



## Case Report

# Combination Therapy of Conventional and Korean Medicine for Multiple Vertebral Compression Fractures Associated with Postpartum Osteoporosis: A Case Report



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## ABSTRACT

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Multiple vertebral compression fractures are a rare condition and are a serious consequence of postpartum osteoporosis. This report describes the case of a 35-year-old woman who had given birth to her first child 2 months before the onset of pain. Magnetic resonance imaging showed compression fractures of 7 vertebrae. The patient was treated with both conventional, and Korean medicine methods including acupuncture and herbal prescriptions. The patient's progress was assessed using self-reported symptoms, scale scores and laboratory test results. Her pain was gradually alleviated and biochemical inflammation marker levels improved, but her functional status remained severely impaired. Clinical practitioners who treat women in the postpartum period must be aware of osteoporosis and potential vertebral fractures and need to consider Korean medicine as an alternative therapy to help such patients.

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## Introduction

Postpartum osteoporosis is mostly described in association with multiple fractures of vertebral bodies. Since multiple vertebral fractures associated with postpartum osteoporosis are very rare, their incidence, etiology and mechanisms are not fully understood. Patients' symptoms include severe back pain, disability, and perceived changes in body shape such as decreased height [1]. Back pain usually starts spontaneously without a history of trauma, making it difficult to diagnose osteoporotic fractures at an early stage [2]. Multiple vertebral compression fractures associated with postpartum osteoporosis that have been treated with traditional Korean medicine have not previously been reported.

In this case study a female patient with multiple vertebral compression fractures associated with postpartum osteoporosis is described, and the result of a month of hospital treatment with both conventional and traditional Korean medicine is presented.

## Case Report

### Medical history

A 35-year-old woman was admitted to hospital. Her chief complaint was severe lower back pain on the right side that made walking impossible without assistance. Gynecological history of the patient revealed that she gave birth to her first child via cesarean section 2 months prior and was currently breastfeeding. She experienced mild lower back pain for approximately 2 weeks before the sudden onset of severe and long-lasting pain which began after standing up from a seated position, several hours before admission. There was no past history, hereditary disease, malignancy, or osteoporosis that could explain the symptoms.

### Radiography and magnetic resonance imaging results

The patient was unable to stand upright, so she underwent a lumbar spine X-ray in a supine position. No significant bony

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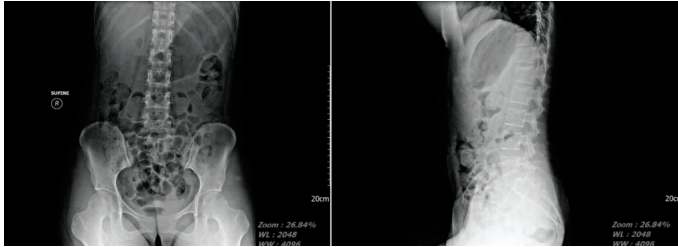


Fig. 1. Lumbar spine X-rays of the patient showing no significant bone abnormality.

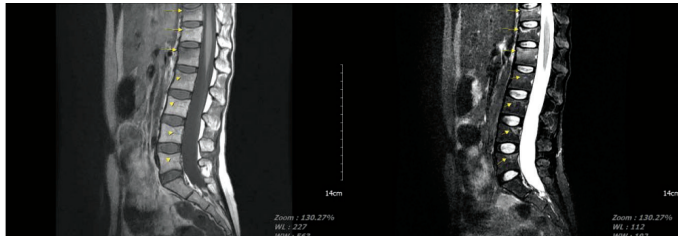


Fig. 2. Lumbar spine magnetic resonance images of the patient showing multiple vertebral compression fractures from T11 to L5. The posterior column of the spine remains preserved.

