

Robotic Transaxillary Thyroid Surgery: Patients Satisfaction with Cosmetic Outcome

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Abstract

Transaxillary robotic thyroidectomy is a new approach that eliminates the need for a cervical incision. This is achieved by approaching the thyroid from the axilla, allowing the surgical incision to be completely covered by the patient's arm at rest. Robotic transaxillary thyroidectomy is feasible and can be performed safely. This review evaluates the current literature on patient satisfaction with this operation.

Keywords: Thyroid gland; Robotic thyroidectomy; Scarless thyroidectomy; Thyroid scar

Introduction

In today's world, Robots have been increasingly used in surgery because of their greater image, accuracy and articulation. Since the gold standard approach for thyroid surgery is the conventional cervical surgery, many surgeons questioned the benefits of using robots for thyroid surgery. Nevertheless, selected group of patients do appreciate hidden surgical scar to help them regain their daily quality of life.

The transverse cervical incision allows for optimal exposure of the thyroid and surrounding neurovascular structures. It is a safe, effective surgical treatment for many thyroid diseases. However, conventional open thyroid surgery can cause psychological and cosmetic problems from having a visible scar in certain group of patients.

Recently, advancement in surgical techniques and endoscopic instruments provides better understanding of the endoscopic cervical anatomy, contributed to the expansion of cervical minimally invasive surgery. When compared to conventional open thyroid surgery, endoscopic thyroidectomy provides minimal scarring and pain, shortened hospital stay, and faster patients recovery [1]. Accordingly, various types of endoscopic thyroid operations have been described using axillary, breast, anterior chest, and cervical approaches [1-3]. However, endoscopic thyroidectomies have some technical limitations, including inadequate two-dimensional (2-D) view, narrow working space [4,5], and unarticulated rigid endoscopic instruments which hampers the surgical dissection around vital structures in this region [6-9]. Moreover, some individuals were unsatisfied with this smaller neck incision using video assisted cervical approach, and new techniques have been described to obtain better cosmetic results by avoiding visible cervical scar.

Robotic Thyroid Surgery

The da Vinci SI surgical gasless robot system (Intuitive Surgical, Sunnyvale, CA, USA) has emerged as a new remote access surgery. One major benefit of robot system is avoiding the unsightly neck scars that result from conventional thyroid surgery. This is achieved by approaching the thyroid from the axilla, allowing the neck incision to be completely covered by the patient's arm at rest [10]. Additionally, the gasless robotic system provides an adequate stereo-optic three-dimensional view of the operating field, and decreases complications associated with gas insufflation, such as hypercapnia, respiratory acidosis, and air embolism [4].

Recently, Robotic gasless transaxillary thyroidectomy has rapidly gained popularity in North American practice [11-14]. This approach

is established to be scarless neck surgery, and was reported in the Korean experience to yield better functional outcomes, as shown by lower rates of hyperesthesia, postoperative voice change, swallowing discomfort, and increased cosmetic satisfaction as reported by 90.7% of patients [15,16]. Kang et al. completed robot-assisted modified radical thyroidectomy, including total thyroidectomy, central and lateral neck lymph node dissection, using the da Vinci surgical system in 33 patients with thyroid carcinoma and lymph node metastases. The operation extended for (281 ± 41) minutes, without any serious postoperative complications such as recurrent laryngeal nerve injury or hypoparathyroidism occurred [17]. Furthermore, Lee et al. reviewed the clinical data of 1043 patients with low-risk differentiated thyroid carcinoma who underwent robotic thyroidectomy in four academic centers. This multicenter study demonstrated that the incidence of postoperative complications was only 0.96% (10 cases), including permanent recurrent laryngeal nerve injury in 5 cases, tracheal injury in 3, muscle flap hematoma necessitating reoperation in 1 case, and Horner's syndrome in 1 case [18]. However, a cost analysis of robotic thyroidectomy approach, based on medical cost in the united state, showed that robotic system is more time-consuming which contribute to increasing operating theater costs [19,20]. Nevertheless, we believe consistency of the team members, including operating room staff and experienced surgeons, yields the best improvements over time. On the other side, robotic thyroid surgery extended operation time must be compared to the benefit of improved cosmetic outcomes, and the potential psychological benefits of eliminating cervical incisions. Tae et al. showed that cosmetic satisfaction was significantly higher in the robotic thyroidectomy than that in the open thyroidectomy at all postoperative times [21]. Aesthetic results from surgery are increasingly important to young women, who represent a considerable fraction of our patients affected by thyroid diseases. Because the anterior neck is a prominent, frequently uncovered part of the body, an unpleasant scar can be very distressing for the patient and for the surgeon. Many

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medical and surgical treatments have been changed based on these aesthetic interests, which improved therapeutic trend toward exploring new techniques with better cosmetic outcomes and patient satisfaction.

Our team experience with robotic transaxillary thyroidectomy considered as one of the largest experience in North America. Patients are coming to our clinics from all over the states seeking for robotic surgery, most of our patients were satisfied with their scarless neck incision, and had better postsurgical quality of life. Obesity is considered as a major challenge for transaxillary robotic surgery, however, our data showed that inspite of longer flap creation time which extends the total operative time, there was no significant difference in complications between obese and normal-weight patients [13]. We demonstrated that with experience and instrumental compensation, the limitation of body mass index has been defeated. After performing 45 cases, we noticed there was a significant persistent decrease in overall total operative times [13]. Furthermore, Korean experience with robotic surgery showed that the learning curve for inexperienced surgeons to perform robotic thyroidectomy was 35–40 operations [22]. These studies demonstrate the lengthy learning curve of robotic surgery, which enhances surgical outcomes with more experience of the whole surgical team.

Currently, transaxillary robotic thyroid surgery application in North American individuals is facing serious complications, including brachial plexus injury, excessive blood loss, injury to blood vessels, and esophageal perforation [23]. Facelift robotic thyroid surgery is a new approach uses a thyroid single access port in the post auricular crease and occipital hairline location [24]. In Facelift robotic thyroidectomy, absolute exclusion of the possibility of brachial plexus injury and chest wall numbness can be achieved. Further experience with this new technique is necessary before considering this a standard approach.

Conclusions

We sought to illustrate specific factors considered to be most important in achieving better cosmesis in patients undergoing thyroidectomy. Robotic surgery is an exciting new treatment option for our patients, and in the hands of a high-volume thyroid surgeon, this novel technique is feasible, provides excellent cosmetic results, and can be performed safely as an outpatient procedure. Many of our patients are actually self-referred because they are seeking for the form of thyroid surgery with the least visible scars.

Disclosure

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2. The authors have no financial interests in companies or other entities that have an interest in the information included in the contribution.
3. Additionally, there are no other conflicts of interest to report.

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