



The Correlation Between Cardiovascular Risk Factors And Laryngeal Cancer

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Abstract: Cardiovascular diseases and otolaryngeal (ENT) cancers pose significant challenges to global health, being leading causes of morbidity and mortality. Although environmental risk factors contribute to the increasing prevalence of these two conditions, their correlation has not been adequately explored. Common risk factors, such as smoking and male gender, play a crucial role in the development of ENT cancers including laryngeal cancer and cardiovascular diseases. We examine in detail the links between cardiovascular risk factors and the characteristics of laryngeal cancers, emphasizing the importance of a systematic cardiac evaluation in a study involving 100 patients.

Key words: Laryngeal cancer, Cardiovascular risk factors, Smoking, Hypertension, Diabetes, Dyslipidemia

I. INTRODUCTION

Cardiovascular diseases and otolaryngeal (ENT) cancers pose significant challenges to global health, being leading causes of morbidity and mortality. Although environmental risk factors contribute to the increasing prevalence of these two conditions, their correlation has not been adequately explored. Common risk factors, such as smoking and male gender, play a crucial role in the development of ENT cancers including laryngeal cancer and cardiovascular diseases.

This study aims to deepen our understanding of the relationship between these two entities by evaluating the correlation between cardiovascular parameters and laryngeal cancers, highlighting the importance of a preventive and multidisciplinary approach for patients at risk.

II. MATERIALS & METHODS

A. MATERIALS

1. Study Population:

The study retrospective was conducted in the departments of Otorhinolaryngology and Cardiology with informed consent from the patients. One hundred patients recently diagnosed with laryngeal cancer between September 2022 and September 2023 were included.

2. Demographic Data Collection:

Extraction of demographic characteristics (age, gender) from medical records.

3. Cardiovascular Risk Factors Assessment:

Identification of chronic smokers, diabetics, hypertensive, and dyslipidemic patients through interviews and medical records.

4. Biomedical Measurements:

Measurement of LDLc levels through standardized blood analyses.

B. METHODS

1. Cardiovascular Risk Factors Analysis:

Calculation of the percentages of chronic smokers, diabetics, hypertensive, and dyslipidemic patients in relation to the total population.

2. LDLc Level Analysis:

Determination of the average LDLc level in the population.

3. Association between Cardiovascular Risk Factors and Laryngeal Cancers:

Application of the chi-squared test to evaluate the association between cardiovascular risk factors (chronic smokers, diabetics, hypertensive, dyslipidemic) and laryngeal cancers.

4. Statistical Analysis:

Use of descriptive statistics to present demographic characteristics and identified associations.

5. Ethical Considerations:

Conduction of the study in accordance with the Declaration of Helsinki. Obtaining ethical approval from the institutional ethics committee.

6. Results Analysis:

Interpretation of identified associations between cardiovascular risk factors, highlighting the importance of preventive cardiac assessment in patients with laryngeal cancer.

This methodology ensures a rigorous approach to explore the links between cardiovascular risk factors and characteristics of laryngeal cancers, emphasizing the importance of cardiac evaluation in the clinical management of these patients

III. RESULTS

1. Hypertension (HTA) and Larynx:

- **Result:** 63% of patients with laryngeal cancer exhibit hypertension with a p-value of 0.025 and a 95% confidence interval (CI).
- **Analysis:**
 - The high prevalence of hypertension underscores a significant link between high blood pressure and laryngeal cancer.
 - The p-value of 0.025 indicates a statistically significant association, emphasizing the importance of blood pressure assessment in managing laryngeal cancer patients.

2. Diabetes and Larynx:

- **Result:** 52% of patients with laryngeal cancer are diabetic with a p-value less than 0.05 and a 95% CI.
- **Analysis:**
 - The high prevalence of diabetes suggests a noteworthy correlation with laryngeal cancer.
 - A p-value less than 0.05 confirms a statistically significant association, highlighting the importance of thorough evaluation of glycemic status in these patients.

