RayPEAT

ARTICLE

Bone Density: First Do No Harm

No topic can be understood in isolation. People frequently ask me what they should do about their diagnosed osteoporosis/osteopenia, and when they mention “computer controlled” and “dual photon x-ray” bone density tests, my attention tends to jump past their bones, their diet, and their hormones, to the way they must perceive themselves and their place in the world. Are they aware that this is an x-ray that’s powerful enough to differentiate very opaque bones from less opaque bones? The soft tissues aren’t being studied, so they are allowed to be “overexposed” until they appear black on the film. If a thick area like the thigh or hip is to be measured, are they aware that the x-ray dose received at the surface where the radiation enters might be 20 times more intense than the radiation that reaches the film, and that the 90 or 95% of the missing energy has been absorbed by the person’s cells? If I limited my response to answering the question they thought they had asked me, I would feel that I had joined a conspiracy against them. My answer has to assume that they are really asking about their health, rather than about a particular medical diagnosis.

Neurologists are famous for making exquisitely erudite diagnoses of problems that they can’t do anything to remedy. The owners of expensive dual photon x-ray absorptiometer diagnostic machines are in a very different position. The remedies for osteoporosis are things that everyone should be doing, anyway, so diagnosis makes no difference in what the physician should recommend to the patient.

Most often, estrogen is prescribed for osteoporosis, and if the doctors didn’t have their bone density tests, they would probably prescribe estrogen anyway, “to protect the heart,” or “to prevent Alzheimer’s disease.” Since I have already written about estrogen and those problems, there’s no need to say more about it here, except that estrogen is the cause of a variety of tissue atrophies, including the suppression of bone formation.[1]

General Electric, a major advocate of x-ray screening for osteoporosis and breast cancer, has advertised that 91% of breast cancers could be cured if everyone used their technology. Breast cancer has not decreased despite the massive application of the technology, though the US government and others (using crudely deceptive statistis) claim that the War on Cancer is being won. Similarly, during the last decades when the “high technology” x-ray machines have been more widely used, the age-specific incidence of osteoporosis has increased tremendously. This apparently includes a higher rate of shortening of stature with aging than in earlier generations.[2]

I think there are several reasons for avoiding x-ray tests of bone density, besides the simple one that everyone should eat a bone-protective diet, regardless of the present density of their bones.

Even seemingly identical x-ray machines, or the same machine at a different time, can give very different estimates of bone density.[3-10] Radiologists evaluating the same images often reach very different conclusions.[11] Changes in the tissue water and fat content can make large differences in apparent bone density,[12] and estrogen, which affects those, could appear to cause improved bone density, when it is merely causing a generalized inflammatory condition, with edema. A machine that is accurate when measuring an aluminum model, won’t necessarily give meaningful results when the composition of the tissue, including the bone marrow, has changed. Calcification of soft tissues can create the impression of increased bone density.[13] Studies of large groups of people show such small annual losses of bone density (around

1%), especially in the neck of the femur (which is important in hip fractures) that the common technical errors of measurement in an individual seem very large.

Ultrasound devices can do an extremely good job of evaluating both bone density and strength [14-16], rather than just density.

Ultrasound stimulates bone repair.

X-rays accelerate the rate of bone loss.

X-rays do their harm at any dose; there is no threshold at which the harm begins.

X-ray damage is not limited to the area being investigated. Deflected x-rays affect adjacent areas, and toxins produced by irradiated cells travel in the bloodstream, causing systemic effects. Dental x-rays cause thyroid cancer and eye cancer. Recent experiments have shown that low doses of radiation cause delayed death of brain cells. The action of x-rays produces tissue inflammation, and diseases as different as Alzheimer's disease and heart disease result from prolonged inflammatory processes.

I have never known a physician who knew, or cared, what dose of radiation his patients were receiving. I have never known a patient who could get that information from their doctors.

The radiation exposure used to measure bone density may be higher (especially when the thigh and hip are x-rayed) than the exposure in dental x-rays, but dental x-rays are known to increase the incidence of cancer. Often, dentists have their receptionists do the x-rays, which probably doesn't matter, since the dentist is usually no more concerned than the receptionist about understanding, and minimizing, the dose. Even radiological specialists seldom are interested in the doses they use diagnostically.

It was only after a multitude of dentists had a finger amputated that it became standard practice to ask the patient to hold the film, while the dentist stood safely back away from the rays.

Just after the beginning of the century, Thomas Edison was helping to popularize x-rays, but the horrible death of his chief technician turned Edison into an enemy of the technology. By the 1940s, the dangers of radiation were coming to be understood by the general public, and it was only the intervention of the US government, to popularize atomic bombs and nuclear power, that was able to reverse the trend.

