ROBOT-ASSISTED MINIMALLY INVASIVE SURGERY (RAMIS)

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INTRODUCTION

Robot, a word came from the check word robot which suggests forced labor. In 1993, first Automated Endoscopic System for Optimal Positioning (AESOP) prototype robot was used clinically and then marketed as the first surgical robot. It is the world's first surgical robot certified by the FDA in the USA.

Later, different robot prototypes like the Endoassist (Armstrong Healthcare Ltd., High Wycombe, Buck, UK), FIPS endoarm (Karlsruhe Research Center, Karlsruhe, Germany) have been developed which increases the utility of Surgical Robots [1-5].

The most widely used *da Vinci* a prototype robot, which was a master-slave manipulator with three arms, one for the camera and two for operating the instruments used in various fields such as urology, general surgery, gynecology, cardio-thoracic, pediatric and ENT surgery came in to existence in 1997. This has proved to be a breakthrough technology and stood the test of time since its origin. The advent of artificial intelligence has hyperbolic the utilization of minimally invasive surgery among laparoscopically naïve surgeons and swollen the repertoire of full-fledged surgeons to incorporate a lot of advanced and complicated reconstructions [2,6-8].

THE *da Vinci* SURGICAL ROBOT

The *da Vinci* surgical robot has been bit by bit upgraded from the primary three-arm system to the current four arms, light weight and more versatile version called the S-Type. The system basically has three components: the robotic cart, the surgeon console and the endoscopic stack or column. The system has technical option which significantly augments the quality and control of the visual field and thus enhances the dexterity of the surgeon. It delivers a high quality three dimensional (3-D) vision to the surgeon manning the console [9-13]. This technology permits intuitive tele manipulation with tremor conclusion, motion scaling and endo-wristed instruments. This is often basically gives this technology an edge over the endoscopic technology which has been prevailing over the last two decades and overcomes number of the pitfalls of standard laparoscopy which have probably restricted the capabilities of the surgeon in the field of minimally invasive surgery [14,15].

APPLICATIONS

- The system was designed to be used in minimally invasive surgery. However, it is used for open surgery also.

- Procedures like ablation, Nissens' fundoplication, adrenalectomy, rectopexy, cardiomyotomy, herniation repair and bariatric surgery were developed to be performed with conventional instruments with the robotic technology.

- Surgeries improved with the robot- radical prostatectomy, radical cystectomy, pyeloplasty, partial nephrectomy, ureteric reimplantation, major hepatectomy, spleen conserving pancreatectomy, esophagectomy, stomachic bypass, gastrectomy, nephrectomy, Heller's cardiomyotomy, pulmonary resections, pneumonic resection (with TME), troublesome splenectomies [16-19].

To conclude, robotic surgery is an already well-established technology being employed across the globe. Currently the urologists and general surgeons are the frontrunners as far as the *da Vinci* system is concerned. Surgeons like Gynaecologists, paediatric, cardio-thoracic, ENT are taking the cue and incorporating it in their individual fields and the applications of the *da Vinci* are increasing day by day. The education curve for advanced abdominal minimally invasive surgeries is sustained and long however achievable at specialised centers with a high volume of cases.

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