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Old Blood-Pressure Treatments Make High-Tech Comebacks

By RON WINSLOW

ORLANDO, Fla. -- More than a half-century ago, doctors treating patients with uncontrolled high blood pressure might resort to crude and invasive methods such as severing nerves or zapping neck arteries with an electrical charge.

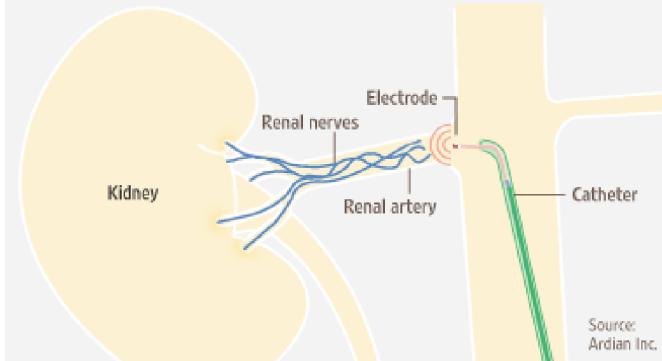
Both strategies reduced blood pressure, but the procedures came with such major complications that they were reserved essentially for life-and-death situations. With the development of modern drugs, the treatments fell by the wayside.

Now, two start-up companies are bringing the procedures back -- aided by high-tech gadgetry that today is a mainstay of cardiology treatment. In two small studies featured Monday at the annual scientific meeting of the American College of Cardiology, the strategies achieved substantial, sustained reductions in blood pressure.

If the results for either, or both, of the procedures are borne out in larger, more-rigorous trials, it would amount to a major advance in treating hypertension -- one of the most common disorders in medicine and one of the most frustrating to treat.

Jamming Enemy Transmissions

Nerves transmit signals between the kidney and the brain, affecting blood pressure. In an experimental procedure, an electrode is threaded into the renal artery and delivers radio frequency energy that disables the nerves, silencing signals that cause blood pressure to rise.



About a third of the adult population in the developed world has the condition. In the U.S. alone, that amounts to more than 70 million people. Despite a variety of drugs that include pills such as diuretics, beta blockers and ACE-inhibitors, only about a third are successfully treated. Another third aren't getting any treatment, while the rest fail to get to blood-pressure goals despite taking a fistful of pills every day -- or because they fail to take their medicine.

The final third are at especially high risk of suffering a stroke, heart attack, heart failure or kidney failure, four of health care's most debilitating and costly conditions.

So for researchers and entrepreneurial companies, hypertension is a huge opportunity -- and a big risk.

"Most mechanical solutions to aggressively treat hypertension have not panned out," says Dan Jones, a blood-pressure expert at the University of Mississippi. In both of these cases, even if all goes well, the procedures wouldn't likely be available in the U.S. until about 2012, at the earliest.

One of the approaches, being developed by [Ardian](#) Inc., of Palo Alto, Calif., involves a 40-minute procedure in which an electrode-tipped catheter is threaded from the groin into the renal artery. Once in the kidney, the electrode delivers radio-frequency energy into the renal artery wall to kill nerves that play an important role in triggering and sustaining high blood pressure.

One result: The kidney doesn't respond to signals that it should conserve salt and water or send out hormones that cause blood vessels to constrict or the heart to pump harder.

The study was conducted among 50 patients with average blood pressure of 177/101, despite being on an average of nearly five drugs. Readings above 140/90 are considered high blood pressure; optimal levels are 120/80 or lower. The procedure resulted in a decline one year later of 27 millimeters of mercury for the systolic, or top number, and 17 for the diastolic pressure. Generally, a 20-millimeter reduction in systolic blood pressure is associated with a 50% reduction in long-term risk of death related to cardiovascular disease.

"There's no doubt these changes are clinically meaningful," said Henry Krum, a researcher at Monash University, Melbourne, Australia, who led the study and presented the data at the meeting. The study was also published online in the British medical journal the Lancet. There wasn't any evidence that the treatment damaged the artery wall, an important potential risk of the procedure.

Most patients in the study continued on at least some of their blood-pressure medication, but one hope is that the device could someday enable many people to control blood pressure without pills. Ardian's investors include [Medtronic Inc.](#)

The other technique is being developed by CVRx Inc., of Minneapolis, which counts [Johnson & Johnson](#) among its backers. It involves implanting a device similar to a pacemaker in the chest. Leads from the device are wrapped around the carotid or neck arteries where so-called baroreceptors are located. These receptors play an important role in maintaining blood pressure.

When electrical impulses from the device are sent to the baroreceptors, says Marcos Rothstein, a researcher at Washington University in St. Louis, it "fools the brain" into thinking the body's blood pressure is even higher than it actually is. That triggers a response marshaling a full complement of the body's natural regulatory weapons to dilate blood vessels, reduce the workload on the heart, and restore balance to the kidney.

Among 60 patients with average blood pressures of 183/105 taking five blood-pressure pills, the technique reduced systolic levels by an average of 22 and diastolic by 15 after two years with the device, Dr. Rothstein reported. In addition, he reported that patients on average had improvements in heart function.

Both companies are launching large randomized studies to test their techniques.

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