

## Efficacy and Safety of CyberKnife Stereotactic Radiosurgery for Occipital Condyle Metastasis

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**Abstract**

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### Abstract

**Objectives:**

Occipital condyle metastasis (OCM) is a rare condition characterized by severe occipital pain and neurological symptoms due to lower cranial nerve deficits, stemming from its anatomical location. Despite the widespread use of stereotactic radiosurgery (SRS) for cranial metastases, its specific impact on OCM remains underexplored. This study evaluates the efficacy and safety of CyberKnife SRS in treating OCM, focusing on symptom control and local tumor control.

**Methods:**

We retrospectively analyzed cases of OCM treated with SRS at our institute from 2012 to 2023, evaluating patient demographics, presenting symptoms, treatment parameters, and outcomes. Key measures included occipital pain, dysfunctions of lower cranial nerves, and local tumor control.

**Results:**

Eighteen patients (10 females) with a median age of 64 years (range: 40-79) were treated. Common presentations included occipital pain (44%) and lower cranial nerve deficits (28%). The median target volume was 6.95 cc (range: 0.95-72.7), and the median margin dose was 20 Gy (range: 16-40). The median follow-up period was 7 months (range: 1-44). Notably, only one patient experienced tumor recurrence and subsequently died from primary cancer progression five months after treatment. SRS achieved a 93.8% local tumor control rate over three years, with a median overall survival of 13 months. Among those presenting with symptoms, 87.5% reported pain relief (p=0.04), and 80% observed improvements in cranial nerve function (p=0.003). The only patient without clinical symptom improvement also had tumor recurrence.

**Conclusion(s):**

CyberKnife SRS is a promising treatment for OCM, offering significant pain relief and improvement in neurological symptoms, along with excellent local control rates. This non-invasive therapy provides a valuable alternative to surgery, potentially enhancing the quality of life for patients with limited treatment options due to this challenging condition.