

CAN PHARYNGO-CUTANEOUS FISTULA INCIDENCE BE REDUCED IN TOTAL LARYNGECTOMY PATIENTS?

Ahmet KÖYBAŞIOĞLU, M.D., Erdoğan İNAL, M.D., Fikret İLERİ, M.D.,
Yusuf KEMALOĞLU, M.D., Levent BEDER, M.D., Birol UĞUR, M.D.

Gazi University, Faculty of Medicine, Department of Otorhinolaryngology, Ankara, Turkey
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SUMMARY :

Purpose: Pharyngo-cutaneous fistula is an important complication following total laryngectomy with an incidence reported to be in the range of 4%-32% in the literature. We believe that our low fistula rate is due to our surgical technique. For that reason, we aimed to present the retrospective analysis of the total laryngectomies performed in our department in this article. **Methods:** Twohundred-ten total laryngectomy patients were reviewed with regard to pharyngo-cutaneous fistula incidence between the years 1984 and 1996. During the laryngeal releasing, the inferior constrictor muscles are cut from the thyroid cartilage alae and the perichondrium is elevated from the lateral border 2-3 mm at each side medially, saving totally a 5-6 mm mucosal edge. The laryngectomy defect is sutured in a T manner with 3 levels, and thyroid gland and suprahyoid muscles are sutured anteriorly to give extra support for the suture line. Late oral intake (7-9 days postoperatively) and preventive antibiotic coverage are also thought as helpful to prevent the fistula formation. **Results:** The fistula incidence was found to be 4% for the total laryngectomy and thyroid papillary cancer patients (195 patients). When the hypopharyngeal and cervical esophagus carcinoma patients are considered (15 patients), five patients developed fistulas and all of them were ones who had reconstruction forming a tube using pectoralis major myocutaneous flap ; fistula formation rate for this group was 33.3%. Overall rate was 6.2%. Stage IV patients had higher fistula rate than stage III patients ($p<0.0002$). **Conclusion:** We agree with the concept that the best fistula treatment is the prevention of its development. To achieve this goal, we recommend the mentioned surgical technique, late oral intake and prophylactic antibiotic administration as factors that decrease pharyngo-cutaneous fistula formation incidence.

Key Words: Laryngectomy, Cutaneous Fistula, Pharyngeal Diseases, Postoperative Complications.

INTRODUCTION

Pharyngo-cutaneous fistula is an important complication following total laryngectomy, which leads to an important morbidity, prolongs hospitalization, and may even end up with death. Studies in the literature report pharyngo-cutaneous fistula

rate varying from 4 % to 32 %, which, in addition to its related complications, brings an additional burden to the cost of the treatment (1-9). For that reason, many studies dealing with the factors leading to pharyngo-cutaneous fistula formation and their prevention have been arranged. A number of risk factors for the development of pharyngo-cutaneous

fistula has been defined, and these are shown in Table 1 (1-6, 8-10).

Table - 1: Risk factors for development of pharyngo-cutaneous fistula.

Preoperative tracheotomy
Radical neck dissection
Low hemoglobin count
Positive surgical margin
Preoperative radiotherapy
Width of pharyngeal resection
Early removal of the nasogastric tube
Systemic disease
Surgical technique
Prophylactic antibiotic therapy
Gastroesophageal reflux

The best treatment for fistula is the prevention of its formation (11). In order to decrease the interaction of the predisposing factors, preventive efforts, such as improving patients preoperative medical status, prevention of infections and operative technique can be taken. We believe that we maintained a lower rate of fistula formation due to the operative technique performed in our department. For that reason, we aimed to present the retrospective analysis of the total laryngectomies performed in our department in this article.

MATERIALS AND METHODS

From 1984 to 1996, 210 patients were treated by total laryngectomy at the Department of Otorhino-laryngology and Head and Neck Surgery at Gazi University Hospital. Of these 12 were female, 198 were male, and their ages ranged from 28 to 82, with a mean age of 57.4. Total laryngectomy was performed as primary therapy in 202 patients, among which 187 were T3 and T4 larynx cancer, and 15 T3 hypopharyngeal and cervical esophageal cancer. In 8 patients, total laryngectomy was performed for recurrent tumours (7 larynx cancer recurrences after radiotherapy and 1 thyroid papillary carcinoma recurrence) (Table 2). In 15 patients with hypopharyngeal and cervical esophagus cancer, the closure was different from primary closure and incidence of fistula formation for them was studied as a separate group.

Total laryngectomy is started with dividing strap muscles inferiorly from their sternal origins, elevating them to expose the thyroid gland. The thyroid gland is separated on the midline, and the isthmus and the thyroid lobe on tumour site is added to resection specimen. The hyoid bone is separated from suprahyoid musculature, and for the lateral releasing, inferior constrictor pharyngeus muscles are cut along the thyroid cartilage border involving perichondrium. The inner perichondrium is elevated medially for 3-4 millimeters with the help of an perichondrium elevator (Fig. 1). After the application of this procedure on both sides, the larynx is separated obliquely from the tracheal rings, separated from the esophagus, elevated su-

Table - 2 : Tumour site of the total laryngectomy patients and percentages of development of fistula.