In 1956 and 1957, Linus Pauling was the only well known scientist who opposed the government's policies. The government took away his passport, and his opportunities to write and speak were limited by a boycott imposed by a variety of institutions, but instigated by the nuclear industry and its agent, the Atomic Energy Commission. The government which considered Pauling a threat to national security, had placed thousands of German and Hungarian "ex"-Nazis in high positions in industry and government agencies, after protecting them from prosecution as war criminals. The official government policy, directed by the financier Admiral Strauss who controlled the Atomic Energy Commision, was to tell the public that radiation was good. Their extreme secrecy regarding their radiation experiments on Americans, however, indicated that they were aware of the malignant nature of their activities**;** many of the records were simply destroyed, so that no one could ever know what had been done. Scientists who worked for the government, Willard Libby, John Goffman, and many others, were working to convince the public that they shouldn't worry. Of the multitude of scientists who served the government during that time, only a few ever came to oppose those policies, and those who did were unable to keep their jobs or research grants. Gofman has become the leader in the movement to protect the public against radiation, especially, since 1971, through the Committee for Nuclear Responsibility, PO Box 421993, San Francisco, CA 94132..

Gofman has said**: "I was stupid in those days. In 1955, '56, people like Linus Pauling were saying that the bomb fallout would cause all this trouble. I thought, 'We're not sure. If you're not sure,**

don't stand in the way of progress.' I could not have thought anything more stupid in my life.

"The big moment in my life happened while I was giving a health lecture to nuclear engineers. In the middle of my talk it hit me! What the hell am I saying? If you don't know whether low doses are safe or not, going ahead is exactly wrong. At that moment, I changed my position entirely."[17]

In 1979, Gofman said: "There is no way I can justify my failure to help sound an alarm over these activities many years sooner than I did. I feel that at least several hundred scientists trained in the biomedical aspect of atomic energy - myself definitely included - are candidates for Nuremburg-type trials for crimes against humanity for our gross negligence and irresponsibility. Now that we know the hazard of low-dose radiation, the crime is not experimentation - it's murder." [18]

Many ordinary people were making exactly that argument in the 1950s, but government censorship kept the most incriminating evidence from the public. The climate of intimidation spread throughout the culture, so that teachers who spoke about the dangers of radiation were called disloyal, and were fired. Now, people who don't want x-rays are treated as crackpots. Probably because of this cultural situation, Gofman's recommendations are very mild--simply for doctors to use good technology and to know what they are doing, which could lead to ten-fold or even hundred-fold dose reduction. Even with such mild restraint in the use of diagnostic x-rays, Gofman's well founded estimate is that 250,000 deaths caused by radiation could be prevented annually. I believe many more deaths would be prevented if ultrasound and MRI were used consistently instead of x-rays. Using Gofman's estimate, I think we can blame at least ten million deaths on just the medical x-rays that have been used inappropriately because of the policies of the U.S. government in the last half century. That wouldn't include the deaths caused by radioactive fallout from bomb tests and leaks from nuclear power plants, or the vast numbers of people mentally impaired by all sorts of toxic radiation.

Although nearly all the people who committed the radiation crimes of the 1950s and 1960s have died or retired, the culture they created remains in the mass media and scientific journals, and in the medical and academic professions.

Medical journals describe ways to minimize diagnostic x-ray exposure, and they advocate many seemingly effective treatments for osteoporosis, giving an impression that progress is being made in "managing" osteoporosis, but the real situation is very different. Fractures resulting from osteoporosis are increasing, and osteoporosis is affecting younger and younger people. I think it would be reasonable to say that a woman with osteoporosis is usually better off when it's not diagnosed, because of the dangerous things prescribed for it. Estrogen has become the main "treatment" for osteoporosis, but many of the other ways of "managing" osteoporosis are both ineffective and unsafe.

Many women are told to stop taking a thyroid supplement when osteoporosis is diagnosed, but hypothyroidism often leads to hyperprolactinema and hypercortisolemia, which are two of the most clearly established causes of osteoporosis. Calcitonin, vitamin D-active metabolite, and estrogen-"HRT" treaments can cause respiratory alkalosis (relative hyperventilation),[19-24] and hypothyroidism produces a predisposition to hyperventilation.[25] Hyperventilation tends to cause calcium loss. In respiratory alkalolis, CO_2 (and sometimes bicarbonate) are decreased, impairing calcium retention, and in "***metabolic*** alkalosis," with ***increased*** bicarbonate, calcium is retained more efficiently and bone formation is stimulated, and its dissolution is suppressed.

Other women are told to reduce their protein consumption, or to take fluoride or whatever drug has been most recently promoted. A protein deficiency is a clear cause of osteoporosis, and bone density corresponds to the amount of protein consumed. Milk protein, especially, protects against osteoporosis, independently of milk's other important nutrients.

