



## MEDICAL MALPRACTICE

# Remote Control Surgery: Robots in the Operating Room

By William Maddix and Phyllis Miller

It used to be a given that performing surgery was a hands-on undertaking. But that scenario is fast going the way of the rotary dial phone. Many surgeries these days involve use of cameras, video screens and robots. Surgeries performed using these technologies are called ‘minimally invasive’ due to the small incisions used. The key to minimally invasive surgery is a camera placed inside the patient through a small incision, connected to a video display. The surgeon then manipulates surgical instruments through other tiny incisions. There is virtually no type of surgery untouched by these technological advances.

One of the newest advances in minimally invasive surgery is the Da Vinci Surgical System, which differs from other minimally invasive techniques in several important ways. This system has all the advantages of twenty-first century technology wedded to the knowledge and instinct of a trained surgeon. The system employs a complex robot affixed to a frame above the patient. The robot is operated remotely by the surgeon. Like other minimally invasive surgeries, Da Vinci robotic surgeries employ small incisions and a camera with viewing screen. But the Da Vinci system is different in several very important ways.

The magnifying camera is mounted on the end of one of the robot arms and can twist and turn like a head on a neck. This feature allows greater visibility within a very tiny space. Various instruments are loaded onto the other arms of the robot such as graspers and cutters. These instruments are tiny with movable joints like a wrist. Once the robot is positioned and the surgical field prepared, the robot is lowered into position and the arms are guided into small incisions. Various instruments can be loaded onto the arms as needed. The surgeon, who is sitting with his head inside a

console some distance from the operating table, does not wear gown or gloves while guiding the robot. The surgeon uses hand controls, foot pedals and forehead pressure against a head holder to manipulate the instruments inside the patient's body. A computer translates the surgeon's large, human motions into the miniscule motions carried out by the tiny instruments. The computer even translates the proper pressure for a pinch or grasp and can make tiny stitches smaller than any human hand could ever make. The system allows for precise movements in extremely tight spaces, provides a focused and magnified view of the surgical site and nearly eliminates the miniscule hand tremors all humans have. Although many Da Vinci surgeries take longer to perform than traditional surgeries, their precision is unmatched.

There are, however, some potential disadvantages of robotic surgery. The systems are very expensive and training the surgeons and staff to properly and safely operate them takes time. There is a steep learning curve. A surgeon also has to learn to rely on what he or she sees on the console screen, not what is felt; the robot has no sense of touch.

Most of the complications seen with robotic surgery are the same as those that can happen with laparoscopic or traditional surgery. However, the ability to deal with those situations may be quite different in a robotic surgery. For example, a consultant of another specialty may need to be brought in who is neither adept nor familiar with the operation of the robot. If there is a need to convert to an open-incision surgery to address a problem or a need to institute emergency procedures like CPR, disengaging the robot quickly is a potential concern. All of the arms and camera need to be disengaged and the robot removed from the surgical field. The surgeon also needs to quickly gown and glove. The entire team needs to be practiced and able to quickly act in an emergency.

If you or someone you love is considering robotic surgery, here are some questions you may want to ask in addition to the usual ones about complications and what to expect.

Do you regularly conduct practice drills to get your patients out of the robot in an emergency?

How many of this type of surgery have you done with this robot?

Is the rest of the operating room team similarly experienced?

Robotics are here to stay and doubtless will improve over time as does all new technology. The cost will come down and the experience level of operators will go up. No doubt more and more of us will have the experience of robots in surgery in the near future.



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