

Life-threatening paraspinal muscle hematoma after percutaneous vertebroplasty

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ABSTRACT

Bleeding and hematoma formation is rarely reported in percutaneous vertebroplasty procedure. An 84 year old male presented with a large paraspinal muscle hematoma after a percutaneous vertebroplasty. The patient had neither any prior bleeding disorder nor any anticoagulant treatment. Vital signs of the patient were unstable, and his hemoglobin level decreased daily. After a month of conservative treatment, including transfusion, cryotherapy, pain control and bed rest, his hemoglobin level remained stable and he showed relief from pain. Four months later, hematoma resolved spontaneously and he could walk without back pain.

Key words: Hematoma, paraspinal muscle, percutaneous vertebroplasty, anaemia

MeSH terms: Bone cements, spinal column, hematoma, vertebroplasty

INTRODUCTION

Percutaneous vertebroplasty is performed as an alternative treatment in patients with vertebral compression fractures who fail conservative treatments. Although vertebroplasty is performed safely under fluoroscopic guidance, the procedure carries an inherent risk of substantial harm due to its percutaneous nature. Complications include cement leakage, pulmonary emboli, hematoma, infection and adjacent fracture. Hematoma, which is categorized as subdural, epidural, psoas muscle and soft tissue hematomas is a rare complication, especially without a coagulopathy or anticoagulation therapy. There has been no report of a paraspinal muscle hematoma. Here, we report a case of a large paraspinal muscle hematoma, which caused life-threatening anemia.

CASE REPORT

An 84-year-old male, who had undergone a percutaneous vertebroplasty for a compression fracture of the first lumbar

vertebra, was brought to our emergency department from a primary-care hospital. Reasons for the transfer were a growing mass in his left flank and progression of anemia. His comorbidities included hypertension and end-stage renal disease with associated anemia, and he was on regular hemodialysis. The patient had neither prior bleeding disorder nor any anticoagulant treatment. His blood pressure was 94/52 mmHg. His pulse rate was 100/min. He was not febrile.

Two days before admission to our institute, he visited an orthopedic clinic with a history of severe pain in the lower back, which started after a slip. He underwent radiological examinations, including computed tomography (CT) and magnetic resonance imaging (MRI). Radiographs revealed a compression fracture at the first lumbar vertebra [Figure 1]. Due to severe pain, the patient underwent percutaneous vertebroplasty that was performed via the left pedicle of L1 using polymethyl methacrylate with fluoroscopy under local anesthesia, and there was no complications during the procedure. The backache improved immediately following the procedure and the patient was able to walk independently. On the next day, he complained of left flank pain and tenderness around the injection site. Swelling developed in the left lower back. The hemoglobin level decreased to 4.3 mg/dL in comparison with the initial level of 7.5 mg/dL. Contrast enhanced CT scan revealed a left paraspinal muscle hematoma [Figure 2].

On admission to our emergency department, the patient presented with a large unilateral back mass, which was firm, combined with severe tenderness. There was no neurological deficit on examination. Followup MRI

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showed an extensive focus of complex signal intensity in the left paraspinal muscle, suggesting a paraspinal muscle hematoma [Figure 2]. His coagulation profile, including platelet count, prothrombin time and partial thromboplastin time was within the normal range. Thus, angiographic intervention was performed to find and coagulate a bleeding vessel. However, the bleeding focus could not be isolated and there was no pseudoaneurysm [Figure 3]. His initial creatine kinase level was increased to 251 IU/L. After fluid resuscitation and 4 transfusions, vital signs were stable and the hemoglobin level increased to 6.5 mg/dL. On the next day, the hematoma continued to increase, with further progression of back pain. He received conservative treatment, including intermittent compression cryotherapy and pain control and was advised bed rest. After the patient received 10,000 unit of epokine twice a week and 11 transfusions, totally almost 4.4 L of blood in 2 weeks, the hemoglobin level maintained more than 7 mg/dL. After a month of conservative treatment and epokine injection, the patient showed relief from pain and his hemoglobin level

maintained more than 10 mg/dL. Subsequently, the flank mass began to decrease in size. Four months later, the flank mass was completely resolved at the followup CT image [Figure 4], and he could walk without back pain.

DISCUSSION

Vertebroplasty has gained popularity worldwide as an effective and safe minimally invasive treatment for back-pain due to osteoporotic vertebral collapses not responding to conservative medical therapy.¹ The overall complication rate of percutaneous vertebroplasty has been reported to be <1%.² Although rare, vascular injuries and hematomas after the percutaneous vertebroplasty procedure have been reported. There are a few case reports of subdural hematoma,³ epidural hematoma⁴ and hematoma in the psoas muscle.⁵

The mechanism underlying this rare complication remains unclear, we assume that the development of the hematoma can be explained by injury of rich vascular supply to the paraspinal muscle and the facet. Biafora *et al.*⁵ have reported a case of injury to a segmental branch of the L4 lumbar artery following kyphoplasty and noted the rich vascular supply to the paraspinal muscle and the facet. Four pairs of lumbar arteries occur from the aorta, and pass posteriorly around the vertebral body. The interarticular arteries divide from the lumbar artery at the intervertebral foramen and passes backwards, in contact with the outer surface of the laminae, crossing each pars interarticularis. The interarticular arteries pass medially toward the spinous process, giving off vertical branches, which ascend and descend in the substance of the paraspinal muscles [Figure 5].⁵⁻⁷ We assume that these small arteries may have been ruptured during the procedure. Due to small diameter and minimal bleeding rate, the initial angiography may have failed to demonstrate the bleeding site.