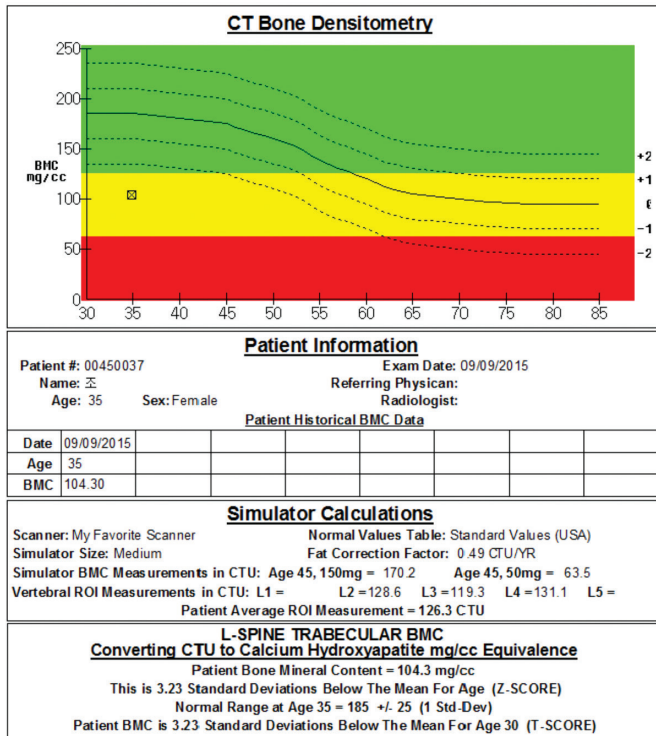


Fig. 3. Lumbar spine quantitative computed tomography results.

abnormality was found on the radiograph (Fig. 1). The magnetic resonance imaging (MRI) of the lumbar spine showed compression fractures of 7 vertebral bodies, from T11 to L5 (Fig. 2). Additional cervical-thoracic-lumbar spine images were scanned to assess whether further lesions related to the patient's current symptoms had occurred, but no other abnormalities were found (data not shown). After the confirmation of multiple fractures, a quantitative

Table 1. Summary of Admission Laboratory Test Results.

Item	Result	Normal range
ALP (IU/L)	320.3	104-338
ESR (mm/h)	41.0 (H)*	0-20
CRP (mg/dL)	Positive (0.43)	Negative
25-hydroxyvitamin D (ng/mL)	14.78 (L) <sup>†</sup>	< 10 deficiency 10-30 insufficiency 30-100 sufficiency ≥ 100 toxicity
Ca (mg/dL)	9.50	8.2-10.8
P (mg/dL)	4.20	2.5-5.5
Mg (mg/dL)	1.70	1.4-2.1
Osteocalcin (ng/mL)	14.13	9-42
PTH-C (pg/mL)	102.5 (L) <sup>†</sup>	180-560

\*Higher value compared to normal range; <sup>†</sup>lower value compared to normal range. ALP, Alkaline phosphatase; Ca, calcium; CRP, C-reactive protein (qualitative method); ESR, erythrocyte sedimentation rate; Mg, magnesium; P, phosphate; PTH-C, C-terminal parathyroid hormone.

computed tomography scan of the lumbar spine was carried out. The bone mineral content was 104.3 mg/mL, which in itself indicated osteopenia. Using the department's internal method, the result corresponded to a Z-score of -3.23, which indicated a bone mineral density of 3.23 standard deviation below the expected range for the patient's age (Fig. 3).

**Laboratory tests**

Routine admission laboratory examination consisted of biochemistry, blood and urine tests. After the radiology results had been assessed, a thyroid function test, serum C-terminal parathyroid hormone (PTH-C) was measured, electrolyte tests including serum calcium and phosphate, 25-hydroxyvitamin D, and an osteocalcin test to determine the etiology of the patient's fractures. Table 1 shows the laboratory test results of clinical relevance. All other investigations were within the normal range (data not shown).

**Treatment methods**

**Conventional treatment**

The patient was referred to the Department of Internal Medicine for conventional medical care. Detailed information of the treatment provided, including the names of the medications, daily doses, therapeutic effect and active substances, is provided in Table 2.

**Korean medicine treatment**

Acupuncture treatment was performed at EX-B2 near the site of the patient's lower back pain and the quadratus lumborum muscle, using 0.25x40 mm, sterilized, disposable stainless-steel needles. As the patient was uncomfortable in the prone position, treatment was performed with her lying on her side. Acupuncture treatment was generally performed twice a day. Additional treatment for indigestion was given when necessary at LI4, LR3, CV12, and ST36.

Herbal medicines were prescribed for the patient's chief complaints and any further symptoms. Two preparations from

Table 2. Detailed Information of Conventional Medication Administered to the Patient.

