Brief Report
Volume 18:6, 2022

Journal of Surgery [Jurnalul de chirurgie]

ISSN: 1584-9341 Open Access

Transoral Robotic Surgery

Marvin Jesse*

Department of Neurosurgery, Inselspital, Bern University Hospital, University of Bern, Bern, Switzerland

Introduction

Robotic surgery has grown in popularity in a variety of medical disciplines, including cardiac surgery, urology, general surgery, and gynaecology. Nonetheless, recent media coverage has prompted some sceptics to wonder if the benefits of robotic surgery exceed the possible drawbacks. The high initial cost of the robotic system, as well as the expense of devices, has contributed to pessimism regarding robotic surgery in general. Concerns concerning transoral robotic surgery have included difficulties such as the practicality of TORS safety and efficacy, the teachability of sophisticated new procedures, and rivalry with the recent trend of nonsurgical therapy for comparable tumours [1].

About the Study

In the next paper, we will evaluate the existing clinical experience with TORS at various institutions and analyse the numerous difficulties and limits stated in the literature. The surgeon sits at a console, controlling micromanipulators that are linked to a robotic cart at the patient's bedside. Three arms are commonly used in TORS. The centre arm is equipped with a doublevideo endoscope with high-quality video that provides the surgeon with a three-dimensional image of the operation field through the console. The other two arms are equipped with replaceable devices that have miniature tools on the end that mirror regular surgical equipment. The tips of the double-video endoscope and instrument arms are inserted transorally, and an assistant sits at the bedside to assist with suctioning and retraction [2].

Because the tips of these robotic surgical tools are also wristed, when surgeons move their wrists and hands at the console, the entire motion is scaled down to the miniature robotic instruments, providing benefits such as tremor filtering. Traditional nonrobotic transoral surgery can be surgically uncomfortable at times due to the tools being lengthy and of limited utility, the tiny optics being outside the oral canal, or the laser being a line of sight beam far from the lesion. In contrast, the robotic optics are located in the mouth cavity, and the miniature surgical tools move in sync with the doctors' hands, making the experience more like to an actual open surgical procedure [3].

TORS was originally successfully explored at the University of Pennsylvania through a series of technical and feasibility demonstrations utilising the da Vinci surgical robot. Initial research included preclinical trials using manikin and cadaveric models, which demonstrated that the best approach to do TORS was through mouth gags rather than typical laryngoscopes. Additional cadaver and canine experiments revealed that several pharyngolaryngeal locations were feasible. This work established the groundwork for the first use of TORS in human patients, in which three base of tongue neoplasms and supraglottis were successfully removed in a human clinical trial authorised by an institutional review board. The current number of TORS cases done at the University of Pennsylvania exceeds 225.

Total operative time and operating room setup time have both been mentioned as potential barriers to routine da Vinci robot utilisation. Total operative time appears to decrease with growing experience, in our experience and that of others. This development appears to be similar to that of other robotic surgical subspecialties. In a study of 150 patients with oral cavity or laryngopharyngeal lesions, an extra setup time of 15 minutes was required to accomplish exposure and robotic surgery.TORS placement took only 4 minutes longer as compared to typical transoral exposure duration resection [4].

With the introduction of novel minimally invasive transoral procedures in robotic-assisted surgery and transoral laser microsurgery, the role of surgery in the multidisciplinary treatment of head and neck cancer is growing. In contrast to standard open surgical resection, these endoscopic techniques yield good oncologic results while maintaining speech and swallowing function. Drs. Weinstein and O'Malley of the University of Pennsylvania used the da Vinci Surgical System to treat head and neck tumours, coining the phrase "transoral robotic surgery" to characterise these treatments.

Several studies show that TORS is a viable option to open surgery with or without mandibulotomy for oropharyngeal cancers. TORS provides a high-resolution, enlarged, three-dimensional picture of the operation field, allowing for good vision of the target anatomy. The surgeon's delicate hand and finger motions are converted into exact motion-scaled movement of the robotic tools within the upper aerodigestive tract's small constraints.

By employing tilted binocular endoscopic view of operational anatomy, TORS may circumvent some of the limits inherent in the direct line-of-site approach used in transoral laser microsurgery. TORS procedures may also enhance cosmesis, result in a shorter hospital stay, and have a low rate of gastrostomy tube dependency, showing that swallowing function is retained. There have been reports of high rates of negative surgical margins, which correspond to local disease control. So far, several institutional studies have detailed TORS4-7 experience, but there has been limited multicenter data. This study's purpose is to report on the safety, feasibility, and sufficiency of TORS surgical margins in a multicenter setting. The da Vinci Surgical System has been approved for use by the US Food and Drug Administration.

The gradual trend toward minimally invasive organ-and-function-preserving treatments for oropharyngeal and laryngopharyngeal lesions, paralleled by the evolution of new technologies, has resulted in a greater number of surgical options for the management of head and neck tumours, ranging from transoral CO_2 laser microsurgery to transoral robotic surgery to video-assisted and robotic surgery for the neck and thyroid. Innovations and advances in optic technology, as well as the advent of the da Vinci robot, have continuously increased the view and reach of minimally invasive endoscopic transoral robotic methods. TORS has been well established in several locations of the upper aerodigestive tract, ranging from the nasopharynx through the oropharynx to the larynx, most commonly for the excision of squamous cell carcinoma.

Chemotherapy and radiation therapy have been incorporated into oropharyngeal cancer treatment protocols over the last three decades, which has resulted in the development of organ preservation treatment protocols. However, the emphasis has recently shifted to function-preservation treatment modalities, with the recognition that the mere presence of an organ does not guarantee its function. This has resulted in a rethinking of surgical options and a shift away from radical surgeries and toward minimally invasive procedures such as TORS.

***Address for Correspondence:** Marvin Jesse, Department of Neurosurgery, Inselspital, Bern University Hospital, University of Bern, Bern, Switzerland; E-mail: jsurgery@journalres.com*

Date of Submission: 18 June, 2022, Manuscript No. jos-22-73452; **Editor Assigned:** 21 June, 2022, PreQC No. P-73452 **Reviewed:** 25 June, 2022; QC No. Q-73452; **Revised:** 04 July, 2022; Manuscript No R-73452; **Published:** 06 July, 2022, DOI: 10.37421/1584-9341.2022.18.39

Previous research has identified a number of potential benefits of TORS over traditional treatment options, including the avoidance of external incisions, the preservation of normal surrounding structures, and shorter hospitalizations. These benefits are linked to improved postoperative function and have been shown to reduce the need for gastrostomy and tracheostomy tube placement. There is currently a lack of functional status and health-related quality-of-life data on TORS patients [5].

Conclusion

The current study's goal was not only to assess long-term, longitudinal HRQOL results in individuals treated with using TORS, but also to establish which pretreatment elements should be used have an impact on postoperative functional outcomes and overall QOL HRQOL outcomes were also compared to QOL outcomes from other treatment modalities, such as RT with or without chemotherapy. Without the use of chemotherapy or other non-TORS operations for lesions of the laryngopharynx The Ohio State University Office of Responsible Research Practices granted institutional review board permission. The transoral robotic surgery database at The Ohio State University Medical Center was used to identify patients receiving TORS.

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How to cite this article: Jesse, Marvin. “Transoral Robotic Surgery.” J Surg 18 (2022): 39.