



A new extended supracricoid laryngectomy technique for tongue base and hyoid bone involvement: crico-glosso-mandibulopexy technique

Dil tabanı ve hiyoid kemik tutulumu için yeni uzatılmış suprakrikoid larenjektomi tekniği: Krikoglosomandibulopeksi tekniği

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In the conventional supracricoid laryngectomy technique, tumors extending beyond the lingual surface of the epiglottis with tongue base invasion are contraindicated due to the requirement of the hyoid bone resection. The loss of the hyoid bone causes intractable aspiration and renders the cricoid pexy process impossible. Therefore, surgeons tend to treat such tumors with total or subtotal laryngectomies or organ preservation protocols. In this article, a new supracricoid partial laryngectomy technique for tumors requiring resection of the hyoid bone and the base of the tongue was described.

Key Words: Extended; hyoid bone; supracricoid laryngectomy; tongue base.

Konvansiyonel suprakrikoid larenjektomi tekniğinde, dil tabanı invazyonu ile birlikte epiglotun lingual yüzeyini geçen tümörler, hiyoid kemik rezeksiyonu gerektireceği için kontrendikedir. Hiyoid kemik kaybı, aspirasyonun takip edilemesine yol açarak, krikoidal peksi işlemini imkansız kılar. Bu nedenle, cerrahlar bu tür tümörleri total veya subtotal larenjektomiler veya organ koruma protokolleri ile tedavi etme eğilimindedir. Bu yazıda, hiyoid kemik ve dil tabanı rezeksiyonu gerektiren tümörlere yönelik yeni bir suprakrikoid kısmi larenjektomi tekniği tanımlandı.

Anahtar Sözcükler: Uzatılmış; hiyoid kemiği; suprakrikoid larenjektomi; dil tabanı.

Supracricoid laryngectomy (SCL) was first described in 1959 by Majer and Reider as an alternative to total laryngectomy in selected supraglottic and glottic cancers.^[1] The purpose of SCL is an oncologically safe excision of the tumor without any permanent tracheostome as well as preservation of speech and swallowing functions.

In the conventional SCL technique, all of the paraglottic region, the supraglottic larynx, bilateral vocal cords, and the thyroid cartilage are removed and the cricoid cartilage with one or two mobile

arytenoids are preserved. If the tumor had a supraglottic origin, the pre-epiglottic space would also be resected with preservation of the hyoid bone. In this procedure, named cricohyoidopexy, the remaining larynx is reconstructed with suspension sutures between the cricoid cartilage and the hyoid bone. If the tumor were limited to the vocal cords and the anterior commissure without supraglottic spread, the epiglottis could be preserved, and the cricoid cartilage is sutured to the hyoid and epiglottis for reconstruction.



This technical variation was called crico-glossomandibulopexy (CGMP).

In the general concept of laryngeal surgery, laryngeal tumors extending beyond the lingual surface of the epiglottis with tongue base invasion require resection of the hyoid bone. Believing that the loss of the hyoid bone causes intractable aspiration and renders cricoid pexy impossible, surgeons tend to treat such tumors with total or subtotal laryngectomies or organ preservation protocols including radiotherapy with concomitant or adjuvant chemotherapy. The authors in their institution treat such advanced tumors primarily with surgery.

This study describes a new supracricoid, partial laryngectomy technique for tumors requiring resection of the hyoid bone and the base of the tongue.

CASE REPORT

The study investigated three patients who underwent surgery with the CGMP technique between 2008 and 2011. All of the patients had transglottic tumors invading the base of the tongue. The tumors were staged according to the American Joint Committee on Cancer (AJCC) 2002 staging guidelines.^[2] The surgeries involved extended supracricoid laryngectomy techniques including tongue base with hyoid bone resection via CGMP.

The first case was a 43-year-old man with a clinically T_{4a}N₁M₀ supraglottic tumor. The primary lesion rose from the tongue base, and invaded the preepiglottic space extending to the petiole of the epiglottis with anterior commissure involvement without disturbing vocal cord mobility. The surgery involved an extended SCL with preservation of both arytenoids. On the 35th postoperative day the nasogastric tube was removed, and following adjuvant radiotherapy, the patient was decannulated during the fifth month after the surgery. Five years after the original surgery, the patient is still without locoregional tumor recurrence.

