

*Op-Ed*

## Robotic Surgery: An Example of When Newer Is Not Always Better but Clearly More Expensive

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WHEN THE US FOOD AND DRUG ADMINISTRATION (FDA) first approved the da Vinci surgical robot for clinical use in 2000, many people assumed that robotic surgery would have as much effect on improving patient outcomes as had minimally invasive, or laparoscopic, surgery. A decade after its introduction, laparoscopic surgery and the smaller incisions it uses produced clear evidence that patients generally did better—faster recoveries, shorter hospital stays, less bleeding, and so forth—than with more “traditional” or open surgery. That said, in some instances surgeons believe they will have better outcomes if they have both the sight and the feel of the whole area allowed by traditional incisions.

The evidence associated with robotic surgery, however, has been considerably less compelling. The lead researcher on robotics at ECRI (formerly known as the Emergency Care Research Institute), a nonprofit organization that brings applied scientific research to assess the effect of medical procedures, devices, drugs, and processes on patient outcomes, recently commented that with publications on robotic surgery with varying study designs and variable conclusions appearing monthly, it becomes challenging to draw definitive conclusions comparing robotic surgery with traditional laparoscopic surgery. It also depends on which type of surgery is being compared.<sup>1</sup> The incremental costs associated with the da Vinci procedure are less debated, with costs ranging from \$3,000 to \$6,000 more than traditional laparoscopic surgery.

As more procedures are performed and more evidence is accumulated, some types of procedures have been found more likely to benefit from robotic surgery, while other types have not. Not surprisingly, the difference tends to be associated with those areas in the body that are difficult

to reach with a laparoscope, thereby making the alternative to robotic surgery the more traditional “open” surgery.

For gynecologic surgery, particularly hysterectomies, the second most common surgery for women, robotic surgery does not appear to improve results. A study reported in *JAMA* of 250,000 hysterectomy patients in 441 hospitals found that the outcomes of da Vinci robot surgery were no better than those using laparoscopic surgery. The da Vinci surgeries did, however, take longer and added an average of \$2,000 to the procedure.<sup>2</sup> Similar findings of higher rates of complications and significantly higher costs were reported by researchers from Columbia University comparing robotic surgery with laparoscopic surgery to remove ovaries and ovarian cysts.<sup>3</sup>

When it comes to prostatectomies, urologists have found the outcomes for da Vinci robotic surgery to be much better than for laparoscopic surgery and use this method in more than 90% of these procedures. Laparoscopic removals of the prostate gland are more difficult to perform and the da Vinci robot allows for minimally invasive prostatectomies.

Robotic surgery also appears to provide clinical benefits for some, but not all, types of head and neck surgery. A 2015 study that evaluated transoral robotic surgery (TORS) with neck dissection reported an advantage using robotic surgery.<sup>4</sup> As with the prostate surgery, minimally invasive surgeries on the head and neck that formerly were difficult or impossible to do have reported improved outcomes when robotic surgery was used.

In addition to the higher costs associated with the \$2 million purchase cost of a da Vinci robot, plus the increased costs of some of the attachments, are reports of adverse events, including deaths, injuries (such as to the bladder, kidney, and ureter during surgery), and malfunctions. As in other areas of medicine, these adverse events seem to be associated with how frequently a procedure is performed in a particular hospital or by a particular surgeon. The FDA is reportedly doing further review of these reported adverse events.

Hospital charges are higher in hospitals using more robotic surgery, which is not surprising given the higher charges associated with robotic surgery. However, insurers have not routinely reimbursed the use of robotic surgery at higher rates than those for other types of minimally invasive surgery. Whether this will continue in the future may depend on the growth in the use of robotic surgery and on the evidence associated with it. Nonetheless, the public plans, particularly Medicare, may

already be compensating hospitals indirectly for robotic surgery. Because the Centers for Medicare and Medicaid Services updates diagnosis-related groups (DRGs) by averaging hospital costs per DRG over a 3-year period, even indirectly reimbursed costs, like those for robotic surgery, tend to get rolled into the charges used to calculate DRGs over time.

The question that hospitals, insurers, and patients need ask is whether robotic surgery is an advance important enough to be financially supported so that surgeons may gain proficiency with the tool along with the hope that the costs will decline over time. To date, however, there is no indication that these robotic procedures are likely to become more cost-effective over time. Should insurers then reimburse the use of robotic surgery only in those situations in which more traditional laparoscopic surgery is not (or, at least, has not yet been) possible?

Some of its advocates have pointed to another use for robotic surgery: complex surgery performed by a surgeon who is hundreds or thousands of miles away. Even though this may be possible and perhaps appealing for countries without an advanced medical capacity, using robotic surgery would require a lot of complex technical support at the site where the surgery is being performed. This also requires the capacity to support the patient during the procedure and post operation, as well as the means to maintain the equipment so that it functions properly. These are hardly simple tasks but are at least worth contemplating. It is hard to imagine that in the United States, it would not simply be easier and cheaper to move the patient to the surgeon and focus on providing more regionalized specialty care in those rural areas where it is needed.

Having more limited and targeted use of robotic technology and the higher reimbursement that goes along with it would seem to be the most sensible strategy to follow. But in the past, this strategy has been harder to implement in the United States than in other countries, and many hospitals already are advertising the availability of robotic surgery as a way to differentiate themselves from other hospitals in their area, even if this means absorbing the likely additional costs.

With the greater emphasis on cost efficiency and measurable improvements in clinical outcomes through the use of Accountable Care Organizations and Medicare Advantage plans, hospitals and the surgeons associated with them (as employees or otherwise) may feel compelled to adopt robotic surgery only when it makes clinical and financial sense. Although this has not been our country's practice in the past, perhaps we really are entering a different era. It is important to continue

implementing cost-effective advantages that make important clinical contributions. It is equally important that the United States not implement new technologies that do not meet this test.

## References

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