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Case Report

Transdiscal Cement Leakage During Vertebroplasty

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Abstract

Bone cement leakage is a major cause of surgical complications during percutaneous vertebroplasty. A 78-year-old woman experienced transdiscal cement leakage during vertebroplasty for painful compression fractures of thoracic vertebrae 9 and 10 (T9 and T10). During surgery, bone cement leaked from T9 to T10, passing through the right anterior intervertebral disc space. We have had no prior experience with this complication and, to our knowledge, there are no similar cases in the literature. Nevertheless, the patient's back pain was relieved to a considerable degree. Related imaging findings and possible reasons for leakage are discussed. (*Tzu Chi Med J* 2009;21(4):339–341)

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1. Introduction

Vertebroplasty is an effective treatment for osteoporotic vertebral compression fractures with generally a very high success rate and relatively few complications (1–6). Most sequelae are caused by bone cement leakage. Leaks have been reported in the spinal cavity, the intervertebral foramen, the vertebral vein, and the inferior vena cava, and can cause local or serious systemic complications, or even death (7–13). Transdiscal leakage of bone cement from one vertebra to another has not been reported. In our case, postoperative magnetic resonance imaging (MRI) showed that bone cement had leaked into the space below the anterior longitudinal ligament and the adjacent vertebral body. Trauma was the most likely cause for the channel formation.

2. Case report

A 78-year-old woman came to our outpatient department because of lower back and abdominal pain. The patient reported falling 1 month previously, resulting in serious lower back pain. She visited a local clinic after the injury and tried traditional Chinese medicine. She took analgesics intermittently, but could not alleviate the pain. Finally, she was unable to walk and had to use a wheelchair. Physical examination showed that the patient was alert and had no fever, had normal muscle strength in the lower limbs, and had no abnormal tendon reflexes. The straight leg raising test showed that activity of the feet was slightly limited to approximately 80° in both lower limbs. Blood and urine tests were normal. The patient had no surgical history or history of heart disease or diabetes. Her blood pressure was slightly elevated.

Plain radiographs taken in the outpatient department showed degenerative changes in the thoracolumbar spine and a compression fracture of thoracic vertebra 10 (T10) (Fig. 1). MRI showed T9 and T10 vertebrae fractures with poor healing (Fig. 2).

The patient received a vertebroplasty the day after admission. Surgery was performed in the angiography room with the patient in the prone position. After

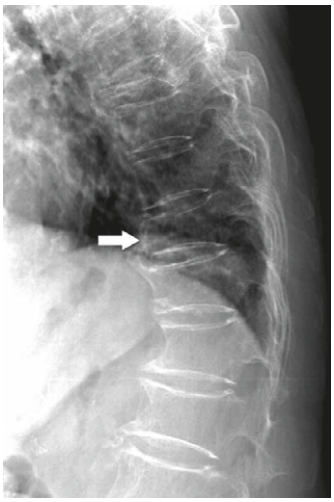

Fig. 1 — Lateral plain radiography of the thoracolumbar spine shows degenerative changes and a T10 compression fracture (arrow) with mild kyphotic changes. Relatively mild, chronic compression fractures at the T11 and T12 vertebrae can also be observed.

Fig. 2 — Sagittal T1-weighted magnetic resonance imaging (TR/TE: 600/8.5) of the thoracic spine shows T9 and T10 vertebrae compression fractures with poor healing and possible dead bone or air collection (arrow). A flat T7 vertebra due to an old fracture is also noted.

disinfecting the skin and draping the patient, two No. 13 needles (Gallini, Mirandola, Italy) were inserted into the vertebral bodies via the right pedicle of T9 and the left pedicle of T10 under fluoroscopic guidance. A small amount of contrast medium was then injected and a cavity was found in the vertebral body of T10. The contrast medium did not flow into the spinal cavity or veins. We injected bone cement composed of polymethylmethacrylate (Howmedica, Limerick, Ireland) and barium powder (E-Z-EM Inc., Lake Success, NY, USA) through the needle. During surgery, the bone cement leaked from the right anterior area of T9 to T10 (Fig. 3). Fluoroscopy showed

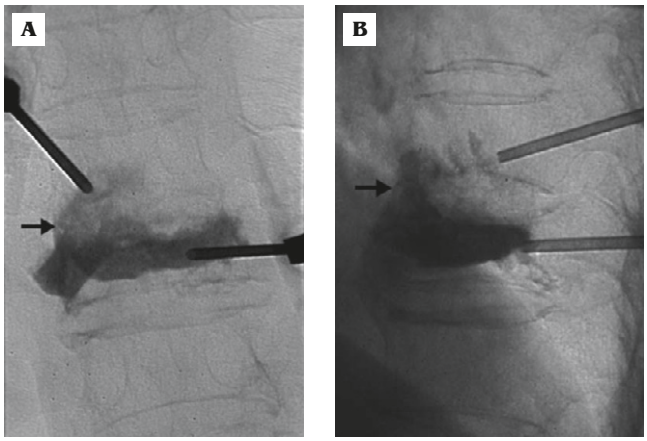

Fig. 3 — Fluoroscopic images during surgery in the (A) prone and (B) lateral projections show the puncture needles, injected cement and leakage site (arrows).

