Boswellia as a Promising Adjunctive Treatment for Radionecrosis Following Stereotactic Radiosurgery

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ABSTRACT

Radionecrosis is a serious complication of stereotactic radiosurgery (SRS), occurring in 5–25% of patients and often presenting with neurological symptoms and perilesional edema[3]. Standard treatments such as corticosteroids and bevacizumab are limited by toxicity and long-term inefficacy. Boswellia serrata, a botanical extract rich in boswellic acids, has demonstrated anti-inflammatory, antioxidant, and anti-edema properties. It inhibits 5-lipoxygenase and reduces leukotriene synthesis, thereby dampening neuroinflammatory cascades, stabilizing the blood–brain barrier, and mitigating vasogenic edema—all key drivers of radionecrosis pathology. A 2024 retrospective study of 94 patients with MRI-confirmed radionecrosis reported a 59.6% response rate to Boswellia, with 12% achieving complete and 48% partial responses; 63.8% of patients off corticosteroids responded favorably[1]. A 2024 meta-narrative review of 130 patients found approximately 50% showed clinical or radiologic improvement, and one-third were able to reduce corticosteroid use[2]. MRI scans consistently demonstrated perilesional edema reduction. Doses ranged from 300 to 4,200 mg/day and were well tolerated with minimal adverse effects. Given that Boswellia sacra extracts have demonstrated anti-inflammatory, antioxidant, neuroprotective, and anti-edematous properties in both in vitro and in vivo studies, and considering their higher content of boswellic acids compared to B. serrata, we recommend prioritizing the investigation of B. sacra for their therapeutic potential in the treatment of radiation-induced necrosis. Furthermore, their prophylactic application alongside stereotactic radiosurgery (SRS) warrants exploration as a potential strategy for preventing radionecrosis.

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