

New bone-loss risk factors in young women

Osteoporosis, or bone loss, afflicts about 20 million people in the United States, most of whom are postmenopausal women. But younger women can be affected as well. A new study suggests that osteoporosis may be linked to the occurrence of long, irregular menstrual cycles and to endometriosis in women who are only in their 30s — still many years away from menopause.

"These women will get into trouble with bone loss earlier [in] menopause than women who have more bone to start with," says study leader and radiologist Pamela Jensen at Yale University.

Moreover, these findings may have uncovered clues about endometriosis, a poorly studied disorder in which the endometrial tissues that normally line the uterus grow outside of it, causing pain and, often, infertility. It is estimated that as many as 25 percent of women in their 20s and 30s suffer from this disease, according to Jensen, who will discuss her work Nov. 29 at the Radiological Society of North America's annual meeting in Chicago.

Jensen's group used X-ray quantitative computed tomography (QCT) to measure the cross section of two parts of the forearm's distal radius bone. Among 67 women studied, most of whom were in their 30s, the eight who had irregular and widely spaced menstrual periods and 41 with endometriosis had statistically smaller bone measurements than the eight women with regular menstrual cycles and no endometriosis. And, as in other recent studies, the researchers also found decreased bone mass in the 10 subjects who have regular menstrual periods but who smoke.

There is increasing agreement among physicians that osteoporosis in postmenopausal women is somehow caused by decreased estrogen levels; indeed, a European consensus conference concluded last month that the only established preventive measure that reduces the frequency of osteoporotic fractures in postmenopausal women is estrogen treatment. A shortage of estrogen has been implicated in smoking-related osteoporosis as well: Levels of this hormone in female smokers are lower than in female nonsmokers. Jensen also suspects that estrogen plays a role in bone loss associated with long (greater than 35 days) menstrual cycles, because these women release relatively less total estrogen over time than do women with normal 28-day cycles.

But Jensen discovered that estrogen levels do not explain bone loss in endometriosis patients. Estrogen levels in these women are comparable to those of healthy women. Moreover, she found that the calcium metabolism in this group falls in the normal range.

Jensen instead points a finger at interleukin-1, a protein secreted by the immune system in response to foreign invaders (SN: 10/31/87, p.277). Studies by her and others have recently detected higher interleukin-1 levels in women with endometriosis than in women without the disorder.

Jensen posits that the presence of endometrial tissue outside the uterus triggers the secretion of a kind of interleukin-1 that activates osteoclasts, cells that break down bone. At the same time, she says, interleukin-1 may stimulate the production of interleukin-2, a related protein associated with the immune system's killer T cells. She suspects that by killing fertilized eggs and by causing inflammation and fibrosis around the uterus and fallopian tubes, interleukin-2 causes infertility in women with endometriosis.

Jensen's group is in the midst of clinical studies with a drug (a gonadotropin releasing hormone analog) that may help treat endometriosis. If the drug succeeds, Jensen expects that her patients' bone loss will be halted as well.

Radiologist and endocrinologist Claude Arnaud, at the University of California at San Francisco, says Jensen's theory is interesting but cautions that much more work is needed to nail down interleukin's relationship both to endometriosis and to bone loss. And, because of the small number of patients in the study, he says that osteoporosis's link to irregular menstrual cycles should be viewed as preliminary. But if this latter correlation is validated, "it would make endocrinologists and gynecologists pay more attention to individuals with menstrual abnormalities," he says.

Jensen's use of the forearm as a site for measuring bone density with QCT is a departure from standard procedure. Osteoporosis researchers are currently debating which sites and methods are best for diagnosing bone loss. Jensen says most radiologists have been looking at the spine, since that's where the more noticeable effects of osteoporosis show up in older people. But she argues that in the early stages of the condition, weight-bearing bones such as the spine protect themselves by redistributing their mass — an effect that X-ray QCTs cannot detect.

The distal radius does not bear weight, so by looking at it Jensen believes she is seeing some of the earliest bone loss. "That is why we are probably the first people to pick up a lot of these early changes that would otherwise be masked," she says.

Jensen doesn't know how many young women may have lower-than-normal bone mass, but she guesses that the number is substantial and is growing as more and more women smoke, diet and

undertake strenuous exercise regimens that halt menstruation, among other things that may lead to bone loss. Luckily, she says, at this stage in life the loss is not yet serious, and there is the possibility that treatments that encourage bone regeneration will be found. If so, she says, we need a means of identifying women with the greatest bone-loss risk, and "we've got to start getting physicians thinking about the fact that just because a woman looks healthy, it doesn't mean that she doesn't already have some bone loss."

— S. Weisburd

Radiation exposure: Safe, eye on radon

Current annual levels of exposure to radiation from all sources in the United States are, on average, not dangerously high, according to a review of available data released last week by the National Council on Radiation Protection and Measurements, a nonprofit research organization in Bethesda, Md.

The report recommends, however, that a national survey of radon levels in homes be conducted. Radon gas, generated by the natural radioactive decay of radium in the soil, is estimated by the report to account for about 55 percent of the total average yearly exposure to radiation. There is growing concern that large numbers of U.S. homes have high indoor radon levels (SN: 11/22/86, p.325). Uranium miners exposed to elevated radon levels have experienced increased rates of lung cancer, notes the report. Average radon levels can vary greatly from home to home and in different regions of the country, but widespread testing has not been conducted.

Other naturally occurring radiation sources contribute 27 percent of the average yearly exposure, according to the report. These include cosmic radiation from the sun and outer space, radioactive rocks and faint traces of radioactive materials found in living creatures, including humans.

The remaining portion of the yearly radiation exposure, 18 percent of the total according to the report, comes from human-made sources. Medical uses of radiation, such as X-ray procedures and nuclear imaging, account for the bulk of these exposures. Consumer products, including cigarettes, domestic water supplies, building materials, mining and agricultural products and natural gas in heaters and cooking ranges, make up 3 percent of the total annually.

Averaged over the U.S. population, radiation levels on the job and from other environmental sources, including nuclear power plants and fallout from nuclear weapons tests, amount to less than 1 percent of the total yearly exposure.

— B. Bower