

# Comparison of Early Versus Delayed Oral Feeding After Total Laryngectomy in Terms of Pharyngocutaneous Fistula Development

## *Total Larenjektomi Sonrası Erken ve Geç Oral Beslemenin Farengokutanöz Fistül Gelişimi Açısından Karşılaştırılması*

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Original Investigation  
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### Abstract

**Objective:** There is still no consensus on the effect of early oral feeding and nasogastric tube feeding on the development of pharyngocutaneous fistula (PCF) after total laryngectomy. The aim of the present study was to compare the effects of early oral feeding and nasogastric tube (NGT) feeding after total laryngectomy on the incidence of PCF.

**Methods:** A total of 59 male and three female patients with a mean age of 61.65 (range 44-77) years who underwent total laryngectomy and bilateral neck dissection between May 2010 and June 2016 were evaluated retrospectively. Thirty-two patients started oral feeding on postoperative day three, and 30 patients started NGT feeding on postoperative day one following oral feeding on 7th day. Besides the investigation of the factors which can affect PCF formation,

the incidence of PCF was also determined between the two groups of patients.

**Results:** Only preoperative albumin value was different between the groups in the determination of factors which can affect development of PCF. No statistical difference was found between the two groups in terms of the development of PCF and the length of hospital stay ( $p>0.05$ ).

**Conclusion:** To start oral feeding on postoperative day three or with a NGT feeding on postoperative day one following oral feeding on day seven did not affect the development of PCF and the length of hospital stay in patients who underwent total laryngectomy.

**Keywords:** Laryngectomy, fistula, enteral nutrition, nasogastric tube



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### Öz

**Amaç:** Total larenjektomi sonrası erken oral besleme ile nazogastrik tüp (NGT) ile beslemenin farengokutanöz fistül (FKF) gelişimine etkisi konusunda fikir birliği yoktur. Bu çalışmanın amacı total larenjektomi sonrası erken oral besleme ile NGT ile beslemenin FKF insidansına etkilerini karşılaştırmaktır.

**Yöntemler:** Mayıs 2010 ile Haziran 2016 tarihleri arasında total larenjektomi ve bilateral boyun diseksiyonu uygulanan ve yaş ortalaması 61.65 (min 44-maks 77) olan toplam 59 erkek ve üç kadın hasta geriye dönük değerlendirildi. Otuz iki hastada postoperatif üçüncü günde oral beslemeye başlanırken, 30 hastada beslemeye postoperatif ilk günde NGT ile başlanıp, yedinci günde oral beslemeye geçildi. Farengokutanöz fistül gelişimine etkisi ola-

bilecek faktörler yanında, iki grup hastadaki FKF insidansı da araştırıldı.

**Bulgular:** Farengokutanöz fistül oluşumuna etki edebilen faktörler araştırıldığında, sadece preoperatif albumin değeri iki grup arasında farklı idi. İki grup arasında FKF oluşumu ve hastanede kalış süreleri açısından istatistiksel fark saptanmadı ( $p>0.05$ ).

**Sonuç:** Total larenjektomi uygulanan hastalara postoperatif üçüncü gün oral beslemeye başlama ile, ilk gün NGT takiben yedinci gün oral besleme başlama, FKF gelişimini ve hastanede yatış süresini etkilemedi.

**Anahtar kelimeler:** Larenjektomi, fistül, enteral beslenme, nazogastrik tüp

### Introduction

The connection that forms between the pharynx and cervical skin is called a pharyngocutaneous fistula (PCF). This connection can cause leakage

of saliva to the skin surface. This salivary leak on the skin is one the most common regional complications with a risk of 8% - 22% after total laryngectomy. A PCF can result in a longer hospital

**Cite this article as:** Bulğurcu S, Çukurova İ. Comparison of Early Versus Delayed Oral Feeding After Total Laryngectomy in Terms of Pharyngocutaneous Fistula Development. Turk Arch Otorhinolaryngol 2018; 56(4): 217-20.

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**Received Date/Geliş Tarihi:** 09.06.2018

**Accepted Date/Kabul Tarihi:** 06.08.2018

**Available Online Date/Çevrimiçi Yayın Tarihi:**  
25.12.2018

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DOI: 10.5152/tao.2018.3605

stay, delay adjuvant postoperative treatment, and contribute to nutritional deficits and other life-threatening complications (1).

Many risk factors cause PCF, including comorbid illnesses, preoperative radiation treatment, former tracheotomy, hemoglobin level, patient age, tumor stage, type of operation, and concurrent neck dissection (2). However, no consensus exists to determine high-risk patients, as the same factors are not significant in all studies.

Adequate nutrition is an important part of postoperative management after total laryngectomy, but it is widely accepted that early oral feeding (OF) may facilitate the development of PCF. Feeding via a nasogastric tube (NGT) for 7-14 days after total laryngectomy is a common practice applied by head and neck surgeons. On the contrary, there are also studies indicating that early OF does not contribute to PCF (3). However, there is still no consensus for the proper time to start oral intake. The aim of the present study was to investigate the effect of OF and NGT feeding on PCF formation in patients who underwent total laryngectomy for laryngeal carcinoma.

