Robotic Surgery a boon or a bane

**Team ID: A2-**

Abstract

*Purpose statement of this paper is to explain the extent to which robotic surgeries are being reliable .Creating awareness about the advantages and disadvantages of robotic surgery.The purpose of this study is to explore some of the different advantages that persuade us to motivate people to rely on robotic surgery and to make them aware of the uncertainties of robotic surgery. The study seeks to answer the research question* *How are robots trustworthy for surgery? The goal is to analyze pros and cons of robotic* *surgery. To answer this question we will take a gander at the likelihood that automated surgery might be a case of turnaround adjustment, where the innovation drives the social contract between the specialist and patient. Also we will take a gander at the effects automated surgery will have on conventional parts of the restorative morals of surgery, for example, educated assent, self-sufficiency of specialists and patients, corporate showcasing, and the obligation to give the best accessible care, and also expanding the asymmetry of the trust connection amongst specialist and patient. It will be contended that these issues will develop in vital as future robot surgery frameworks acquire self-sufficiency in making or recommending surgical procedures.*

**INTRODUCTION**

Robotic surgery, surgery is a term for technological development that uses robotic systems to carry out surgical procedures. Robotically-assisted surgery was developed to overcome the limitations of pre-existing minimally-invasive surgical procedures and to aggrandize  the capabilities of surgeons performing open surgery.

In the case of robotically-assisted minimally-invasive surgery, instead of directly moving the instruments, the surgeon uses one of two methods to control the instruments; either a direct telemanipulator or through computer control. A telemanipulator is a remote manipulator that allows the surgeon to perform the normal movements associated with the surgery simultaneously the robotic arms carry out those movements using end-effectors and manipulators to perform the actual surgery on the patient. In computer-controlled systems the surgeon uses a computer to control the robotic arms and its end-effectors, though these systems can also still use telemanipulators for their input. There are so many advantages of robotic surgery including remote surgery, negligibly intrusive surgery and unmanned surgery etc.

But indeed has some disadvantages including high technicality, nonavailability in all places, highly expensive, and chance of uncertainty etc.

On account of upgraded open surgery, self-ruling instruments supplant customary steel apparatuses, playing out specific activities, (for example, rib spreading) with much smoother, controlled movements than could be accomplished by a human hand. The fundamental goal of such shrewd instruments is to decrease or dispose of the tissue injury generally connected with open surgery without requiring more than a couple of minutes' preparation with respect to specialists. This approach looks to enhance open surgeries, especially cardio-thoracic, that have so far not profited from insignificantly intrusive methods.

This type of surgery has been censured for costing $1,500 to $2000 more per patient.

This type of Surgery has been utilized as a part of many sorts of pediatric surgical systems including: tracheoesophageal fistula repair, cholecystectomy, nissen fundoplication, morgagni's hernia repair, Kasai portoenterostomy, intrinsic diaphragmatic hernia repair, and others.

**LITERATURE REVIEW**

Robotic surgery means carrying out surgical operations with the help of robots.

**HISTORY AND BACKGROUND OF ROBOTIC SURGERY**

• The world's first surgical robot was the "Arthrobot", which was created and utilized without precedent for Vancouver, BC, Canada in 1983. The robot was produced by a group drove by Dr. James McEwen and Geof Auchinlek, in a joint effort with orthopedic specialist, Dr. Brian Day. National Geographic created a motion picture on mechanical autonomy which included the Arthrobot. In related tasks around then, other therapeutic robots were created, including an automated arm that performed eye surgery and another that went about as a working right hand, and gave the specialist instruments in light of voice summons.

On 17 January 2002, surgeons at Children's Hospital of Michigan in Detroit performed the nation's first advanced computer-assisted robot-enhanced surgical procedure at a children's hospital.In 2001, Children's Hospital Boston was the first pediatric hospital to acquire a surgical roboT.

• In 1985 a robot, the PUMA 560, was utilized to put a needle for a mind biopsy utilizing CT direction.

• In 1988, the PROBOT, created at Imperial College London, was utilized to perform prostatic surgery.

• In 1992, the ROBODOC from Integrated Surgical Systems was introduced to process out exact fittings in the femur for hip substitution.

