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Cutting Back

Interventional radiology offers a less-invasive alternative to some surgeries

By LAURA LANDRO

At 74, Angileen Gilbert still teaches in an elementary school in Toledo, Ohio, and leads an active life. But after she suffered a painful compression fracture in her spine from a fall, she was unable to dress herself or drive.

The injury wasn't serious enough for high-risk spinal surgery, and she couldn't tolerate narcotic pain medications, so her doctor recommended another option: vertebroplasty.

In the procedure, Columbus, Ohio, physician Brian Schirf used an X-ray image to guide a narrow tube through a small incision into the fracture area, then injected bone cement to stabilize the collapsed vertebra. Performed with minimal sedation, it didn't require an overnight hospital stay and stopped the pain. "I got up and walked out of there, and it was like night and day," Ms. Gilbert says. "Within a matter of hours, I was 100% better."

Vertebroplasty is one of a growing number of minimally invasive procedures performed by specialists like Dr. Schirf, known as interventional radiologists. Using X-rays, MRIs, ultrasounds and other imaging technologies, these doctors make tiny incisions to guide needles, catheters and other devices deep into the body to insert stents in arteries, blast away tumors and blood clots, and incinerate or freeze diseased tissues. Thanks to flexible scopes with lenses that transmit images to a monitor screen near the patient, physicians can manipulate the instruments from outside the body.

Without the large incisions of conventional surgery, recovery time is faster and there is less chance of infection. Patients are sedated but conscious, reducing the risks of complications from general anesthesia.

"The old surgeon's phrase is that a chance to cut is a chance to cure," says Robert Vogelzang, chief of interventional radiology at Northwestern University School of Medicine. "But we've flipped the switch and replaced many traditional surgical procedures—there is almost no organ or system in the body that we can't treat with these methods."

Interventional radiology grew out of the invention of angioplasty—the revolutionary use of imaging to guide a balloon-tipped catheter into an artery or vein to improve blood flow and treat coronary-artery disease.

While procedures and the devices to perform them can be costly, interventional radiologists say they can save on health-care costs in the long run because most procedures don't require expensive hospital stays. Hospitals are also increasingly calling on interventional radiologists to help manage patients with complications from severe illnesses such as cancer.

Of course, the procedures carry risks. Just as surgeons may leave sponges or instruments in patients by mistake, there have been reports of objects left in a patient's aorta after a cardiac catheterization. Some procedures use high levels of radiation, which may put patients at greater risk of cancer, and require the use of contrast fluids, which can cause allergic reactions or kidney damage.

Some interventional-radiology procedures are too new to know if they work over the long term, and questions have been raised about the effectiveness of some procedures. In the case of vertebroplasty, for example, the New England Journal of Medicine last August published findings from clinical trials suggesting that patients got equal pain relief with a placebo treatment.

Brian Stainken, chairman of the diagnostic imaging center at Roger Williams Medical Center in Providence, R.I., says that additional studies are under way, but the procedure has helped many women with crippling osteoporosis. "Prolonged bed rest and drugs are not good for an 80-year-old woman," he says. "If I can send them home without acute misery to return to normal life, I've done a huge service."

Here are some recent advances in the field:

Uterine Fibroid Embolization

How It Works: Benign tumors in the uterus can cause prolonged, heavy menstrual bleeding and pain. In the conventional treatment, the fibroids are surgically removed; in some cases, a complete hysterectomy is needed. In embolization, a catheter is inserted through a nick the size of a pencil point, then guided through the femoral artery to release particles the size of a grain of sand into the blood vessels feeding the fibroid, cutting off its blood flow so that it shrinks. Most women can return to work the same day.

Caveats: Risks include infection and pain. Some women may stop menstruating for a time or permanently; women over 40 may undergo premature menopause.

Cryoablation

How It Works: Using imaging to pinpoint a tumor in an organ such as the kidney or pancreas, the physician inserts a thin probe filled with argon gas. The argon rapidly freezes the tumor. The tumor is thawed by replacing the argon with helium, and then refrozen—a process that kills the tumor. Two studies suggest that cryoablation is effective for selected patients with kidney cancer known as renal cell carcinoma. It is being considered for other cancers.

Caveats: Short track record.

Catheter-Directed Thrombolysis

How It Works: Patients can suffer a fatal pulmonary embolism when arteries in the lung become blocked from blood clots that often begin as deep-vein thrombosis, or clots deep within leg veins. When the clots break free, they can be trapped in the lungs and block the oxygen supply, causing heart failure and death. Clot-busting drugs can cause major bleeding and may not work fast enough. Using catheters, physicians can gain access to the blood vessel through a small incision and deliver the drug right into the clot.

Caveats: One analysis found a 2.4% chance of major complications (still, that's lower than the rate from traditional therapy).

Radiofrequency Ablation

How It Works: For inoperable tumors in organs such as the kidney, a small needle is guided through the skin into the tumor, then radio waves are transmitted at a frequency that heats and kills the tumor cells. The dead tumor tissue shrinks and slowly turns into a scar. Because the treatment doesn't harm healthy tissue, it can be repeated as often as needed, and most people can resume regular activities in a few days. The procedure is being studied for treatment of pancreatic and breast cancers.

Caveats: The risks are similar to a biopsy, such as localized bleeding and pain. May also cause damage in healthy tissue nearby.

Chemoembolization

How It Works: A minimally invasive treatment for liver cancer. A catheter is threaded up the femoral artery in the groin to feed chemotherapy medication directly into the organ while at the same time blocking the arteries

feeding the tumor to starve it of its blood supply. Patients usually have to stay in the hospital for at least two days and may feel fatigued for about a month.

Caveats:Not considered a cure for cancer.

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