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Original Research Article

A Study on Clinico-Epidemiological and Histopathological Profile of Carcinoma Larynx and Hypopharynx

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ABSTRACT

Background
This study was conducted to investigate the clinico-epidemiological and histopathological profiles of laryngeal and hypopharyngeal cancer.

Methods
This was a descriptive cross-sectional study carried out over the course of 18 months in 65 patients who underwent direct laryngoscopy and biopsy, as well as additional histopathological examination, at the Department of Otorhinolaryngology at the Government T.D. Medical College Hospital in Alappuzha, Kerala. The study was approved by the institutional ethics committee, and the participant's written informed consent was obtained.

Results
Based on the TNM staging that was done after coordinating clinical and radiological results, out of the 65 cases, 48 cases were diagnosed with carcinoma larynx and 17 cases were hypopharyngeal cancers. Most cases of carcinoma supraglottis showed up in stage III (9 cases), then stage II (7 cases), stage I (5 cases), and finally stage IVA (3 cases). Compared to supraglottic cancer, glottic cancer which had 14 cases in stage I and 4 in stageII manifested at an earlier stage. There were just six cases which presented in the advanced stage, four of them were in stage III, and one in each of the stages IVA and IVB. There were six cases of carcinoma hypopharynx in stage II and six in stageIII, three cases in stages IVA, and just one case in stageI.There was one case of in-situ cancer in the hypopharynx (stage 0).All hypopharynx carcinomas had dysphagia and most had nodal metastasis.None had subglottic extension. Minor cartilage erosion seen in12%.The histological diagnosis of squamous cell carcinoma was found in all of our patients. Moderately differentiated squamous cell carcinoma was the most often encountered histological grade followed by well differentiated and then poorly-differentiated.Prevertebral space involvement or carotid encasement were absent.

Conclusion

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Early detection is challenging for hypopharyngeal tumors, which also have a high risk of metastasis and recurrence. Patients with cancer of the larynx and hypopharynx may have an unfavorable prognosis if they have an airway compromise necessitating a tracheostomy. The public's knowledge of the signs, risk factors, and need to seek medical care as soon as symptoms appear can help significantly reduce the morbidity and death rate from laryngeal and hypopharyngeal cancer.

Keywords: Laryngeal Carcinoma, Hypopharyngeal Carcinoma, Squamous Cell Carcinoma, Direct Laryngoscopy and Biopsy, Tracheostomy, TNM Staging.

INTRODUCTION

In Asia and India, laryngeal cancer ranks ninth and seventh, respectively, among causes of cancer in males. Among Indian men, laryngeal cancer is regarded as one of the top ten cancer causes. In men, it accounts for 3-6% of all cancer cases, while in women, it accounts for 0.2–1% of cases. According to reports, the incidence of laryngeal cancer varies between 1.26 and 8.18 per 100,000 people, depending on the area of the nation. In India, the 5-year survival rate for laryngeal carcinoma is about 28%.[1]

However, the cancer's location (glottis, supraglottis, or subglottis) affects the 5-year survival rate. For glottic malignancies, the 5-year survival rate is almost 80%, but for supraglottic cancers, it is 50%.[2] As per the National Cancer Registry Programme India's Cancer Statistics 2020 Report, the estimated incidence of laryngeal cancer in 2020 is 3316 (cumulative risk 1/1633) for females and 27146 (cumulative risk 1/184) for males in India.[3] Based on the epithelial lining of the larynx, squamous cell carcinoma (SCC) accounts for around 85% to 95% of laryngeal malignancies.[4] Laryngeal non-squamous cell cancers are uncommon. Each of the three laryngeal regions-the supraglottis, glottis, and subglottis-has a different incidence of SCC depending on the population. The incidence of the glottic and supraglottic SCC is comparable in Japan. In all groups, primary subglottic SCC is uncommon. According to a number of case-control studies, alcohol and tobacco use are the main causes of squamous cell laryngeal carcinoma. Exposure to cement dust, silica, asbestos, and powerful inorganic acids are all considered occupational risks. There is a higher chance of laryngeal cancer in a diet high in salted meat and total fat. Consuming fruits, legumes, and plant foods protects against laryngeal cancer.[5]

