

# Sweden hospital in lab-made windpipe transplant

July 7 2011, By LOUISE NORDSTROM , Associated Press

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A 36-year-old man who had tracheal cancer has received a new lab-made windpipe seeded with his own stem cells in a procedure in Sweden they call the first successful attempt of its kind, officials said Thursday.

The Karolinska University Hospital in Stockholm said the surgery was performed June 9, and that the patient is on his way to a "full recovery." He will be released from a hospital Friday.

Karolinska said the patient, whose late stage cancer had almost fully blocked his windpipe, had no other options since no suitable donor windpipes were available.

Professor Paolo Macchiarini, who has also involved in previous windpipe transplants, said the surgery at Karolinska "is the first synthetic tissue engineered windpipe that has been successfully transplanted."

To perform the surgery, an international team lead by Macchiarini built a scaffold and a bioreactor to seed it with the patient's stem cells. New cells to line and cover the windpipe were then grown on the scaffold for two days before it was transplanted.

"Because the cells used to regenerate the trachea were the patient's own, there has been no rejection of the transplant and the patient is not taking (anti-rejection) drugs," Karolinska said in a statement.

Windpipe transplants have previously been performed using donor

windpipes and the patients' own stem cells. But this latest surgery in Sweden is the first to use a man-made organ. Several years ago, Macchiarini and other experts used a patient's bone marrow stem cells to create millions of epithelial and cartilage cells to coat their Colombian patient's new windpipe, damaged after years of suffering from tuberculosis.

And Belgian doctors previously implanted a donor windpipe into their patient's arm to restore its blood supply and grow new tissue before placing it into her throat. In both transplants, because the patients' own cells were used to coat the windpipes, neither of them needs to take anti-rejection medicines.

Experts say synthetic structures could be used to fashion simple organs like the windpipe, esophagus or bladder, but that it will be years before scientists can create more complicated organs like kidneys or hearts in the laboratory.

The plastic polymer used to make the artificial windpipe has previously been used in tear ducts and blood vessels. It has a spongy surface to speed cell growth. The makers of the synthetic windpipe said they thought its most immediate application would be for patients with tracheal cancer and that a similar structure might also help people with cancer of the throat. Patients with those types of cancer are often diagnosed late and have few good treatment options.

Macchiarini said that more surgeries like the one just performed in Sweden are planned before the end of this year and will include two adult patients and one child.

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