Encourage advancement of automated frameworks was completed by Intuitive Surgical with the presentation of the da Vinci Surgical System and Computer Motion with the AESOP and the ZEUS mechanical surgical frameworks.

Natural Surgical purchased Computer Motion in 2003; ZEUS is never again being effectively showcased.

The da Vinci Surgical System includes three parts: a specialist's reassure, a patient-side automated truck with 4 arms controlled by the specialist (one to control the camera and three to control instruments), and a superior quality 3D vision framework.

Articulating surgical instruments are mounted on the automated arms which are brought into the body through cannulas. The specialist's hand developments are scaled and separated to dispose of hand tremor then converted into smaller scale developments of the exclusive instruments.The camera utilized as a part of the framework gives a genuine stereoscopic picture transmitted to a specialist's reassure.

The da Vinci System is FDA cleared for an assortment of surgical methodology including surgery for prostate tumor, hysterectomy and mitral valve repair, and is utilized as a part of more than 800 clinics in the Americas and Europe. The da Vinci System was utilized as a part of 48,000 methodology in 2006 and offers for about $1.2 million.

**STRATEGIES AND MEASURES**

L. D. Britt, MD, MPH, FACS, a Past-President of the American College of Surgeons (ACS), assumes an influential position in various associations that set the arrangements for general surgery preparing. As indicated by Dr. Britt, "While our train needs to proceed 'to push the edge of the envelope' as for grasping propelled innovation, it is similarly basic that any advancement (counting mechanical surgery) has a recorded demonstrated advantage in light of confirmation/result examination. As the stewards of our assets, we should likewise advance cost adequacy." (Personal correspondence with Dr. Griffen, January 2013.) These necessities are obviously expressed in an ACS Committee on Emerging Surgical Technologies and Education (CESTE) arrangement going back to 1995 titled Statement on Issues to be Considered Before New Surgical Technology Is Applied to the Care of Patients.9 Dr. Britt calls attention to that in spite of the fact that the College's pioneers are strong of seeking after mechanical innovation, they are worried that, so far, little information are accessible to legitimize it. All things considered, there is some positive thinking that critical applications for mechanical autonomy will advance that will grow the extent of general surgery past current limits. Right now, creating last approach with respect to these issues is untimely.

**ADVANTAGES/BENEFITS OF ROBOTIC SURGERY FOR PATIENTS**

The benefits of robotic assisted surgery are numerous in light of the fact that they conquer a large number of the hindrances of laparoscopic surgery. They increase dexterity, restore proper hand-eye coordination and an ergonomic position, and enhance representation .Also; these robotic systems make surgeries that were in fact difficult or impractical before, now conceivable. One advantage of using the robotic surgery is that the surgeon does not have to be present, but can be anywhere in the world, leading to the possibility for remote surgery.

Robotic surgery provides less injury and scars to the body and more significant specialist accuracy gives the accompanying advantages over conventional open systems including: short hospital stay due to faster healing, less blood loss, less painless confusions, including less danger of disease, including less risk of infection, faster return to normal activities. These robotic systems are planned so that the surgeon's quivering can be remunerated on the end-effectors movement through suitable equipment and programming ﬁlters. Moreover, these systems can scale developments so that extensive developments of the control grasps can be changed into micro motions inside the patient.

Contrasted and other insignificantly obstructive surgery approaches, robot-helped surgery give the specialist better control over the surgical instruments and a superior perspective of the surgical site. Likewise, specialists and surgeons no longer need to remain all through the surgery and don't tire too fast.

These automated frameworks kill the support impact, making instrument control more natural. With the specialist sitting at a remote, ergonomically planned workstation, current frameworks likewise dispose of the need to wander aimlessly in unbalanced positions to move the instruments and envision the screen. By most records, the upgraded vision managed by these frameworks is noteworthy. The 3-dimensional view with profundity discernment is a checked change over the ordinary laparoscopic camera sees. Likewise further bolstering one's good fortune is the specialist's capacity to specifically control a stable visual ﬁeld with expanded magniﬁcation and mobility. The majority of this makes pictures with expanded determination that consolidated with the expanded degrees of opportunity and improved ability instrument control more natural. With the specialist sitting at a remote, ergonomically planned workstation, current frameworks likewise dispose of the need to wander aimlessly in unbalanced positions to move the instruments and envision the screen. By most records, the upgraded vision managed by these frameworks is noteworthy. The 3-dimensional view with profundity discernment is a checked change over the ordinary laparoscopic camera sees. Likewise further bolstering one's good fortune is the specialist's capacity to specifically control a stable visual ﬁeld with expanded magniﬁcation and mobility.

