

## RESEARCH ARTICLE

# Epidemiological Study of Laryngeal Carcinoma in Western Nepal

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### Abstract

**Background:** Laryngeal malignancy is a common malignancy of the head and neck region. Affected patients usually present with features that are characteristic of certain subsites. The larynx is oncologically divided into three: supraglottis, glottis and subglottis. Studies from Western countries have shown that the glottis is the commonest subsite to harbour laryngeal malignancy. However, the supraglottis has been reported to be the commonest subsite in developing countries, including examples in the Indian subcontinent. To our knowledge, no study has been carried out in western Nepal about the epidemiology of laryngeal cancer to date. The purpose of this study was to analyse the epidemiology of laryngeal cancer in relation to its risk factors, age distribution, and preferred subsites and to see if there is any recent change in the subsite wise distribution of laryngeal malignancy in western Nepal. **Materials and Methods:** Patients of all ages and both sexes with suspected laryngeal malignancy were enrolled in the initial study. Detailed history taking and clinical examination was performed to find out the involved subsite in relation to the clinical features. Direct laryngoscopy was performed to further confirm the subsite and to take biopsy from the growth under general anesthesia. After confirmation of malignancy from the biopsy report, patients were finally included in the study. Data were analysed and observations were made to find out the distribution of laryngeal malignancy in different subsites. **Results:** The supraglottic larynx was the commonest subsite to harbor laryngeal malignancy. Smoking and alcohol were found to be the common risk factors. The mean age of the patients was in their sixties. **Conclusions:** Laryngeal malignancy is common in elderly individuals. Supraglottic laryngeal malignancy is the commonest laryngeal malignancy in people who smoke and drink alcohol in Nepal. Avoidance of alcohol use and smoking will be a milestone to reduce the incidence of laryngeal cancers and associated mortality.

**Keywords:** Laryngeal carcinoma - subsite distribution - squamous cell - risk factors - Nepal

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### Introduction

Head and neck cancer (HNC) is the eighth most common cancer as estimated from worldwide data. In spite of recent developments in investigation and treatment modalities, the mortality rate from head and neck cancers is still high in the underdeveloped countries in comparison to developed ones. In a study conducted by Yoke Fui Wong et al in Malaysia (2015), the 5-year Overall Survival rate for head and neck cancer patients was found to be 34.4% with a median follow up of 24 months. This study was conducted between a seven year duration from 2003 to 2010.

Laryngeal malignancy is the second most common malignancy in head and neck region worldwide (Chu EA, Young JK, 2008). There are a variety of malignant tumours arising in larynx. Squamous cell carcinoma is the commonest and accounts for more than 90% of all malignancies. Incidence of laryngeal malignancy is

increasing in the developing countries probably due to increased use of alcohol and smoking as the risk factors.

Larynx is divided into three subsites anatomically and oncologically. Tumors arising in these three subsites have their own characteristic oncologic behavior and present with the features that are characteristic to certain subsites. Patients with tumors of supraglottis present with non-specific throat pain and dysphagia as the primary feature and neck node at presentation is common. Patients with glottic cancers usually present with hoarseness and neck metastasis is rare. The presentation is also early. Patients with subglottic laryngeal carcinoma usually present with stridor. Supraglottic cancers usually present in the late stages with neck node metastasis because of non specific presenting symptoms. Gul K et al. (2015) have noted that stage of the disease is the major prognostic factor on treatment response and survival in patients with laryngeal carcinoma.

Alcohol and smoking are the most common

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accepted risk factors of laryngeal carcinoma. Previous epidemiological surveys performed at developed countries show that glottic malignancy is the commonest laryngeal malignancy. Studies performed in developing countries suggest that supraglottic carcinoma is common than glottic cancers.

None of the studies has been so far carried out in western Nepal about the epidemiology of laryngeal cancers. The author has attempted to evaluate the situation of the same in an institutional basis. A clinicopathological analysis of laryngeal cancers presenting between 1<sup>st</sup> August 2012 to 31<sup>st</sup> December 2014 in Manipal Teaching Hospital, Pokhara, Nepal was performed.

Purpose of this retrospective study is to analyse if there is any change in the subsite wise distribution in laryngeal malignancy in relation to its risk factors in western Nepal.