Treatment of an intramuscular hematoma is usually conservative including rest, ice bag application, and

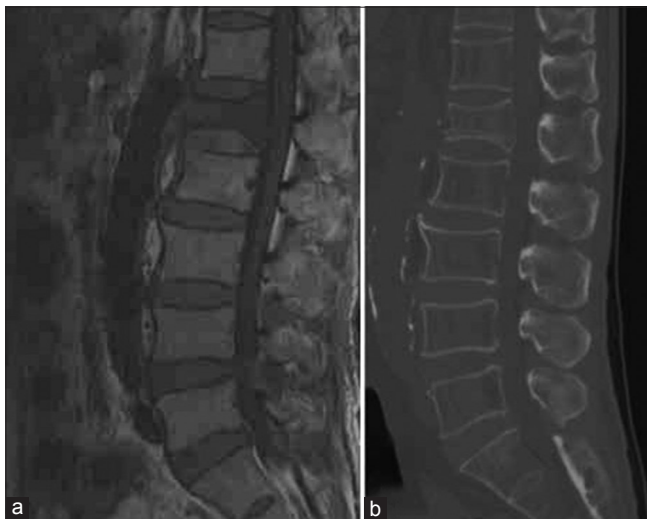


Figure 1: Preoperative T1 weighted sagittal magnetic resonance imaging (a) and sagittal computed tomography (b) showing a compression fracture at L1



Figure 2: Postvertebroplasty T1 weighted axial magnetic resonance imaging (a), T2 weighted axial magnetic resonance imaging (b), and contrast enhanced CT axial image (c) at L1 showing the paraspinal muscle hematoma. Less enhanced space occupying lesion in the left paraspinal muscle, comparing with aorta, suggesting the hematoma rather than pseudoaneurysm



Figure 3: Lumbar aortogram showing no active bleeding vessel and pseudoaneurysm

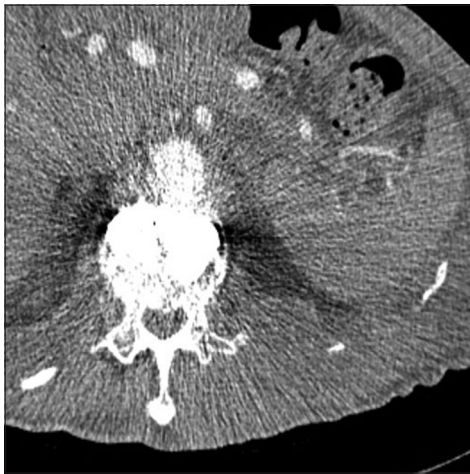


Figure 4: Followup CT scan axial cut showing the resolving hematoma

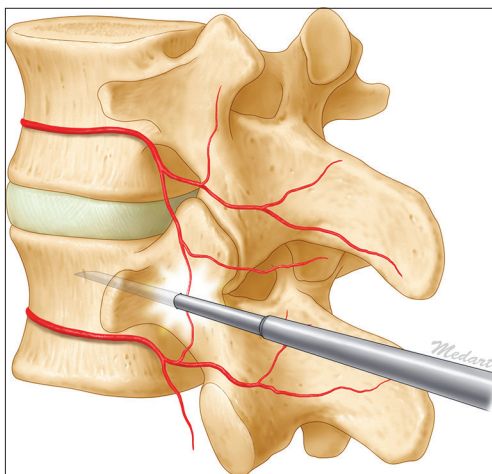


Figure 5: Schematic diagram showing a vascular anatomy around the facet joint and the paraspinal muscle

compression.⁸ Rest prevents further formation of a large gap within the muscle as well as reducing the size of the hematoma and, subsequently, the size of the connective

tissue scar. Compression reduces the intramuscular blood flow to the injured area.⁸ Holscher *et al.*⁹ introduced percutaneous drainage as an alternative treatment when a liquefied hematoma was confirmed on the radiological evaluation. However, we did not perform percutaneous drainage because the hematoma was solid and organized and due to poor general condition of the patient there was a possibility of infection. Further, there are certain highly specific indications in which surgical decompression might actually be beneficial, such as large intramuscular hematoma and acute compartment syndrome.^{8,10} Although we didn't measure the pressure of the compartment within paraspinal muscle, there was no sign or symptom suggesting compartment syndrome, and creatine kinase level was not increased enough to suggest acute compartment syndrome. Further, there was a case report of treating even the acute compartment syndrome successfully with conservative method.¹¹ Thus, we treated the patient conservatively.

CONCLUSION

We report a paraspinal muscle hematoma as a rare complication of percutaneous vertebroplasty. The suggested pathomechanism was the rich vascular supply to the paraspinal muscle and the facet joint which may have been injured during the procedure. Further, although paraspinal muscle hematoma is usually cured with the conservative treatment, when it is large enough to cause an acute compartment syndrome, percutaneous drainage or surgical decompression must be considered.

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