



Challenges in Initiation and Running an ENT, Head and Neck Robotic Surgery Program in our Country

Kalpana Nagpal^{1*}, Malik ND¹, Nishant Rana¹, Chitra Chatterji² and Avani Aeron¹

¹Department of ENT and Head and Neck surgery, Apollo Hospitals, Indraprastha, India

²Department of Anesthesiology, Apollo Hospitals, Indraprastha, India

Abstract

To initiate and run the robotic program successfully has been a very challenging task for us. This program at our hospital which is one of the largest corporate hospitals in India started three years ago. We have done 135 cases so far. In developing countries starting such a program involved high costs of training as there is no ENT, head & neck robotic surgery training program here and non-availability of trained robotic surgeons is added disadvantage. Running the program successfully has also been met with a range of challenges. There are various reasons or drawbacks here as to not having very large numbers in our series despite having excellent feedback from almost every patient that underwent robotic surgery at our setup.

Keywords: ENT and head and neck surgery; Robotic program; Challenges and training

Introduction

Surgical robot (da Vinci, Intuitive Surgical, CA, USA) was introduced in India in 2006 and since then over 70 robots are functional in various parts of India [1]. To the best of our knowledge, they are mainly restricted to handful of high volume specialty centers of few major cities of India only. Though India is a developing country, robotic assisted surgeries has undergone a substantial growth since its introduction and it is following surgical revolution relatively with a slower pace as compared to developed countries. Despite the enthusiasm and efforts of the surgical fraternity robotic cases and procedures are rising, but we are still facing diverse challenges to set up a platform for robotic surgeries. Having said that, there is no doubt that India is already prepared for robotic surgery; it has yet not occupied the center stage. There are numerous challenges that India is facing and has to face ahead also in placing the robotic surgery at the core of surgical world.

When we talk about robot in India, Urology forms the base and bulk of robotic surgery. Though the first robotic system was introduced in 2006 in India and ever since it is utilized mainly by Urology, Cardiothoracic, Orthopedics and Gynecology specialties. But what about ENT and head & neck surgery? When will ENT and Head & Neck surgery achieve this revolution in our country?

In developed countries like USA, South Korea and Japan, the utilization ratio of robot in the field of ENT and head and neck surgery is increasing day by day. But India is still far behind to add the robotic surgery in its armamentarium. However, some centers in India are achieving milestones in robotics and tables are turning now. The main obstacle in Indian hospitals is the wide social, technological and economical gap, due to which it is challenging to establish a proper robotic surgery program.

Indeed, evidence based medicine has proven robotic surgery a superior tool in surgical world in many aspects, still it is lacking the space in surgical revolution in India. Robotic assisted surgeries in ENT, head & neck may greatly expand the scope of minimally invasive surgeries and will be of great benefit over the coming years. Our objective is to describe the prevailing situation of robotic surgery in ENT and head & neck surgery in India and the challenges we have been facing in initiating and running an ENT, head & neck robotic surgery program.

Robotics in ENT and Head and Neck Surgery

Robotic surgery in ENT is the breakthrough that is emerging in the medical world. Robotic assisted surgery allows us to move beyond the limitations of the human hand in performing meticulous and delicate tasks [2]. Robotic surgery in our field is mainly indicated for diseases of oropharynx (including obstructive sleep apnea) and supraglottis with better functional outcomes

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*Correspondence:

Kalpana Nagpal, Department of ENT and Head and Neck surgery, Apollo Hospitals, Indraprastha, New Delhi, India,

E-mail: kalps_apollo@yahoo.co.in

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without compromising oncologic results and attenuating adjuvant radiotherapy [3].

With experience, a robotic ENT surgeon can perform multiple procedures with improved efficacy and optimal outcomes. Robotic technology seems perfectly suited for ENT and head & neck surgery which are performed in a concise space, thereby providing easier access, less tissue damage helping in less blood loss, less pain score and speedy recovery, with shorter hospital stay. Robotic articulated arms offers the distinct advantage of wide range of motion of up to 360 degrees, when working in difficult areas like oropharynx and supraglottic region. It makes the surgeries minimally invasive and extremely precise, eliminates physiological tremors, provide magnified three-dimensional high definition vision, improve dexterity by using Endowrist instruments with seven degrees of freedom and motion scaling [4,5].