### Materials and Methods

This is a retrospective study carried out in the Department of ENT, Manipal Teaching Hospital, Pokhara, Nepal from 1<sup>st</sup> August 2012 to 31<sup>st</sup> December 2014. After complete history taking and detailed clinical examination of the primary site and neck to delineate the subsite of origin of the tumor, flexible laryngoscopy was performed to assess the probable site of origin of the tumor and its extension. Direct laryngoscopy was performed under general anesthesia in the operation theatre to further confirm the site of origin and for biopsy purpose. Patients were followed up with biopsy reports. Histopathologically confirmed cases of squamous cell carcinoma of larynx were finally included in the study.

Observations were made regarding the age of presentation, site of origin of the tumor and its association with the risk factors. Data were analysed and results were interpreted

### Results

One hundred and one histopathologically confirmed new cases of laryngeal squamous cell carcinoma were included in our study. Age of the patients ranged from 40 years to 92 years with the mean age of 64.16 years. The mean age of females was 58.5 years and that of males was 65.5 years. Twenty-Eight of our patients belonged to less than 60 years while seventy-three patients belonged to age range of more than 60 years. Forty one percent of our patients belonged to the age range of 60-69 years. Males accounted for 81% and females accounted for 20% of total patients. Male to Female ratio was 4:1 (Table 1). Fifteen of our patients had transglottic carcinoma. Due to difficulty to locate the exact site of origin of transglottic malignancies, it was not taken into account for the sub-site comparison groups. Final comparison was made amongst 86 patients of supraglottic, glottic and subglottic subsites of the larynx.

Out of 86 patients, 61 patients (70%) had supraglottic carcinoma, 24 (28%) had glottic carcinoma and one patient had subglottic carcinoma. Supraglottic larynx was the commonest subsite of larynx to develop the disease. (Table 2.). All of our patients were smokers whereas 67

**Table 1. Number of Patients According to AgeRange and Sex**

Age Range	Males	Females	Total Number of patients
40-49 yrs	7	6	13
50-59 yrs	13	2	15
60-69 yrs	34	7	41
70-79 yrs	19	5	24
>80 yrs	8	0	8
Total	81	20	101

**Table 2. Subsite Distribution of Laryngeal Cancers**

Subsite	No. of patients
Supraglottic	61
Glottic	24
Subglottic	1
Transglottic	15
Total	101

**Table 3. Comparison of Laryngeal Cancers amongst Smokers and Alcohol Consumers**

Subsites	Smokers and alcohol users	Smokers	Total
Supraglottic	46 (75%)	15 (25%)	61
Glottic	11 (46%)	13 (54%)	24
Total	57	28	85

P=0.009

patients used to drink alcohol also. Out of 61 patients of supraglottic carcinoma, 46 used to smoke and drink and 15 used to smoke only. Out of 24 patients of glottic carcinoma, 11 patients used to smoke and drink whereas 13 patients used to smoke only. There was significant association between smokers and drinkers and smokers alone in supraglottic and glottic cancers (p=0.009) (Table 3). This observation shows that supraglottis is the commonest subsite of larynx to harbor squamous cell carcinoma and squamous cell carcinoma of supraglottis is common in people who smoke and drink alcohol.

### Discussion

Carcinoma of larynx has been reported as the most common primary head and neck cancer in developing countries (Lasrado et al., 2012; Mafi et al., 2012; Siddiqui et al., 2012), whereas it is the second most common head and neck cancer worldwide (Chu EA, Young JK, 2008).

Larynx is oncologically divided into three different subsites: supraglottic, glottic and subglottic. The malignancies in different subsites behave differently. The malignancies in different subsites of larynx have direct impact on the treatment modality, surgical outcome, and prognosis. In laryngeal carcinoma, neck node metastasis is more common in supraglottic and subglottic region while there is hardly any neck metastasis in glottic carcinoma due to anatomical characters. Therefore, glottic carcinomas are easier to manage than supraglottic cancers.

Laryngeal cancers are the cancers of the elderly people. These are rare below the age of 40 years. In our study the mean age of presentation of the laryngeal cancers was

64.16 years. This is in close relationship to studies carried out by Kowit Pruegsanusak et al. (2012) from Thailand and Babak Saidi et al. (2009) who had the mean age of presentation as 60 years and 59.92 years respectively. Both the studies are from underdeveloped countries.

