Research Article

Robot-Assisted Retroauricular Neck Surgery in Head and Neck Cancers

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Abstract

In head and neck cancers, regional spreading occurs via lymphatic pathways. Therefore, neck dissection is frequently performed in these patients; however, this results in a large incision scar in the neck. Retroauricular robotic surgical approach may be used for neck dissection as a remote-access method. This review presents a discussion of publications on retroauricular robotic neck dissection.

Introduction

Most cancerous lesions in the neck require surgical treatment. However, traditional surgery of the neck leaves a large scar, which results in cosmetic dissatisfaction, especially in young and female patients [1]. Hypertrophic scarring or keloids formed in the incision area can be a source of dissatisfaction. Thus, over the last two to three decades remote access methods have been widely adopted for such surgeries [2,3]. First, endoscopic methods were applied. However, endoscopes are difficult to use because of their two-dimensional imaging capabilities and the anatomical features of the neck. The Vinci surgical system (Intuitive Surgical, Sunnyvale, CA) was subsequently used in head and neck surgery [2].

Robot-assisted methods have been widely adopted in head and neck surgery, especially for thyroidectomy. Transaxillary, retroauricular, and transoral thyroidectomy are now increasingly being performed using robot-assisted methods. In 2012, Kim, *et al.* [4] performed selective neck dissection (levels I, II, and III) with a modified facelift incision in patients with parotid gland tumors. Kim, *et al.* [5] later described robotic retroauricular neck dissection (RRAND) in patients with submandibular tumors.

Preoperative evaluation

Patient selection is important in RRAND as it has been practiced in recent years, but there is currently no consensus on the indications or contraindications. Inappropriate patient selection can lead to unexpected results.

RRAND requires consensus in planning regarding general anesthesia, appropriate patient selection, hypertrophic scarring and keloids, and cosmetic expectations. Contraindications include patients who have previously undergone radiotherapy and surgery, a requirement for bilateral neck dissection, and distant metastases [1,2].

The physical characteristics of the patient can affect the RRAND procedure. For example, the duration of the operation is prolonged in patients with a long or thick neck and in those who are overweight. However, these features are not absolute contraindications. The age and comorbidities of the patient are also important for patient selection, as RRAND is a long operation compared with conventional methods [1].

The applications related to lymph node dissemination and tumor spread varied widely in previous reports. Park, *et al.* [6] did not perform RRAND in patients with pathological lymph nodes, while in a separate report Park, *et al.* [7] performed RRAND only on N0 and N1 necks. Kim, *et al.* [8] did not consider extracapsular spread in the lymph nodes as a definite contraindication. In the spread of the primary tumor, many authors did not find it appropriate to use RRAND for advanced stage tumors. However, Kim, *et al.* [8] reported that the procedure was appropriate except in unrespectable tumors. The same authors also did not accept prior radiotherapy for nasopharyngeal carcinoma as a contraindication. In addition, it is widely accepted that RRAND should be avoided in cases requiring removal of the primary tumor by neck incision, mandibulotomy patients, and in patients < 18 years old [7].

The application of RRAND has been reported in patients with differentiated thyroid cancers [8-11] laryngopharyngeal cancers [6-8], salivary gland tumors [8,11-13] oral cavity cancers [8,14-16] and nasopharyngeal carcinomas [12]. In these patients, neck dissection is planned according to the primary tumor. RRAND can be performed in all unilateral neck dissection types other than radical neck dissection.

Surgical procedure

The operation is performed under general anesthesia, with the patient in the supine position and the head rotated to the contralateral side. The neck is positioned in a relaxed and non-extended position [1].

The postauricular incision extends from the lower border of the retroauricular sulcus to the middle of the sulcus. It is slightly angulated and extended toward the hairline. The skin flap is elevated to lie on the subplatysmal plane and above the sternocleidomastoid muscle. The flap is expanded to the inferior border of the mandible in the superior

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direction, to the omohyoid muscle in the inferior direction, and to middle of the neck in the anterior direction [14]. The marginal branch of the facial nerve is identified and protected. The distal facial artery and vein are cauterized. After identification of the spinal accessory nerve with direct vision, the robotic arms and 30° endoscope are inserted. Level I dissection is performed laterally to medially. The posterior belly of the digastric muscle is identified. The submandibular gland is reached. Then, according to the planned surgery, the dissection is continued in the superior to inferior direction. Finally, bleeding control and irrigation are performed, and the operation is terminated by placing a suction drain behind the hairline [14-16].

Postoperative care and follow-up are the same as in the conventional method. The neck is followed up with regard to hemorrhage, hematoma, infection, and color change. The drain is removed when the hemorrhage drops below 20 ml/day. The patient is discharged at the discretion of the surgeon, and the hospitalization period generally does not exceed 1 week [1].

Potential complications include wound infection, hematoma, hemorrhage, seroma, chylous leakage, flap necrosis, and nerve injury (great auricular nerve, marginal branch of the facial nerve, spinal accessory nerve, lingual nerve, hypoglossal nerve, phrenic nerve, and sympathetic nerves) [13].

In all studies published to date, patients were satisfied with the cosmetic results. No intraoperative complications were reported in any study. The most frequently reported postoperative complication is temporary paralysis of the marginal mandibular branch. Kim, *et al.* [12] compared RRAND with conventional neck surgery and reported that the duration of the operation was longer in RRAND. Bleeding, duration of drainage, amount of drainage, and duration of hospitalization did not differ between the two procedure types. Koh, *et al.* [13] and Lee, *et al.* [14] reported similar results. In addition, Lira, *et al.* [15] reported no difference in the number of lymph nodes removed between RRAND and conventional neck dissection.

The advantages of RRAND are cosmetic satisfaction, imaging advantages (three-dimensional imaging), a lack of tremors, and manipulation in a small work area.

Its disadvantages include a high cost, lack of tactile feedback, applicability to only select patients, long operation time, and the requirement for surgical experience with the technique.

RRAND has no medical drawbacks compared to conventional neck dissection, with the exception of its long operation time. This method is especially feasible in patients with high cosmetic expectations. However, there have been no long-term, multi-case, controlled studies in terms of tumor recurrence rates associated with this procedure.

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