3. Tobacco and Larynx:

- **Result:** 61% of patients with laryngeal cancer are chronic smokers with a p-value of 0.031 and a 95% CI.
- **Analysis:**
 - The high prevalence of smoking reinforces the well-established correlation between tobacco and laryngeal cancer.
 - The p-value of 0.031 confirms a statistically significant association, emphasizing the need for targeted smoking cessation interventions for these patients.

4. Dyslipidemia and Larynx:

- **Result:** 54% of patients with laryngeal cancer have dyslipidemia with a p-value less than 0.05 and a 95% CI.
- **Analysis:**
 - The high prevalence of dyslipidemia suggests a possible association with laryngeal cancer.
 - A p-value less than 0.05 confirms a statistically significant association, underscoring the importance of evaluating lipid profiles in the overall management of these patients.

5. Dyslipidemia and Metastatic Larynx:

- **Result:** 45% of patients with metastatic laryngeal cancer have elevated LDL levels with a p-value of 0.056.
- **Analysis:**
 - Although the p-value is not strictly less than 0.05, the trend toward significance ($p = 0.056$) suggests a potential link between dyslipidemia and laryngeal cancer metastasis.
 - Further in-depth investigations with larger samples may be necessary to confirm this trend.

General Note:

- Confidence intervals (95% CI) enhance result reliability.
- These associations underscore the crucial importance of a detailed assessment of cardiovascular risk factors in laryngeal cancer patients, with significant implications for prevention strategies and disease management.

IV. DISCUSSION

The significant association between hypertension and laryngeal cancer (prevalence of 63%, $p = 0.025$) suggests a potential involvement of hypertension in laryngeal carcinogenesis.

While the exact mechanisms require further investigation, these results emphasize the importance of closely monitoring blood pressure in patients with laryngeal cancer, with potential implications for tumor progression. Furthermore, results from other large prospective studies have reported positive associations between hypertension and the risk of cancers beyond the larynx in men (1) (2).

The aim of this study was to determine the effect of hypertension on the development of mouth, larynx, and esophagus cancers in a Korean population (1). Hypertension was a notable risk factor for each cancer after adjusting for confounding factors; HR 1.23, 95% CI 1.13-1.33 for laryngeal cancer.

When participants were stratified by gender or smoking status, the risk of developing each cancer was significantly associated with hypertension in men (HR 1.14, 95% CI 1.06-1.21 for mouth cancer, HR 1.24, 95% CI 1.14-1.35 for laryngeal cancer) (1).

We observed an association between the risk of laryngeal cancer and hypertension, regardless of medication (HR 1.25, 95% CI 1.09-1.44 for untreated hypertension; HR 1.26, 95% CI 1.12-1.42 for hypertension with medication) (1).

The high prevalence of diabetes among patients with laryngeal cancer (52%, $p < 0.05$) highlights a significant association between these two clinical entities. This connection underscores the need for careful diabetes management as part of the overall care for patients with laryngeal cancer, providing insights into personalized therapeutic strategies.

Diabetic participants also exhibited a significantly higher risk of laryngeal cancer (HR 1.20; 95% CI 1.02-1.42) (1).

Multivariate analyses revealed that participants suffering from both hypertension and diabetes had an increased risk for laryngeal cancer (HR 1.46; 95% CI 1.22-1.66) (1).

Hypertension combined with diabetes proved to be a significant risk factor, with a higher estimated risk (1). The majority of head and neck cancers (HNC) are attributed to smoking and/or alcohol consumption (3) (4). It has been suggested that diet plays a role in the etiology of HNC, with non-starchy vegetables and certain healthy diets inversely linked to the risk of HNC (3) (5). The daily average Glycemic Index (GI) categorizes carbohydrate-rich foods based on postprandial glycemic response, while the average Glycemic Load (GL) estimates the impact of carbohydrate consumption using the GI, taking into account the quantity of carbohydrates consumed (3) (6). Higher GI and GL are moderately associated with the risk of several cancers (7), likely due to the stimulation of insulin release and the bioactivity of insulin-like growth factor-1, which possesses proliferative, angiogenic, anti-apoptotic, and estrogen-stimulating properties (3) (8).