The malignancy of the caudal portion of the pharynx is known as hypopharyngeal carcinoma. Out of the squamous cell cancers (SCC) of the head and neck, hypopharyngeal cancer has the worst prognosis.[6] Compared to laryngeal cancer, it is more aggressive physiologically. Its early spread might have been caused by the existence of abundant lymphatics. Less than 0.5% of all malignancies are of this type, making them uncommon when compared to laryngeal cancer.[7] Between 2,000 and 4,000 Americans are thought to receive a hypopharyngeal cancer diagnosis each year. Worldwide, a projected 84,254 people had a hypopharyngeal cancer diagnosis in 2020. An estimated 38,599 individuals worldwide passed away from hypopharyngeal carcinoma in 2020. A number of factors, most notably the stage at presentation, affect survival rates for hypopharyngeal carcinoma. According to studies conducted in the US, 32% of patients with hypopharyngeal carcinoma survive for five years. The 5-year survival rate for hypopharyngeal carcinoma is 52% if the disease is discovered in its early, isolated stage. The 5-year survival rate is 34% if the cancer has spread to nearby tissues, organs and/or local lymph nodes. There is a 23% 5-year survival probability in the event of distant metastases. Because signs of hypopharyngeal carcinoma sometimes appear later in life, the disease is typically discovered at a more advanced stage.

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However, hemoptysis or hoarseness are common symptoms of laryngeal cancer, which may allow for an earlier diagnosis.[8] In France and India, there are 8–15 instances of hypopharyngeal cancer for every 100,000 male population, which is a higher incidence. It accounts for 3–14% of all head and neck SCCs in the US and Europe, and 75% of newly diagnosed patients appear in stage III or IV. This is because of its anatomical placement, which is quiet and causes a delayed presentation. Moreover, a robust lymphatic network in the hypopharynx encourages early migration toward lymph nodes. Cancers of the hypopharynx usually affect those over 50. Sixty is the average age at presentation. The pyriform sinus is the most frequent location of origin, followed by the posterior pharyngeal wall and the post-cricoid region. Piriform sinus and posterior pharyngeal wall carcinomas show male dominance (5–20:1). However, there is a moderate 1.5:1 female prevalence in post-cricoid lesions.[9]

Most patients have several comorbidities when they first arrive, and the majority of them smoke and drink heavily. Squamous cell carcinoma is the most prevalent histology. The peculiarities of laryngeal and hypopharyngeal cancer, like varying risk factors and wide regional variation in incidence and survival, have been highlighted in epidemiological studies carried out worldwide. The association between laryngeal cancer and tobacco smoking is well established. But there is wide variation in disease distribution and survival, the role of tobacco chewing, indoor air pollution, occupational hazards and dietary factors in laryngeal and hypopharyngeal cancer causation and that needs to be understood. This knowledge of risk factors and the distribution of cancer larynx and hypopharynx can be used to prevent the occurrence of and screen for these cancers. We have conducted the study in Alappuzha, the smallest district in Kerala, but a densely populated place. Since it is a coastal area, the majority of the population is made up of fishermen and manual labourers.Socio-addictive factors like alcohol and tobacco are much more common in Alappuzha. It has been found that there is a higher prevalence of laryngeal and hypopharyngeal malignancies in Alappuzha. This hospital-based descriptive study was conducted to find out the common clinical presentation of patients with laryngeal and hypopharyngeal carcinoma considering the age profile, symptomatology, disease stage, etiological factors, occupational history, histological profile, and the requirement of tracheostomy in the laryngeal and hypopharyngeal carcinoma patients attending ENT OPD at TD Medical College Alappuzha.

AIMS AND OBJECTIVES

Primary Objectives

1. To study the clinical symptoms at presentation.
2. To evaluate the pattern of site involvement and stage at presentation.
3. To find the pattern of histopathological type.

Secondary Objectives

1. To study the risk factors for carcinoma larynx and hypopharynx among patients attending the ENT department at Govt. TD Medical College Alappuzha.
2. To evaluate the requirement of tracheostomy depending on the site involved
3. To study the nodal metastasis and distant metastasis at presentation.
4. To correlate clinical and radiological staging.

