Chicago-area hospitals aim to boost transplants with 'lung in a box'

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Emphysema crept up on Bob Falat, gradually robbing him of his ability to breathe.

The Lockport man, 72, had to use oxygen day and night after smoking for nearly 40 years—a habit he now calls the worst thing he's ever done. He was on the waiting list for a lung transplant, but he wasn't sure he'd survive long enough to get it.

That's when his doctors at Loyola Medicine presented him with a new option: get a donor lung that initially might not have seemed healthy enough to use. Falat was hesitant, but there were few alternatives.

In January, Falat became the first person at Loyola to receive a lung using technology sometimes known as "lung in a box," as part of a clinical trial. The idea behind the technology is to see if donor lungs that once may have been discarded may be healthy enough to transplant if given more time to evaluate.

It's an innovation that could offer promise to patients with serious lung conditions who might otherwise have a tough time getting transplants quickly, given that about 80 percent of donated lungs are now considered unusable. Some hospitals, such as University of Chicago Medical Center, have used the technology in-house, while others such as Loyola University Medical Center are flying lungs to a central location for testing.

Here's how it works: In what looks like a scene out of a science fiction movie, a donor lung is placed in a transparent dome and connected to a ventilator that blows air and oxygen into it, inflating and deflating it to mimic breathing. A solution of proteins and nutrients is pumped into the lung's blood vessels to keep it alive. Remaining donor blood and medications are diluted and filtered away. The lung is then observed and tested over the course of several hours to determine if it's healthy enough for transplant. The system can also improve the health of some lungs, such as by healing bruises and removing blood clots, making the organs ready for use.

Doctors hope the technology, called ex vivo lung perfusion and approved by the Food and Drug Administration for use in clinical trials, can increase the supply of donor lungs. Lungs can otherwise be more difficult to get than other organs used in transplants, often because they're damaged when potential donors are on life-support before they die. The lungs might, for example, become congested with fluid, or patients might contract pneumonia.

In Illinois, 42 people are waiting for lungs, including 10 who've been waiting for six months or longer, according to the U.S. Department of Health and Human Services. Nationally, 1,440 people are on waitlists for lungs, fewer than the numbers waiting for kidneys, livers or hearts. Last year in Illinois, 92 lung transplants were performed, including 39 at Loyola, the largest lung transplant center in the state.

"There are patients who unfortunately are dying while waiting for transplants," said Dr. Daniel Dilling, medical director of Loyola's lung transplant program. "This technology ... it's by definition increasing the pool of donor (lungs) available."

Loyola has had multiple lungs tested but only used one in a transplant.

The University of Chicago Medical Center has tested four lungs—two of which were transplanted, as part of a clinical trial separate from the one involving Loyola.

"This expands our donor pool to lungs that are almost perfect but not quite, to lungs we would have turned down before, and that translates to a shorter wait time for our patients," said Dr. Tae Song, surgical director of U. of C.'s lung transplant program.

But the technology can be costly, require staff with special training and may only be used infrequently, making it impractical for other hospitals to have their own systems. The clinical trial in which Loyola is taking part aims to find out if it's effective for hospitals to send lungs to facilities in central locations for testing. Loyola is flying its questionable lungs to a bioengineering company in Maryland for testing.

Not everyone, however, is rushing to adopt the technology. Northwestern Memorial Hospital, which started doing lung transplants about four years ago, doesn't see a need to use it at this point, said Dr. Ankit Bharat, the hospital's lung transplant director. No Northwestern patient has ever died waiting for a lung transplant and the hospital has relatively short wait times, he said.

"For us it didn't make sense to take a marginal lung we would not normally use," Bharat said. "No doubt it's a significant advancement in the field, but just because it's there doesn't mean that every patient needs it."

Dr. Christopher Wigfield, surgical director for lung transplantation at Advocate Christ Medical Center in Oak Lawn, also noted that though he considers the technology important, it can potentially create a significant cost because not all lungs tested will be usable.

But Dilling, with Loyola, hopes that the trial, if successful, will allow hospitals such as Loyola to continue using the technology to get more lungs to patients. The hospital is covering the additional costs of using the system as part of the clinical trial, he said. The hospital considers it an investment that could eventually pay off with more revenue from additional transplants performed and more lives saved.

Falat said that although he was initially wary of the technology, he now feels grateful he was able to benefit from it. Each day since the transplant has been a little better than the last. The grandfather of four isn't back to golfing yet, but he can go for walks again and go to the store.

"I look forward to the next day all the time because the best days, I hope, are still ahead of me," Falat said.