

Bisphosphonate treatment for osteolysis in total hip arthroplasty. A report of four cases

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Summary

Aseptic loosening due to wear debris is the most frequent modality of failure in total hip arthroplasty. Bisphosphonates, a class of molecules which inhibit bone resorption showed an inhibitory effects on particles-induced osteolysis *in vitro* and in animal models. We report the clinical, radiographic and densitometric outcome of four postmenopausal women with total hip arthroplasty affected by periprosthetic osteolysis treated with neridronate due to their unwillingness to be operated. After neridronate treatment, there was general improvement in pain and function: VAS decrease 13 points (15%), the Harris Hip Score increase 9 points (15%). An average number of 3.3 x-ray per patients with an average follow-up of 23 months (range 12-34) were collected and evaluated.

In all the patients except one, serial radiographs didn't show any progression of radiolucencies lines or periprosthetic osteolysis. Bone density was evaluated by Dual energy X-ray absorptiometry after an average follow-up of 21 months (range 6-46 mo): periprosthetic BMD around the whole stem and the cup increased respectively 2.4% and 7.1%.

Treatment was well tolerated and no significant side effects were registered. This retrospective collection of a small group of patients suggest that bisphosphonates should be clinically useful in preventing periprosthetic wear debris mediated osteolysis and claim for dedicated clinical trials.

KEY WORDS: aseptic loosening; total hip arthroplasty; bisphosphonates; osteolysis; bone mineral density.

Introduction

Aseptic loosening to wear debris products which induce osteoclast-mediate bone resorption is the most frequent modality of failure in total hip arthroplasty.

Bisphosphonates (BPs) are a class of molecules which bind strongly to mineral crystals of bone and inhibit bone resorption acting predominantly on osteoclasts (1).

Several investigations have been published on the reduction of bone resorption by BPs *in vitro* and in animal models of particles-induced osteolysis suggesting that pharmacological inhibition of bone resorption might be used to control the osteolysis of aseptic loosening (2-6).

In a recent report, an aggressive periprosthetic osteolysis after total hip arthroplasty was treated with oral alendronate which halted the progression of osteolysis over a year before revision (7). These data from the literature suggest a potential role of bisphosphonates for the treatment of periprosthetic osteolysis. In this paper, we report the outcome of four patients with total hip arthroplasty affected by periprosthetic osteolysis treated with bisphosphonates.

Material and Methods

Four patients with a painful total hip arthroplasty and radiographic osteolysis for which an indication for a revision surgery was given, were treated with injective BPs to inhibit osteolysis progression (Figure 1). The main reason for BPs treatment was the unwillingness to be operated in the short term expressed by the patients.

All patients were postmenopausal women whose anamnestic and demographic data are shown on Table 1. They presented groin pain and a painful limp, radiological signs of periprosthetic osteolysis and a positive Tc-MDP bone scintigraphy showing a radionuclide homogeneous periprosthetic uptake. None of the patients show any clinical sign, symptom or laboratory tests suggestive of deep infection.

The patients were treated with neridronate 25mg (Nerixia, Abiogen, Pisa - Italy) 1 intramuscular injection every 2 weeks for the first 3 months and then 1 injection per months for the whole time of follow-up. All the patients signed an informed consensus for the treatment.

Functional status of the patients before treatment and at follow-up was evaluated by means of Harris Hip Score (HHS). Pain assessment during activity was obtained with a VAS scale, activity level was estimated by means of the Mechanical Usage Score (MUS) developed by Rosenbaum et al. (8) and mobility level by Charnley classes modified according to Röder (9).

Serial standard radiographs were visually evaluated for location, size and progression of osteolysis or lines of radiolucencies. All patients underwent repeated assessment of periprosthetic bone mass and a basal evaluation of lumbar spine by means of dual energy x-ray absorptiometry (Hologic QDR2000, Hologic Inc., Waltham, MA, USA). Bone mineral density (BMD, g/cm²) have been calculated at L1-L4, in the seven Gruen zones around the stem and in the 3 Charnley regions for acetabulum (Figure 1).