Sclerotherapy for Aggressive Vertebral Hemangioma with Severe Bone Destruction: A 5-Year Analysis

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Keywords:
aggressive vertebral hemangioma, sclerotherapy, ethanolamine oleate

Spine Surg Relat Res 2024; 8(5): 548-551
dx.doi.org/10.22603/ssrr.2024-0023

Vertebral hemangiomas rarely extend into the spinal canal and cause neurological symptoms. Herein, a case of an aggressive vertebral hemangioma with severe bone destruction undergoing sclerotherapy with monoethanolamine oleate (EO) is described.

A 62-year-old patient with low back pain was referred to our hospital. Magnetic resonance imaging (MRI) revealed neoplastic lesions in the L2 vertebra and L1 spinous process (Fig. 1A, 1B), and the tumor slightly protruded into the left spinal canal at the L2 pedicle level (Fig. 1C). Other tests, including blood tests, did not provide a definitive diagnosis. We conducted an open biopsy of the L1 spinous process; the pathological diagnosis was cavernous hemangioma. Three months after the first visit, patient developed left thigh pain. MRI revealed that the tumor size had increased, and the bone cortex inside the left pedicle of L2 had disappeared, further protruding into the spinal canal (Fig. 1D, 1E). Radiologists used interventional radiology to perform embolization L2 hoping for tumor shrinkage. Next, we performed posterior fusion (T12-L4) for reconstruction. Embolization could only be conducted on approximately 1/4 of the anterior vertebral body. After the operation, patient's lower back and thigh pain disappeared. However, the tumor grew over time and most of the bone tissue of the L2 vertebra disappeared upon observation 8 months after surgery (Fig. 2A-2C). Although anterior curettage and reconstruction were considered, the bleeding risk was high; thus, surgical treatment was ruled out. Considerably, sclerotherapy was selected and approved by the Ethics Review Committee. In total, 1 g (1 vial) of EO was mixed with 10 mL Iopamilon to make 5% EO. A total of 31 mL of 5% EO with Iopamilon was injected into the tumor of the L2 vertebra under computed tomography (CT) guidance, and sclerotherapy was performed by radiologists (Fig. 3A, 3B). Haptoglobin was used to prevent renal damage associated with hemolysis caused by EO. After sclerotherapy, patient experienced no complications. Five years posttreatment, no low back or thigh pain occurred. The hemangioma shrank (Fig. 4A, 4B), and the vertebral bone tissue was gradually repaired (Fig. 4C, 4D).

Vertebral hemangioma, which extends into the spinal canal, is an aggressive hemangioma[1)] and requires treatment. Various methods have been reported for their treatment[2-4)]. In this study, embolization did not adequately control tumor bleeding. The ethanol injection was not an option because of the risk of spinal leakage. Although radiation therapy has been used to treat pain, its use as the sole treatment for patients with neurological deficits is debatable[4)]. Surgery was risky because of the potential difficulties in controlling hemostasis; thus, sclerotherapy was chosen. Sclerotherapy is used to treat esophagogastric varices, and the sclerosing agent is injected into and around the varicose vein to crush the vessel. Another report described the use of sclerotherapy for venous malformations of the face, trunk, and lower extremities[5)]. However, there are few reports of sclerotherapy being used for vertebral hemangiomas[6-8)].

A percutaneous technique for sclerotherapy of vertebral hemangioma was reported by Gabal AM[6)], in which five patients were safely treated with CT-guided sclerotherapy and exhibited good results. He reported that the vertebrae re-

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Received: January 30, 2024, Accepted: March 20, 2024, Advance Publication: May 10, 2024