MATERIALS & METHODS

This was a descriptive cross-sectional study carried out over the course of 18 months in 65 patients who underwent direct laryngoscopy and biopsy, as well as additional histopathological examination, at the Department of Otorhinolaryngology at the Government T.D. Medical

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College Hospital in Alappuzha, Kerala. The study was approved by the institutional ethics committee, and the participants written informed consent was obtained.

Inclusion Criteria

Patients at Government TD Medical College Hospital, Alappuzha, who were diagnosed with hypopharyngeal and laryngeal cancer during the study period were included in the study.

Exclusion Criteria

1. Patients diagnosed elsewhere and coming for follow-up at Govt. TD Medical College Hospital Alappuzha
2. Patients who have already been treated
3. Patients coming with recurrences
4. Patients with metal or motion artifacts in the primary tumor area in a CT scan
5. Patients who are allergic to iodine contrast

Statistical Methods

Version 4.2.2 of the R program was used to analyze the study data after the data were tabulated using Microsoft Excel. The application was used to clean the data before using proportions to evaluate the data. Frequencies and proportions were computed for descriptive statistics. The data were subjected to a Fisher's exact test and a statistical significance test to examine the relationship between the epidemiological parameters and the symptoms associated with the location of laryngeal and hypopharyngeal cancer.

RESULTS

Clinical Presentation

Symptoms	**Overall (N = 65[1)]**	**Larynx (N = 48)**	**Hypopharynx (N = 17)**
Hoarseness of Voice	33 (51%)	27 (56%)	6(35%)
Foreign Body Sensation	47 (72%)	36 (75%)	11 (65%)
Dysphagia	42 (65%)	25 (52%)	17 (100%)
Breathing Difficulty	13 (20%)	11 (23%)	2 (12%)
Odynophagia	19 (29%)	9 (19%)	10 (59%)
Stridor	7 (11%)	7 (15%)	0 (0%)
Neck Swelling	18 (27.69%)	9 (18.75%)	9 (52.9%)
[1]Mean (SD); N (%)			
Table 1: Symptoms at Presentation of CA Larynx and Hypopharynx			

Foreign body sensation in the throat was reported in 11 (65%)instances of carcinoma hypopharynx and 36(75%)instances of carcinoma larynx cases respectively.. One of the symptoms in 25 cases (52%) of cancer larynx patients was dysphagia. Dysphagia was present in all patients with cancer hypopharynx. A hoarse or altered voice was the next frequently reported presentation symptom. Patients with 56% cancer of the larynx and 35% carcinoma of the hypopharynx had this. Odynophagia was seen in 9 cases (19%) of laryngeal carcinoma and 10 cases (59%) of hypopharyngeal cancer. Of the 48 patients with cancer of the larynx, 11 (23%) experienced trouble breathing. Two cases (12%) of hypopharyngeal cancer involved have breathing difficulty.In 15% of instances of laryngeal cancer, stridor was observed. Neck swelling was observed in 18.75% cases of carcinoma larynx and 52.9% cases of hypopharyngeal cancer.

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A statistically significant correlation was found between the location of the lesion in the larynx and hypopharynx and the different symptoms. Based on the findings from the sample under study, it was determined that hoarseness of voice, foreign body sensation, odynophagia, and neck swelling were significant when the lesion was located in the larynx and dysphagia, neck swelling in hypopharyngeal cancer.

Types	**Larynx (N)**	**Hypopharynx (N)**
Well-Differentiated	12	2
Moderately Differentiated	29	8
Poorly Differentiated	7	6
Carcinoma in Situ	0	1

Table 2: Histopathological Findings of the Study

The majority of our patients had moderately-differentiated SCC, which makes up 60.41% of instances of carcinoma larynx and 47.05% of carcinoma hypopharynx followed by well differentiated type SCC which accounts for 25% cases of laryngeal cancer and 11.76% of hypopharyngeal carcinoma. 35.29% of carcinomas hypopharynx and 14.5% of carcinomas larynx were found to be poorly differentiated. Two patients had well-differentiated SCC and one patient had moderately differentiated SCC among the female patients. One case was a man who had hypopharyngeal cancer in situ.

