Incidental detection of lumbar Paget’s disease by bone densitometry

Sir, Bone densitometry of the hip and lumbar spine using dual-energy X-ray absorptiometry (DXA) is used to diagnose osteoporosis. We report three patients who were referred for bone densitometry, in whom a diagnosis of Paget’s disease was made after the investigation of significantly increased bone mineral density (BMD) of a single vertebral body. BMD measurements were performed using a Lunar DPX alpha scanner and the results were expressed according to the manufacturer’s reference range.

Patient 1 was a 54-yr-old woman who had taken oestrogen replacement therapy for 3 yr after a hysterectomy and bilateral oophorectomy 14 yr previously, and was referred for bone densitometry. There was a 1-yr history of low back pain. Investigations including a liver biopsy 3 months previously had failed to identify the cause of mildly impaired liver function tests. The bone isoenzyme of alkaline phosphatase was not increased. The BMD of vertebrae L2–4 was 1.478 g/cm² (Table 1). The BMD of L2 was more than 40% higher than that of the other individual lumbar vertebrae. Lumbar spine X-rays and an isotope bone scan revealed Paget’s disease affecting L2.

Patient 2 was a 72-yr-old man with an 18-yr history of rheumatoid arthritis who had been taking prednisolone 5 mg daily for 2 yr. He was referred for bone densitometry. He denied low back pain. The BMD of L2–4 was 1.631 g/cm² (Table 1). The BMD of vertebra L2 was more than 20% higher than that of the other individual lumbar vertebrae. Lumbar spine X-ray revealed sclerosis and expansion of the vertebral body of L2 due to Paget’s disease. Alkaline phosphatase was 106 IU/l (normal range 40–120). Paget’s disease had remained asymptomatic for 3 yr.

Patient 3 was a 66-yr-old woman who was referred for bone densitometry after an episode of mid-thoracic pain. She had been taking Premarin (conjugated oestrogens) 0.625 mg daily after a hysterectomy and bilateral oophorectomy 13 yr previously. There was no history of low back or leg pain, and thoracic spine X-rays revealed minor thoracic spondylosis. The BMD of vertebrae L2–4 was 0.952 g/cm², and that of L1 was more than 50% greater than the BMD of the other individual lumbar vertebrae (Table 1). Lumbar spine X-rays revealed uniform sclerosis of the L1 vertebral body without significant expansion, and the L4 vertebral body was expanded with an increased trabecular pattern. An isotope bone scan revealed markedly increased uptake throughout the vertebral bodies of L1 and L4. Increased uptake was also noted throughout the upper third of the left femoral shaft, and the classical X-ray changes of Paget’s disease were noted at this site. A CT scan confirmed characteristic Pagetic changes in L1 and L4. The full blood count, erythrocyte sedimentation rate, calcium, phosphate, renal and liver function tests and immunoglobulins were normal. Her alkaline phosphatase was 214 IU/l.

Paget’s disease is characterized by accelerated resorption and production of bone, resulting in deformity. A radiological survey in Britain of hospital patients aged 55 yr and above revealed an overall prevalence of 4–5% with a focus of 7–8% in Lancashire, which is our catchment area [1]. The disease commonly affects the spine, and the number of vertebrae affected in individuals increases progressively from the cervical to the lumbar spine [2]. The disease is commonly monostotic in the cervical spine but rarely so in the thoracic or lumbar spine. The term ‘ivory vertebra’ has been used to describe isolated, diffuse sclerosis of a vertebral body. Various conditions have been reported to cause the radiographic appearance of ivory vertebra. Paget’s disease affecting a single vertebra with increased density on plain X-ray has been reported previously [3]. Other conditions reported to cause ivory vertebra include spinal osteoblastoma [4] and tuberculous osteomyelitis [5]. More sinister causes of isolated vertebral sclerosis include spinal metastases [6] and lymphoma [7]. The most common diagnostic difficulty with a solitary ivory vertebra is to distinguish Paget’s disease from metastatic disease. Osteosclerosis of multiple vertebrae may also be seen in conditions such as renal osteodystrophy, systemic mastocytosis, tuberous sclerosis and myelofibrosis [8]. In the elderly an increase in bone density due to degenerative facet sclerosis and aortic calcification can cause difficulty in the interpretation of BMD measurements [9].

Table 1. Lumbar spine BMD results by DXA

<table>
<thead>
<tr>
<th>Patient</th>
<th>BMD (g/cm²)</th>
<th>T-score</th>
<th>%</th>
<th>BMD (g/cm²)</th>
<th>T-score</th>
<th>%</th>
<th>BMD (g/cm²)</th>
<th>T-score</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>1.087</td>
<td>−0.36</td>
<td>96</td>
<td>1.322</td>
<td>1.35</td>
<td>123</td>
<td>1.493</td>
<td>3.0</td>
<td>132</td>
</tr>
<tr>
<td>L2</td>
<td>1.878</td>
<td>5.65</td>
<td>156</td>
<td>1.872</td>
<td>5.27</td>
<td>162</td>
<td>0.906</td>
<td>−2.5</td>
<td>75</td>
</tr>
<tr>
<td>L3</td>
<td>1.391</td>
<td>1.59</td>
<td>116</td>
<td>1.610</td>
<td>3.08</td>
<td>139</td>
<td>1.016</td>
<td>−1.5</td>
<td>85</td>
</tr>
<tr>
<td>L4</td>
<td>1.217</td>
<td>0.14</td>
<td>101</td>
<td>1.444</td>
<td>1.70</td>
<td>125</td>
<td>0.930</td>
<td>−2.3</td>
<td>79</td>
</tr>
<tr>
<td>L2–4</td>
<td>1.478</td>
<td>2.32</td>
<td>123</td>
<td>1.631</td>
<td>3.26</td>
<td>141</td>
<td>0.952</td>
<td>−2.1</td>
<td>79</td>
</tr>
</tbody>
</table>

T-score, patients’ bone density compared with that of a young healthy patient and is expressed as standard deviations above or below (−) the mean.
To our knowledge, there have been no previous reports of asymptomatic Paget’s disease affecting the lumbar spine diagnosed after the finding of increased BMD in a single vertebra in patients referred for bone densitometry. In each of our patients the need for further investigation was raised by significantly increased BMD affecting an individual vertebra. The diagnosis of Paget’s disease was confirmed by X-ray and bone scintigraphy and, in one patient, by CT scanning. It is not inevitable that all vertebral bodies affected by Paget’s disease will be associated with increased BMD, as illustrated by patient 3.

This report stresses the need to consider not only the mean BMD result but particularly the individual lumbar vertebral BMD measurements, as the finding of significantly increased BMD warrants further investigation.

An important lesson is that osteoporosis can exist in adjacent vertebrae, even though the mean BMD is normal, as a result of Pagetic bone increasing the average bone density to the normal range.

S. VASIREDDY, J. P. HALSEY

Department of Rheumatology, Medical Unit 2, Royal Lancaster Infirmary, Lancaster LA1 4RP, UK

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Correspondence to: J. P. Halsey.