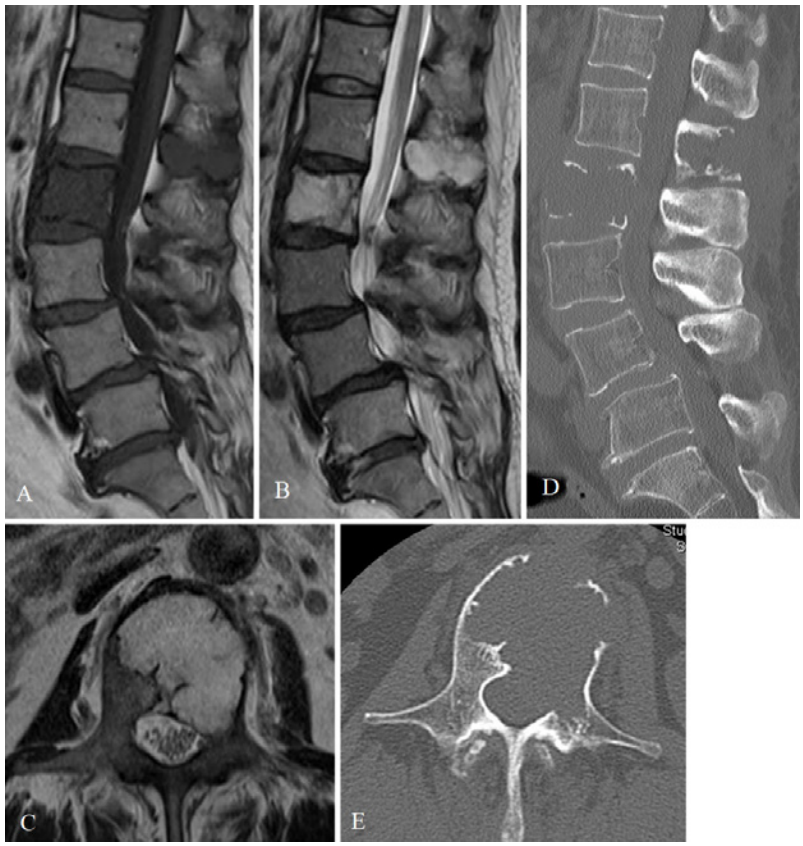

Figure 1. Magnetic resonance imaging and computed tomography images at the initial examination (A, B) and 3 months after the initial visit (C, D); A. low-signal T1-weighted image (WI); B. high-signal T2-WI of the tumor at the L2 vertebra in the mid-sagittal section; C. axial T2-WI showing that the tumor partially intrudes into the spinal canal at the pedicle view of L2; D. most of the L2 vertebrae showed bony destruction; E. bony cortex of the medical margin of the pedicle was lost.

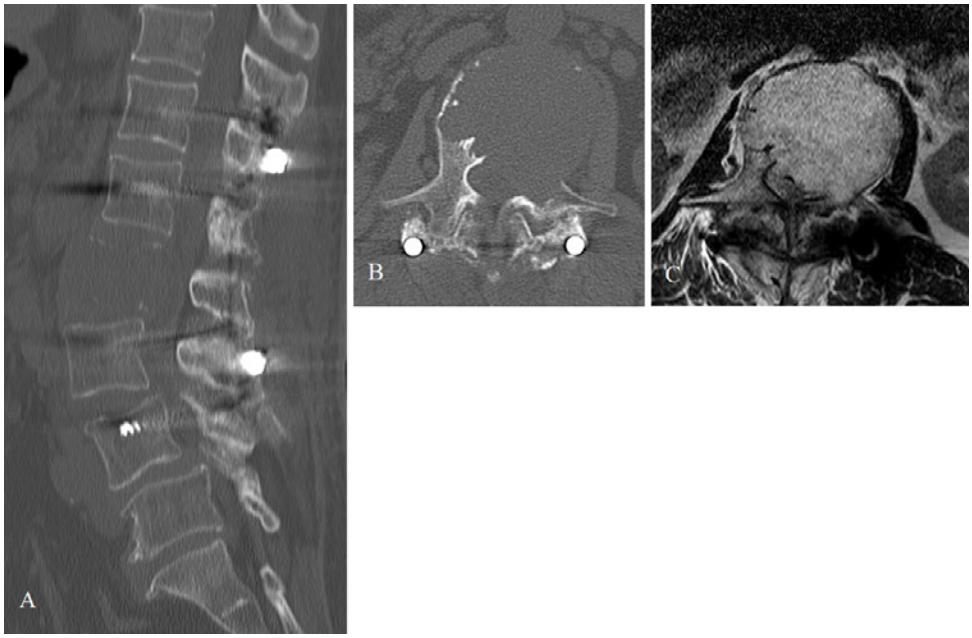

Figure 2. Computed tomography and magnetic resonance imaging 8 months postoperatively; A. bone destruction of the L2 vertebra progressed. B. Most bone cortex of the posterior wall was lost. C. Axial T2-weighted image revealing that the tumor was further enlarged and extended into the spinal canal.

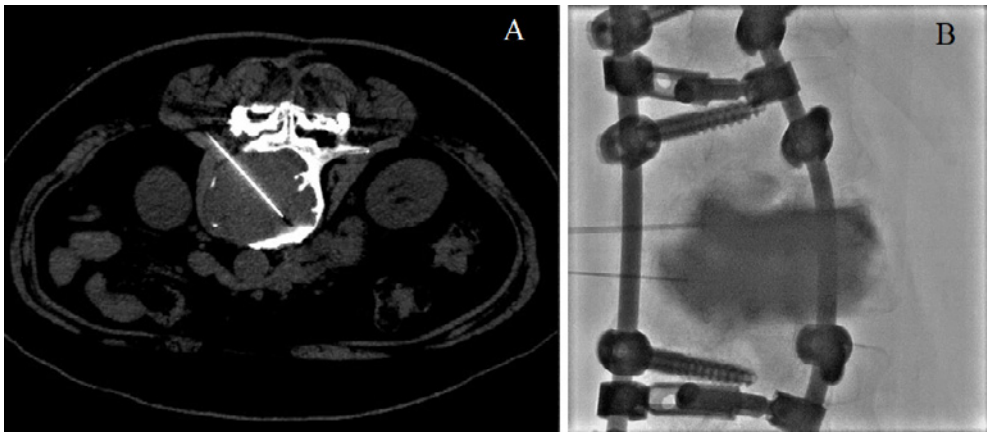

Figure 3. Images during computed tomography (CT)-guided sclerotherapy; A. CT showing needle insertion into the L2 vertebra; B. fluoroscopic images revealing the hardening agent being injected while checking darkened areas with contrast agent into the hemangioma within the L2 vertebra.

