

Summaries for Patients are a service provided by *Annals* to help patients better understand the complicated and often mystifying language of modern medicine.

The full report is titled “Zoledronic Acid Prevents Bone Loss after Liver Transplantation. A Randomized, Double-Blind, Placebo-Controlled Trial.” It is in the 21 February 2006 issue of *Annals of Internal Medicine* (volume 144, pages 239-248). The authors are B.A.L. Crawford, C. Kam, J. Pavlovic, K. Byth, D.J. Handelsman, P.W. Angus, and G.W. McCaughan.

Zoledronic Acid Prevents Bone Loss after Liver Transplantation

What is the problem and what is known about it so far?

Doctors estimate that between 16% and 40% of patients who undergo liver transplantation have bone fractures within 3 to 6 months after surgery. This occurs because the bones lose calcium and become softer (a problem known as osteoporosis) after this type of surgery. Although many drugs are available to strengthen bone structure in the general population, it is not clear whether these drugs are effective in patients who have had liver transplantation.

Why did the researchers do this particular study?

To find out whether zoledronic acid, a particularly powerful medication used to treat osteoporosis, would reverse the bone softening commonly seen in patients who have liver transplantation.

Who was studied?

62 patients who had liver transplantation.

How was the study done?

The researchers used an x-ray technique called dual-energy x-ray absorptiometry (DEXA) scanning to test the strength of the bones (known as bone mineral density, or BMD) at 3 different sites in the body: the spine (lower back), the hip, and the upper part of the thigh bone (femur). The scans were done before transplantation. Each participant was then randomly (completely by chance) assigned to receive either the test drug (zoledronic acid) or placebo (saltwater) by intravenous injection. Each patient received 5 injections of either zoledronic acid or placebo over the next 12 months. Hospital pharmacists, who were not involved in analyzing the results of the study, prepared the solutions for injection so that neither the researchers who were conducting the study nor the participants were aware of whether zoledronic acid or placebo was being administered. All participants (in both groups) received calcium and vitamin D supplements as well as medication to prevent rejection of the transplanted liver. Dual-energy x-ray absorptiometry was repeated at 3, 6, and 12 months after transplantation to evaluate what was happening to BMD over time.

What did the researchers find?

Participants who received zoledronic acid did not have substantial loss in BMD in the bones of the lower back, hip, or femur during the 12 months after transplantation. In those who received placebo, BMD decreased at all 3 sites within 3 months after transplantation but then gradually improved, particularly in the lower back, until the end of the study, 12 months after transplantation.

What were the limitations of the study?

Although the researchers were able to evaluate changes in BMD, there were not enough patients in the study to test whether zoledronic acid decreased fracture rates.

What are the implications of the study?

Zoledronic acid administration can help prevent bone loss after liver transplantation.