Research Article

Assessment of relationship between tobacco consumption and laryngopharyngeal cancers

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ABSTRACT

Background: Tobacco use is a known distinguishable risk factor for oropharyngeal and laryngeal cancers. It is essential to create a public awareness of the negative effects of tobacco on cancers. **Objectives:** The objective of this study was to assess the relationship between tobacco consumption and laryngopharynx cancer at a teaching hospital in Sangareddy. **Materials and Methods:** This study was carried out on 1000 patients who were all subjected to informed consent. The detailed clinical history and clinical and laboratory findings were obtained from the patients and collected from discharge summaries or from medical record department. Blood samples were collected for laboratory analysis of nicotine levels. **Results:** Majority of the patients were between the age group of 51 and 60 years (38.5%), with male predominance (85.30%). Most of the cases had cancer in pyriform sinus (69.6%) followed by posterior pharyngeal wall (16.7%). Almost 95.1% of cases had squamous cell carcinoma. Positive nicotine levels were detected only in less number of samples. **Conclusion:** Excessive and prolonged use of tobacco and its products seems to be an important factor to induct laryngopharyngeal cancers. Stoppage of tobacco consumption results in marked regression of pathologic lesions of laryngopharynx.

KEY WORDS: Tobacco; Laryngopharyngeal Cancer; Nicotine; Squamous Cell Carcinoma

INTRODUCTION

Tobacco and its related products' consumption is a major health hazard globally, especially in Asian countries and India. Globally, over 6 million deaths are occurring due to consumption of tobacco products per year. In 2012, over 17,560 deaths occurred in India due to laryngeal cancer owing to tobacco consumption.[1] The incidence of laryngeal cancer in India has been reported to be 1.26–8.18 per 100,000 population.[2]

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Tobacco smoking increases the risk of malignant tumors to almost every organ in the body. It is widely accepted that tobacco usage is directly related to oropharyngeal and laryngeal cancers, because of their direct exposure while tobacco consumption.[3] A study reported 96.5% of patients with squamous cell carcinoma of the larynx to be smokers, with a relative risk of 5.6.[4]

There are many smokeless tobacco products which include dissolvable nicotine. The usage of smokeless tobacco products is more in Asian countries, especially in India.[5] Few studies have demonstrated the association between tobacco smoking and laryngeal carcinoma; however, tobacco smoke causes laryngeal mucosal lesions, thus certainly responsible to the development of other laryngeal diseases as well. Therefore, with the above literature support, this study was designed to assess the relation between tobacco smoking and laryngopharynx cancer at a teaching hospital in Sangareddy.

MATERIALS AND METHODS

The present study was conducted in the Department of Ear, Nose, and Throat, MNR Medical College and Hospital, from April 2015 to December 2016. This study was carried out on 1000 patients admitted to the department. All the patients were subjected to informed consent. The detailed clinical history and clinical and laboratory findings were obtained from the patients. Clinical history of few patients was collected from discharge summaries or from medical record department.

A full history of tobacco smoking with duration since the patient was habituated along with the quantity of tobacco smoked was also recorded. Based on the number of attempts, smokers were categorized into occasional and low-, medium-, and heavy-grade smokers.

Blood samples were collected for laboratory analysis of nicotine levels. A group of patients, other than suffering from cancer but of the same age and sex group with similar habit of tobacco smoking, were taken as control group and their blood samples were also collected and subjected for similar analysis of blood nicotine level.

RESULTS

A total of 1000 patients were considered, and most of the patients were between the age group of 51 and 60 years (38.5%) followed by 41–50 years (22%) and 61–70 years (16.2%), and the incidence of disease gradually decreased with advancement of age [Table 1].

In the present study, among 200 samples (100 cases and 100 controls) analyzed for blood nicotine by thin layer chromatography (TLC) method, positive nicotine levels were found in less number of cases [Table 2]. It has been noted that blood nicotine levels were more than 0.5 ug/ml in 76% of cases. Whereas in 24% of cases, nicotine levels could not be detected by gas chromatography (GC) method [Table 3].

DISCUSSION

In the present study, most of the patients were between the age group of 51 and 60 years (38.5%) followed by 41–50 years (22%) and 61–70 years (16.2%), and the incidence of disease gradually decreased with advancement of age [Table 1]. A study by Indian Council of Medical Research (ICMR) stated that majority cases were between the age group of 60 and 69 years, with incidence of 31.93% in males and 27.29% in females.[2] The incidence of laryngeal cancer was more predominant in male than female patients [Figure 1]. Indian cancer reports indicate that laryngeal cancer is more common in males than females, which attributes 3–6% of cancers in males and only 0.2–15% in females.[2] For past decades in India, the incidence of laryngopharyngeal cancer significantly decreased in Delhi and Mumbai sectors but significantly increased in Bhopal sector.[6] As per anatomical