Current Overview of Robotics in ENT in India

The rise of robotic assisted surgery is more pronounced in the developed world. USA, Europe and South Korea have adopted the robotic assisted surgery swiftly over the past decade. In India, robotics (Transoral Robotic Surgery, TORS) is the newcomer in ENT and head & neck surgery. The da Vinci robotic system is still not a reality for the vast majority of Indian hospitals. Although several Indian centers are routinely performing robotic surgeries, but only few of them are involved in ENT, head & neck. This program at our hospital (Indraprastha Apollo Hospitals, New Delhi, India) which is one of the largest corporate hospitals in India started three years ago. We have done 135 robotic ENT cases for various indications so far. In contrast, USA, Europe and South Korean health care system is adopting da Vinci system at an exponential rate.

The initiation and running of robotic surgery in ENT is being hindered by many inherent difficulties in our health care system and its development poses many challenges. Firstly, there is scarcity of ENT and head & neck robotic surgeons in the country. Owing to deficits in robotic training in India, it still has not entered mainstream of robotics. Secondly, despite its promising surgical outcomes in ENT, robotics is relatively new and not easily accessible for patients in India. Thirdly, robotics comes at an increased cost to the patients and therefore has not gained widespread acceptance across the Indian population.

Collectively, these factors have led to ENT robotic assisted surgeries being in its infancy and have not allowed it to gain momentum as compared to other parts of the world. There are many robotic systems operational in the country, but due to multiple challenges explained ahead, they are not used to their maximal potentiality.

High Cost: Prime Challenge

A single da Vinci robot cost about \$2 million (Rs 14.3 crores), maintenance cost comes out to around \$180,000 (Rs 1.3 crores) a year and an additional \$3500 (Rs 2.5 lakhs) for a single procedure [1]. Despite the numerous benefits over conventional approaches, the prime challenge for adopting robotics is assuredly been high cost of installation and instruments, its maintenance and hence the high consumer cost. Right now the amplitude of robotics in India is finite because of cost consideration. Being an emerging economy with limited budget and resources, Indian health care system poses remarkable challenges for health care providers to offer expensive

advanced technologies like robotic surgeries. Although it is cost effective in Urology, Oncology and Gynecology but ambiguous in low volume ENT and Head & Neck. Robotic centers which include Urology, Oncology, Gynecology and Cardiothoracic, ENT can be cost efficient to patients indirectly. No doubt, the technology is new and is at a premium price at present, the high cost of robotics is likely to drop in the near future. But the question is when? So for a country like India, there is a need for more economical robotic system and we hope through marketing development and corporate competition we shall achieve cheaper robotic surgeries.

Lack of Insurance Coverage

In the last two decades, robotic technology in the field of medical science has brought a massive change. However, Indian healthcare is lagging behind due to exclusion of robotic surgeries by the insurance companies, unlike other countries like USA where patients receive reimbursements for some robotic procedures. Robotic surgery as we know it today is expensive and hence lack of insurance coverage is one of the prime reason for patient's denial to robotic surgery and choosing conventional alternatives in spite of educating the patient regarding benefits of robotic surgery. Lack of insurance cover for robotic surgery is a cause of concern in India. To cater to such needs, it is becoming important consideration for insurance companies and large corporate like NTPC (National Thermal Power Corporation Limited) and NHPC (National Hydroelectric Power Corporation Limited) to revise the policies, as more hospitals are investing into robotics.

Lack of Awareness and Marketing

Marketing has a critical role in flourishing and increasing the utilization of robotic technology but in India unlike other developed countries, it is the patients and surgeons who are now accepting robotics in medicine. Due to marketing initiative of various centers of developed countries, there has been a proliferation of robotic systems with an exponential increase in the number of ENT, head & neck robotic surgeries. There is a need for change of perception in the market for ENT and head & neck robotics and is best developed as an element of an institute's comprehensive robotic program.

