

GLOBAL HEALTH INTERACTION THROUGH TELESURGERY

Adrian Balica, MD², Joseph Barone, MD¹, Hari Tunuguntla, MD¹, Gloria Bachmann, MD²
¹Department of Surgery, ²Department of Obstetrics, Gynecology and Reproductive Sciences
UMDNJ-Robert Wood Johnson Medical School, New Brunswick, NJ



Introduction

The academic health center at RWJUH has instituted an image stream system in operating room #12 that has the ability to teach telesurgery to global sites. That is, surgeons in New Brunswick can perform a surgical procedure and have it seen (in conformance with HIPPA regulations) at any site including remote ones as long as there is internet capability. Not only will this be useful to teach surgical procedures to other surgeons on an international basis, but also to their entire team of nurses, anesthesiologists and operating room tech staff. One area of great interest to global surgeons learning robotic surgery such as on the daVinci system. This image stream system will allow the teaching of this innovative tool to surgeons outside of our institution.

Telesurgery Defined

Telecommunications in health care transmits both information and techniques in real time. With telesurgery, the surgical technique, the indications for the technique and the preparation and roles of each member of the operating team can be exchanged from one site to another via electronic communications. At RWJUH the IT equipment for recording and transferring the activity of the surgeon and the team are housed in an operating room specifically set up for this indication. The procedure is then transmitted to the site that has internet capabilities. No special equipment is necessary on the receiving side. All HIPPA rules are followed for each patient and with each procedure. Telesurgery communication systems will ultimately impact health care by not only training more surgeons on how to perform sophisticated surgical procedures, but also significantly decrease health care costs. That is, entire surgical teams can be trained without leaving their parent institution. It is clear that for surgeons to perform minimally invasive and robotic techniques, they need teams who can assist in the specifics needs of that procedure..

Telesurgery History

“Telesurgery became a possibility with the advent of laparoscopic surgery in the late 1980s. **Laparoscopy** (also called minimally invasive surgery) is a surgical procedure in which a laparoscope (a thin lighted tube) and other instruments are inserted into the abdomen through small incisions. The internal operating field may then be visualized on a video monitor connected to the scope. In certain cases, the technique may be used in place of more invasive surgical procedures that require more extensive incisions and longer recovery times. Computer-assisted surgery premiered in the mid-1990s; it was the next step toward the goal of remote surgery. The ZEUS Surgical System, developed in 1995 by Computer Motion, Inc., was approved by the Federal Drug Administration in 2002 for use in general and laparoscopic surgeries with the patient and surgeon in the same room. Zeus comprises three table-mounted robotic arms—one holding the AESOP endoscope positioner, which provides a view of the internal operating field, the others holding surgical instruments.”
(<http://www.encyclopedia.com/topic/Telesurgery.aspx>)

Methods

Our academic health center has the expertise to perform complex surgical procedures both through minimally invasive techniques and through the robotic technique using the daVinci system. These surgical techniques are beneficial to patients on several levels including faster recovery times and diminished infection rates. These are common operative complications of major concern throughout the world. Because of the costs associated with bringing surgeons to the US for training and the necessity to not only train the surgeon but also the entire team, including nurses, anesthesiologists and residents, telesurgery is an ideal way to introduce these new techniques internationally.

As a tertiary and quaternary academic health center, we are on the forefront of caring for patients with cutting edge procedures. Because of our expertise, we want to teach other healthcare providers not only in the US but globally. Therefore, Dr. Joseph Barone, of our team assisted in the exploration of telesurgical programs and instruments that would allow real time teaching of these procedures. These systems also had to provide high definition transmission of video in a streaming fashion. Not only do we have telesurgery capabilities, but at our site we also teach surgical techniques through simulation. For example, we were one of the first sites to have the Ross simulator to teach robotics surgery ..



Advantages of telesurgery

One of the reasons that a telesurgery system is useful is its ability to teach advanced techniques, such as robotic surgery, to surgeons both locally and globally. Even if the site does not yet have robotic capabilities, at least the remotely placed surgeons are able to view how robotic surgery is performed. As noted in the diagram, with robotic surgery, the surgeon sits at a console several meters away and through the computer the robotic arms are directed in carrying out the dissection. As clearly noted, the sterile robotic arms are the only objects that enter through the incised skin and therefore recovery time and risk of infection is significantly lower. In addition, because of the computer interface, the normal hand tremor of the surgeon is filtered out. Lastly, this system makes it possible for two and three dimensional visualization of the operative field. Unlike conventional surgery where the surgeon cuts and excises in real time, with a robotic system the surgeon can simulate the maneuver on the console and review it to be sure of its safety and efficacy. If it is the desired maneuver, the remote device is then engaged to perform this task.

Uses for the robotic surgical system

As noted on the *da Vinci* Surgical System website, this method of surgery is used in procedures that treat:

- Bladder Cancer
- Colorectal Cancer
- Coronary Artery Disease
- Endometriosis
- Gynecologic Cancer
- Heavy Uterine Bleeding
- Kidney Disorders
- Kidney Cancer
- Mitral Valve Prolapse
- Obesity
- Prostate Cancer
- Throat Cancer
- Uterine Fibroids
- Uterine Prolapse



Summary

Having a telesurgical system at our academic center, we have the ability to:

- Instruct new surgeons in complex techniques
- Utilize and train surgeons and their surgical teams in developing countries without them having to leave their medical center
- Exchange new techniques and procedures with surgeons on a global basis

Conclusion

As we utilize the image stream system for instruction in advanced surgical procedures, we believe that the global healthcare for all citizens will improve.