Treatment of spontaneous osteonecrosis of the knee (SPONK) by a bisphosphonate; a pilot series in 17 patients.

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Introduction Primary spontaneous osteonecrosis of the knee is a painful lesion in the elderly without known cause and with a typically acute onset of pain. The lesion is most frequently located in the medial femur condyle. The prognosis is poor and associated with a high frequency of osteoarthritis and often leads to subsequent knee surgery. Bisphosphonates are a group of antacatabolic drugs in clinical use for osteoporosis and bone malignancies. Systemic treatment with bisphosphonates can postpone the resorption of a bone graft and have been used in osteonecrosis, both experimentally as well as in clinical series. In a randomized human study in patients with femoral head osteonecrosis, bisphosphonates substantially reduced the risk of secondary osteoarthritides. In the present study we evaluate if bisphosphonates prevent the joint surface collapse also in spontaneous osteonecrosis of the knee.

Methods All patients with clinical signs and history of a knee osteonecrosis of the knee were identified in the outpatient clinic between 2006-2009. The inclusion criteria were osteonecrotic changes in MRI and sudden onset of pain without preceding significant trauma. Exclusion criteria were known bisphosphonate allergy, kidney or dental problems, known secondary etiology to ON and OA > Ahlbäck 1 at symptom onset. Alendronate 70 mg was prescribed once weekly perorally for a minimum of 6 months or until final calcification of the central healing tissue was initiated. The patients were followed clinically and with radiogram and MRI. Lotke index was used to determine the size and progression of the osteonecrosis. Based on the radiographic outcome, the patients were divided into three groups; (A) the patients who never developed osteoarthritis, (B) the patients developing mild osteoarthritis but no collapse and (C) patients developing a joint surface collapse. The Knee injury and Osteoarthritis Outcome Score (KOOS) was filled out at the final follow-up after 1,5-4,5 years.

Results 17 consecutive patients were diagnosed with a primary osteonecrosis of the knee visible either in the MRI alone or both in the MRI and in the radiogram. Nine patients were women and eight were men and the mean age at symptom onset was 68 years (48-82). Ten of the 17 patients never developed osteoarthritis (Group A), 4 patients developed mild osteoarthritis but never collapsed (Group B), and 3 patients had a knee joint surface collapse (Group C). Two of the patients with a knee joint surface collapse underwent subsequent knee arthroplasty and one did not. The first patient stopped medication after the first drug dose due to GI side effects, had core decompression at another hospital after another two weeks. The joint surface collapsed within the following two months and he was subsequently operated with a knee arthroplasty. The second patient stopped treatment after three months due to side effects and a large part of the joint line collapsed in the following six months. This patient was operated with a knee arthroplasty at 2,5 years after symptoms started. The third patient rapidly developed a joint line collapse and osteoarthritis (Ahlbäck 3) under bisphosphonate treatment (6 months), but has not been operated due to relatively mild clinical symptoms. The 15 non-operated patients were treated with bisphosphonates mean 11 (6-21) months. In 7 patients, the necrosis was primarily diagnosed with MRI without changes in the plain radiograms. Five of these patients gradually developed radiographic signs of ON during treatment whereas two patients never did. All 7 patients healed without collapse and with only mild or no osteoarthritis development.

Discussion Comparing with a previous, similar but untreated ON series in 40 patients at our hospital, the clinical results appear better in our series. 10/17 (59%) patients had a good outcome with a complete radiographically recovery compared to only 10/40 (25%) in the original study. The incidence of secondary surgery appears to be less when bisphosphonates are given. In the original series, 22/40 (55%) patients were considered failures due to osteoarthritis and major symptoms and of these patients, 13 (32%) underwent surgery with osteotomy, decompression or prosthesis.

Significance It appears bisphosphonates can decrease the collapse after a spontaneous osteonecrosis of the knee and prevent secondary surgery but only a direct comparison in a prospective randomized study would be able to determine if the bisphosphonates are capable of changing the outcome.

References

<table>
<thead>
<tr>
<th>Number of patients</th>
<th>Group A</th>
<th>Group B</th>
<th>Group C</th>
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<tbody>
<tr>
<td>Lotke (Radiogram)</td>
<td>17</td>
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<td>6</td>
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<tr>
<td>Lotke (MRI) %</td>
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<tr>
<td>Lotke max (Radiogram) %</td>
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<td>35</td>
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A/Good=no OA and no joint collapse B/Intermediate=OA but no joint collapse C/Poor= OA and/or joint collapse

Fig 1 A. A 70-year old women suddenly notices a pain in the right knee. A mild osteoarthritis is seen and no treatment is started. B. After a year, the symptoms are the same but an osteonecrosis visible. The patient is referred to the orthopedic department. C. Radiogram 6 months after start of treatment. The osteonecrosis is starting to heal from the periphery. D. Radiogram at follow up at 2 years after treatment start. The osteonecrosis has healed completely but the patient has developed mild osteoarthritis.