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YOUR HEALTH

# Robot-Assisted Surgery Costs More But May Not Be Better

Hospitals tout the technique, but two studies find they're longer and pricier than laparoscopy

*By*

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Robot-assisted surgeries—a technology oft-touted by hospitals—are longer and more expensive than other types of minimally invasive surgeries, according to a growing body of studies. And in some types of surgery, they have a lower success rate.

Two studies published online last week in JAMA compared robotic-assisted surgeries to laparoscopic surgeries. Both are minimally invasive procedures done through small incisions, designed to avoid the large incisions made in open surgeries, which often result in more pain and complications.

"The robot is essentially just a surgical tool," says David Jayne, a consulting surgeon at Leeds Teaching Hospital, a National Health Service hospital in England and lead author of one of the JAMA studies. "The operation is exactly the same as the laparoscopic operation. So there's always been a big question mark about whether it's going to result in any different outcomes."

In laparoscopy, a tiny camera and surgical instruments are inserted through small incisions. In robotic-assisted surgery, the surgeon operates a console that controls robotic arms attached to surgical instruments and a camera, while looking through a viewer that provides a three-dimensional view of the patient's anatomy.

In Dr. Jayne's study, researchers compared the robotic-assisted and laparoscopic surgeries among 471 rectal cancer patients undergoing a resection, or removal of part of the rectum.

A console controls robotic arms attached to surgical instruments. PHOTO: BSIP/UIG/GETTY IMAGES

The researchers looked at the rate of conversion—when a minimally-invasive surgery must convert to open surgery—expecting robotic-assisted surgeries to have half the conversion rate as the laparoscopic ones. But they found no statistically significant difference in the conversion rates.

They also found that robotic-assisted surgeries were about 35 minutes longer and cost about £1,000 more, or over $1,300.

In the other study, researchers compared robotic-assisted and laparoscopic surgeries for kidney removal, usually done in cancer patients.

They reviewed 13 years of data and found that the percentage of what's called a radical nephrectomy performed with robotic assistance increased to 27% in 2015, when there were 862 procedures, from 1.5% in 2003.

They also found the robotic surgeries exceeded four hours 46% of the time, compared with 26% of the time for the laparoscopic procedures, says Benjamin Chung, associate professor of urology at Stanford University School of Medicine and senior author on the study. The longer operating time results in a greater cost, as does an extra $985 per surgery for robotic instrumentation supplies.

The incidence of complications and length of hospital stay were equivalent for the two techniques.

Robotic-assisted surgeries began after the U.S. Food and Drug Administration in 2000 approved the da Vinci surgical system made by Intuitive Surgical Inc. of Sunnyvale, Calif. It is currently the only manufacturer of the device, but several competing products are in the works, with one approved for use just last week.

In an email, an Intuitive spokesperson says it has installed more than 4,100 systems world-wide and more than four million procedures have been performed using it. Hospitals often advertise their use of the $2 million systems.

Elizabeth Raskin, a colon and rectal surgeon at Loma Linda University in Loma Linda, Calif., says the study doesn't effectively highlight the cases in which the robotic system has its most pronounced advantages, such as when patients are obese, have a narrow pelvis or have had multiple prior operations. She is paid by Intuitive to teach the system to other surgeons.

"The equipment actually allows surgeons to do things that are exceptionally more difficult with laparoscopy," says Dr. Raskin, who says she performs most resection surgeries using the robot system. While there are surgeons who are very good at laparoscopy for such surgeries, the majority aren't, she says.

Patricio Gargollo, a pediatric urologist and surgeon at Mayo Clinic in Rochester, says the concerns are even greater in some pediatric robotic-assisted surgeries, because longer procedures mean children are under general anesthesia for a longer period.

The impact of general anesthesia on young children's developing brain is a continuing area of research. Last year the U.S. Food and Drug Administration issued a warning for the repeated or lengthy use of general anesthesia in children under 3 years old.

Dr. Gargollo says that for some pediatric surgeries there is a benefit to robotic-assisted surgeries, such as when fixing kidney blockages.

But he and others have published data showing there is a higher complication rate and lower success rate for robotic-assisted ureteral reimplants in children compared with the traditional, open-surgery method.

The fairly common condition—affecting about 10% of children—is a complication from a urinary tract infection in which urine goes back up into the kidneys. The condition is sometimes treated with surgery when it's recurrent.

"At the end of the day, it's an unproven technology" for ureteral reimplants, Dr. Gargollo says. "There's no proof or data showing that it's superior to the traditional surgeries that are available. It's more expensive, and it uses longer anesthetic."

Previous research has found that when robotic surgery is used to remove ovaries and ovarian cysts, there is a higher rate of complications compared with laparoscopic surgery.

Aseem Shukla, director of minimally invasive surgery at the Children's Hospital of Philadelphia, says he has used robotic-assisted surgeries for ureteral implants in children successfully. He says the complications are likely due to user error and not the technology. Dr. Shukla was paid by Intuitive several years ago to mentor surgeons on the robot and has taught at Intuitive-supported workshops.

He says robotic-assisted surgery is of great value for more difficult surgeries that require a lot of suturing, because it provides increased range of motion.

Martin Makary, a professor of surgery at Johns Hopkins Hospital, says the JAMA studies are further proof that "technology is not always the answer."

He acknowledged that there are surgeries for which the robotic system is superior, such as for posterior throat tumors and more complicated hysterectomy cases. Also, robotic-assisted prostate surgeries are easier on the surgeon's back, because it's hard to access the pelvis since the patient's chest is in the way of the best surgical positioning.

But laparoscopy has been mastered for procedures like the removal of the gallbladder or the tail of the pancreas. "The robot is being used for everyday surgeries like gallbladder removals and hysterectomies, where there's already a great standard of practice in place," says Dr. Makary. "Any operation you can do in the abdomen is being done with the robot now, whereas the benefits are only for a small subset."

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