Antacid-induced osteomalacia

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Hypophosphatemic osteomalacia caused by antacid intake has been reported in nine cases. The authors report an additional case, which was cured by discontinuing antacids. A review of the literature is presented.

Index terms: Antacids • Osteomalacia


Despite the widespread use of antacids, antacid-induced osteomalacia has been reported in only seven women and two men. This problem arises from the hypophosphatemia resulting from poor absorption of dietary phosphorus. We report an additional case in which chronic antacid therapy produced hypophosphatemic osteomalacia that was reversed after discontinuing antacids.

Case report

A 31-year-old woman was referred to our endocrinology department in July 1982 for evaluation of left lower extremity aches and weakness and suspected metabolic bone disease. For 13 years she had taken at least six tablets of Maalox TC daily (each tablet contains 600 mg of aluminum hydroxide and 300 mg of magnesium hydroxide) for acid peptic symptoms. In November 1981, muscle cramps, weakness, and pain in her left leg and ribs developed. In May 1982, she sustained an atraumatic rib fracture. The Table shows the results of laboratory studies. Figure 1 is a bone scan. Hip and chest x-rays showed osteopenia. Vitamin D levels were normal. A tetracycline-labeled iliac crest bone biopsy was performed (Fig. 2). The results showed normal trabecular bone volume (24.0%) but a marked increase in the amount of unmineralized bone (osteoid). Osteoid was present over 60.7% of the trabecular surfaces (normal approximately 19%) and occupied 29% of the trabecular bone volume (normal approximately 2%). Mean osteoid seam width was 36 µm (normal, approximately 9.7 µm). The number of osteoclasts was not increased, and there was no peritrabecular fibrosis. These histologic features are consistent with osteomalacia. Aurine tricarboxylic acid stain for aluminum was negative. In addition, energy-dispersive x-ray analysis for aluminum as previously described showed no increase in aluminum. Kidney function test results were normal.

Six months after stopping antacid intake, her bone pain diminished markedly and serum chemical values returned to normal (Table). In July 1984, a bone scan was completely normal.

Comments

In patients ingesting excessive oral aluminum hydroxide, a bone mineralization defect may develop because of accumulation of aluminum in bone or because of chronic depletion of inorganic phosphorus secondary to its impaired absorption. Aluminum, however, was not detected in our patient’s bone biopsy specimen.

Features of the previously reported cases include normal serum calcium, increased urinary

<table>
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<th>Test</th>
<th>6/4/82*</th>
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<th>7/84</th>
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<tr>
<td>Ca (mg/dL)</td>
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<td>9.2</td>
<td>10.2</td>
</tr>
<tr>
<td>P (mg/dL)</td>
<td>2.4</td>
<td>4.2</td>
<td>4.4</td>
</tr>
<tr>
<td>Parathyroid hormone (pg Eq/mL)</td>
<td>215†</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Alkaline phosphatase (pg Eq/mL)</td>
<td>231</td>
<td>57</td>
<td>42</td>
</tr>
<tr>
<td>Urine Ca (mg/24h)</td>
<td>542</td>
<td>43</td>
<td>-</td>
</tr>
<tr>
<td>Urine P (mg/24h)</td>
<td>1.2</td>
<td>221</td>
<td>-</td>
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</table>

* Date of initial admission to the hospital.
† Normal range = 163–347 (pg Eq/mL).
drawing the aluminum hydroxide restores the serum phosphorus levels to normal and reverses all the skeletal manifestations of osteomalacia.

An interesting aspect of this condition is its predominance in women. Eight, including our case, of 10 reported cases were in women. This may be because phosphate losses in men are derived principally from soft tissues, whereas a significant fraction of phosphate losses in women comes from the skeleton.\textsuperscript{17}

Since aluminum hydroxide antacids are commonly used and abused by patients, prospective studies are needed to better estimate the incidence of this serious problem.

Acknowledgment

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References


Fig. 1. Bone scan showing multiple areas of increased uptake in the ribs.
Fig. 2. Bone biopsy specimen showing osteomalacia. The histomorphometry measurements are shown in the text.