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Brief Report

Pharyngocutaneous Fistula after Laryngectomy: Incidence, Predisposing Factors, and Outcome

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Pharyngocutaneous fistula is a common and troublesome postoperative complication after total laryngectomy. The objective of this report was to determine the incidence, predisposing factors, and outcome of postlaryngectomy pharyngocutaneous fistula in patients operated on in our department and to describe the management of the complication.

The medical records of 146 consecutive patients who underwent laryngeal surgery for squamous cell carcinoma of the larynx between 1990 and 2005 were assessed. All patients had similar preoperative/postoperative care. We studied a number of factors that could influence fistula formation such as age, gender, smoking, systemic disease, preoperative radiotherapy, previous tracheotomy, site of tumor, surgical procedure, positive surgical margins, type of closure (T vs. vertical), concurrent neck dissection, suture material, clinical stage, histologic grade, and experience of surgeon (consultant vs. resident).

A pharyngocutaneous fistula was observed in 13% (19/146) of the patients within a mean time of 9.6 days from surgery. Spontaneous closure with local wound care was noted in 17 (89%) patients whereas a surgical closure was necessary in two. One patient required surgical closure by direct suture of the pharyngeal mucosa. Pectoralis major myocutaneous flap was used in another one. Our findings showed that fistula formation was significantly more common in patients who received previous radiotherapy or who had positive surgical resection margins or had a systemic disease. The mean healing time was 26 days.

We concluded that pharyngocutaneous fistula remains a troublesome complication of the early postoperative period after total laryngectomy. There are many conflicting reports in the literature concerning the predisposing factors, but our data showed that the presence of systemic diseases, previous radiotherapy, and positive surgical margins can all be important predisposing factors, or at least underlying causes. Our experience confirmed that most fistulas can be successfully managed with conservative treatment.

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Introduction

Development of pharyngocutaneous fistula (PCF) is the most common and troublesome postoperative complication following laryngectomy. Billroth was the first person to report PCF as a complication.[1,2]

PCF after laryngectomy occurs when there is a failure in the pharyngeal repair resulting in a salivary leak.[3] This is a demoralizing complication not only for the surgeons involved, but also for the patient and his family. Its occurrence leads to increased morbidity, delay in adjuvant treatment, prolonged hospitalization, and increased treatment costs.[3,4] The reported incidence of PCF is extremely variable in the literature ranging from 5% to 65%.[1,3] A rate between 13% and 25%[4,5] has been often reported and only few reports had a rate of less than 10%.[4,7] Although a number of factors that result in PCF have been described, there is still no agreement on the most significant factors.[6,8,9]

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The objectives of this report were to determine the incidence of PCF in our patients with total laryngectomy, to identify factors which contribute to fistula formation, and to analyze our results in managing this complication.

Patients and Methods

We studied prospectively all patients who underwent laryngeal surgery for squamous cell carcinoma of the larynx between January 1990 and December 2005 in Otolaryngology Department of Ahwaz Jondishapour University of Medical Sciences. We studied all the previously-reported factors that could influence fistula formation such as age, gender, smoking, presence of a systemic disease (e.g. hypertension, diabetes, chronic bronchitis, chronic congestive heart failure), previous radiotherapy, previous tracheotomy, site of tumor, tumor stage, surgical procedure, type of closure (T vs. vertical), concurrent neck dissection, suture material used, clinical stage, histologic grade, time of oral feeding, positive surgical margins, and experience of surgeon (consultant vs. resident).

The surgical technique used and postoperative care were generally standardized in all cases examined. Pharyngeal reconstruction was performed as a rule in two layers, mucosal and muscular, using vicryl sutures. A T-shaped or vertical pharyngeal closure was followed, and upon completion of the procedure, local pressure bandage was applied with continuous negative-pressure drainage in place for at least 48 hours. Removal of skin sutures was performed gradually on the 8^{th} and 9^{th} postoperative days.

Nutrition of the patients was commenced during the second postoperative day assisted by a nasogastric feeding tube that was placed peroperatively. Nasogastric tube remained in place until the 8^{th} postoperative day, when oral feeding was commenced.

Statistical analyses were performed using χ^2 and Student's *t*-test. Statistical significance was defined as $P<0.05$. All analyses were performed using SPSS 10.1 statistical program.

Results

A total of 146 laryngectomies were performed during the study period. Twenty-two patients (15%) had received previous radiotherapy, the remaining 124 (85%) underwent laryngectomy as their primary treatment.

The mean follow-up time for our patients was 63 months. The vast majority of the patients had locally-advanced carcinoma as follows: T1 (n=6), T2 (n=8), T3 (n=91), and T4 (n=41).

Nine (6.1%) patients had hypopharyngeal cancers and 93.9% had laryngeal cancers. Of 146 laryngectomies, 137 required total laryngectomy with or without partial pharyngectomy. Nine patients required a gastric pull-up.

The overall fistula rate was 13% (19/146). There was no PCF in patients who underwent neopharynx reconstruction with gastric pull-up (9/146). The majority of leaks manifested within the first two weeks (16/19) and most appeared in the lateral part of the suture line (17/19) (Figure 1). Fistula appeared after a mean of 9.6 (range: 6 – 22) days of operation (Figure 2).

The mean age of the patients who developed a fistula was 54.2 years; it was 55.3 for those who did not develop fistula ($P>0.05$). In most of the patients (17 of 19) the fistula healed with conservative treatment alone.

