Balloon kyphoplasty for painful C-7 vertebral hemangioma

Case report

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✓The authors report on the efficacy of balloon kyphoplasty applied to obliteration of symptomatic cervical hemangioma. This 49-year-old woman suffered from progressive neck pain, numbness of the upper extremities, and frequent headaches. Hemangioma of the C-7 vertebral body was diagnosed. Kyphoplasty was performed successfully through a right anterolateral approach. The patient became asymptomatic, and follow-up examinations confirmed complete recovery. To the authors’ knowledge, this is the first description of cervical hemangioma treated by balloon kyphoplasty. (DOI: 10.3171/SPI/2008/8/5/458)

KEY WORDS • cervical spine • kyphoplasty • vertebral hemangioma

Intralesional injection of acrylic cement is widely used for the treatment of painful VHs.¹,³,⁵,⁶,⁹ The percutaneous vertebroplasty was first described as the method of minimally invasive intralesional cement injection.³,⁵,⁹ Recently some authors have described the use of balloon kyphoplasty for managing painful VHs.⁹ We applied the balloon kyphoplasty technique for percutaneous injection of acrylic cement for a painful cervical VH.

Case Report

History and Examination. This 49-year-old woman with no significant medical or surgical history had been suffering from recurrent neck pain for several years. She was referred to the neurosurgery department with a 1-year history of persistent severe neck pain, upper-extremity numbness, and frequent headaches. Neck pain was increased by head motion. Treatment with pain medication failed to improve the situation. Her social and professional activities as a university professor were considerably limited. On neurological examination the patient demonstrated pain provoked by palpation of the spinous process at C-7. She scored her perception of pain as an 8 on a visual analog scale.¹⁰ The rest of the neurological examination revealed normal findings.

Plain radiographs (Fig. 1) showed typical coarse vertical striations attributed to VH that were present in the C-7 VB. Magnetic resonance imaging showed a high-signal lesion of the C-7 VB on both T1- and T2-weighted images (Fig. 2). There was no epidural extension of hemangioma. No degenerative change was observed in the examined spine (from C-1 to T-5). Computed tomography showed thickened trabeculae inside the C-7 VB as well as cortical bone discontinuity of its posterior wall.

The patient insisted on treatment leading to recovery but refused surgical treatment, and different therapeutic possibilities were discussed. Without the patient’s consent, and with absence of neurological deficit or canal compromise, open surgery was ruled out. Radiotherapy was not indicated because of the proximity of the thyroid and risk of radio-induced complications. Taking into account the severity of pain and absence of penetration of the hemangioma into the canal, minimally invasive intralesional injection of acrylic cement was advised. The main challenge in this case was the discontinuity of the posterior wall of the VB. We found that kyphoplasty can be safely performed through an anterolateral approach, offering minimal risk of cement extrusion into the spinal canal.

Abbreviations used in this paper: VB = vertebral body; VH = vertebral hemangioma.
Painful C-7 vertebral hemangioma treated by balloon kyphoplasty

Treatment. The procedure was performed under fluoroscopic control. The patient was placed supine and sedated. At the C-7 level a skin stab incision was made on the anterior edge of the right sternocleidomastoid muscle. Through an anterolateral approach a KyphX Osteo Introducer cannula (Kyphon, Inc.) was inserted into the VB at a depth of 2–3 mm. Moderate bleeding through the cannula was observed. A biopsy was not performed to avoid possible hemorrhage. The kyphoplasty balloon was inserted in the center of the VB (Fig. 3). The balloon was inflated to destroy thickened bone trabeculae. After removal of the balloon, the hemangioma was filled with 1.5 ml of high-viscosity KyphX HV-R bone cement. Computed tomography scans obtained after the procedure showed cement in the majority of the VB (Fig. 4). Minimal cement leakage was present in the left epidural vein but did not produce any symptoms.

Fig. 1. Left: Plain cervical radiograph (lateral view) showing the C-7 VB hemangioma with vertical striations. Right: A computed tomography scan showing the honeycomb appearance of the C-7 VB with disrupted cortical bone of the posterior wall (arrows).

