

THE ROLE OF RADIOTHERAPY IN PHARYNGOCUTANEOUS FISTULA FOLLOWING TOTAL LARYNGECTOMY

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ABSTRACT:

Pharyngocutaneous Fistula (PCF) is the most common complication after total laryngectomy (TL).

Aim: The purpose of this study was to determine the effect of preoperative radiotherapy and pharyngocutaneous fistula in patients undergoing total laryngectomy.

Methods and Patient: Retrospective study of 58 patient undergoing total laryngectomy at our department in Tishreen University Hospital in Lattakia from 2015 to 2018.

Result: Eighteen patient developed PCF (31%). Preoperative radiotherapy (P value 0.0001), radiation induced hypothyroidism RIHT (P value 0.003), radiation therapy with concurrent chemotherapy (P value 0.02), Low preoperative hemoglobin (P value 0.02) were associated with fistula development.

Conclusion: Pharyngocutaneous fistula is a common complication of total laryngectomy, preoperative radiotherapy, radiation induced hypothyroidism RIHT, radiation therapy with concurrent chemotherapy are important in determining the risk of fistula.

Key words: Total laryngectomy, radiation therapy, chemotherapy, fistula.



INTRODUCTION:

Cancer of the larynx affects more than 13,150 people each year and results in an estimated 3710 deaths, according to the National Cancer Institut (NCI) 2018 [1].

Three types of standard treatment are used for patients with laryngeal cancer: Radiation therapy, Surgery and Chemotherapy.

The addition of chemotherapy to the radiation therapy before surgery in patients with advanced cancer of the head and neck has resulted in high rates of complete tumor regression that are associated with prolonged survival [2, 3, 4, 5].

The thyroid gland is one the most radiosensitive normal tissues in the human body. It is frequently affected by radiotherapy in head and neck cancer patients, and thyroid dysfunctions are commonly seen following irradiation [6]. The incidence of radiation-induced hypothyroidism has been described mostly within the range of 20–30% and the reports are currently increasing in literature [7, 8].

Total laryngectomy (TL) carries with it significant morbidity, with 40%–92% reported complication rates [6, 9, 10].

The most frequent postoperative complication is the development of a pharyngocutaneous fistula (PCF), which occurs with variable frequencies of 2.6% to 65.5% [9].

Case series have identified many factors as significantly associated with PCF development.

Preoperative radiation therapy increases both the frequency and severity of postoperative PCF [11-7-14], and chemotherapy augments this effect [11]. Other factors associated with increased rates of PCF include patient comorbidities [11], hypothyroidism [11], low perioperative hemoglobin [11, 12] and albumin [5], more advanced primary tumor stage, prior tracheotomy [11, 12] positive surgical margins, concurrent neck dissection, and surgical closure technique .

The aim of this study was to determine the effect of preoperative radiotherapy and pharyngocutaneous fistula in patients undergoing total laryngectomy.

In addition to the primary aim of the study, we also performed a full analysis of other potential causative factors for PCF in our laryngectomy population, like low preoperative hemoglobin and prior tracheotomy.

MATERIALS AND METHODS:

Retrospective study of 58 patient undergoing total laryngectomy at our department in Tishreen University Hospital in Lattakia –Syria from 2015 to 2018.

Excluded from the study were patients undergoing pharyngolaryngectomy . None of the included patients had any other reconstruction over and above our standard three-layered primary closure of

the pharyngeal tissues following removal of the larynx. No free flaps were used in any of the analyzed patients.

Statistical analysis:

Data were analyzed using IBM SPSS Statistics Version 19 for Windows. A value of $p < 0.05$ was considered statistically significant. The results were presented as mean \pm standard deviation (SD) for all variables that were normally distributed and as median with data range when not normally distributed. Differences between groups were analysed using the independent samples t test, and between quantitative variables were performed by Fisher exact or chi-square.

RESULTS:

Patient characteristic:

This study population included 58 patients with a median age of 63 years, range (26_80). The distribution of the population in males and female was 87.9% and 20.1% respectively (figure 1).

Twenty five patient (43%) got preoperative radiation (table 1), among this 25 patient there were 11 patient (44%) with radiation induct hypothyroidism (table 2), and 14 patient (56%) got combined radiation and chemotherapy (table 3). Preoperative tracheostomy was performed to 26 patient (45%) (table 4).

Pharyngocutaneous fistula:

Eighteen patient (31%) developed PCF. With univariate analysis

preoperative radiotherapy was associated with a significantly higher rate of pharyngocutaneous fistula (PCF) (p -value=0.0001).

Radiation induced hypothyroidism with TSH > 4.7 mIU/L perfectly predicted PCF formation with 9 out of 11 patients developing PCF. Preoperative TSH was higher in patients who developed PCF compared to those who did not (median 5.0 mIU/L versus 0.7 mIU/L, p -value=0.003)

Preoperative chemoradiotherapy (CRT) was associated with a significantly higher rate of pharyngocutaneous fistula (PCF) (p -value=0.02).

Preoperative hemoglobin less than 11.35 g/dl was significantly associated with PCF (p -value= 0.02). Table (5)

tracheotomy performance prior to surgery didn't have a significantly higher rate of PCF compared to patients who did not undergo preoperative tracheostomy (p -value=0.6).

Univariate Analysis of Predictors for PCF Formation for All Patients Undergoing Total Laryngectomy. Table (6)

DISCUSSION:

PCF development is a common complication of TL [2, 3, 13] that causes increased length of hospital stay and delayed initiation of oral diet, and requires complex wound care, occasionally necessitating additional surgery for closure [3-5].

Our study identified preoperative radiation as significantly associated with PCF development with univariate analysis and similar results have been in studies conducted by Sarjus *et al* and showed that PCF rates very significantly depended on preoperative radiation [2].

The effect of radiotherapy which increases the risk of PCF development augmented by the addition of chemotherapy and this has been reported in the study which was done by Nilda Suslu *et al* and showed that preoperative chemoradiotherapy (CRT) was associated with a significantly higher rate of PCF [1, 10].

We also identified RIHT significantly associated with PCF development, and there is a comparison study done by Andrew *et al* which showed that RIHT predicts postoperative fistula in patients undergoing TL [15].

We also identified preoperative hemoglobin as a risk factor for PCF.

CONCLUSION:

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 previous radiotherapy, radiation induced hypothyroidism RIHT, radiation therapy with concurrent chemotherapy can be all important predisposing factors, or at least underlying causes.

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