The second case was a 57-year-old man with a supraglottic tumor originating from the laryngeal side of the epiglottis with massive preepiglottic space involvement. The tumor was staged as T_{4a}N_{2c}M₀ due to the invasion of the external

laminae of the thyroid cartilage but the mobility of the vocal cords was intact. During surgery, both of the arytenoids were preserved and an extended supraglottic laryngectomy was done. The nasogastric tube was removed on the 21st day after the surgery and the patient was decannulated during the fourth postoperative month following adjuvant radiotherapy. The patient is still alive and tumor-free, four years after the surgery.

The third patient was a 52-year-old woman with a clinically T_{4a}N₀M₀ supraglottic tumor beginning from the base of the tongue and extending to the anterior commissure with left aryepiglottic fold and arytenoid mucosal invasion. She had a history of previous radiotherapy one year before for a T₁ epiglottic tumor. She underwent an extended supracricoid laryngectomy with tongue base resection, hyoidectomy, and left arytenoidectomy. The patient was decannulated on the 28th postoperative day; she began oral feeding on the 34th day. During the follow-up, however, a neck recurrence was observed during the 14th postoperative month. The patient underwent salvage neck dissection; she died twelve months after the second operation due to systemic metastatic disease.

SURGICAL TECHNIQUE

The majority of the surgical steps of the CGMP are similar to conventional SCL techniques.^[2] However, unlike the SCL, the CGMP cuts the suprahyoid muscles over the hyoid bone as in the total laryngectomy, according to the amount of tongue base resection. Thereafter, the thyroid cartilage is released to free with the hyoid bone.

During the reconstruction stage, the cricoid cartilage is firmly sutured above the remaining tongue muscles with No 1 polydioxanone sutures to complete the cricoglossopexy where the tongue base is partially resected and the hyoid bone is removed. Following this maneuver, there is an appropriate localization of the neolarynx and then a tracheotomy can be performed approximately between sixth and seventh tracheal rings. The next step is the cricomandibular approximation (Figure 1). A hole is drilled in a horizontal plane at the level of the mandibular symphysis. Three nonabsorbable sutures (No 1 polypropylene)

are inserted through the drill hole and passed through the anterior lamina of the cricoid cartilage submucosally. Head extension is limited for three weeks postoperatively to secure the mandibulopexy.

DISCUSSION

Supracricoid laryngectomy has exceptionally successful oncologic and functional results in the treatment of supraglottic and glottic tumors.^[3] However, extensive pre-epiglottic space involvement with hyoid bone invasion, cricoarytenoid joint fixation, subglottic extension with cricoid cartilage involvement, and external thyroid cartilage perichondrial invasion are the classic contraindications of this technique and require total laryngectomy.

As an alternative to the limitations of SCL, for tumors with glotto-subglottic extension (T₂-T₃) and tumors with cricoarytenoid joint involvement, an extended SCL technique reconstructed with tracheohyoidopexy has been described.^[4,5]

However, involvement of the tongue base and hyoid bone invasion is still regarded as a contraindication to SCL and near total laryngectomy or total laryngectomy is usually applied to these patients. This decision is not due to oncological unreliability. The major problem with such tumors is the difficulty in the reconstruction of the laryngeal remnant and

the resulting intractable aspiration. However, all of the patients in the study group recovered their laryngeal functions successfully (Figure 2). The key point in the prevention of laryngeal dysfunction is to enable laryngeal elevation. Where suturing the cricoid cartilage to the tongue base remnant is not a reliable method of suspension, the procedure described here adapted the laryngeal suspension technique for supraglottic laryngectomies described by Calcaterra to augment laryngeal suspension; the cricoid cartilage is approximated to the mandibular symphysis with three nonabsorbable suspension sutures.^[6] The anterosuperior raise maneuver of the larynx is the key point of aspiration prevention in this surgical technique. The new position of the larynx is secured with extension restriction of the neck. Nevertheless, in all three patients, the cricomandibulopexy sutures were broken during the fifth postoperative month, approximately. Fortunately, the patients had begun oral intake and any kind of supraglottic stenosis was observed in the late period.