Primary site	Number of Patients	Number of patients who developed fistula *	Total
Larynx			
-primary	187	6 (3.2)	8 (4.1)
-recurrence	7	1 (14.3)	
Thyroid papillary carcinoma	1	1 (100)	
Hypopharynx and Cervical Eosophagus	15	5 (33.3)	
Total	210	13 (6.2)	

* : Numbers in parenthesis shows percentages.

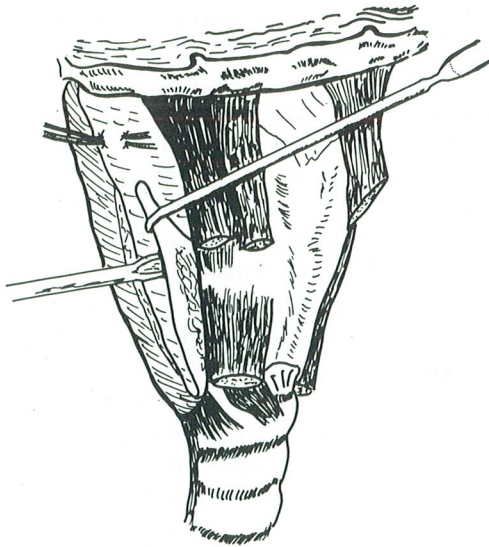


Fig. 1 : Elevation of the inner perichondrium of the thyroid cartilage ala.

teriorly, and opposite to the side of the tumour the pharynx is cut. After the larynx is removed, the mucosal irregularities and cyanotic edges along the borders of the laryngectomy defect are removed using dissection scissors and mucosa is sutured in T manner continuously using 3.0 vicryl. Inferior constrictor pharyngeus muscles are sutured as a second layer over the resection area and this layer is further augmented using suprahyoid muscles superiorly and thyroid lobe fascia anteriorly. Recently, pharyngeal neurectomy is performed unilaterally. The operation is finished after placing suction drains.

In the period starting one day before and ending one week after the operation, a combined antibiotic protocol consisting of a third generation cephalosporin (Ceftriaxon) and Ornidazol or Metranidazol (for the anaerobic bacteria) are administered. The suction drain is removed on the third or fourth day after the operation. Oral intake is restricted for 8-9 days and feeding is provided via a nasogastric tube. On the eighth or ninth days postoperatively, fistula formation is checked by observing the patient while drinking milk; if there is no flux of liquid around the stoma border, the nasogastric tube is removed and the patient is allowed for oral intake. If there is fistula development in the postoperative period, a nasogastric tube is inserted again, oral intake is totally restricted and wound care consisting of debridement of the orifice of the fistula and pressure dressings are applied twice a day. In order

to decrease the secretion of saliva 1/2 mg atropin i.m. daily (1/4 mg in the morning, 1/4 mg at night) is administered unless the patient has a cardiologic problem.

Fisher's exact test was used for statistical analysis.

RESULTS

Table 2 provides an overall summary of the results. We believe that the reconstruction procedure for the hypopharyngeal and cervical esophagus carcinoma patients is different from the closure procedure after total laryngectomy, and the rate of fistula formation must be assessed separately. Five patients in the former group developed fistulas and all of them were patients who had reconstruction forming a tube using the pectoralis major myocutaneous flap; four of these fistulas closed with secondary healing and one fistula closed using deltopectoral flap. Fistula formation rate for this group was 33.3%.

Six patients who developed fistula formation among the primary total laryngectomy patients all had stage IV advanced tumours. Among them, one who had been operated due thyroid papillary carcinoma died on the eighth postoperative day due to rupture of common carotid artery. In this patient, saliva was draining from the hemovac drain but no fistular orifice opening to the skin had been detected. One patient with pharyngo-cutaneous fistula, who had had radiotherapy and total laryngectomy in another hospital due to recurrence, had to be intervened many times, and after a gastric pull-up operation oral feeding could be possible for him. In another patient who had a total laryngopharyngectomy operation with reconstruction using pectoralis major myocutaneous flap, pharyngo-cutaneous fistula was closed using a deltopectoralis flap. In all the patients apart from these two, pharyngo-cutaneous fistulas closed secondarily in 7-29 days (mean 16 days).

Among 7 larynx cancer patients who had tumour recurrences after primary radiotherapy and were totally laryngectomized, one developed pharyngo-cutaneous fistula that closed secondarily. Pharyngo-cutaneous fistula rate was 3.2% for those did not receive radiotherapy, 14.3% for who received radiotherapy, 100% for papillary thyroid cancer, and 4.1% for the total laryngectomy patients. When hypopharynx and cervical

oesophagus carcinoma cases were involved in the calculation of the rate, total pharyngo-cutaneous fistula rate was found to be 6.2%.

Patients who received radiotherapy had higher pharyngo-cutaneous fistula rates than those who did not, but there was statistically no significant difference between two groups regarding the fistula rate ($p=0.679$).