Fig. 2. Sagittal T1- (left) and T2- (right) weighted magnetic resonance images of the cervical spine showing the C-7 VB hemangioma.
Posttreatment Course. On the following day the patient declared disappearance of pain and returned home. She was able to return to a normal social and professional life. After 13 months of follow-up the patient remains asymptomatic.

Discussion

Vertebral hemangiomas are benign vascular lesions, that occur in 10–12% of the population and predominate in women.\textsuperscript{7,8} The majority of VHs are located in the thoracic and lumbar spine.\textsuperscript{8,11} Cervical vertebrae are rarely involved.\textsuperscript{4,6,11} The data from autopsies have shown a 5.5% rate of a cervical location.\textsuperscript{4,8} Fox and Onofrio\textsuperscript{7} reported 4 (5.7%) cervical locations among 70 VHs in 59 patients. Laredo at al.\textsuperscript{11} found 4 (6.9%) cervical VHs in a series of 58 patients. In a literature review, Chi et al.\textsuperscript{2} found a cervical location in only 1 of 23 women who had pregnancy-related VHs.

Laredo et al.\textsuperscript{11} distinguished the following 3 categories of VHs: asymptomatic, compressive, and symptomatic. The majority of VHs are asymptomatic, incidental findings.\textsuperscript{1,3,7,9,11} Compressive VHs are associated with signs of compression of the spinal cord or cauda equina.\textsuperscript{11} Compression may be provoked by the following factors: extension of the hemangioma, expansion or pathological fracture of affected vertebra, or hemorrhage within the spinal canal.\textsuperscript{1,4,7-9,11} Symptomatic VHs are responsible for back pain as a leading symptom.\textsuperscript{11} Asymptomatic pathological collapse of affected vertebra was also reported.\textsuperscript{4} For management of
symptomatic or compressive VHs the following different treatment modalities are used: radiation therapy, surgery (decompression, corpectomy, vertebrectomy, and spinal instrumentation), transarterial embolization, intralungal cement injection (vertebroplasty and kyphoplasty), and intralungal ethanol injection.\textsuperscript{1,3–9} In 1987 Galibert and colleagues reported successful cement injection (methylmethacrylate) for management of VH.\textsuperscript{1,3} Since then this technique (vertebroplasty) has become popular for management of VHs because of immediate pain resolution, mechanical reinforcement of vertebra and long-term recovery.\textsuperscript{1,1} For access to lesions located in the lower cervical spine (C4–7), an anterolateral approach is recommended.\textsuperscript{3–6} Vertebroplasty carries the risk of intra–spinal canal cement leak with possible compression of the spinal cord.\textsuperscript{1} A cervical anterolateral approach may be complicated by retrograde cement leak through a needle canal to the anterior paravertebral tissues and can be responsible for transitory dysphagia.\textsuperscript{1} Another percutaneous modality, balloon kyphoplasty, has been previously used to treat thoracic, lumbar, and sacral VHs.\textsuperscript{9} In this technique the surgeon uses a balloon to create a void inside the VB. Low-pressure administration of high-viscosity acrylic cement into the void diminishes the risk of extra–vertebral extrusion. The percutaneous kyphoplasty through an anterolateral approach in the lower cervical region was dangerous and carried the risk of an intra–spinal canal cement leak, but kyphoplasty seemed to be less dangerous than vertebroplasty. The ratio of cement leak within the spinal canal in patients with symptomatic VH treated by balloon kyphoplasty was significantly lower compared with vertebroplasty.\textsuperscript{9} We used balloon kyphoplasty to avoid risk of leakage of cement within the spinal canal at the C-7 level and to control application. We decided to take an anterolateral approach, which was successfully used by some authors for percutaneous vertebroplasty in the lower cervical region.\textsuperscript{3,4} A posterior transpedicular approach was ruled out because the diameter of cannula for the balloon (KyphX Osteo Introducer) was comparable to the diameter of the C-7 pedicle. Transpedicular introduction of such a large tool could have resulted in a fracture of the pedicle. To our knowledge, the management of cervical VH by balloon kyphoplasty has never been described.

Disclaimer

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References


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