The conservative treatment involved adequate drainage, neck compression, and frequent dressings. Half of these fistulas healed within 14 days and three quarters healed within four weeks. One point three percent of the patients (two of 19) required surgical intervention by way of either a myocutaneous flap for control of PCF or direct mucosal suture. The mean hospital stay in patients having PCF was 29 days.

In our series, the presence of a systemic disease, history of previous radiotherapy, and a positive surgical margin were significantly associated with fistula formation. Conversely, there were no statistically significant differences between the

Figure 1. PCF in the left side of ostoma.

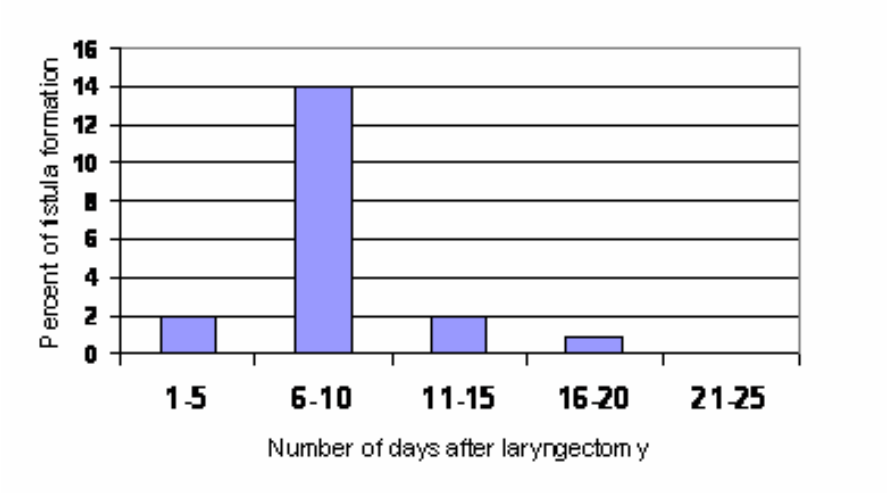

Figure 2. Relationship between fistula formation and time elapsed in days after laryngectomy.

fistula and the nonfistula groups with regard to age, gender, smoking, previous tracheotomy, site of tumor, surgical procedure, tumor stage, tumor differentiation, type of closure (T vs. vertical), suture material used (silk vs. vicryl), clinical stage, time of oral feeding, and experience of surgeon (consultant vs. resident).

The Incidence of fistula formation was 15.8% (three of 19) for glottic tumors, 26.4% (five of 19) for supraglottic tumors, and 57.8% (11 of 19) for the sum of transglottic and subglottic tumors.

The performance of a radical or selective neck dissection was required in 26 (17.8%) patients. An emergency preoperative tracheotomy was performed in 16 patients for dyspnea.

The mean age of the patients who underwent total laryngectomy was 54.2 (range: 23 – 75) years. The vast majority of the laryngectomized patients were men; only 10 (6.8%) out of 146 patients were women.

Discussion

Generally, PCF develops just above the tracheostoma, at the weakest point of the suture line of the pharyngeal mucosa. The involved neck skin becomes tender and dark red.[9]

The rate of fistula formation after total laryngectomy in the present study was 13% (19 of 146) studied patients. This rate is in agreement with the data presented in the international literature over the past decade, according to which the rate varies from 8.7% to 22%.[2,3,6,8,9] In our series, the presence of systemic diseases, history of previous radiotherapy, and positive surgical margin were significantly associated with fistula formation.

Statistical analyses showed a significant correlation between PCF and preoperative radiotherapy, which might be attributed to the diminished healing capacity of the irradiated tissues.[6,7]

Tracheotomy, as a predisposing factor for fistula, is frequently performed for more advanced tumors, sometimes in emergency situations. These reasons may possibly contribute to an increase in the rate of fistula formation. However, the present study did not show any reason in favor of such postulation.[3,7]

Association of neck dissection with fistula formation is controversial.[5,6,8,9] In our study, the neck dissection did not have any significant correlations with PCF.

It is generally agreed that most fistulas respond well to conservative treatment.[6,8,10] Eighty-nine percent of fistulas we studied were healed with conservative management. A useful adjunct is to sterilize the fistula from within by administering 10 mL of 0.25% acetic acid by mouth. If the previously-described measures are unsuccessful in sealing off the pharynx from the neck within three weeks, operative closure should be considered, although spontaneous closure may occur up to six weeks after onset.[2,3]

Many authors believe that delayed oral feeding reduces fistula formation after laryngectomy as there is no stress on the suture line due to feeding. In our study, 73.6% (14 of 19) of our patients had leakage in less than two weeks, i.e. before the oral feeding was started. There is little evidence to support the view that the time of oral feeding influences fistula formation following laryngectomy. A few authors did not even adopt the nasogastric tube and instead started oral feeding on

the first[2,7] or third[5,7] postoperative days. Moses et al. reported a lower incidence of fistula in the group of patients who resumed feeding on postoperative day seven, whereas it was much higher in patients who did so after the seventh day.[7]

Aprigaliano and Levine reported a 9% fistula rate without use of nasogastric tube and oral feeding on post-operative day three.[1]

Grau C et al. demonstrated a statistically significant difference in the formation of PCF between vicryl and catgut groups, in favor of vicryl.[9] Vicryl has unique properties when compared with catgut, in terms that it is much stronger, causes less inflammation, and has a longer half-life. We did not have any such experience in our study.

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