An overlapping analysis based on INHANCE, including seven of the eight current studies, demonstrated a positive association between laryngeal cancer and a diet labeled "animal products and cereals," which was simultaneously based on high GI foods (e.g., cereals) and low glycemic load foods (e.g., meat) (9).

The results robustly confirm the well-established link between chronic smoking and laryngeal cancer (prevalence of 61%, $p = 0.031$). Beyond the imperative to promote smoking cessation interventions, these findings also underscore the importance of raising awareness among patients and strengthening tobacco prevention campaigns, as smoking is also a modifiable cardiovascular risk factor.

The etiology of laryngeal cancer is strongly associated with exposure to carcinogenic substances present in tobacco smoke (10).

Laryngeal cancer is not recognized as a hereditary type of cancer, primarily due to its clear etiology associated with exogenous exposure to tobacco smoke as the main causative agent (10).

The combined consumption of alcohol and tobacco has shown a synergistic effect. The risk ratio increased more multiplicatively than additively. Mouth and laryngeal cancers were associated with the highest tobacco-associated risk values (11).

In individuals who were former or current smokers, as well as those who had never smoked, the group of smokers with hypertension and diabetes had a higher risk of mouth cancer (HR 1.33, 95% CI 1.14-1.56) and laryngeal cancer (HR 1.68, 95% CI 1.41-2.00) (1).

The significant association between dyslipidemia and laryngeal cancer (prevalence of 54%, $p < 0.05$) suggests a potential role of lipid metabolism in laryngeal tumorigenesis. The assessment and management of dyslipidemia could thus become integral elements of the care for patients with laryngeal cancer, offering opportunities for innovative preventive interventions.

It has been shown that elevated serum cholesterol is one of the most important coronary heart disease risk factors.

Cholesterol accumulation in the bloodstream can cause atherosclerotic plaques to form within artery walls (12).

In recent years high serum cholesterol has been linked to the development of cancer although the results are inconsistent.

Several underlying mechanisms by which cholesterol and carcinogenesis may be linked have been proposed. Lipids are the major cell membrane components essential for various biological functions including cell growth and division for the maintenance of cell integrity. Cholesterol is a precursor of bile acids and steroid hormones, it may cause increased tumor angiogenesis, reduced tumor apoptosis and increased tumor cell proliferation (13).

One of the proposed mechanisms involves a vital role of cholesterol in cell membranes, which could affect various signaling pathways (14) and relevant proteins like the cell survival kinase Akt (15)(12).

While the trend towards statistical significance ($p = 0.056$) in the association between dyslipidemia, particularly high levels of LDL, and metastatic laryngeal cancer is promising, more in-depth studies are necessary to corroborate these results. This observation suggests an intriguing avenue for future research into the interactions between lipid metabolism and the metastatic progression of laryngeal cancer.

Clinical Implications:

-These results underscore the crucial importance of an integrated cardiovascular approach in the management of patients with laryngeal cancer.

-Practitioners should consider not only oncological aspects but also cardiovascular risk factors, providing comprehensive care to enhance clinical outcomes.

Limitations and Future Perspectives:

-Despite significant results, limitations such as the retrospective nature of the study must be acknowledged.

-Larger prospective studies are necessary to confirm these associations and shed light on the underlying mechanisms.

-Exploring interactions between these risk factors and other relevant variables could also refine our understanding of these associations.

V. CONCLUSION

This study highlights the correlation between cardiovascular risk factors and laryngeal cancers, highlighting the need for cardiac evaluation in these patients. Integrated management of these risks could potentially improve clinical outcomes. Prospective studies and clinical trials are necessary to consolidate these results and refine treatment protocols.

Meanwhile, integration of cardiac assessment into daily clinical practice is recommended for a more holistic approach to laryngeal cancer patients.

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