### Methods

A total of 62 patients who were diagnosed with squamous cell carcinoma and underwent total laryngectomy with a bilateral neck dissection between May 2010 and June 2016 were retrospectively investigated after obtaining approval from the Ethics Committee of Tepecik Training and Research Hospital (Date 7/03/2017, No:2/7). All participants were informed about the study, and written informed consents were obtained. A transglottic carcinoma was found in 55 patients, and a subglottic carcinoma was present in 7 patients. Feeding was achieved with a NGT in 30 patients and with an OF in 32 patients. Total laryngectomy and bilateral neck dissection were performed with a “T” shaped closure technique in all patients.

A database was created including data about tumor features (T and N stages), gender, age, smoking habits, alcohol use, presence of preoperative tracheostomy, preoperative radiotherapy, comorbidities (history of diabetes, chronic obstructive pulmonary disease, and vascular disease), blood values (preoperative serum hemoglobin, albumin, postoperative serum hemoglobin, and thrombocytes), and transfusion of erythrocytes.

Enteral nutrition with NGT was initiated in all patients on postoperative first day. The NGT was removed, and OF was started if no PCF had developed by postoperative day seven. In the non-NGT patients, nutritional support was provided with total parenteral nutrition products on postoperative first two days, and OF was started with semi-solid food on day three. OF with solid food was started on day seven if no PCF had developed. Nutritional support was provided with total parenteral nutrition products when a PCF was observed. All patients diagnosed with a PCF were treated daily with compressive dressings and adequate antibiotics. Patients who underwent thyroidectomy and partial laryngectomy, were reconstructed with a flap, or had tumor continuity at the surgical margin were excluded from the study.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS®) version 20.0 software (IBM Corp.; Armonk, NY, USA). Pearson’s chi-square test and Fisher’s exact test were used to determine the associations between the study groups. Student’s t-test was used to evaluate the duration of hospitalization. A p-value <0.05 was considered significant.

### Results

No significant differences were observed in terms of age, gender, smoking and alcohol use, tumor T and N stages, preoperative serum hemoglobin, postoperative serum hemoglobin, thrombocytes, preoperative tracheostomy, preoperative radiotherapy, comorbid illnesses, or erythrocyte transfusions between the NGT and OF patients. The difference on preoperative albumin levels were statistically significant between the two groups (Table 1). However, no significant differences were observed between the two groups in terms of developing a PCF or hospital stay (Table 2). All patients with a PCF were treated with compressive dressings. All patients recovered completely without any sequela.

**Table 1.** Patient characteristics

Variables	Number of patients with NGT	Number of patients with OF	p
<b>Gender</b>			<b>0.476</b>
Male	28 (93.33%)	31 (96.87%)	
Female	2 (6.66%)	1 (3.22%)	
<b>Age</b>	61.46+7.52	61.81+9.65	<b>0.878</b>
<b>Smoking</b>	30 (100%)	32 (100%)	<b>1.00</b>
<b>Alcohol</b>	2 (6.66%)	3 (9.37%)	<b>0.755</b>
<b>TNM-T stage</b>			<b>0.875</b>
T2	0 (0%)	2 (6.25%)	
T3	21 (70%)	24 (75%)	
T4	9 (30%)	6 (18.75%)	
<b>TNM-N stage</b>			<b>0.451</b>
N2a	1(3.33%)	0 (0%)	
N2b	3 (10%)	2 (6.25%)	
N2c	22 (73.33%)	27 (84.37%)	
N3	4 (13.33%)	3 (9.37%)	
<b>Preop Hb &lt;12.2 g/dL</b>	11 (36.66%)	16 (50%)	<b>0.405</b>
<b>Postop Hb &lt;12.2 g/dL</b>	21 (70%)	20 (62.5%)	<b>0.429</b>
<b>Preop albumin &lt;3.5 g/dL</b>	23 (76.66%)	28 (87.5%)	<b>0.001</b>
<b>Postop thrombocyte &lt;130 K/mL</b>	3 (10%)	3 (9.37%)	<b>0.533</b>
<b>Erythrocyte transfusion</b>	6 (20%)	8 (25%)	<b>0.744</b>
<b>Previous tracheotomy</b>	4 (13.33%)	7 (21.87%)	<b>0.448</b>
<b>Co-morbid illness</b>	10 (33.33%)	12 (37.5%)	<b>0.886</b>
<b>Previous radiotherapy</b>	2 (6.66%)	2 (6.25%)	<b>0.890</b>

NGT: nasogastric tube; OF: oral feeding; Preop: preoperative; Postop: postoperative

**Table 2.** Relationship between feeding approach and PCF

	Patients with NGT	Patients with OF	p
Number of PCF	5 (16.66%)	6 (18.75%)	0.929
Duration of hospitalization (days)	16.43+11.60	12.87+7.22	0.125