Crico-glosso-mandibulopexy is an oncologically and functionally safe surgical technique in the treatment of transglottic laryngeal tumors extending to the tongue base with pre-epiglottic space involvement or hyoid bone invasion with feasible functional results. However, study groups with larger numbers are necessary to evaluate the success of the technique.

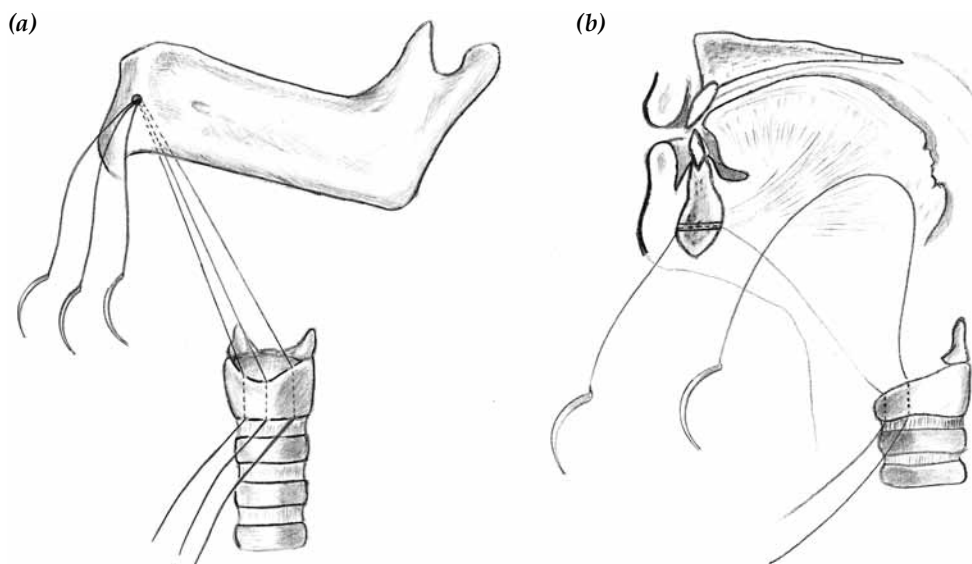


Figure 1. (a) Oblique view of the cricomandibular approximation sutures. (b) Lateral view of the cricoglossopexy and cricomandibular approximation sutures.

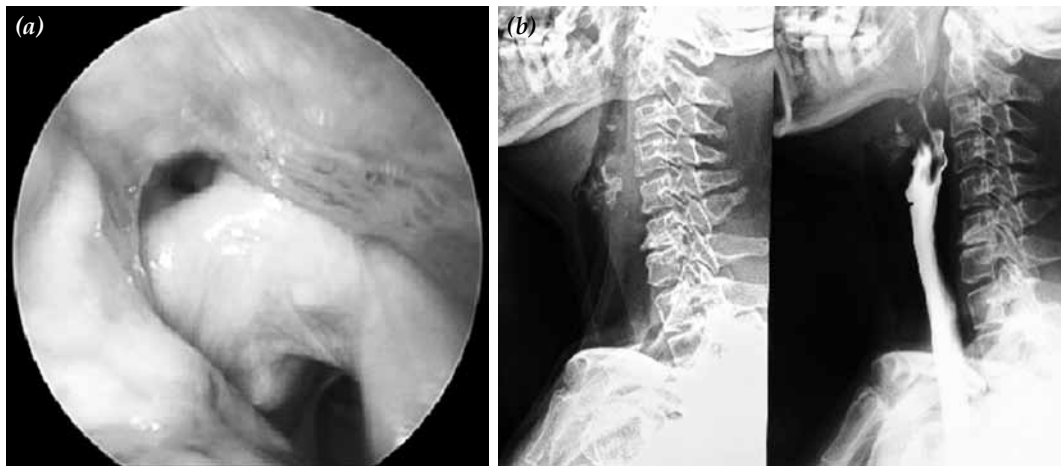


Figure 2. (a) Postoperative laryngoscopic view of the third patient. (b) Same patient's postoperative oesophagus passage radiogram with barium contrast. Note the absence of the hyoid bone with successful swallowing function.

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