Product	Dose	Medical purpose	Ingredients per daily dose
Hadcal	1 tablet/ d	Provides calcium and vitamin D	Calcium carbonate 1,500 mg Cholecalciferol concentrated powder 4 mg
Parlodel	0.5 tablet/ d	Suppression of lactation	Bromocriptine mesylate 1.43 mg

Table 3. Traditional Korean Medicine Herbal Prescriptions Administered to the Patient.

Herbal prescription	Herbal components	Administered	Daily dose
Keoseup-hwalhyeol-jitong-tang (decoction that removes dampness, supports blood circulation and stops pain)	Lonicerae Flos 8 g, Akebiae Caulis 8 g, Coicis Semen 8 g, Atractylodis Rhizoma 8 g, Cinnamomi Ramulus 4 g, Dianthi Herba 4 g, Angelicae Gigantis Radix 4 g, Persicae Semen 4 g, Saposhnikoviae Radix 4 g, Angelicae Dahuricae Radix 4 g, Rehmanniae Radix Recens 4 g, Linderiae Radix 4 g, Achyranthis Radix 4 g, Clematidis Radix 4 g, Poria Sclerotium 4 g, Paeoniae Radix 4 g, Citri Unshius Pericarpium 4 g, Cnidii Rhizoma 4 g, Gentianae Scabrae Radix et Rhizoma 4 g, Polygoni Avicularis Herba 4 g, Biancae sappan 2 g, Carthami Flos 2 g	Day 1 to Day 18	Extract of 120 mL, 3 times per d
Nokyong-kunbi-tang (decoction that strengthens the spleen with deer antler)	Astragali Radix 12 g, Lycii Fructus 8 g, Angelicae Gigantis Radix 8 g, Atractylodis Rhizoma Alba 8g, Longanae Arillus 8 g, Cnidii Rhizoma 6 g, Glycyrrhizae Radix et Rhizoma 4 g, Amomi Semen 4 g, Cervi Parvum Cornu 4 g, Aucklandiae Radix 4 g, Poria Sclerotium 4 g, Paeoniae Radix 4 g, Crataegi Fructus 4 g, Rehmanniae Radix Preparata 4 g, Ginseng Radix 4 g, Fallopia multiflora 4 g, Carthami Flos 1 g	Day 19 to Day 27	Extract of 120 mL, 3 times per d

Jaseng Hospital of Korean Medicine were made up for the patient: Keoseup-hwalhyeol-jitong-tang (decoction that removes dampness, supports blood circulation and stops pain) and Nokyong-kunbi-tang (decoction that strengthens the spleen with deer antler). The schedule, daily doses and exact herbal ingredients are described in Table 3.

### Assessments

#### Patient-reported symptoms

The patient's electronic medical records were reviewed to evaluate changes in the patient's symptoms.

#### Patient-reported scales

The 11-point numeric rating scale (NRS) was used to measure the severity of pain and evaluate average pain during routine daily movements. The 3-level version of EuroQol-5 dimensions (EQ-5D<sup>®</sup>), instrument was used to evaluate the patient's quality of life [3], (the maximum score is 1 point, which indicates a perfect quality of life). The Oswestry Disability Index (ODI) evaluates disability in patients with lower back pain [4]. It consists of 10 questions, with scores ranging from 0 to 100 with higher values indicating a higher degree of disability. All 3 assessments were taken 3 times: at admission, on Day 15, and at discharge.

#### Follow-up laboratory tests

On Day 15, follow-up laboratory examinations were performed to trace abnormalities on admission.

#### Progress of the patient under treatment

The patient's acute pain lasted for 3 days after admission. From the 4th day on, her night pain was alleviated, but she still felt pain when trying to move without assistance. After Day 16, the pain was generally alleviated, but walking independently was still impossible because of the pain it caused. The patient experienced intermittent dyspepsia, and constipation due to bed rest and lack of exercise, which improved with acupuncture treatments. After

Table 4. Patient-reported Scales and Laboratory Test Results.

	Day 1 (admission)	Day 15 (follow-up)	Day 27 (discharge)
Patient-reported scales			
NRS	7	6	5
EQ-5D	- 0.121	0.108	0.677
ODI	93.33	88.89	86.67
Laboratory test results			
ESR	41.0 mm/h (H)*	3.0 mm/h	(-) <sup>‡</sup>
CRP	Positive (0.43 mg/dL)	Negative	(-) <sup>‡</sup>
PTH-C	102.5 pg/mL (L) <sup>†</sup>	160.0 pg/mL (L) <sup>†</sup>	(-) <sup>‡</sup>

\*Higher value compared to normal range; <sup>†</sup>lower value compared to normal range; <sup>‡</sup>no results.