Laryngeal carcinoma is more common in males than females. In our study, male patients predominated the females by a ratio of 4:1. This study is in accordance with studies performed by Patel et al. (2006) Kwang Moon et al. (2003) and Negar Mafi et al (2012) who reported male to female ratio as 4:1, 5:1, and 5.6: 1 respectively. However, according to Savita Lasrado et al. (2012), there was no sex difference in head and neck cancers.

All the patients in our study were smokers for a long time and 92% of them were regularly smoking until the time of diagnosis of malignancy. Thirty-four patients were smokers only whereas 67 (67%) patients were both smokers and alcohol consumers until the time of diagnosis. This fact also supports smoking and alcohol to be the important risk factors for laryngeal cancers.

Out of 61 patients suffering from supraglottic laryngeal cancer, 46 were both regular smokers and alcohol consumers whereas 15 patients were smokers only. Out of 24 patients suffering from glottic malignancy, 11 were both smokers and alcohol consumers whereas 13 were smokers only. Comparison was made between the two subsites in terms of smokers only, smokers, and alcohol consumers. The p value was 0.009 signifying that supraglottic carcinoma is more common in smokers and alcoholics than smokers alone. Twenty-five patients were from the so-called Brahmin community who routinely do not consume alcohol and seventy-six patients were from other communities where alcohol is freely consumed. This fact also supports the increasing incidence of supraglottic cancers in communities where alcohol is routinely taken. A study by Raquel Ferreira et al. (2013) also supports the role of alcohol as a risk factor for developing cancer of the oral cavity, pharynx, esophagus, stomach, larynx, colorectum, central nervous system, pancreas, breast and prostate. Likewise Bhawana Gupta and Newell W. Johnson (2014) have also found that exposure to tobacco and alcohol, as well as diets inadequate in fresh fruits and vegetables as the the major risk factors for development of cancers of the upper aerodigestive tract. Owen Pyeko M Patel A, Ouma Oburra H (2014) also reported that cigarette smoking and alcohol ingestion were strong risk factors for development of late stage and poorly differentiated laryngeal squamous cell carcinoma in Kenya.

Supraglottis was the most commonly involved subsite in the larynx (70% of all cases of laryngeal carcinoma excluding transglottic carcinoma) in our study. This is in contrary to the normally accepted fact of glottic carcinoma being most common in larynx. Akmansu et al. (1999) have reported the incidence of supraglottic cancer being 73.9%, followed by 13% transglottic and 13% glottic in laryngeal cancers in Turkish population. Similarly, Jaimanti and Naresh K. Panda (2004) in a 10 year follow up of patients suffering from carcinoma larynx found the incidence of supraglottic carcinoma as 55.94% of all laryngeal cancers followed by glottis (17.3%), transglottic (13.04%) and subglottis (3.62%).

Thapa et al. (2003) in a retrospective chart review of 8 months duration in Nepal Medical College, Kathmandu, Nepal, found that supraglottic carcinoma was commoner than glottic carcinoma. It is difficult to draw a conclusion from their study due to small number of patients. In a study performed by Koirala K et al. (2013), supraglottic larynx was reported to be the commonest subsite of larynx (78.2%) to harbor laryngeal malignancy. However in a study done by Jukka et al. (2000) in Finland from 1974 to 1995, glottic carcinoma was marginally in higher position than supraglottic carcinoma. This fact was documented to be due to increased use of alcohol as well as smoking in the study population. Mohanty BK et al. (2002) have stated that supraglottic cancer is more common than glottic in indian subcontinent . This variation in demographics might be due to the higher prevalence of chewing tobacco rather than smoking in the Indian subcontinent, which results in tobacco rich saliva coming in contact with the supraglottis. In contrast , smoke from tobacco smoking has more contact with the glottis in the way to lungs. Similar to this report, Similarly T. Bhattacharya et al. (2014) also reported that supraglottic carcinoma was 2.2 times more compared to glottic carcinoma in their series.

In conclusion, in our study supraglottic carcinoma was the dominant tumor of larynx. Supraglottic laryngeal carcinoma is in its increasing prevalence in developing countries because of the practice of consumption of alcohol and smoking. The poor overall five year survival rate was also due to supraglottic cancer and its presentation at late stage. Public awareness towards the avoidance of alcohol and smoking will reduce the risk of development of supraglottic laryngeal cancers and head and neck cancers overall in the developing countries like Nepal.

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