Trying Little-Known Option To Seal A Leaky Lung

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The final straw came when Guy Vance's chest, neck and face ballooned, little air bubbles in his skin crackling to the touch — all because of a leak somewhere in his lung.

Air was seeping into his chest cavity and under his skin, seeking another escape route. Two earlier surgeries had failed to seal the leak. A drainage tube implanted in the 63-year-old's chest offered only a temporary, painful solution. So Dr. Keith Mortman snaked a tiny, umbrella-shaped valve into Vance's lung in hopes of finally plugging the leak — by redirecting how air can flow in that part of the lung.

"Enough of this frequent-flyer stuff in the hospital. Let's get you home," Mortman, director of minimally invasive thoracic surgery at Washington Hospital Center, told Vance last week.

Lots of problems — lung diseases, chest trauma, thoracic surgery — can cause an air leak in the lung's delicate lining, in turn making the lung partially collapse. Fortunately, the vast majority of leaks seal themselves in about a week. But a fraction of those people, like Vance, suffer prolonged air leaks that just won't heal, triggering repeated, expensive hospitalizations and complications like infections from chest tubes.

Enter endobronchial valves, a little-known option to treat persistent leaky lungs without further surgery — they're slid in through the windpipe. And they soon might be used for more than those rare prolonged leaks: Experiments are under way to see if the valves also could help advanced emphysema.

But wedging these valves into just the right spot can be tricky. Minutes after Mortman snaked a camera into the top of Vance's right lung came the discovery that his airways don't form the normal three-way branch, but a narrowed, two-way tunnel.

"As much as I like this gentleman, we knew he wasn't going to make it easy for us," sighed Mortman, who just a month earlier had hopped a plane to Redmond, Wash., to learn the procedure from valve maker Spiration Inc.

Vance's odyssey began with lung cancer in 2004. Radiation left his right lung particularly fragile, vulnerable to leaking. Last fall, doctors slid a flap of muscle into Vance's chest cavity to help seal off a persistent leak that left him breathless, but it didn't work. They operated again in early spring, unsuccessfully. Vance was in and out of the hospital for months, his worst episode that scary swelling called subcutaneous emphysema. "It would blow up my body," said Vance, pausing for

breaths. Prepped for the procedure, he told Mortman, "Doc, I'm pretty much ready to go."

The idea: Blocking air from entering the bad section of his lung decreases pressure on the leak and might help it heal. Spiration's IBV valve looks like a metal umbrella and acts like a one-way plug, blocking new air from flowing past but letting stale air or mucus escape.

"We're doing this for quality of life, to get the tube out of his chest and prevent him from being readmitted to the hospital," said Mortman, who navigates Vance's radiation-scarred bronchial tubes with the slightest motion of the tube in his trachea.

Angle, move up a millimeter, reposition, measure. Finally Mortman picks a spot. An assistant gently moves a plunger to unfold the valve — but it springs out of place. The airway was too tight a squeeze. Mortman pulls out the valve and finds a better position.

Try No. 2 doesn't unfold correctly. A Spiration representative, watching in case Mortman seeks advice, will send it back to company engineers to see why. Mortman's third try hooks into place. Swinging the catheter into an adjoining airway, Mortman then hooks in another valve to seal off that direction, too. It will take a few weeks to tell if the leak finally heals, but Vance goes home the next day, breathing OK.

How often do these valves succeed? That's not yet clear. The Food and Drug Administration approved "humanitarian use" of the IBV valve for prolonged surgical air leaks — an option that lets promising novel options for rare conditions sell, with some profit restrictions, before large effectiveness studies are done.

With a shorter hospital stay, it's cheaper than air-leak surgery, yet prominent IBV researcher Dr. Robert Cerfolio of the University of Alabama at Birmingham said few doctors know about the option.

Temple University researchers last fall published outcomes of 40 patients implanted with a similar but still experimental valve now owned by competitor Pulmonx Inc., and found nearly 48 percent had their leak completely sealed and most of the rest improved.

But both companies have a bigger aim: To treat advanced emphysema by redirecting air from scarred lung spots and into healthier areas of the lung. Spiration's emphysema study is ongoing; Pulmonx has clearance to sell its valve in parts of Europe and is preparing for a U.S. study.

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