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“ROBOTIC LAPAROSCOPIC SURGERY VS CONVENTIONAL LAPAROSCOPIC SURGERY”

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INTRODUCTION

Surgery is a technology consisting of a physical intervention on tissues as a general rule, a procedure is considered surgical when it involves cutting of a patient's tissues or closure of a previously sustained wound other procedures that do not necessarily fall under this rubric, such as angioplasty or endoscopy. Surgery is a medical specialty that uses operative manual and instrumental techniques on a patient to investigate or treat a pathological condition such as a disease or injury to help improve body function. The act of performing surgery may be called a surgery procedure or operation. A surgeon is a person who practices surgery and a surgeon's assistance. surgery usually spans minutes to hours, but it is typically not an ongoing or periodic type of treatment all forms of surgery are considered invasive procedures so called noninvasive surgery usually refers to an excision that does not penetrates the structure being excised. Surgery is medical treatment in which someone's body is cut open so that a doctor can repair or remove or replace a diseased or damaged part. The branch of medicine concerned with treating disease, injuries etc. by means of manual or operative procedures except by

incision into the body. The production of a manifold by removing parts of one manifold is placing them with corresponding parts of others. Elective surgery is performed to aid or confirm a diagnosis. Amputation involves cutting of a body part, usually a limb or digit. Replantation involves reattaching a severed body part. Transplant surgery is the replacement of an organ or body part by a insertion of in another from different into the patient. Minimally invasive to insert miniaturized instruments within a body cavity or structure as laparoscopic surgery. Laser surgery involves use of a laser for cutting tissue instead of a scalpel.

Laparoscopic Surgery

It has been used for more than 20years with significant patient benefits over open incision for surgery. During this surgery a surgeon performs a procedure holding instruments. The patient views the surgical area through an endoscopic camera, which projects an image onto a nearby monitor. Robotic-assisted surgery is considered an evolution in minimally invasive surgery both are different surgery but both are invasive surgeries. All this is done by the surgeon by controlling the robotic arm in a computerized manner. So in a robotic

surgery, the robotic arm basically mimics the surgeon's hand movements to perform the operation. However, robotic surgery can be more time consuming than a normal one. Setting up the robotic prior to the surgery takes up considerable time. Still hospitals did not adapt this method. These medical robots include the Marko robotic system, which is a single-purpose robot currently used for orthopedic prosthetic implantation. In the robotic surgery is the freedom of movement for the surgeon in the operating theatre so it is a invasive surgery.

Advantages

- Robotic-assisted surgery is performed through very small incisions, patients may experience.
- Significantly less pain.
- Decreased blood loss.
- Shorter recovery time.
- A faster return to normal delivery time.

Disadvantages

- This is high cost involved
- Possibility of malfunction is high just like all electronics.
- Scars on the body
- Might be not able to make full use of the advantages of the robots if they have not mastered it yet

Robotic Surgery

The da Vinci surgical system provides surgeons with an alternative to both traditional open surgery and conventional laparoscopy, putting a surgeon's hands at the control of a state-of-the-art robotic platform the robotic surgery to perform even the most complex and delicate procedures through very small incision with unwanted precision. Neurosciences and psychology are descriptive sciences, either on the biological or cognitive level with great successes to describe and cure certain diseases. But they are not sufficient to create intelligent systems.

Robotics is the only synthetic discipline to understand intelligent behavior in the natural worlds robotic tells are what the actual problems are when trying to organize the behavior in natural worlds.

Procedure

During robotic-assisted surgery a certified surgeon performs a procedure with their team of highly trained nurses and operating room staff while sitting at a specialized surgical console. The surgeon views a high definition, 3D image of the surgical site and uses the platform to control four robotic arms. The arms hold a camera and instruments and carryout the surgeon's every command.

Robotic-Assisted Surgery

The leading-edge equipment used during robotic assisted surgery allows provides to perform procedures with extreme precision. This makes the technique ideal for many basic and complex surgeries some of the robotic-assisted surgeries current we are using

- Colorectal surgeries
- General surgeries
- Gynecologic surgeries
- Urological surgeries

The robotic surgery is also different from laparoscopic surgery because. These two surgeries are minimally invasive surgery.

Open surgery or Traditional surgery

This is a man-made surgery. It is the traditional type of surgery in which an incision is made using a scalpel. The surgeon then inserts the instruments and conducts the surgery, if they involve common surgical procedure or settings, such as use of a sterile environment, anesthesia conditions, typical surgical instruments and suturing or stapling. All forms of surgery are considered as invasive procedures so called noninvasive surgery usually refers to an excision that does not penetrate the structure being excised. All the

instruments must be sterilized and an instrument must be replacing or reserialized if it became contaminated. Operating staff must wear sterile like scrubs, a scrub cap, sterile surgical gown, sterile latex, surgical mask and they must scrub hands with an approved disinfectant agent before each procedure.