		Tracheostomy Emergency			
	N	**Yes**	**No**	**Total**	**P-Value**
Stage of CA Larynx	48				
Stage I		0	19	19	
Stage II		1	10	11	
Stage III		4	9	13	0.001
Stage IVA		2	2	4	
Stage IVB		0	1	1	
Total		7	41	48	

Table 3: Requirement of Emergency Tracheostomy in CA Larynx and Hypopharynx (Fisher's Exact Test)

One case of stage II carcinoma of the larynx, four cases of stage III, and two cases of stage IVA required an emergency tracheostomy. According to our research, stage III laryngeal carcinomas require emergency tracheostomies more frequently.

		Tracheostomy Elective			
	N	**Yes**	**No**	**Total**	**P-Value**
Stage of CA Larynx	48				
Stage I		0	19	19	
Stage II		2	9	11	
Stage III		5	8	13	0.6
Stage IVA		1	3	4	
Stage IVB		0	1	1	
Total		8	40	48	

Table 4: Requirement of Elective Tracheostomy in CA Larynx and Hypopharynx (Fisher's Exact Test)

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One stage IVA case of cancer hypopharynx necessitated an elective tracheostomy. Two stage II cases, five stage III cases, and one stage IVA case of laryngeal cancer underwent elective tracheostomy. Sixty percent of patients with stage IV cancer required a tracheostomy (emergency or elective), of which twenty percent were elective and forty percent were emergency.

DISCUSSION

Patients suffering from laryngeal and hypopharyngeal cancer endure immense suffering as a result of developing difficulties with speaking and swallowing.

Ninety-three percent of the cases that were brought to us for our study were older than fifty, with a mean age of sixty-three years at presentation. The age range of the sixth and seventh decades of life was associated with the highest prevalence of laryngeal and hypopharyngeal cancer. Of these, 38% belonged to the sixth decade and 32% to the fifth. The mean age of the males was 64 years, while the mean age of the females was 57 years. In our study, a 35-year-old male patient was the youngest, and an 80-year-old male patient was the oldest. According to statistics from the American Cancer Society, patients who are 55 years of age or older make up the majority of laryngeal cancer diagnoses; younger people make up a relatively small percentage. Approximately 66 years old is the typical age of a laryngeal cancer diagnosis.[10]

Only 3 cases (5%) and 62 cases (95%) of the total 65 cases included females. Males saw higher rates of hypopharyngeal cases and laryngeal carcinoma than females. In cases of laryngeal carcinoma, there were 95.83% male cases and 4.16% female cases; in cases of hypopharyngeal carcinoma, there were 94.12% male cases and 5.88% female cases. According to an ICMR study, men are more likely (9:1) to get laryngeal malignancies, which are more common in South Asia.[11] In a similar vein, 91.3% of participants in an epidemiological study of laryngeal and hypopharyngeal cancer conducted in the otolaryngology clinic at Bialystok Medical University in Poland between 1988 and 2012 were men and 8.7% were women.[12]

Of the individuals included in the study, 48 cases (73.84%) had laryngeal carcinomas, and 17 cases (26.15%) had hypopharyngeal malignancies. Of the cases of laryngeal cancer, 24 come from the supraglottis and 24 from the glottis. This discovery bears resemblance to a clinicopathological investigation conducted in Hong Kong by KY Lam and AP Yuen on laryngeal cancer. Their findings indicated that the disease's incidence rose with age in both genders and that 30% of patients had tumors of the supraglottis and glottis.[13]

There are three examples of hypopharyngeal carcinoma: one from the posterior pharyngeal wall, one from the post-cricoid region, and fifteen (82.23%) from the pyriform sinus. The results of several investigations on hypopharyngeal tumors were consistent. At Rujendra Hospital in Patiala, a study on the clinicopathology of hypopharyngeal tumors found that growth was most often seen in the pyriform fossa (80% of cases).[14] The majority of our study's laryngeal and hypopharyngeal cancer patients are from rural areas with low socioeconomic levels. Individuals with lower socioeconomic status have a higher cancer incidence and shorter cancer-related survival periods. It is thought to be a sign of underlying medical and social issues that lead to illness, illness recurrence, and decreased survival. Disparities in healthcare access between socioeconomic status groups can account for socioeconomic consequences. These discrepancies might be the result of issues with childcare, time off work, and transportation, all of which low-income individuals may find more challenging.[15]

After examining the risk factors, smoking is determined to be the most prevalent factor associated with laryngeal and hypopharyngeal cancer, with alcohol consumption coming in second. Research has indicated that alcohol consumption and smoking both increase the risk

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of laryngeal and hypopharyngeal cancer.[16] The average smoking age in our sample was thirty years old. The longer a person is exposed to risk variables, the higher the risk. Chewing tobacco was a habit for 20% of patients.

