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ORIGINAL ARTICLE

Frequency and predisposing factors of pharyngocutaneous fistula after total laryngectomy

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KEYWORDS

Pharyngocutaneous fistula;
PCF;
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Abstract *Objective:* The objective of our study was to determine the frequency and predisposing factors of pharyngocutaneous fistula in postlaryngectomy patients.

Materials and methods: Charts of those patients who were treated with total laryngectomy for laryngeal carcinoma in our department from 2000 to 2008 were reviewed. Total 77 patients were included in the study. The variables studied for the development of pharyngocutaneous fistula (PCF) after total laryngectomy were: age and gender, diabetes mellitus, post-operative hemoglobin, ischemic heart disease, chronic obstructive pulmonary disease, tumor characteristics including tumor site, stage, differentiation and extension into pyriform sinus, pre-operative radiotherapy, pre-operative chemotherapy, pre-operative tracheostomy and positive surgical margins.

Results: Univariate analysis showed diabetes, pre-operative radiotherapy, pre-operative chemotherapy and pre-operative tracheostomy to be significantly associated with the formation of PCF. However, multivariate regression revealed that the only pre-operative radiotherapy was highly associated with the formation of PCF ($OR = 132.923$, $P = 0.001$).

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Conclusions: We found 28.6% incidence of pharyngocutaneous fistula mainly because of the number of patients undergoing radiotherapy and chemotherapy as primary treatment for laryngeal cancers is increasing with current approach of organ preservation protocol.

1. Introduction

Head and neck cancer is the ninth common cause of death in the United States according to the national statistics.[1] In Pakistan head and neck cancer is ranked among the most common malignancies in male[2,3] and the carcinoma of larynx is the 2nd most common. The treatment of advanced laryngeal cancer had traditionally been total laryngectomy (TL) followed by adjuvant radiotherapy. For past few decades, focus of primary treatment for advanced laryngeal cancers has shifted from surgery to radiotherapy and chemotherapy with the intention of organ preservation protocol.[4]

A large number of people still undergo total TL as either primary treatment for advance laryngeal cancers i.e. stage III and stage IV,[4] or as a management of recurrent/persistent disease after chemo radiation or treatment related tissue damage (like chondroradionecrosis).[5] TL for laryngeal cancers is associated with a high rate of complications such as pharyngocutaneous fistula (PCF), chyle leak, wound infection, hemorrhage, pneumonia and embolism; among these complications pharyngocutaneous fistula is believed to be the most common.[5] Development of PCF is not only associated with increased hospital stay, patient discomfort, high health costs and delayed adjuvant treatment but can also lead to life-threatening outcomes such as carotid artery rupture.[6,7] Studies have revealed incidence of PCF to be as high as 65%.[8]

The etiology of PCF remains unclear, however, it is believed to be multi-factorial in origin.[9] Various factors have been implicated in the formation of PCF including diabetes mellitus, pre-operative hypoalbuminemia, post-operative hemoglobin less than 12.5 g/dl, liver disease, pre-operative radiotherapy, tumor size, residual tumor, positive surgical margins,[10,11] location of tumor, cervical lymph node metastasis, concurrent neck dissection, intra-operative blood transfusion, extent of surgery, operative time, surgical technique and gastro-esophageal reflux disease.[12]

It is evident that the same factors have not been found significant in all studies; hence the controversy still remains in identifying high-risk patients. With many different etiological agents responsible for the disease and a different level of care compared to western countries, in Pakistani population Udaipurwala and colleagues[13] quoted the incidence of PCF 8.9%. However they did not investigate the role of above mentioned factors in formation of PCF. Our study was aimed to identify the rate of PCF after total laryngectomy and the associated significant risk factors among these patients of the developing world particularly through multivariate analysis.

2. Materials and methods

The charts were reviewed of those patients who were treated with total laryngectomy for laryngeal carcinoma in our department from 2000 to 2008. Total 90 patients underwent TL, of these 77 patients were included in the study. Thirteen patients were excluded due to inadequate data or flap reconstruction to achieve primary closure. The variables included age and gender, diabetes mellitus (DM), post-operative hemoglobin, ischemic heart diseases (IHD) and chronic obstructive pulmonary disease (COPD) and tumor characteristics including tumor site, stage, differentiation and extension into pyriform sinus, pre-operative radiotherapy and pre-operative chemotherapy and surgical details (preoperative tracheotomy and positive surgical margins). The data were analyzed using SPSS 18. Using Chi-square test and odds ratio, univariate analysis was carried out. Variables that were found statistically significant on univariate analysis were reanalyzed using multivariate regression.

3. Results

There were 70 males (91%) and seven females (9%). The mean age was 57 years. Further characteristics of our patients are given in Table 1. Of 77 patients 22 (28.6%) developed pharyngocutaneous fistula. The mean time taken for PCF formation was 7 days (range = 3–14 days) see Table 2. Univariate analysis was made by calculating odds ratio (OR) and using the Chi-square test to calculate level of significance. This showed diabetes, pre-operative radiotherapy, pre-operative chemotherapy and pre-operative tracheostomy to be significantly associated with the formation of PCF (Table 3). However, multivariate regression (Table 4) revealed only the pre-operative radiotherapy highly associated with the formation of PCF ($OR = 132.923$, $P = 0.001$).

4. Discussion

Complications following total laryngectomy (TL) can be divided into local (infection, hemorrhage, fistula or chyle leak) and general (myocardial infarction, urinary tract infection, pulmonary, renal or metabolic)[14] Of all the complications of laryngectomy the occurrence of PCF is believed to be the most common.[15]

Our study revealed a high rate of PCF of 28.6% among patients undergoing TL. Although this rate was in agreement with a number of studies,[16,17] it is still very high compared to data from recent studies in developed countries, which quoted incidences between 12% and 16%.[18,19] Numerous factors have been implicated to be involved in the formation of PCF. Using univariate analysis, our study showed that pre-operative radiotherapy, diabetes, pre-operative tracheostomy, post-operative hemoglobin less than 12 g/dl and pre-operative chemotherapy to be associated with fistula formation, whereas only pre-operative radiotherapy was found to be statistically significant on multivariate analysis.

With increased reliance on organ preservation protocols, an increased number of patients receive chemotherapy and