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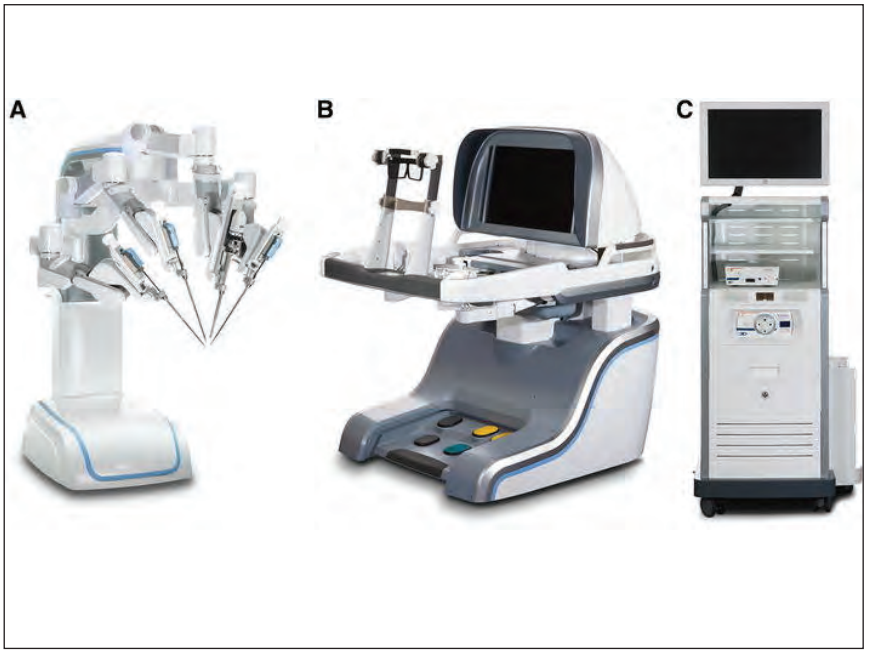
ROBOTICS

THE FUTURE OF SURGERIES

Use of intra-operative aids like image-guided navigation will also play a greater role in robotic surgery in the future, informs **Dr Vivek Venkat, Consultant,Uro-Oncology & Robotic Urology, Nanavati Super Speciality Hospital** in an interview with Neha Wagle.



Initially developed with a view to perform surgery on the battlefield, robotic surgery has grown by leaps and bounds in the last two decades. Today it has become one of the most important tools a surgeon has, allowing for precise surgery with the added benefits of minimal-invasive approach.

Can you brief our readers what are the inventions happening in robotic surgery?

Global market of robotic surgery is expanding every minute with new companies investing in development of robotic systems to intensify competition and cost reduction. The Cambridge Versius system, which is available in markets, allows most of the functionality of the Da Vinci System. A South Korean system (Revo-i) has also started human testing and a Chinese surgical robot is under research and development process.

The new systems are designed to track the surgeon's eye movement as potential means to control the robotic camera instead of the traditional foot pedal. Further miniaturisation of instruments and access through a single incision (single-port) system are also under development. This may be important, particularly in paediatric cases. Research using pressure sensor or different components like 'tactile gloves' to provide touch feedback (haptic feedback) to the surgeon is ongoing and this could be a real game changer for the surgeon. Use of intra-operative aids like image-guided navigation will also play a greater role in robotic surgery in the future. Training and simulation modules to replicate surgical challenges and difficult cases will allow better training of surgeons. Use of robotics for tele-surgery using strong 5G communication networks could allow the benefits to reach more people at distances; however this needs a lot more research.

What are the drawbacks of robotic surgery and minimally invasive surgeries as per your personal experience?

One of the main drawbacks of any minimally-invasive surgery is the loss of touch with the surgeon's fingers (haptic feedback). During robotic surgery the surgeon relies purely on vision to operate. However, with adequate training the surgeon can rely very well on visual cues to operate. But in certain large and advanced tumors it is safer to do traditional open surgery as access is very important for complete removal.

Another predominant drawback is additional costs and unavailability of medical insurance packages for robotic surgeries. However, there are significant advantages to robotic surgeries for uro-oncological procedures like prostatectomy for prostate cancer and partial nephrectomy for kidney cancer. A large section of well-informed patients and their families reciprocate these advantages and willingly bear the additional expense for a much better outcome. With intense competition in the robotic surgery field, hopefully the costs will substantially reduce in the future.

Training in robotic surgery remains a roadblock for many surgeons and improvement in stimulation and training modules would make a significant impact. The integration of machine learning with large databases could give surgeons guidance by allowing a step-by-step guide. Such integration between robotic systems, operating rooms and databases of trainers or videos would help overcome a surgeons' initial learning period.

What do you have to say about AI in healthcare segment?

Artificial Intelligence (AI) is a buzzword on everyone's lips today. AI will play a huge role in healthcare of the future. Certain jobs involving pattern recognition like pathology and radiology are likely to increase dependency on machine learning algorithms with physicians playing a supervisory role.

Clerical jobs in healthcare, including billing, lab work, etc. may have already started using AI tools but present diagnostic algorithms have not shown to be accurate enough to replace a human physician and depend on human guidance.

Verb Surgical (a company formed by Johnson and Johnson with Google) are working on completely automated surgery and recently reported on autonomous suturing using their device. However, the time when AI can completely take over a surgical procedure may need a few years.

At present, AI plays a significant role in pre-surgical planning, intra-operative 3-D imaging and navigation for precise and subtle operations. People expect that ultimately robots will replace surgeons and actually perform the surgery. Nevertheless, I believe that this still remains well in the future. However, given the speed at which AI research is progressing, one never knows when surgeons' job could be under threat. ✚