Simpson Grade II Resection of Spinal Atypical (WHO Grade II) Meningiomas is Associated with Symptom Resolution and Low Recurrence

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Learning Objectives

1) Describe the recurrence rate and postoperative outcomes following resection of spinal atypical meningiomas, 2) Discuss the appropriate resection strategy and adjuvant therapy for spinal atypical meningiomas

Introduction

Because of their rarity, outcomes regarding spinal atypical meningiomas (AMs) remain unclear; of 725 patients with spinal meningioma described in the 2000-2013 literature, only 15 had AMs. These cases of spinal AMs seem to indicate that they are aggressive and recur soon after resection. There is no consensus on how extensively spinal AMs should be resected and moreover, whether adjuvant radiation therapy is required for local tumor control. This study reports outcomes after resection of AMs in 17 patients.

Methods

Data from all patients who presented with spinal AMs to two tertiary referral centers between 1998 and 2013 were obtained by chart review. Histological slides of resected tumors were re-reviewed according to 2007 WHO Classification criteria by one neuropathologist (C.C.) with a grade II designation reserved for tumors with one of: 1) 4-to-19 mitoses per 10 high power fields (HPF); 2) at least three of the following five atypical features: spontaneous necrosis, macronucleoli, loss of architecture, hypercellularity, and small cell change; 3) spinal cord invasion; or 4)

Results

From 102 patients with spinal meningioma, 20 AM tumors [7 cervical, 12 thoracic, 1 lumbar] were identified in 17 patients [median age 42 (range, 19-75) at time of resection, 18% male, median follow-up 34 months (range, 1-171) following resection]. 12 (60%) tumors had 4 or more mitoses per 10 HPF [mean 4.6 (range, 4-6)], 7 (35%) tumors had three or more atypical features, 4 (20%) had predominantly clear cell or chordoid features, and 1 (5%) had cord invasion. Simpson grade I, II, III, and IV resection were achieved in 4 (20%), 14 (70%), 1 (5%), and 1 (5%) tumors, respectively. One patient that underwent grade II resection received adjuvant radiation therapy. After grade I, II, and III resection, zero tumors recurred. After grade IV resection, one tumor recurred (100%). In all but four patients, data regarding postoperative functional status were available. Before resection, 13 (65%), 11 (55%), 11 (55%), 8 (40%), 5 (25%), and 4 (20%) tumors caused sensory deficits, pain, weakness, gait ataxia, upper motor neuron signs, and incontinence, respectively. One tumor presented asymptomatically. Postoperatively (median time 3.6 months [range, 1-13 months] after resection), 0 (0%), 6 (38%), 2 (13%), 1 (6%), 0 (0%), and 0 (0%) tumors caused sensory deficits, pain, weakness, gait ataxia, upper motor neuron signs, and incontinence, respectively. In all patients with post-operative follow-up data, functional status

Conclusions

Despite published cases suggesting an aggressive clinical course for spinal AMs, this series of spinal atypical meningiomas indicates that Simpson grade II resection without adjuvant radiation therapy can result in rapid symptom resolution and low recurrence.

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