**Who pulls the strings? Robot may someday stitch patients after surgery**

By Associated Press, adapted by Newsela staff

05.10.16

WASHINGTON — Getting stitched up by Dr. Robot may one day be real: Scientists have created a robotic system that did just that in living animals without a real doctor pulling the strings.

**Robots May Assist Doctors**

Wednesday's research is part of a move toward surgical robots. These machines will be able to perform medical operations. The goal is to remove the doctor's hands from some tasks that a machine might do by itself. It's similar to how engineers are creating self-driving cars.

No, doctors would not leave the bedside. They are in charge, and they would handle the rest of the operation. Nor is the device ready for operating rooms.

However, tests using pigs were promising. The robotic arm performed as well as doctors in stitching tissue, sometimes better, researchers said in the journal Science Translational Medicine.

**Does A Robot Have A Winning Hand?**

"The purpose wasn't to replace surgeons," said Dr. Peter C.W. Kim of Children's National Health System in Washington, a doctor who led the project. "If you have an intelligent tool that works with a surgeon, can it improve the outcome? That's what we have done."

If you've heard about machines like the Da Vinci system, you might think robots already are operating. Not really. Today many hospitals offer robot-assisted surgery. Doctors use the machinery as tools that they control, often to operate through tiny openings in the body. That work has been controversial, though, as some studies have shown it can cost more without better results.

So why the push for higher-level robots? Proponents think there are cases where a machine may outperform a human hand.

**Baby Steps**

Wednesday's project is "the first baby step toward true autonomy," said Dr. Umamaheswar Duvvuri of the University of Pittsburgh Medical Center. The doctor is a surgeon and robotic expert.

Though Dr. Duvvuri said that people should not expect to see doctors ever leave entire operations to a robot.

Because it is made to do one job — stitch up tissue — the machine is like the robots in other industries. Robot arms do the welding and painting in most U.S. car-making, for example. They can find supplies in warehouses. From the driver's view, many cars now can warn drivers when they are too close to the car in front, or take control and apply the brakes to avoid a crash.

**The New STAR System**

The new STAR system — it stands for Smart Tissue Autonomous Robot — works sort of like a programmable sewing machine.

Kim's team took a robotic arm and added stitching equipment plus 3-D tracking. They also gave it abilities similar to night vision. They added sensors to help guide each stitch and tell how tightly to pull.

The doctor marks on the tissue that needs stitching, and the robot takes aim as doctors keep watch.

**Testing It On Pigs**

Now the test: Could the STAR reconnect tubular pieces of intestinal tissue from pigs, sort of like two ends of a garden hose? Any soft-tissue surgeries are tricky for machinery because those tissues move out of place so easily. And the stitches in these connections must be placed precisely to avoid leaks or blockages, a challenge even for experts.

The researchers tested the STAR robot against other types of operations. They tested it on pieces of pig bowel outside of the animals' bodies as well as in five living but sedated pigs.

**Good But Not Perfect**

By some measures "we surpassed the surgeons," said Children's engineer Ryan Decker. The STAR machine was better at consistency of stitches and their strength to avoid leaks.

The STAR approach wasn't perfect. The STAR had to reposition fewer stitches than the doctors performing minimally invasive or robot-assisted suturing. But in the living animals, the robot took much longer and made a few suturing mistakes while the surgeon sewing by hand made none.

Kim's team members have filed patents to legally protect the system they invented. Kim said the robot can be sped up. He hopes to begin human studies in two or three years.