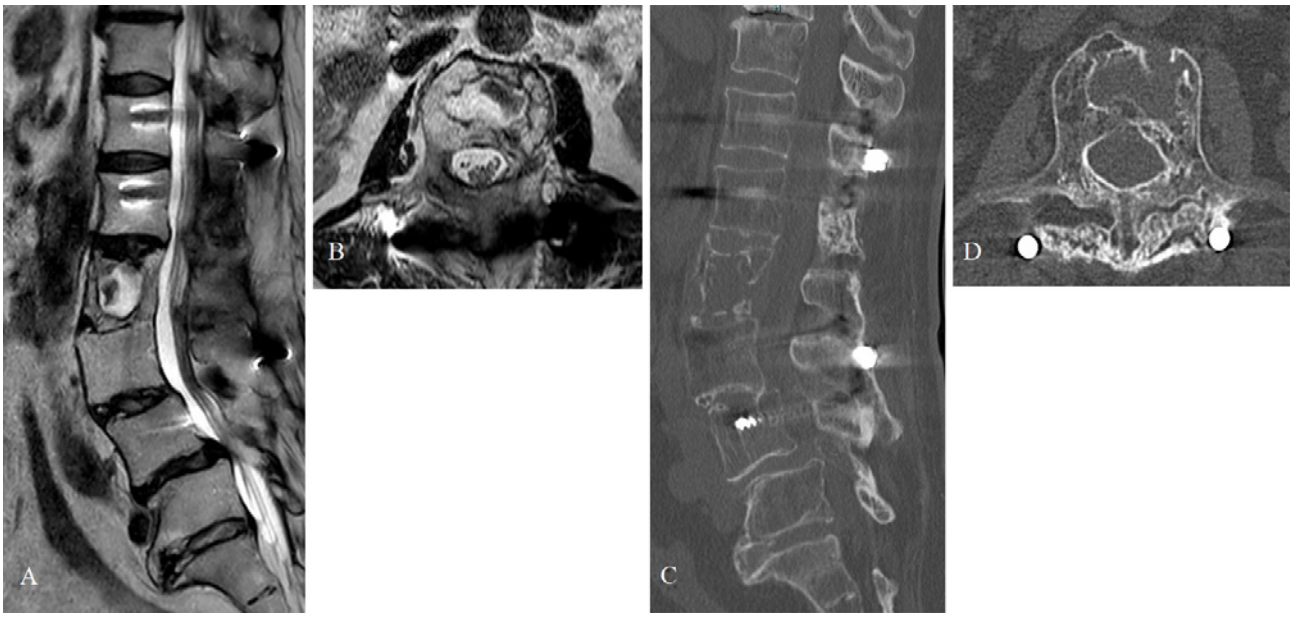

Figure 4. Magnetic resonance imaging and computed tomography (CT) images 5 years after sclerotherapy; A. T2-weighted images showing tumor has shrunk. B. Tumor extending into the spinal canal disappeared. C. CT images showing bone formation from the perivertebral body; D. bone formation seen from the posterior wall to the left side of the pedicle.

gained their normal outline but did not exhibit a high degree of bone destruction. In our case, although the vertebral body was highly destructive, it was repaired by osteogenesis from the surrounding vertebral body. Therefore, this method is expected to result in long-term vertebral osteogenesis and consequent stabilization of the vertebral body. This treatment is minimally invasive and has the potential to safely reduce hemangiomas, even in cases of severe bone destruction.

Conflicts of Interest: The authors declare that there are no relevant conflicts of interest.

Sources of Funding: None

Acknowledgement: We are grateful to radiologists and radiology technologists at the Department of Radiology, Tottori University of Faculty of Medicine. The authors would like to thank Spine Surgery and Related Research Editorial office for the English language review.

Author Contributions: C Takeda conceptualized, collected, and interpreted the clinical data and wrote the manuscript. S Tanishima interpreted the clinical data and critically revised the manuscript for essential content. M Yoshida, T Mihara, K Yamaga, and Y Ohuchi helped in treating the case and confirming the content. S Tanishima and H Nagashima critically revised the manuscript. All authors have and approved the final manuscript.

Ethical Approval: This report was approved by the institutional review board of Tottori University(22J006).

Informed Consent: Informed consent for publication was obtained by all participants in this study.

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