Procedure

In this type of surgeries an incision is a cut made into the tissues, bone or organ so that a surgical procedure can be performed. An incision is typically made with a sharp instrument such a scalpel, is extremely sharp and leaves the skin and tissues with clean edges that are able to heal well. It is a common misunderstanding that an incision cut

order to allow the surgeon to access the surgical site for this reason an incision may appear to have healed on the surface in only a week or two but can take months to reach full strength as the underlying muscle and tissues continue to heal. As an incision heals, the wound fills in with new tissues called granulation or granulating tissue. Even though it is a time-consuming process but it is very accurate success rate is high in this of surgeries.

Advantages

- The healing process is much less pain
- Reducing risk of post-operative infections
- Preferences is more prone to open surgery
- It avoids blood clots than the robotic surgery

Disadvantages

- Time consuming process
- Blood loss is heavy
- Stay time in hospital is more
- Healing process is slow

Robotic Surgery Vs Traditional Surgery

In most of the cases we have studied that the procedure, there were mechanical problems as the robotic arms were not responding as expected. The robotic technology and ultimately was able to complete the procedure. The operation took twice as long as expected. If had been successful but postoperatively the patient developed serious bleeding requiring multiple blood transactions and the patient requires several additional surgeries and a prolonged hospital stay because of heavy blood loss. It is a fast process but it has more disadvantages the patient may die in severe problems. The failure rate is high in robotic surgery. And the operator should more experience about the machine and working. Robotic surgical systems have the potential to improve surgical technique and outcomes but they also create a unique set of risks and patient safety concerns.

Not only one robotic surgery traditional surgery all fails in severe conditions. But they are rare in some cases like difficulty in surgeries mostly cardiac surgeries. Some of the situations like heavy blood control, controlling Bp falls at the time of operation, heart rate increases patient may panic due to tension etc.

CASE STUDIES

Case-1: This case involves a male patient in Washington who underwent a robotic procedure, and then suffered post-operative bleeding leading to his death. The patient underwent a procedure to remove part of his prostate, which concluded without incident. Immediately after the procedure, the patients' hemoglobin was measured, and over the next few hours were noted to have dropped. Doctors continued to monitor his hemoglobin, which eventually stabilized. A few hours later, the patient began to complain of chest

pain and weakness and coded shortly afterwards. It was later revealed that the man had been bleeding internally.

Case-2: A 62 years old man presented with high grade transitional cell carcinoma of the bladder. A year before, he had a left nephrectomy for renal carcinoma, performed with traditional open surgery. His remaining kidney functions poorly, making him dependent on dialysis. At this time, the patient required resection of the bladder and because of the risk of future cancer to the prostate and the malfunctioning kidney was advised to have them removed at the same time. The entire procedure was done with a minimally invasive, robotic-assisted procedure through fire 1cm incisions and one larger incision to remove the organ. All three organs could be removed in one piece also with the urethra. The minimally invasive approach offers major advantages over a traditional open approach. Since there is no need to cut through muscle recovery time is faster. The patient returned home in two days.

Compared with one and half weeks required for open surgery and experienced less pain and a faster return to normal activity. Other advantages include less blood loss, risk of infection and scarring. More than a year later, the patient is doing well and remains cancer free.

Case-3: A 67 years old man presented with transitional cell carcinoma of the bladder and urethra in addition to adenocarcinoma of the prostate.

The required removal of the prostate, one third of the bladder, the distal one-third of the urethra and the right kidney. Reconstruction was required with urethral re-implementation on the right side. The entire surgery was performed in a single robotics-assisted, minimally invasive procedure in six hours, about the same time one would expect for a

traditional open approach. Nine months later, the patient in doing well follow up every three months post operatively with CT and Cystoscopy has revealed no evidence of cancer recurrence.

Case-4: Software Failures

The da Vinci has very few software errors recorded, but in one case, a patient sued the manufacturer after undergoing a prostatectomy at Bryn Mawr hospital in June 2005. In this case, there were error messages coming up on the screen and the surgery had to be aborted. The robot was then examined by both the hospital staff and the manufacturer, neither of which could apparently find the software problem nor were able to fix the problem.

Later on, the patient found he was bleeding whenever he went to the bathroom and that he suffered from erectile dysfunction which he attributed to damages from the aborted surgery. He sued the manufacturer but the ruling stated that he did not provide enough evidence to show without a reasonable doubt that the software issues experienced in the surgery was the root cause of his new medical issues.

In this case, testing the robot out prior to surgery may help highlight possible problems during the surgery and if the surgeon should look for alternative surgical procedures.

