Percutaneous Vertebroplasty as a Treatment for Painful Osteoblastic Metastatic Spinal Lesions

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ABSTRACT

Percutaneous vertebroplasty (PVP) has been used widely to treat pain caused by osteolytic spinal lesions, whereas vertebroplasty for osteoblastic spinal lesions is less known. The purpose of this study is to describe PVP as a highly effective miniinvasive procedure to treat painful osteoblastic metastatic spinal lesions. Four patients with painful osteoblastic metastatic spinal lesions were treated by PVP in the authors' department, and immediately relief of pain was achieved in all of them. The findings from this study may encourage more studies of PVP in palliative treatment of patients with osteoblastic lesions.

ABBREVIATION

PVP = percutaneous vertebroplasty

Percutaneous vertebroplasty (PVP) was first described by Galibert et al (1) as a successful treatment for pain derived from symptomatic vertebral hemangioma in 1987. Since then, the procedure has been accepted widely and is now performed with increasing frequency for treatment of painful benign and malignant lesions of the spine (2–4). Although the clinical efficiency of PVP is encouraging in treatment of osteolytic spinal metastatic lesions, there have been very few reports on the role of PVP in the treatment of osteoblastic metastatic spinal lesions (4–6). Even less is known about the effectiveness of PVP in treating painful osteoblastic metastatic spinal lesions. Here we summarize our experience with the successful treatment of four patients with painful osteoblastic metastatic spinal lesions by PVP under fluoroscopic guidance.

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MATERIALS AND METHODS

Inclusion Criteria

The four patients had pathologically confirmed primary cancer lesions, and computed tomography (CT) scan found the presence of osteoblastic lesions in the painful area (**Figs 1, 2**); all four patients had CT and magnetic resonance imaging examination to rule out other chronic diseases that could cause lumbar back pain. The target vertebra was identified by the elicitation of pain by direct pressure or percussion. All the patients had severe pain caused by metastatic osteoblastic vertebral cancer, which lasted for at least 1 month and did not respond to conservative treatments, such as opioid analgesic and hormone therapy. The survival time of patients was longer than 3 months since the performance of PVP. PVP was offered to the patients only after a consensus was achieved among a team of surgeons, oncologists, and radiotherapists. Informed consent was provided in each case. This study was approved by our institutional review board.

PVP Treatment

The patient was placed in a prone position. Local anesthesia was administered using lidocaine. Vertebroplasty was performed under fluoroscopic guidance with a C-arm digitalized angiographic system (Angiostar; Siemens, Erlangen, Germany), which allows for anteroposterior and lateral views. A 13-gauge bone puncture needle (Cook Inc., Bloomington, Indiana) was slowly hammered into the first third of the anterior middle of the vertebral body through a

