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DA VINCI ROBOTIC SURGERY SYSTEM: PROS AND CONS

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Robot-assisted surgery or robotic surgery are any types of surgical procedures that are performed using robotic systems. Robotically assisted surgery was developed to try to overcome the limitations of pre-existing minimally-invasive surgical procedures and to enhance the capabilities of surgeons performing open surgery. The patient exits the hospital and gets back to his normal life in a shorter time after the surgery, which may allow patients to leave the hospital only one or two days after the operation [1; 2].

The Da Vinci Surgical System is a robotic surgical system that uses a minimally invasive surgical approach. The system is manufactured by the company Intuitive Surgical. The system is utilized for prostatectomies, and increasingly for cardiac valve repair, and for renal and gynecologic surgical procedures.

The Da Vinci System comprise a surgeon's console that is typically in the same room as the patient, and a patient-side cart with three to four interactive robotic arms (depending on the model) controlled from the control console separate from the operating table. The arms carry out endoscopy-like maneuvers via end-effectors inserted through specially designed trocars. Robotic arms hold objects, and can act as scalpels, scissors, bovies, or graspers. The final arm controls the 3D cameras. The surgeon uses the controls of the console to manoeuvre the patient-side cart's robotic arms. The system always requires a human operator. The surgeon sits comfortably in the surgical seat and handles the tools that are placed inside the patient. After the surgeon’s movements have been digitalized they are filtered, thinned and transmitted to the computer’s control station, which transfers those movements through an electromechanical interface to the robotic arms and to the tools. A surgical assistant and a scrub nurse are often still needed scrubbed at the tableside to help switch effector instruments or provide additional suction or temporary tissue retraction using endoscopic grasping instruments.

Robotic surgery is characterized by higher speed and it can save time up to 30% compared to conventional operations, and therefore it will be more comfortable for the patient and surgeons.

Accuracy is important when performing the operation, as this can be seen through the doctor’s hand that may be unable to access to the smallest areas of the body. However surgical manipulators and robotic endoscopes provide undeniable precision that helps it to reach the most accurate and sensitive areas during the surgery.

In general surgeries, surgeons are depending on their own vision under the operating room lights, but with robotic surgery, they now have better visibility with the high-resolution and high definition images on the screen they are able to see areas where they could not be able to see before [3].

During surgeries lasting multiple hours, surgeons are standing up all the times, surgeons are prone to fatigue and decreased concentration, but this is not the case in robotic surgery, plus surgeons are sitting comfortably rather than standing up, so they can feel better

and be focused all of the time with good visibility of the magnified 3D image, that leads to more accuracy and fewer errors that might occur in long time surgeries.

Even such the technological wonder as the Da Vinci system has drawbacks. One of the important robotic surgery disadvantages is its high cost for providers and patients as well so it is not a budget-friendly solution for multiple healthcare providers. Sometimes, surgeons depend on their sense in surgery procedures, from their own experience they might feel if something is right or wrong depending on haptic feedback.

A study published in the Journal of the American Medical Association found that side effects and blood loss in robotically-performed hysterectomies are no better than those performed by traditional surgery, despite the significantly greater cost of the system. On April 17, the FDA issued a safety communication urging doctors to avoid use of morcellation in uterine fibroid surgeries. The agency indicated that about one in 350 women undergoing the procedures may have unsuspected sarcoma, which doctors are unable to detect prior to the hysterectomy.

Although surgical robots have some advantages over the human hand, we are still a long way from the day when robots will perform surgery without human involvement. But, with advances in computer power and artificial intelligence, it could be that in this century scientists will design a robot that can locate abnormalities in the human body, analyze them and operate to correct those abnormalities without any human guidance. This will end a lot of randomness and disharmony between the medical team during all surgical procedures, complex surgeries related to delicate tissues and neurology are in dire need of such technology, which contains a degree of accuracy and safety that is not present in conventional operations and is not that much present in ordinary perspectives [4].

All countries of the world are currently witnessing a great development in the field of robotic surgery, as there are many countries developing robots that can execute more complex missions, and who knows, we may see in the future that robots will control a field Surgery where nurses and specialists are replaced by robot arms controlled by one doctor.

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