ONCODAILY MEDICAL JOURNAL

abstract

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DOI: 10.69690/ODMJ-018-3101-6799

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Asia and Middle East Society of Therapeutic Radiation and Oncology
Affiliated with ASTF

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An Institutional Experience of Stereotactic Radiosurgery and Stereotactic Body Radiotherapy in the Management of CNS Tumors and Metastases

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Introduction: Stereotactic Radiosurgery (SRS) and Stereotactic Body Radiotherapy (SBRT) has become an integral component of treatment for patients with limited brain or spine metastases as well as a curative treatment option for grade 1 meningioma and vetibular schwannomas offering precise, high-dose radiation delivery while sparing adjacent normal tissue. We report our institutional experience and early clinical outcomes of SRS in patients with metastatic brain,spinal lesions, grade 1 meningioma and vestibular schawannomas.

Methodology: A retrospective analysis was conducted of 17 patients who underwent fractionated SRS/ SBRT between september 2023 till june 2025 for metastatic lesions of brain (n=13) ,spine (n=2), as well as evaluating the effictiveness of SRS in post-op grade 1 meningioma (n=1) and post-op vestibular schwanoma (n=1). Metastatic Patients were selected based on good performance status, controlled extracranial disease, and limited metastatic burden (≤5 lesions). Treatments were delivered using image-guided SRS systems. Brain lesions received a median fractionated dose of 30Gy in 5fractions, while spinal lesions were treated with a median dose of 32.5 Gy in 5 fractions (6.5 Gy per fraction). SRS Doses for meningioma and vestibular schwannoma were 25Gy/5 and 18Gy/3 fractions respectively. Clinical evaluation and MRI were performed at 3-month intervals to assess local control, symptom response, and toxicity.

Results: The median age of the cohort was 54 years (range: 32–71). The most common metastatic tumors were gynaecological and genitourinary malignancies (40%), followed by breast cancer (33.3%) and lung cancer (13.3%), while sarcoma and salivary duct carcinoma each accounted for 6.7% of the total 17 cases. Additionally, two postoperative cases, one of grade I meningioma and one of vestibular schwannoma were included. The median treated lesion volume was 4.2 cc. At a median follow-up of 6 months, local tumor control was achieved in 85% of treated lesions. Neurological or pain improvement was observed in 60% of symptomatic patients. Two deaths occurred due to systemic disease progression. Treatment was well tolerated, with mild acute toxicities (headache, grade 2

dermatitis and fatigue) in 25% of patients and no ≥Grade 3 adverse events observed. The patient treated for postoperative vestibular schwannoma showed stable disease at 3 months follow-up.

Conclusion: Our early institutional experience indicates that SRS and spine SBRT are safe, effective and convenient treatment options for patients with limited brain and spinal metastases, as well as for curative treatment of vestibular schwannomas and grade I meningiomas. These techniques provide excellent local control, meaningful symptom relief, and minimal toxicity, supporting their integration into multidisciplinary oncologic care.

Conflict of interests: The authors declare no conflict of interests.

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.