CRP, C-reactive protein (qualitative method); EQ-5D, 3-level version of EuroQol-5 dimension, ESR, erythrocyte sedimentation rate, normal range 0–20 mm/h; NRS, numeric rating scale; ODI, Oswestry (Low Back) Disability Index, PTH-C, C-terminal parathyroid hormone, normal range 180–560 pg/mL.

Day 18, the patient complained of dizziness and headache. To treat these symptoms, the original prescription of herbal medicine was changed at Day 19 to Nokyong-kunbi-tang (decoction that strengthens the spleen with deer antler) and the symptoms improved (Table 3).

NRS score slightly decreased from 7 at admission to 5 at discharge. Regardless of the pain with active movement, the patient's pain at rest quickly disappeared after initial treatments. The EQ-5D<sup>®</sup> score was at its worst on admission (–0.121), but showed considerable improvement at discharge (0.677). The ODI remained relatively high throughout the hospitalization period.

Follow-up laboratory test results are summarized in Table 4.

Most parameters were within their normal range. Electrolyte test results were within their normal range (data not shown). Normalization of erythrocyte sedimentation rate and C-reactive protein was observed. PTH-C remained below normal throughout the follow-up period, even though it improved compared with the admission laboratory results.

The patient was discharged on the 27th day of hospitalization. Although her overall physical condition had improved, walking and performance of daily activities were still difficult without help.

## Discussion

It is difficult to define the risk factors of multiple vertebral compression fractures associated with postpartum osteoporosis, because of its rare nature and the few cases that have been reported so far. Relatively recent reports concluded that immobility, lack of sports activity, and a history of severe dental problems could be related to postpartum osteoporotic fractures [1]. Loss of bone calcium due to breastfeeding [5] is also one of the factors under consideration.

It is remarkable that radiography did not show any signs of fracture. The false-negative rate of radiography in suspected spinal fractures was reported to be at a worldwide average of 34% [6]. Clinical practitioners are well-advised not to rely upon radiology results, but should perform further evaluations when patient's symptoms and history to indicate potential fractures.

Laboratory test results were characterized by an elevation of inflammatory markers and a decrease of PTH-C initially. Elevated erythrocyte sedimentation rate and C-reactive protein at admission had normalized by follow-up, which implied that acute inflammation at the fracture sites had settled. Deficiency in parathyroid hormone causes hypocalcemia and hyperphosphatemia [7], but neither condition was observed in our patient. PTH-C showed a recovering trend, although it remained slightly below the lower limit of the normal range.

There are no clinical guidelines on the treatment of multiple vertebral compression fractures associated with postpartum osteoporosis. The available options include cessation of breastfeeding, providing calcium and Vitamin D supplements [5], bisphosphonates to treat the underlying osteoporosis [8], and kyphoplasty in case of structural instability or chronic pain [9].

Medical care was provided to the patient by supplementing with calcium and vitamin D, assistance was given for the patient to stop breastfeeding, and traditional Korean medicine was prescribed for pain relief. Korean medicine played a major supporting role in the patient's treatment with conventional medicine, providing pain relief in the early stage of hospitalization, and through treatment of discomfort such as dyspepsia, headache, and dizziness. Pain relief was exclusively managed using traditional Korean medicine.

Non-steroidal anti-inflammatory drugs, which are considered first-line therapy for patients suffering from vertebral fractures [10], were not used. During the hospitalization period when the patient was on bed rest, Korean medicine was particularly beneficial at reducing side effects of the patient's condition such as digestive disorders. Furthermore, acupuncture is effective in relieving paraspinal muscle spasm and tenderness, which are major problems in patients with vertebral fractures [11].

In this study a rare case of multiple vertebral compression fractures associated with postpartum osteoporosis was reported, marked by severe lower back pain and a decrease in serum PTH. Combination therapy of acupuncture, herbal medicine and conventional medicine helped relieve the patient's pain and uncomfortable symptoms during the 4 weeks of hospitalization. Traditional Korean medicine can be used to treat patients with a similar presentation.

## Conflicts of Interest

The authors have no conflicts of interest to declare.

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