

Original Research

Knowledge about robotics amongst Otolaryngologists and Head & Neck Onco-Surgeons: A Qualitative study

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ABSTRACT:

Aim of the study: The purpose of the study was to assess Knowledge about robotics as well minimally invasive surgeries assisted with the help of robotic technology amongst Otolaryngologists and Head & Neck Onco-Surgeons. **Methodology:** A questionnaire survey was conducted over a period of 2 years amongst 38 head and neck onco-surgeons which also included 6 otolaryngologists. The questions were based on their experience of robotic assisted surgery among head and neck tumors which also stated their reasons for preference or the hinderance encountered in this intricate type of surgical procedure. **Results:** Study showed various surgeons were of opinion that the chief advantage of using Robotic surgery was improved visualization (41%), precision (23%) as well as reduced post-operative complications (15%). Whereas current robotic technology is not cost effective (56%) which is difficult to procure in limited settings especially in developing countries as well as it requires a prior specialized training. **Conclusion:** Robotic surgery is constantly advancing and is overcoming its confines. Additional advancement though is necessary to create more portable models as well those which are cost effective. Most importantly proper training is required for operating this kind of surgical advancement.

Key words Robotics, minimally invasive surgery, multidisciplinary, Onco-surgery.

Received: 25 February, 2020

Accepted: 13 March, 2020

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This article may be cited as: Wasan B, Babu PS, Shetty V, Kumar A, Bhure S, Uppal A, Tiwari RVC. Knowledge about robotics amongst Otolaryngologists and Head & Neck Onco-Surgeons: A Qualitative study. J Adv Med Dent Res 2020;8(4):61-64.

INTRODUCTION

Fresh advances in equipment and surgical techniques have made minimally invasive surgery (MIS) a well-endured and efficient technique in various fields of surgery. It has more than a few advantages over

standard surgical approaches, with more rapid recovery, lower rate of postoperative infection, reduced pain, improved postoperative immune function and cosmetic results. Thus, robotic-assisted surgery (RAS) has gained popularity in quite a few

surgical and medical specialties.¹ Robotic technology has managed improvements in head and neck surgical techniques by providing improved visualization, augmented manual dexterity, and the skill to perform surgery using a virtual environment.²

With the drive to decrease morbidity from greater resections requiring mandibular split procedures for entrée and to lessen complications from chemotherapy in neoplasms transoral robotic surgery (TORS) for the surgical management of oropharyngeal tumors was established.³ There are many rewards of robotic surgery. The 3-dimensional visualization and tenfold magnification of the operative field augment the depth of the field and the lucidity of the tissue planes during dissection.⁴ This can be particularly helpful during head and neck surgery and pediatric surgery, because of the minor size of the surgical field and the incapacity to maneuver the instruments and the camera within it. It can also benefit in differentiating tissue types in oncological dissection.⁵

This type of surgical system removes the surgeon's tremor with the help of hardware and software filters. Furthermore, movements can be ascended, whereby large hand movements can be deciphered into micromovements inside the operative field, permitting the surgeon more precision. It also progresses dexterity, letting maneuverability that approaches that of open surgery. Through the robotic portion of the surgery the surgeon is sitting with his/her forearms resting securely on a pad and the head resting against the console, consequently improving ergonomics. This results in condensed body fatigue.⁶ With the surgeon sitting at a distant workstation, it removes the need to physically twist and turn in difficult positions to move instruments within the operative field while concurrently visualizing a monitor. In addition, hand muscle fatigue is abridged, which when considered together with better visualization, makes tasks such as suturing considerably easier. Studies advocate that the robotic surgery is minimally stressful for the surgeon.⁷ The surgical innovations and a growing awareness of the distant effects of radiation therapy have led to an amplified role of transoral endoscopic-head and neck surgery (eHNS) within the multidisciplinary treatment paradigm.⁸ Transoral laser microsurgery (TLM) is much better MIS in treating oropharyngeal and laryngopharyngeal cancers.⁹ The total complication and survival rates of TLM are recognized to be largely correlated with the surgeon's experience.¹⁰ Surgical robot use is anticipated to ease the surgeon's learning curve and consequently bring best results to patients with limited adverse event.¹¹

Presently no governing-body authorized credentialing guidelines exist for robotic surgery. Accreditation of robotic skill expertise remains at the institutional level, may be extensively variable, and every so often relies on industry guidance. This process lacks standardization and is not skill based, which leaves

tremendous room for improvement. The American Head and Neck Society (AHNS) and American Academy of Otolaryngology – Head and Neck Surgery (AAO-HNS) have yet to approve guidelines for the training and credentialing of robotics in Otolaryngology and Head and Neck Surgery (OTO-HNS). Leadership in this area from the suitable governing societies is vital for ensuring patient safety and public trust.²

AIM OF THE STUDY

The purpose of the study was to assess Knowledge about robotics as well minimally invasive surgeries assisted with the help of robotic technology amongst Otolaryngologists and Head & Neck Onco-Surgeons.

