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# Resection vs. coagulation of dural attachment in patients with spinal meningioma: an updated systematic review and meta-analysis

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## Abstract

**Background:** The Simpson grading scale assumes dural resection (grade I) is more effective against recurrence than coagulation (grade II). However, the results of recent studies have raised doubts about this effectiveness in spinal meningiomas. Therefore, we aimed to perform a meta-analysis comparing outcomes between Simpson grades I and II in spinal meningiomas.

**Methods:** According to the PRISMA statement, we systematically searched PubMed, EMBASE, and Web of Science for studies involving patients with spinal meningiomas who underwent Simpson grades I, II, III, or IV. Outcomes were radiological tumor recurrence, postoperative neurological deficits, and procedure-related complications.

**Results:** We included 54 studies with a total of 3334 patients. Simpson grades I, II, III, and IV were performed in 674 (20%), 2205 (66%), 254 (8%), and 201 (6%) patients, respectively. The follow-up ranged from 9 to 192 months, and 95.4% of all tumors were WHO grade 1. There was no difference in radiological tumor recurrence (OR 0.80, 95% CI: 0.46-1.36,  $P = 0.41$ ;  $I^2 = 0\%$ ), postoperative neurological deficits (OR 0.74, 95% CI: 0.32-1.75,  $P = 0.50$ ;  $I^2 = 0\%$ ) or procedure-related complications (OR 2.22, 95% CI: 0.80-6.13,  $P = 0.12$ ;  $I^2 = 3\%$ ) between Simpson grades I and II. Furthermore, no significant difference in postoperative neurological deficits or procedure-related complications was detected when comparing all Simpson's to each other. However, radiological tumor recurrences in Simpson I and II were significantly lower than in III and IV, with Simpson III outperforming IV (OR 0.19, 95% CI: 0.09-0.40,  $P < 0.01$ ;  $I^2 = 0\%$ ).

**Conclusion:** Simpson grade I is not more effective than grade II in any outcome, although both are superior to III and IV in tumor recurrence. Our results might suggest that dural coagulation is preferable over resection when the latter carries a higher risk of complications.

**Keywords:** Coagulation; Recurrence; Resection; Simpson grade; Spinal meningioma.

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