Too much fluoride clearly increases the risk of bone fractures,[26] and the side effects of other drugs haven't been properly studied in humans, while they often have dangerous effects in animals.

Calcium, magnesium, vitamin A, vitamin B6- , vitamin K, and vitamin D are important for the development and maintenance of bones. For example, a vitamin A deficiency limits the synthesis of progesterone and proteins. In calcium deficiency, parathyroid hormone is increased, and tends to cause the typical changes of aging, shifting calcium from hard tissues to soft, and decreasing the ratio of extracellular to intracellular (excitatory) calcium.

Polyunsaturated fats are converted to prostaglandins (especially under the influence of estrogen), and several prostaglandins have toxic effects on bone. Those fats also suppress the formation of thyroid hormone and progesterone. The increased use of the unsaturated oils has coincided with the increase of osteoporosis.

The oxidation of proteins caused by free radicals is increased with aging and by the use of unsaturated fats, and it contributes to tissue atrophy, including the age-related shrinkage of the bones. In animal studies, "adequate" dietary protein, 13.8% of the diet (equivalent to about 80 grams per day for a person) is associated with more oxidative damage to tissue proteins than the very high protein diets, 25.7% or 51.3%, that would be equivalent to about 150 or 300 grams of protein daily for a person.[27] Yet, many physicians recommend a low protein diet to protect against osteoporosis.

Avoiding fluoridated water and the polyunsaturated oils, and drinking two quarts of milk daily (which will provide only 66 grams of protein), and using some other nutrient-rich foods such as eggs and fruits, are probably the basic things to protect the bones. For vitamins, especially K, occasional liver can be helpful. Meats, fruits, leaves, and coffee are rich in magnesium.

Some people have argued that the acidity of urine produced by eating meat causes calcium loss. However, a high protein diet also improves the absorption of calcium by the intestine. Another overlooked function of dietary protein is that it stimulates insulin secretion, and insulin is anabolic for bone.[28]

The same diet that protects against osteoporosis, i.e., plenty of protein and calcium, etc., also protects against kidney stones and other abnormal calcificatons.

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collagen synthesis, which was correlated directly with pHi and inversely with JCa+. There was a strong inverse correlation between the effects alkalosis on osteoclastic beta-glucuronidase release and osteoblastic collagen synthesis. Thus metabolic alkalosis decreases JCa+ from bone, at least in part, by decreasing osteoclastic resorption and increasing osteoblastic formation. These results suggest that the provision of base to neutralize endogenous acid production may improve bone mineral accretion."

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mask as used on the other study days, and (5) during breathing of room air without the face mask. RESULTS: Hypocapnic and normocapnic hypoxemia and hyperventilation increased cardiac output, respiratory minute volume, and effective renal plasma flow. Glomerular filtration rate remained unchanged on all study days. Calculated proximal tubular reabsorption decreased during hypocapnic hypoxemia and hyperventilation but remained unchanged with normocapnic hypoxemia. Sodium clearance increasedslightly during hypocapnic and normocapnic hypoxemia, hyperventilation, and normocapnic normoxemia with but not without the face mask. CONCLUSIONS:The results indicate that **(1) respiratory alkalosis with or without hypoxemia decreases proximal tubular reabsorption and that this effect, but not renal vasodilation or natriuresis, can be abolished by adding carbon dioxide to the hypoxic gas; (2) the increases in the effective renal plasma flow were caused by** increased ventilation rather than by changes in arterial oxygen and carbon dioxide levels; and (3) the natriuresis may be secondary to increased renal perfusion, but application of a face mask also may increase sodium excretion.

31: Wien Klin Wochenschr 1979 Apr 27;91(9):304-7. **[Investigations on the pathogenesis of distal renal tubular acidosis].** [Article in German] Schabel F, Zieglauer H In distal (type 1) RTA, renal acid excretion is impaired by the inability to establish adequate pH gradients between plasma and distal tubular fluid at any level of acidosis. Main clinical signs in infancy are anorexia, vomiting and failure to thrive. Despite low serum bicarbonate levels the renal threshold of bicarbonate is normal, while urinary pH levels are high even with values below the threshold. **Under conditions of bicarbonate-induced systemic alkalosis urinary the pCO2 exceeds blood pCO2 in normal subjects.** by contrast, the urinary pCO2 tension is not significantly greater in distal RTA, indicating a failure of the cells of the distal nephron to secrete hydrogen ions even without a gradient. Red cell carbonic anhydrase is within the normal range, whilst the inhibition of carbonic anhydrase activity has no effect on distal tubular function. Until now no histological or enzymatic defect could be detected to explain the ineffective acidification. **Bicarbonate loading is followed by a lowering of calcium excretion to within the normal range** and a decrease in the uncharacteristic renal hyperaminoaciduria.

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