

# Secondary Osteoarthritis Falsely Raises Bone Mass

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TAMPA — Spinal osteoarthritis can occur following osteoporotic end-plate perforation and can lead to a falsely high bone mineral density score, Dr. Sumiaki Okamoto of the Okamoto Clinic in Oita, Japan, and colleagues reported in a poster presentation at the annual meeting of the International Society of Clinical Densitometry.

Dr. Okamoto and colleagues analyzed the relationship between lumbar bone mineral density (BMD) scores and the presence of multiple perforations in vertebral end plates in postmenopausal women with osteoporosis and related secondary osteoarthritis (OA).

The study population consisted of postmenopausal women aged 45-85 as

**Any sclerotic calcification or callus formation around the end-plate perforations adds to an erroneously high lumbar bone mineral density score.**

well as healthy premenopausal women who were aged 20-40. The majority of the postmenopausal women studied had both osteoporosis as well as spinal osteoarthritis.

At a single outpatient clinic in Oita, Japan, investiga-

tors performed 3-D helical CT scans on 1,240 spines.

Perforations were frequently seen in vertebral end plates in untreated postmenopausal female patients but rarely were observed in premenopausal women volunteers.

The perforations were first seen soon after menopause and increased in number over time. The ratio of perforations to vertebral end-plate area was significantly correlated with the number of years after menopause.

Dr. Okamoto and colleagues speculate that perforations might originate from the circulatory system, as blood vessels pierce the vertebral end plate to nourish the intervertebral disks.

If a disk is herniated and under pressure, the disk nucleus could escape through the perforations. This occurrence could account for the loss of the watery content of disk cartilage that is associated with osteoarthritis.

“Overadaptation” of bone after osteoporosis leads to formation of multiple Schmorl’s nodes at fracture lines. Serial radiographs documented the growth of osteophytes after fresh fractures in one patient. In another patient, serial radiographs revealed the disappearance of prominent osteophytes after stabilization.

Fracture lines did not appear to be smooth in the 3-D images. Instead, the images showed mixtures of perforated indentations or Schmorl’s nodes, which indicated expansion of the disk space together with convergence of the rims of the vertebrae.

“The finding suggests that disk hernia-

tion into the weakened vertebral body through the perforated end plates can cause osteoarthritis in the same manner as the lateral slippage of the disk,” wrote the investigators.

“What has conventionally been known as fish-shaped vertebral fractures may in fact be secondary to the herniation of the disk nucleus into the weakened vertebral body of the osteoporotic spine,” the researchers added.

In this situation, the osteoarthritic

changes are due to the bone, rather than the cartilage, and result from overadaptation. The intervertebral space narrows and the osteophytes surrounding the vertebral end plates fuse.

“The unloaded vertebral end plates disappear rapidly when the surrounding osteophytes fuse together like a single pipe to support the load,” wrote the study investigators. Furthermore, sclerotic calcification or callus formation around the end-plate perforations adds to an erro-

neously high lumbar BMD score. “I find it intriguing to connect two common illnesses, such as spinal osteoporosis and fractures, with vertebral osteoarthritis,” Dr. Harold Rosen of Beth Israel Deaconess Medical Center in Boston said in an interview.

“However, further research needs to be done to support this assertion, such as finding that the BMD at sites other than the spine is low in patients with spine OA,” Dr. Rosen added. ■



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