NGT: nasogastric tube; OF: oral feeding; PCF: pharyngocutaneous fistula

## Discussion

Many studies have been conducted about prevention of PCF after total laryngectomy. In these studies, the effects of age, gender, smoking and alcohol use, previous radiotherapy, tumor characteristics, prior tracheotomy, accompanying systemic disease, pre- and postoperative hemoglobin levels, postoperative platelet levels, preoperative albumin levels, and erythrocyte transfusions were investigated (4-8). In the present study, we evaluated the difference between nutrition with a NGT and OF and found no difference in terms of PCF formation between the two groups despite the significant difference in preoperative albumin levels between the groups. Morton et al. (9) and Mattioli et al. (2) emphasized the important relationship between albumin and PCF in their studies. Our results indicated the effect of low preoperative albumin level on PCF formation. We will evaluate this factor in a larger patient group in future studies.

Some surgeons prefer delaying OF to prevent development of a fistula. The effect of early OF on the possibility of fistula development remains controversial (10). Starting oral nutrition during the early phase is accepted as playing a role in the development of PCF. On the other hand, a NGT causes local trauma and significantly increases stress on the pharyngeal suture line, and this stress may result in the formation of a fistula. It has been thought that applying a NGT can damage the pharyngeal mucosa primarily via acidic gastroesophageal reflux (11). PCF vary from 1% to 50% in patients with total laryngectomy fed with a NGT (12, 13). In our study, we detected a PCF in 16.66% of patients in whom feeding with a NGT was started on postoperative day one.

No other studies observed any relationship between the formation of fistulae and starting OF early. Akyol et al. (14) observed PCFs in 21% of patients who received a total laryngectomy and who received an early oral diet (water and clear fluids) on postoperative day one. Aprigliano (15) reported a 9% incidence of PCF in patients who underwent a total laryngectomy and to whom oral nutrition was started on postoperative day three. We determined that 18.75% of fistulas developed in patients who had started OF on postoperative day three. A NGT can cause several complications, such as permanent nasal alar deformity, acute sinusitis, pneumothorax, aspiration pneumonia, gastroesophageal reflux, and persistent dysphagia. In addition, a NGT can cause additional stress on the suture line during the postoperative period and contribute to the development of a PCF (14, 16, 17).

Sharifian et al. (18) found no significant difference between nutrition with a NGT for the first 7 days and OF on day 3 in patients who had PCF after total laryngectomy. They also reported that the PCF could be completely closed with compressive dressings. In consistent with previous studies, our patients with PCF healed well with compressive dressings in both groups.

## Conclusion

Starting OF on postoperative day three did not influence the formation of PCF and hospital stay after total laryngectomy. Therefore, we recommend early OF after total laryngectomy. It is necessary to investigate the effect of albumin level on the development of PCF after total laryngectomy in larger groups of patients.

**Ethics Committee Approval:** Ethics committee approval was received for this study from the Ethics Committee of Tepecik Training and Research Hospital (Date: 7/03/2017, No: 2/7).

**Informed Consent:** Written informed consent was obtained from patients who participated in this study.

**Peer-review:** Externally peer-reviewed.

**Author Contributions:** Concept - S.B., İ.Ç.; Design - S.B., İ.Ç.; Supervision - S.B., İ.Ç.; Resource - S.B., İ.Ç.; Materials - S.B., İ.Ç.; Data Collection and/or Processing - S.B., İ.Ç.; Analysis and/or Interpretation S.B., İ.Ç.; Literature Search - S.B., İ.Ç.; Writing - S.B.; Critical Reviews - S.B., İ.Ç.

**Conflict of Interest:** The authors have no conflicts of interest to declare.

**Financial Disclosure:** The authors declared that this study has received no financial support.

**Etik Komite Onayı:** Bu çalışma için etik komite onayı Tepecik Eğitim ve Araştırma Hastanesi Etik Kurulu'ndan alınmıştır (Tarih: 7/03/2017, No: 2/7).

**Hasta Onamı:** Yazılı hasta onamı bu çalışmaya katılan hastalardan alınmıştır.

**Hakem Değerlendirmesi:** Dış bağımsız.

**Yazar Katkıları:** Fikir - S.B., İ.Ç.; Tasarım - S.B., İ.Ç.; Denetleme - S.B., İ.Ç.; Kaynaklar - S.B., İ.Ç.; Gereçler S.B., İ.Ç.; Veri Toplanması ve/veya İşlemesi - S.B., İ.Ç.; Analiz ve/veya Yorum - S.B., İ.Ç.; Literatür Taraması S.B., İ.Ç.; Yazıyı Yazan - S.B.; Eleştirel İnceleme - S.B., İ.Ç.

**Çıkar Çatışması:** Yazarlar çıkar çatışması bildirmemişlerdir

**Finansal Destek:** Yazarlar bu çalışma için finansal destek almadıklarını beyan etmişlerdir.

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