In developed countries like USA, there is a growing number of ENT patients who are opting for robotic surgeries because they are aware of its benefits and they believe that it provides superior outcomes with less pain and fewer complications than its conventional counterparts [6]. Indian patients and general public often have lack of awareness and associated myths about the robotic technology and its potential implications in the field of ENT, head & neck surgery. If surgical robot can improve visualization, dexterity and provide better results with shorter procedure time, then logically there is a need to spread awareness and justification of these robotic technologies through awareness campaigns, published data and cases.

Lack of Awareness amongst Physician Community

It's a matter of concern that a major part of our physician community is not aware and updated regarding the approved indications of robotic surgery in ENT. This lack of familiarity with robotics and its application amongst the physicians of the robotic institutes itself results in poor integration of robotics into health care. So, there is a need to add robotic technology in medical education and the role of the physician community to build a trust and positive

attitude towards robotic technology in health care settings becomes crucial. Even, the competition amongst the conventional and robotic surgeons and their lack of convergence towards robotic surgery is also creating a hindrance in adopting a platform for robotics.

Lack of Robotic Training

One of the critical issues is the training required to carry out robotic assisted surgeries in ENT. The people of India must have access to robotic technology in Indian hospitals and young ENT surgeons must be trained in the country itself. But unfortunately even in the era of prime time of robotics, there is no provision of national robotic surgery training program both in government and corporate setups and non-availability of grants for international robotic training. We have many robotic systems but few trained surgeons and relatively fewer cases, which are affecting surgeon's experience and hence affecting curriculum teaching; and therefore becoming another challenge for trained robotic surgeon. This small number of robotic surgeries in ENT and head & neck can make it difficult to perform the requisite number of procedures for training as per standards of accreditation and obtaining the license for robotic surgery becomes even more difficult with existing rigid rules.

Indian hospitals need to understand the full potential of da Vinci. Acquisition of robotic surgery skills *via* robotic simulation or cadaveric training programs and skills training using virtual instruments should be emphasized by the robotic institutes for new ENT and head & neck surgeons. Special training of the team in terms of setting up/docking of robot to bed side surgeons, nurses and support staff and advanced training programs for robotic surgeons regarding managing a quality of surgery should be available. Criteria for proctorship and mentoring should be seriously established for console surgeon especially at a high volume centre of excellence.

Future Aspects of ENT and Head and Neck Robotic Surgery

Robotic technology has already entered the field of ENT and head & neck surgery and will definitely grow in the near future and become comparable to other fields in India and to other parts of the world. Indian medicine has immense potential and talent in the domain of ENT and head & neck and is capable of becoming one of the largest providers of robotic surgeries across the world. The economic bone should be strong to implement and flourish it and should be equally taken on by hospital, insurance companies, patients and surgeons. The present compromised state of robotic surgery in ENT due to low patient turnover can be solved to some extent by an easy referral system and by creating the awareness by all possible

modes. In order to ensure success in ENT, head and neck robotics, there needs to be a dedicated and motivated robotic surgical team including anesthesiologist and commitment from the institution and department helping in frequent patient scheduling. The robot in ENT can be a better tool in future if health care system of India considers the above described challenges passionately. Broadly, the future of ENT robotic surgery in India depends on the cost, awareness and affordable training centers exclusively for robotics in ENT, head and neck.

Conclusion

There are significant challenges to initiate and run a robotic program in India especially in the ENT, head & neck surgery. So the challenges for all ENT and head & neck surgeons are to expand horizons as per evidence based manner in training the young ENT surgeons. Secondly, the insurance companies should come forward to make robotic technology a worthy investment in India and hopefully the problem of high cost, difficulty of obtaining enough patients for robotic surgery and getting a proper expertise and training of surgeons and support staff will overcome in future. Marketing is a crucial component of building robotic surgery practice. Despite these obstacles with this background of Indian health system our results and patient satisfaction are adequately encouraging.

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