Case-5: Failures due to Operator Errors

One of the over-arching concerns that medical robotics brings is the possible increase in the severity of surgical mishaps. For example, if a surgeon was to go through a traditional surgery, the possible damage done by dropping an instrument would be felt but might not have been as severe as with a robot's arm falling off onto the patient or having the entire system freezing in place. Operator training then comes to the foreground as only the proper training will alleviate.

Possible room mishaps.

In one study, surgeons reported not feeling comfortable with operating until experiencing 15 to 18 surgeries. Furthermore, studies have revealed the learning curve that surgeons face when first operating machines such as the da Vinci or Robodoc. Results from these studies reveals a longer operating time, more blood loss, and in different cases where surgeons were not properly trained, possible severe harm to the patient.

Case-6: A 40-year-old female was planned for robot-assisted repair of vesicovaginal fistula. Following port placement and docking, the monopolar scissors got stuck in the cannula during insertion. The instrument could neither be advanced nor withdrawn from the cannula. The system did not show any error signal or alarm. With some force, the scissors could be removed from the cannula. Assuming that there was a problem in the pulley system of the drape, the drape connection to the arm was checked and was found to be alright. We then inserted bipolar forceps which were reintroduced after cleaning the pulleys on the scissors, but again the same problem occurred. Moreover, this time the scissors could not be brought out even with force. This time again there was no alarm and the emergency grip release wrench were of no use. Ultimately, de-docking was required to remove the robotic arm along with the cannula and the instrument from the patient. The cannula was forcefully pulled away from the scissors to remove it. On close inspection, it was revealed that the tip-cover accessory of the scissors was over advanced on to the shaft beyond the orange line during instrument preparation.

Case-7: In the not so distant future, AI-controlled robots will almost certainly enslave humanity and make us all wish

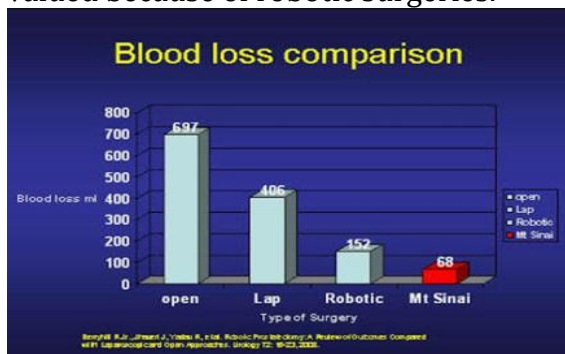
we could go back to the Stone Age, but for now, they're actually pretty helpful machines. In fact, they're even saving human lives in entirely new ways, and surgeons from the Maastricht University medical center in the Netherlands completed the first robot-assisted super microsurgery. The robot was used to suture vessels measuring as small as 0.3 millimeters across in order to treat lymph edema in a patient. It's such an incredibly delicate procedure that very few surgeons on the planet will even attempt, and this is the first-time robotic assistance was used for such an operation. But despite it being a medical first, it seems everything went off without a hitch.

CONCLUSION

In a robotic system not only is there potential for human error in operating the robotic technology but an added risk of mechanical failure is also introduced. Multiple components of the system can malfunction, including the camera binocular lenses, robotic arms and instruments. If any part of the robot fails in working then the risk to the patient is high. The availability of seeing the surgery may panic the patient. NYC'S Langone robotic surgery center alone performs about 1,800 robotic surgeries every year using one of "five-state of the art da Vinci research surgical systems". However, BBC reported that a study into the safety of surgical robots over a 14-year period in the US has linked the machines used to at least 144 deaths and more than 1,000 injuries during medical malfunctions that include "broken instruments falling into patient's bodies", electrical sparks causing tissue damage, tissue burns and system errors making surgery take longer than planned". Computer-assisted robotic arms are very expensive and that is why hospitals are not too keen on their implementation.

Furthermore, the surgeons need to undergo paper training for the complete know how of robotic instrument when the surgeon starts using the robotics, initially the surgeries might take more time. Since, the surgeons will get accustomed with the new procedure.

Training in robotics is still a relatively new field, and there is not a strong body of evidence to support a specific training and credentialing model most of the doctors are discouraged due to robotic surgeries because the patient is not self-ability to perform the operation. The medical study for doctors is not valued because of robotic surgeries.



Due to the statistics using the doctor are discourage or disappointed to do operating the capability of the doctor decreases. But in reality, the accurate surgeries done by the specialist doctor's only non-machine cannot do all surgeries. Despite high operative cost, Robotic laparoscopic surgery (RLS) doesn't result in statistically better treatment outcomes, with the exception of lower estimate blood cost. Operative time and total complication rate are significantly more favorable in Conventional laparoscopic surgery (CLS).

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