

Biomedicine

Benefits of prostate therapy questioned

Older men with slow-growing prostate tumors may get little or no benefit from surgery and radiation therapy, a new report suggests. Such aggressive treatment may help only a select group of prostate cancer patients, primarily young men with fast-growing tumors.

Despite questions about its usefulness, surgery to remove a malignant prostate has become increasingly popular in the United States, according to a second study. Both reports appear in the May 26 *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION*.

The prostate is the walnut-sized male sex gland that surrounds the urethra. Treatment for prostate cancer routinely includes surgery, radiation therapy, or both. In some cases, physicians suggest a course of "watchful waiting," which includes checkups to see if the cancer has progressed and treatment for cancer complications such as pain. U.S. clinicians are known to favor the invasive approaches, yet the risk-benefit equations of these options have not been rigorously examined, says Craig Fleming of the Oregon Health Sciences University in Portland.

Fleming and his colleagues designed a computer program that analyzed the benefits and the risks of each treatment option. The analysis considered such variables as quality of life, complications, and gains in longevity.

The findings suggest that for many men with slow-growing prostate tumors, surgery and radiation therapy offer "limited benefits" and can cause debilitating complications, such as impotence and severe incontinence. With or without treatment, most prostate tumors grow slowly. Thus, treatment usually doesn't offer significant longevity benefits, says Fleming. Indeed, chances are good that many men, particularly older men, will die from another cause before prostate cancer kills them, he says.

The analysis suggests that for many men, a less invasive approach may be warranted. Rather than opting for surgery or radiation therapy, says Fleming, men with a slow-growing tumor may want to adopt a wait-and-see approach that includes regular visits to the urologist.

Despite the risks, some patients decide to go ahead with more aggressive treatment, he adds. Men who want surgery often cite the procedure's psychological benefits. For example, notes Fleming, some men say surgery offers peace of mind because they know the malignancy has been removed.

In the second study, John E. Wennberg of Dartmouth Medical School in Hanover, N.H., and his colleagues examined the frequency of surgery for prostate cancer in the United States. They discovered that the rate of radical prostatectomy in 1990 was nearly six times the rate in 1984. Furthermore, the chance of undergoing prostate surgery varied widely according to geographic location. For example, men with prostate cancer who lived on the West Coast were more likely to receive the surgery than their New England peers.

For older men who opt for surgery, the risks of the operation may not be trivial. The analysis indicates that within a month of surgery, almost 2 percent of men over age 74 died and nearly 8 percent suffered major complications.

As with many other medical procedures in common use, the safety and efficacy of surgery and radiation therapy for prostate cancer have not been rigorously assessed, Fleming says. If these treatments had to meet the same standards applied to new drugs by the Food and Drug Administration, the procedures probably wouldn't pass muster, he asserts.

What's a man to do? Scientists are currently conducting two trials to evaluate the safety and efficacy of treatments for prostate cancer, Fleming says, but the results won't be in for years. For now, he suggests, men with prostate cancer should seek out a physician who can advise them on the risks and benefits of the various treatment options.

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Earth Science

Richard Monastersky reports from Baltimore at a meeting of the American Geophysical Union

Great quake followed slow precursor

Seismologists studying records of a great earthquake that struck south of New Zealand in 1989 have detected evidence that the tremor started off extremely slowly, taking many minutes to build before releasing its main burst of energy in the largest earthquake of the last 14 years. While the discovery does not immediately offer a method for predicting seismic disasters, it bolsters the hope that scientists may someday be able to discern when the Earth is preparing to generate a major quake.

Pierre F. Ihmlé, Paolo Harabaglia, and Thomas H. Jordan of the Massachusetts Institute of Technology found the evidence of a precursor while studying the magnitude 8.2 jolt that occurred May 23, 1989, on a submerged fault along the Macquarie Ridge. Although large, the remote tremor caused little damage.

Analyzing records of the seismic waves detected around the world after the quake, Ihmlé and his colleagues found unusual features in the lowest-frequency vibrations. To explain the anomaly, they suggest that such waves began emanating from the undersea fault more than six minutes before the actual earthquake started. They call this early activity a "slow earthquake" and calculate that it released 20 to 25 percent of the energy liberated by the entire shock. On its own, the slow precursor would have had the same strength as the magnitude 7.6 temblor that struck east of Los Angeles last June.

The researchers suggest that the early low-frequency waves may have come from a part of the fault deep beneath the ocean floor, where high temperatures make rock more ductile. Rock on either side of the fault could have started to slip in the deep zone, moving slowly until the rupture spread into the cool upper crust, where it sparked a fast tear that unleashed most of the quake's energy in a 20-second burst, says Ihmlé.

Researchers have detected slow precursors of other large oceanic earthquakes. But this is the first known example that started on a strike-slip fault, where land on each side of the fault slides horizontally — the same type of motion seen along California's San Andreas fault. The other examples were seen in subduction zones, in which one plate slides beneath another. Scientists have not yet found slow precursors to any San Andreas quake or to jolts on any other continent. But the new discovery offers clues about how large earthquakes start, and it should spur research on precursors, says Ihmlé.

Garden of volcanoes in the Pacific

Like gardeners mowing a lawn half the size of California, a team of oceanographers cruised back and forth over a patch of the Pacific Ocean for two months late last year in an attempt to map the seafloor along a section of the East Pacific Rise. That sonar mapping project revealed an extraordinary number of volcanoes hidden under the waves, report Daniel S. Scheirer and Ken C. Macdonald of the University of California, Santa Barbara, and Donald W. Forsyth of Brown University in Providence, R.I. Along the patch of the rise they mapped, which ran from 15°S to 19°S, the scientists detected 1,113 seamounts, each of which rose at least 100 meters off the seafloor.

The East Pacific Rise marks a great rift in Earth's outer shell. As tectonic plates on the sides of the rift slowly inch apart, molten rock rises to fill the gap, creating new pieces of ocean floor. Scheirer says the volcanoes discovered along the southern part of the rise are three times more numerous than those along a well-studied part of the rise north of the equator. What's more, sonar images reveal that these volcanoes are sprouting over a broader area than those in the north. Because most of the southern East Pacific Rise remains unmapped, scientists do not know whether other patches have such widespread volcanic activity. If so, that would indicate a fundamental difference in the way the northern and southern sections of the rise evolve.

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