According to stage, 40 of the patients were in stage IV and 155 were in stage III. All the patients while who developed pharyngo-cutaneous fistula were stage IV patients no pharyngo-cutaneous fistula developed in stage III patients. There was a statistically significant difference between the two groups regarding fistula rate ($p<0.00002$).

According to postoperative histopathologic evaluation of the total laryngectomy resection specimens, none except the thyroid papillary carcinoma patient had tumour positive resection margins.

DISCUSSION

Factors leading to pharyngo-cutaneous fistula formation have been a subject of debate in the literature. Some authors' conclusions are not accepted by others. It has been postulated that this debate was the result of different preoperative, operative and postoperative procedures (3). A number of risk factors for the development of pharyngo-cutaneous fistula have been defined, and they are shown in Table 1. Among them, preoperative radiotherapy, prophylactic antibiotic therapy, stage and width of surgical procedure are the factors which we will discuss.

There are authors in the literature who concluded that preoperative radiotherapy increases the risk of pharyngo-cutaneous fistula formation (2, 4, 5, 7) while others do not accept it to be a statistically significant risk factor (1, 3, 9). Preoperative radiotherapy impairs the tissue perfusion and may increase the tendency towards pharyngo-cutaneous fistula formation. In our series, preoperative radiotherapy was not found out to be a statistically significant factor in pharyngo-cutaneous fistula development. The limited number of patients who received preoperative radiotherapy limits us to come to an exact conclusion.

In patients with advanced carcinoma, wide resection of the tumour area increases the

likelihood of pharyngo-cutaneous fistula formation (1, 3, 7-9). In our series, all of the patients who developed fistulas were the ones in the stage IV carcinoma group which consisted of 40 patients. All of the total laryngectomies in the series were performed for stage III and stage IV patients, so that radical neck dissection, modified radical neck dissection, or lateral selective neck dissection was also performed in addition to total laryngectomy. There are series which claimed neck dissection to be a factor that increases the incidence of pharyngo-cutaneous fistula (7), while others did not agree (9). In our opinion, neck dissection in addition to total laryngectomy is in fact a condition related to stage, thus the stage must be taken into consideration in the evaluation of the role of neck dissection. In our series, all of the patients were in advanced stages and this distribution was statistically significant. Neck dissection is usually applied to patients with advanced stage and the immunologic response in these patients is limited. These may be factors that increase pharyngo-cutaneous fistula development rate in this handicapped group.

We agree with the concept that one of the most important risk factors for the development of pharyngo-cutaneous fistula is the surgical technique performed. During the laryngeal releasing step, the inferior constrictor muscles are cut from the thyroid cartilage alae and the perichondrium is elevated from the lateral border 2-3 mm at each side medially, saving totally 5-6 mm mucosal edge. This brings an advantage to the surgeon during the closure of the defect. This technical detail is emphasized in only 3 (12-14) of the 7 reference books reviewed (12-18). Confronting with color changes at the edges of the pharyngeal mucosa at the end of the operation is not an unfamiliar situation for the surgeon dealing with larynx cancer. These unhealthy mucosal edges must be debrided. This is a situation that will extend the mucosal defect. In literature, authors who have discussed the importance of the surgical technique have emphasized the importance of the tumour size but have not made any comment on the mentioned technique. We think that the low pharyngo-cutaneous fistula incidence of 3.2% in the primary total laryngectomy group patients is due to our surgical technique. There is a significantly higher incidence in stage IV patients, but when the whole patient group is taken into account, pharyngo-cutaneous fistula rate is still 4% which is low with respect to the literature we assign this to

the surgical technique applied.

All of the patients in our series were fed with nasogastric tube for 8-10 days, postoperatively. Krouse et al noticed that 19 % percentage of their patients had sinus tracts in the pharynx and soft tissues of the neck when they applied barium swallow pharyngoesophagography postoperatively. They have reported a significant increase in pharyngo-cutaneous fistula formation in patients with sinus tracts longer than 2 cm (4). According to this, starting oral intake earlier may be a factor that increases the development of this sinus tract into a fistula. Therefore, we recommend not to start early oral intake in order to decrease the the fistula formation risk. Since all of our patients were fed with nasogastric tube, we were not able to compare the results with early oral intake without nasogastric tube. We also were not able to compare patients who were given prophylactic antibiotics with those who were not, since all were given antibiotics.

In conclusion, we agree with the concept that the best fistula treatment is the prevention of its development. To achieve this goal, we recommend the above mentioned surgical technique, late oral intake and prophylactic antibiotic administration as factors that decrease pharyngo-cutaneous fistula formation incidence.

Correspondence to : Dr.Ahmet KÖYBAŞIOĞLU
Gazi Üniversitesi Tıp Fakültesi
Kulak Burun Boğaz Anabilim Dalı
Beşevler
06500 ANKARA - TÜRKİYE
Phone : 312-2141000 / 6402
Fax: 312-215 05 87

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