

**Background:** Radiation treatment of spinal and paraspinal tumors has been limited by the tolerance of the spinal cord. With new treatment technologies, like IMRT and extracranial SRS, higher radiation dose can be delivered to the target with the capability of sparing sensitive normal structure. This study is comparing the most advanced radiation techniques (IMRT and SBRT) for spinal tumor treatment.

**Methods:** 12 patients were treated for 13 spinal lesions; the treated lesions included metastases and primary spinal tumors in all spinal segments. Treatment indications were tumor control and pain palliation. All patients had been treated with SRS. We retrospectively compared the SRS and IMRT treatment plan. SRS was planned using the 3Dline, (ERGO++, Elekta) for direct treatment planning. For IMRT planning we used CMS Xio software (CMS, St. Louis, MO). A dose– volume histogram for the peripheral tissue and organ at risk around the target generated and evaluate. The IMRT plan had to meet the same tumor coverage as the srs. The SRS plan were transferred to the XiO planning system and recomputed in order to eliminate algorithm accuracy performance difference.

**Results:** The median target volume was 8.1 cc (4.1-12.5cc). The SRS plan showed lower median target dose (5.3%, range 3-31%) and lower median dose (27.9%, range 6.6-27.2%) to critical structures (spinal cord, kidneys). The IMRT plan showed higher peripheral dose volume exposure for of 30.3%, 49.4% and 62.7% for the 10%, 20% and 30%, respectively, of overall exposed tissue volume. The planning and quality assurance duration for SRS was on average 75 minutes and for the IMRT plan 480 minutes.

**Conclusion:** SRS technique showed a higher and faster gradient fall off reflected by a more conformal tumor coverage and less exposure to normal tissue. SRS was less time consuming for planning and quality assurance compared to the IMRT.