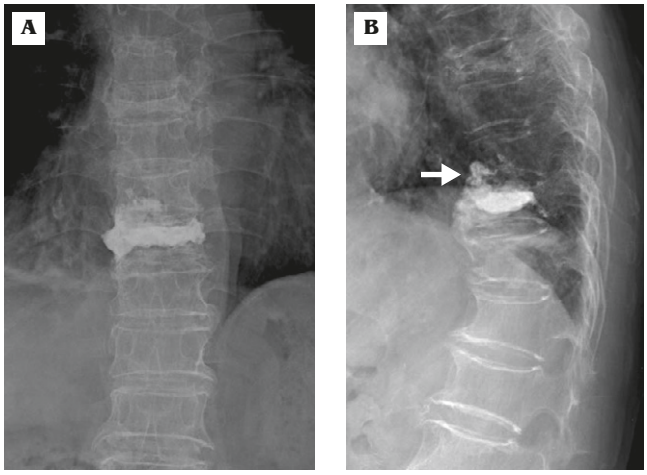

Fig. 4 — (A) Anteroposterior and (B) lateral plain radiography of the thoracolumbar spine taken in an outpatient follow-up show the injected cement in the T10 and T11 vertebrae with the cement joined in the right anterior area (arrow).

that the bone cement did not leak into the spinal cavity or surrounding veins. We injected 4.3 mL bone cement into T10 and injected 2.5 mL bone cement into T9 until the cavity was filled. The patient could walk with the help of a walker the day after surgery. Abdominal and back pain was alleviated 3 days after surgery. The patient was discharged 4 days after surgery and was followed-up in the outpatient department (Figs. 4 and 5).

3. Discussion

Percutaneous vertebroplasty is now a commonly performed, minimally invasive surgical treatment of small wounds that allows a rapid recovery. It is mainly used for treatment of compression fractures caused

Fig. 5 — Sagittal T1-weighted magnetic resonance imaging (TR/TE: 400/8.5) shows dark cement in the T9 and T10 vertebral bodies, connected in the right anterior area (arrow).

by osteoporosis (2–6). Complications that have been reported are mostly related to bone cement leakage (7–13). Leakage of bone cement into the intervertebral disc has been reported, but we could find no reports of transdiscal leakage of bone cement from one vertebra to another. We report here an unusual transdiscal bone cement leakage in an older woman, but we could not confirm the reasons for the leakage. The most probable explanation is a bone fracture or crack formation caused by trauma, allowing the bone cement to leak from one vertebra to another vertebral body via the fracture (Fig. 3). The bone cement leaked from T9 to T10 via a space below the anterior longitudinal ligament, which was confirmed by postoperative plain radiography and MRI (Figs. 4 and 5). In this case, endplate destruction was noted, which could have been caused by trauma or spondylodiscitis. However, the patient was not febrile and the laboratory data showed no signs of infection. In addition, the signal intensity of the T9/10 intervertebral discs observed on MRI was normal. If there is any concern about infection, the procedure should be postponed, because complications can occur if cement is injected into an infected vertebral body.

The findings from this case indicate that in the event of intraoperative transdiscal bone cement leakage, surgery does not need to be stopped immediately, but the following three observations should be made. First, careful observation under fluoroscopy is required to determine whether the bone cement has leaked, which could result in complications in areas such as the spinal cavity, the surrounding veins, or the inferior vena cava. Second, the amount of bone cement injected needs to be equal to the volume of the injured vertebral body. Third, attention needs to be paid as to whether the pressure felt during bone cement injection increases abnormally. If any of the above conditions are noted, surgery needs to be stopped immediately. An effective therapeutic effect is achievable with good fluoroscopic equipment and experienced surgeons.

In summary, we encountered a case of extremely unusual transdiscal bone cement leakage in a 78-year-old woman. We have had no experience with this complication and could find no similar cases in the literature. Intraoperative observation and postoperative MRI confirmed that the bone cement leaked via the right anterior space below the anterior longitudinal ligament (Figs. 3 and 5). Good fluoroscopic equipment and experienced surgeons were the keys to the success of this surgery.

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