METHODOLOGY

A questionnaire survey was conducted over a period of 2 years amongst 38 head and neck onco-surgeons which also included 6 otolaryngologists. The questions in the survey were open ended as well as in English language and was sent by Email to the survey participants. The questions were based on their experience of robotic assisted surgery among head and neck tumors which also stated their reasons for preference or the hinderance encountered in this intricate type of surgical procedure. The responses were recorded in a spreadsheet and was processed by descriptive statistical analysis.

RESULTS

In the study it was noticed that most of the onco-surgeons (79%) as well as ENT surgeons considered robotic surgery as the future of minimally invasive surgery procedures. The foremost advantage that was stated was improved visualization (41%), precision (23%) as well as reduced post-operative complications (15%). While increased patient compliance accounted for more than 12% for the inclination towards RAS whereas minimal scars (9%) at surgical site was also one of the main advantages which were observed by the otolaryngologists as well as Head and Neck Onco-surgeons. (Table 1)

However, the surgeons noticed that current robotic technology is not cost effective (56%) which is difficult to procure in limited settings especially in developing countries. Robotic surgery is still in its infancy in terms of handling onco-surgeries, it needs a lot of training (23%) amongst various surgeons so that they are accustomed to the technology which was also one of the prominent hindering factors, which leads to choosing over traditional methods of surgical methodology. Furthermore, many more studies are required to support if these robotic assisted surgeries have an exponentially beneficial outcome (21%) which was the opinion of many surgeons participating in the study. (Table 2)

Table 1- Highlighting the advantages of Robotic assisted surgery which were the responses of otolaryngologists as well as onco-surgeons in the present survey

Preferences in favor of robotic assisted surgery (RAS)	
Improved visualization	41%
Precision	23%
Reduced post-operative complications	15%
Increased patient compliance	12%
Minimal scars at surgical site	9%

Table 2- Factors which are limiting the usage of robotic assisted surgery in head and neck tumors

Limitations noticed in RAS in Head and Neck tumors	
Expensive and difficult to procure in limited settings	56%
Training is not adequate or standardized	23%
More studies required to verify its beneficial outcome in the area of oncology	21%

DISCUSSION

One of the key targets for robotic surgery is to deliver safe and precise surgeries in ENT and head and neck, also giving negligible morbidity to patients with brilliant results. As more and more patients are recruited for Robotic surgeries, the set-up time (docking of robot) and robotic console timing is declining with experience along with better results. Robotic surgery in ENT and head and neck is an innocuous and acceptable option and bids definite benefits over conventional open and endoscopic methods. It delivers numerous benefits like magnified 3-D high definition vision, expand dexterity with 7 degrees of freedom, exceptional precision, tremor filtration, motion scaling and surgeon ergonomics.¹²

The main problem of the robotic system in developing countries like India circle around economical costs of the robotic surgery and absence of financial coverage by insurance companies.¹² Another common limitation of contemporary robotic surgery is the absence of haptic feedback, and its requirement becomes essential while resecting a tumor to delineate the margin of tumor.¹³ One of the main limitations especially in developing countries is lack of awareness concerning robotic procedure in ENT among general public as well as several medical practitioners. Generally, robotic surgery in ENT as well as Head and Neck surgery signify novel minimally invasive tactic in the treatment of multiple diseases.¹²

As understanding improves, so higher and more complex resections, including salvage surgery, are becoming conceivable with TORS.¹⁴The usual evolution of this process has meant that reconstructive surgeons are starting to investigate the role of robot-assisted reconstruction (RAR) and transoral robotic reconstructive surgery (TORRS).¹⁵ With the usage of TORS growing gradually, the application of RAR becomes more interesting with being more cost effective as well.¹⁶

With better-quality optics and magnification there may come a time that robotic system will replace the operating microscope and all microsurgery can be achieved robotically. Before that time, deliberations

concerning the safety of such systems, with techniques to achieve intraoperative complications such as a vessel tear, anastomotic hemorrhage, must be taken into account. Additional laborious laboratory and clinical studies are needed. RAS is becoming a treasured tool in a number of specialties.¹⁶

CONCLUSION

The tendency towards the use of minimally invasive surgery has had an influence on the way new technology which is developed and merged into clinical practice. Robotic surgery is constantly advancing and is overcoming its confines. It is refining the outcomes, such as dipping hospital stays and infection rates and permitting for better cosmetic results. Additional advancement though is necessary to create more portable models as well those which are cost effective. Most importantly proper training is required for operating this kind of surgical advancement.

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