.

**Conclusions:** Tomotherapy is a safe and effective tool for treating long CNS volumes to high dose. It allows avoiding junctions and sparing healthy CNS tissue and other organs at risk. A relatively simple immobilization technique used for this patient proved to be stable and reproducible with a 1 cm PTV margin.