Long-term clinical outcomes of excisional surgeries for low-grade malignant spinal tumors

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INTRODUCTION:
Low-grade malignant spinal tumors, such as chondrosarcoma, are expected to have a relatively better prognosis but are generally resistant to conventional radiotherapy and chemotherapy. Therefore, excisional surgery plays an important role in achieving long-term local tumor control and maintaining the quality of life. However, factors concerning local recurrence (LR) after excisional surgery for low-grade malignant spinal tumors remain poorly defined.
METHODS:
Twenty-nine patients undergoing excisional surgery for low-grade malignant spinal tumors (chondrosarcoma, leiomyosarcoma and chordoma) at our institution between 1993 and 2019 who were followed for at least 1 year were retrospectively reviewed. We investigated the association between the development of LR and the following clinical factors: histologic diagnosis (chondrosarcoma, leiomyosarcoma or chordoma), tumor type (primary or metastatic tumor), tumor location (cervical, thoracic or lumbar spine), surgery status (primary or secondary surgery) and surgical procedure (total piecemeal, intralesional en bloc or marginal en bloc excision). Potential factors related to the development of LR were evaluated using the Kaplan–Meier analysis and the log-rank test, with $p<0.05$ considered statistically significant.
RESULTS:
The case series consisted of 15 men and 14 women with a mean age of 49.2 years (range of 7-66 years). The mean follow-up was 77.8 months (range of 13–307 months). The histological diagnosis included 10 chondrosarcomas, 11 leiomyosarcomas and 8 chordomas. Thirteen cases were primary tumors, and 16 cases were metastatic tumors. The overall LR rate was 24.1% (7/29), and the mean time to first LR after surgery was 34.5 months.
The LR rates for tumors in the cervical, thoracic and lumbar spine were 100% (3/3), 11.1% (2/18) and 25.0% (2/8), respectively, and the cervical spinal tumor was significantly associated with the development of LR ($p=0.006$). The LR rates for the primary and secondary surgery were 16.0% (4/25) and 75.0% (3/4), respectively, and the secondary surgery for tumor recurrence after the primary excisional surgery in another hospital was significantly associated with the development of LR ($p=0.02$). The LR rates for cases undergoing total piecemeal, intralesional en bloc and marginal en bloc excision were 75.0% (3/4), 30.0% (3/10) and 6.7% (1/15), respectively, and total piecemeal excision was significantly associated with the development of LR ($p=0.001$). Concerning histologic diagnosis and tumor type, there was no statistical association with the development of LR.
In 6 of the 10 cases undergoing intralesional en bloc excision, the intralesional procedure was performed near the spinal cord, nerve root and/or vertebral artery, where the LR rate was 50.0% (3/6). In the other 4 cases, the intralesional procedure was performed in pediculotomy of total en bloc spondylectomy (TES), where the LR rate was 0% (0/4).
DISCUSSION AND CONCLUSION:
Evaluation of the long-term clinical outcomes referred to 29 patients undergoing excisional surgery for low-grade malignant spinal tumor indicated that cervical spinal tumor, secondary surgery and total piecemeal excision were significantly associated with the development of LR. No patients who underwent TES with intralesional pediculotomy had a recurrence, suggesting that intralesional pediculotomy may be an acceptable procedure in excisional surgery for low-grade malignant spinal tumors.