**PRACTICAL USES OF SURGICAL ROBOTS TODAY**

**In today’s medicinal services showcase, numerous associations are keen on making themselves pioneer company with the most progressive mechanical hardware.. Doing as such permits those to catch a greater amount of the medicinal services advertise.**

Improvement of apply autonomy is impelling enthusiasm for new tissue anastomosis procedures, enhancing laparoscopic instruments, and advanced coordination of effectively existing advances.

Utilizations of mechanical surgery are growing quickly into a wide range of surgical controls. The cost of obtaining one of these frameworks stays high, notwithstanding, making it impossible that an establishment will gain. This low number of machines and the low number of specialists prepared to utilize them makes fuse of apply autonomy in routine surgeries uncommon. Regardless of whether this progressions with the growth of time stays to be seen.

**FUTURE SCOPE IN ROBOTIC SURGERY TOWARDS HEALTH CARE**

In today’s modern world and age of cutting edge innovation, we are at long last making gigantic steps with regards to the restorative field. The most recent and most creative innovation that is found in the restorative field today is basically: robots. More are we seeing robots that are helping the specialist in the working room. These robots will help numerous patients consistently, particularly as the innovation is idealized and redesigned.

Envision that you have recently found that you have prostate tumor. The simple considered having this ailment is overwhelming, not to mention facing a surgery too. On the off chance that you wind up having all or some portion of your prostate expelled the specialist will likely suggest that you have an automated prostatectomy. This system will definitely diminish the measure of recuperation time that is normally connected with any surgery including the prostate.

Another real region where robots are much utilized is for heart surgery. Despite the fact that the innovation for performing automated heart surgery is costly and hard to locate, the general outcomes being seen from the utilization of a robot amid heart surgery are great to the point that we ought to see this innovation turn out to be more available throughout the following quite a while. The utilization of a robot for heart surgery brings about a less obtrusive methodology which thusly gives a faster recuperation time also.

Hysterectomies are the second most normal surgery that is played out every year. A huge number of ladies require the expulsion of their uterus for an assortment of reasons. Ladies may have this method because of wild draining or for malignancy too. An ever increasing number of hysterectomies are being performed by the help of a robot. The utilization of a robot to play out a hysterectomy is profoundly helpful to every patient. Similarly as with the prostatectomy and heart surgery, a hysterectomy performed by a robot likewise brings about a less obtrusive technique with shorter recuperation times. Another advantage for most ladies is that they will likewise observe less scarring accordingly of the methodology. There are numerous healing facilities that give this mechanical methodology.

**CHALLENGES IN ROBOTIC SURGERY**

There are several disadvantages of using robots as a means of surgery. These high tech technologies are not available everywhere. Many developing countries have to struggle much more to introduce such technologies. Since the technology is new and has not been tested yet so it is very difficult to rely on new technologies. It become very hard for the patient to trust on such a technology whose success is not sure. In the first place of all, automated surgery is another innovation and its uses and viability have not yet been settled. Detailed study of these topics has not been done yet .Moreover training doctors so that they can use robots as a means of surgery is a difficult. Numerous methods will likewise must be upgraded to advance the utilization of mechanical arms and increment productivity. Nonetheless, time will doubtlessly cure these inconveniences. Cost is another major disadvantage. With a sticker price of a million dollars, their cost is about restrictive. Regardless of whether the cost of these frameworks will fall or rise involves guess. Some trust that with upgrades in innovation and as more experience is picked up with automated frameworks, the cost will fall. Others trust that changes in innovation, for example, haptics, expanded processor paces, and more unpredictable and skilled programming will expand the cost of these systems. Also at issue is the issue of updating frameworks; how much will healing centres also, medicinal services associations need to spend on overhauls and how frequently? Regardless, many trust that to legitimize the buy of these frameworks they should increase broad multidisciplinary use. Another disservice is the extent of these frameworks. Both frameworks have generally huge impressions and moderately bulky mechanical arms. This is a critical detriment in todays as of now swarmed working rooms. It might be troublesome for both the surgical group and the robot to fit into the working room. Some recommend that scaling down the mechanical arms and instruments will address the issues related with their present size. Others trust that bigger working suites with numerous blasts and divider mountings will be expected to suit the additional space necessities of automated surgical frameworks. The cost of preparing for these robots and the cost of the robots themselves make them a particularly costly innovation. One of the potential weaknesses distinguished is an absence of perfect instruments and hardware. Absence of specific instruments builds dependence on tableside collaborators to perform some portion of the surgery. This, notwithstanding, is a transient impediment since new advancements have and will create to address these weaknesses. The vast majority of the impediments recognized will be cured with time and changes in innovation. Just time will tell if the utilization of these frameworks legitimizes their cost. On the off chance that the cost of these frameworks stays high and they don't diminish the cost of routine strategies, it is impossible that there will be a robot in each working room and therefore impossible that they will be utilized for routine surgeries.