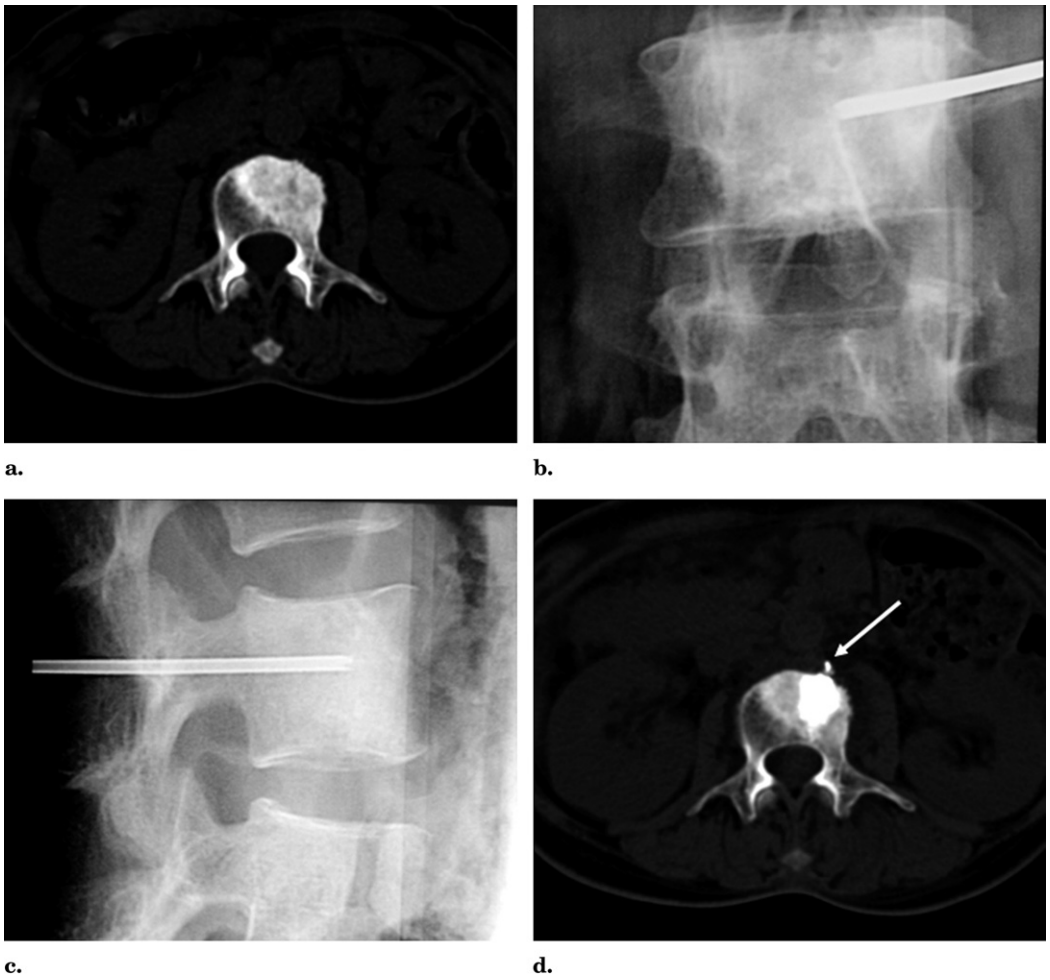

Figure 1. Image of pancreatic cancer patient with osteoblastic metastatic spinal lesions to L3 vertebral body. **(a)** Pre-PVP CT scan shows osteoblastic metastatic spinal lesions of L3 vertebral body. **(b,c)** Fluoroscopic images of the front and lateral view during PVP. **(d)** post-PVP CT scan shows bone cement depositing in the osteoblastic area. The white arrow indicates leakage of bone cement into the anterior vertebral vein.

unipedicular approach under fluoroscopic guidance. The fluoroscopy time used for puncture was recorded. Bone cement (Corinplast 3; Corin Inc, Gloucester, UK) was mixed with barium sulfate powder for opacification and then injected into the vertebral body through the puncture needle under constant lateral fluoroscopy. Injection was stopped if it became difficult because of high resistance or when the cement reached the posterior vertebral wall or entered an extraosseous space, such as the paravertebral vein. The amount of bone cement used for PVP was noted.

Pain Assessment and Complication after PVP

To assess the analgesic effect of PVP, the four patients had at least three follow-up assessments after operation: at 1 day, 1 month after PVP, and the last follow-up (within 14–24 weeks after PVP). Patients were asked to quantify their pain according to a verbal analgesic scale of 0–10, with 10 indicating the maximum pain before PVP and at follow-up (5). The PVP-associated complication was also observed in the four patients.

RESULTS

The demographic and clinical data of patients are listed in the **Table.** The mean score of pain on verbal analgesic scale was 8.5 ± 0.6 (range, 8–9) before treatment; the pain was relieved immediately after treatment in all four patients, with the mean pain score decreasing to 1.5 ± 0.6 (range, 1–2) 1 day after treatment, 1.8 ± 0.5 (range. 1–2) 1 month after treatment, and 1.8 ± 0.5 (range, 1–2) at the last follow-up, showing that PVP had a persistent pain-relieving effect. The mean fluoroscopy duration for puncturing the diseased vertebra was 10.6 ± 1.1 min (range, 9.0–11.6 min), and the mean amount of cement was 2.9 ± 0.5 mL (range, 2.2–3.5 mL). There were no PVP-related complications after operation except that one patient had asymptomatic leakage of bone cement into the anterior vertebral vein (**Fig 1**).