Revealing Secrets

OR MORE THAN A CENTURY. dard test—nuclear scan—uses a radioactive dye. Coand the risk of damaging healthy tissue. But Perruccio X-rays have allowed doctors to observented tomography (CT) angiography, another rapidvasamong the rst to bene t from a new imaging sys the inner workings of the human body.approach, involves multiple X-rays of the heart. In cortem developed at Yale University that simultaneously Today a new generation of imaging detrast, MRIs use magnetic and radio waves, so patients blood ow, electrical activity, and biochemical vices is probing even deeper—and tranaren't exposed to potentially damaging radiation. activity, providing neurosurgeons with a clearer picture forming medicine in the process. Still, few ERs currently have MRI scanners, whilef what's wrong in a patient's brain so they can operate

Take the case of a 53-year-old woman rushed to the case of a 53-year-old emergeng room of Suburban Hospital in Bethesdawidely available, the decision facing many chest-patern will someday allow epilepsy patients to undergo Md., with chest pains. Heart attack or just indigestion patients and their doctors will be whether CT's potera single operation instead of two.

It's a common dilemma. Every minute counts whetial for quick diagnosis outweighs its radiation risks. Perruccio suffered no loss of brain function as a

treating heart attacks. Yet less than half the 6 million Stroke victims may also bene t from the emergence sult of her surgeries and remains seizure-free. She

diagnosed with standard tests. tells doctors Fortunately, Suburban was partic how an organ ipating in a large clinical trial by the National Institutes of Health (NIH) Or tissue would exploring whether magnetic reso-'feel' if touched nance imaging (MRI) might offer

patients who end up in the ER with chest pains each year can be quick one new device gies. Ischemic strokes—the mosthildren with autism. Because surgeons gave her so common type—are caused by bloodnuch, she explains, she wants to give back to others.

clots, which can be dissolved if an individual receives the right drugs within three hours of onset. But that same therapy can prove fatal in pa tients with other types of strokes. An

URING A PHYSICAL, DOCTORS often palpate, or feel, various parts of a patient's body. But how can organs deep within the body be "felt"? A new technol

afaster, more accurate way to diagnose heart attacked. Stroke Center study found that MRI was four ogy, magnetic resonance elastography (MRE) 3 a High-resolution images, obtained in about 40 min times better than CT at identifying ischemic strokesvariation on MRI scanning—may hold the answeff. utes, showed that the patient was indeed experiencing Beyond the ER, new imaging technology is reduce Researchers at the Mayo Clinic in Rochester, a heart attack, so doctors performed a procedure into or even eliminating surgical procedures. Just ald inn., developed MRE to help detect diseases open an artery that was 99% blocked. A month lateral Perruccio, 26, of Denver. Diagnosed with epileraffecting the elasticity of the body's tissues. For the woman's heart was functioning normally. sy at 12, she struggled with the brain disorder throughnstance, a liver damaged by alcohol feels much

Dozens of patients in the NIH trial had the sameout her teens. Even with medications, she experiended than a healthy liver. This hardening is called experience, laying the groundwork for what may be eizures that impaired her speech and memory. brosis. The standard test involves sticking a needle a shift in how heart attacks are diagnosed in the ER. Searching for relief, she underwent surgery to right to the abdomen and removing a small piece of Indeed, not only do MRIs provide the most detailed move the seizure-causing tissue from her brain. Sulid her, which is examined under a microscope. Ne views of heart muscle, they may also be safer. The staurgery typically involves two seven-hour operatiods biopsies can be uncomfortable, even pairatul,

and pose a risk of bleeding.

In contrast, MRE involves no needle sticks. A patient is moved into an MRI machine with a small pad resembling the head of a drum strapped to the abdomen. The "drum" vibrates in different ways as the patient brie y holds his breath. The result is an elas togram—a detailed map of tissue elasticity. If fibrosis is detected early enough, treatment may halt the disease before it causes irre versible liver damage. Research is evaluating whether MRE can distinguish between other types of tissue, such as benign and can cerous lumps in the breast.

WO IMAGING devices are innovative because of their small size. The optical co herence tomography (OCT) probe is aimed at improving de tection of retinal diseases in children. Created at the Univer sity of California, Davis, the handheld device makes it easier to obtain high-resolution im ages of the retinas of youngsters who nd it hard to sit still.

And a team at Rice Univer sity in Houston has developed a briefcase-size scanner to screen for oral cancer, using a fiberoptic probe to illuminate the in side of the mouth. Its portability and relative affordability could make it invaluable for cancer screening in remote clinics.

It's impossible to predict when thesedevices will move from re search centers into local hospitals or clinics. What is certain is that scientists will develop even more precise imaging technologies to improve our health. Initially published in Parade Magazine. All rights reserved.