**SAFETY ISSUES**

The medical field—and surgery specifically—has had some quick advances in the recent decades because of innovation. The utilization of PCs has changed everything from the way persistent therapeutic records are kept to the utilization of small instruments amplified on a screen amid laparoscopic operations. And after that there's mechanical surgery—or all the more precisely, PC helped surgery. It would have seemed like sci-fi to discuss mechanical surgery as of late as the 1970s, yet it's really ending up noticeably very normal today in everything from heart surgery to hair transplants. Shockingly, there are once in a while chances that stain it a bit. For instance, new research recommends a relationship between mechanical surgery and almost 150 patient passing.

The review, which was led as a joint wander between the University of Illinois at Urbana-Champaign, Massachusetts Institute of Technology in Cambridge, and Rush University Medical Centre in Chicago, found that there were 144 occurrences of death and more than 1,000 wounds in which utilization of a surgical robot may have been a contributing factor. The information was incorporated through reports got by the United States Food and Drug Administration from doctor's facilities, patients, and different gadget makers. When they investigated the majority of the data that had been presented, the researchers found an aggregate of 144 passing, 1,391 wounds, and 8,061 gadget breakdowns occurred amid automated surgery techniques throughout the 14 years whereupon they were centring (from January 2000 through December 2013). At the point when exhibited in this way, it sounds like a great deal of unnecessary enduring that could have conceivably been maintained a strategic distance from had the mechanical gadgets not been utilized

**Methodology**

We will conduct a multisite case study in four big hospitals of Jaipur that is in a developing country and will take feedback from the patient.   The review will be in three stages. In Phase I, dim writing will be looked into to recognize partners' speculations concerning how automated surgery winds up noticeably installed into surgical practice and its effects. These speculations will be refined and added to through meetings directed crosswise over English clinics that are utilizing automated surgery for rectal malignancy resection with staff at various levels of the association, alongside an audit of documentation related with the presentation of mechanical surgery. In Phase II, a multi-site contextual analysis will be directed crosswise over four English healing centres to test and refine the applicant speculations. Information will be gathered utilizing numerous strategies: the organized perception device OTAS (Observational Teamwork Assessment for Surgery); video recordings of operations; ethnographic perception; and meetings. In Phase III, meetings will be led at the four case destinations with staff speaking to a scope of surgical controls, to evaluate the degree to which the consequences of Phase II are general sable and to refine the subsequent speculations to mirror the experience of a more extensive scope of surgical orders. The review will give (i) direction to medicinal services associations on components liable to encourage fruitful usage and joining of automated surgery, and (ii) direction on the most proficient method to guarantee viable correspondence and collaboration when undertaking mechanical surgery.

**SUMMARY**

Robotic surgery is an emerging technology that uses robots to accompany surgeons during open surgery. Robots are trained by experienced surgeons to operate the patient. There are many advantages of robotic surgery such as presence of a surgeon during the operation is not mandatory as surgeon can give instructions to robot, less blood loss, improved surgery, less pain to patient, made unfeasible surgery possible ,Though it takes more time in robotic surgery but healing time for robotic surgery is faster, thus it is fruitful etc. Disadvantages includes highly expensive, less availability in many places, unproven benefits etc.

Though it takes more time in robotic surgery but healing time for robotic surgery is faster, thus it is fruitful.

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