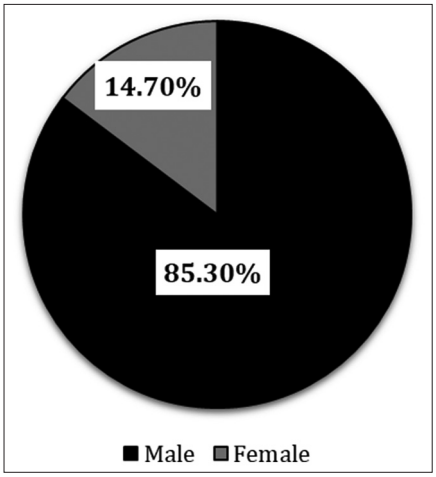

Figure 1: Sex distribution of the cases

Table 1: Age distribution of the cases

Age group (in years)	Number of cases (%)
<20	-
21–30	18 (1.8)
31–40	86 (8.6)
41–50	220 (22)
51–60	385 (38.5)
61–70	162 (16.2)
71–80	98 (9.8)
81–90	28 (2.8)
Above 90 years	3 (0.3)

Table 2: Blood nicotine level estimated by TLC method

Cases	TLC results	Male	Female	Total (%)
Cancer (*n*=100)	+	13	4	17 (17)
	++	10	3	13 (13)
	+++	8	1	9 (9)
	++++	5	1	6 (6)
	−ve	46	9	55 (55)
Control (*n*=100)	+	5	2	7 (7)
	−ve	84	9	93 (93)

TLC: Thin layer chromatography

Table 3: Blood nicotine level estimated by GC methods

Cases	Blood nicotine level	Male	Female	Total (%)
Cancer (*n*=100)	>1.424 ug/ml	40	15	55 (55)
	<1.424 ug/ml	12	9	21 (21)
	not detected	14	10	24 (24)
Control (*n*=100)	not detected	55	16	71 (71)
	<1.424 ug/ml	21	8	29 (29)

GC: Gas chromatography

distribution, majority of cases had cancer in pyriform sinus (69.6%) followed by cancer in posterior pharyngeal wall (16.7%), at postcricoid region (2.5%), and 11.2% of cases had tumors which could not be diagnosed promptly [Table 4]. A study by ICMR reported that 74.70% of cancer cases related to tobacco were found in oral cavity, oropharynx, larynx, and esophagus.

Various cohort studies worldwide evidenced that tobacco usage increases the incidence of laryngeal cancer.[7-9] National Cancer Registry Program confirmed that laryngeal cancer is one form of tobacco-related cancer.[10] Based on epidemiological evidences, the IARC monograph confirms and classifies tobacco use as carcinogenic to human beings.[11] In the present study, it has been found that 95.1% of cases had squamous cell carcinoma, 3.5% had adenocarcinoma, and 1.4% had unknown type of cancer condition [Table 5]. In this study, 62.8% of cases are habituated to smoking tobacco but about 83.2% of cases are habituated to some or all types of tobacco products including tobacco smoking, of which again many are habituated to more than one type of tobacco product [Table 6].

Nicotine may play a role in smoking-related cardiovascular disease through hemodynamic effects.[12-14] The relation between cardiovascular morbidity and nicotine intake is unclear, but still there is a general belief that nicotine replacement therapy may help to cease cardiovascular complications and cancers.[15-19] Nicotine is non-carcinogenic, but *in vitro* and animal studies have proved that nicotine plays a role in tumor promotion through angiogenesis and inhibition of apoptosis.[20,21] In the present study, nicotine levels were detected only in less number of samples by TLC method. Analysis by GC method showed that there is more percentage of blood nicotine levels (>1.425 ug/ml) in 55% cases of cancer group, alarming a possibility to acquire laryngopharyngeal cancer if there is prolonged consumption of tobacco.

Table 4: Anatomical distribution of patients

Anatomical sites	Number of cases (%)
Pyriform sinus	696 (69.6)
Posterior pharyngeal wall	167 (16.7)
Post cricoid region	25 (2.5)
Unclassified	112 (11.2)

Table 5: Histopathological type of the cases

Histopathological types	Number of cases (%)
Squamous cell carcinoma	951 (95.1)
Adenocarcinoma	35 (3.5)
Others including unknown	14 (1.4)

Table 6: Tobacco smoking habit of the patients

Types of tobacco	Number of cases (%)
Only tobacco smoking	628 (62.8)
All types of tobacco products (including smoking tobacco)	832 (83.2)
Non-tobacco users	168 (16.8)

CONCLUSION

From the results, it can be concluded that, most of the patients were between the age group of 51 and 60 years (38.5%), with male predominance. Almost 95.1% of cases had squamous cell carcinoma. Positive blood nicotine levels could be detected only in less number of samples by TLC method and more than 1.425 ug/ml was found in 55% cases by GC method. Excessive and prolonged use of tobacco and its products seems to be an important factor to induct laryngopharyngeal cancers. Various Indian studies have proved that tobacco consumption is a major risk factor which increases the prevalence to get laryngeal carcinoma. Stoppage of tobacco consumption results in marked regression of pathologic lesions of larynx, regeneration of lining epithelium, and mucociliary transport.

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