Numerous case-control and cohort studies conducted worldwide have found a multiplication in the risk of laryngeal and hypopharyngeal cancers associated with tobacco smoking. The risk factor for various tobacco smoking forms ranges from 1.5 to 7 times.[5] A cohort study carried out in the Karunagappally Taluk, Kerala, similarly discovered a strong correlation between laryngeal cancer and smoking, including the quantity and length of cigarettes smoked daily ($P < 0.001$), as well as the likelihood that bidi smoking would result in laryngeal cancer.[17] Chewing tobacco has not been identified as a risk factor for laryngeal carcinoma in numerous investigations on the disease. However, chewing tobacco and betel leaf together elevated the incidence of laryngeal cancer by 2.37 times, according to a hospital-based case-control research by Kapil et al. that included 305 patients with laryngeal cancer. However, the study did not reveal a correlation between tobacco chewing and laryngeal cancer.[18] Chewing tobacco products have been identified as one of the risk factors for hypopharyngeal cancer in a multicentric case-control study done in India. The study comprised 513 cases of hypopharyngeal cancer, 511 instances of laryngeal cancer, and 718 controls.[19] Higher consumption of alcohol, smoking, betel leaf consumption with tobacco, and a preference for spicy and fried foods emerged as significant risk factors for laryngeal cancer. Conversely, consumption of roots, tubers, green leaf vegetables, other vegetables, and fruits was found to decrease the risk.

The majority of our patients were meat, chicken, and fish eaters rather than vegans. Many patients were prone to gastric reflux illness from irregular eating habits.

After analyzing the symptomatology from our study, we found that 88% of patients with glottic cancer had hoarseness of voice, 62% had foreign body sensation, 25% had dysphagia, 17% had breathing difficulties with stridor in 12% of cases, 4.2 percent had odynophagia, and 4.2 percent had neck swelling. The most common signs of supraglottic malignancies were feeling like a foreign body (88%), having trouble swallowing (79%), odynophagia (33%), having trouble breathing (29%), having a hoarse voice (25%), having neck swelling 18.75%.

The most common presentation symptoms for hypopharyngeal malignancies were dysphagia (100%), hoarseness (40%), odynophagia (67%), foreign body sensation (73%), neck swelling (52.9%), and breathing difficulties (13%).

The study demonstrated a statistically significant correlation between the symptoms of hoarseness of voice, foreign body sensation, dysphagia, odynophagia, and neck swelling and the places at which they were more frequently reported. The hypopharyngeal carcinoma showed a higher incidence of dysphagia, which is also statistically significant (p-value < 0.05).

Nearly one-third of the patients saw appreciable weight loss. The patients' hemoglobin levels were poor in 48% of them. All of our patients' liver and kidney function tests came back normal. The chest X-ray was normal, with the exception of a few little anomalies.

To determine the size of the tumor, PES and PGS involvement, laryngeal cartilage invasion, subglottic extension, lymph node involvement, prevertebral space involvement, and carotid involvement, imaging examinations (CT/MRI) were performed on all patients. Subglottic extension was absent in all cases. There was mild cartilage involvement in 12 individuals. Prevertebral space and carotid encasement involvement were absent in all of the individuals. Following the correlation of radiological and clinical results, TNM staging was carried out.

A video laryngoscopy was used to assess each subject. Proliferative, ulcero-proliferative, and ulcerative types of growth are the many forms observed. Proliferative tumors

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made up the majority of the tumors, with ulcero-proliferative tumors coming in second. Both the glottis and supraglottis were equally involved in the larynx. We did not observe any subglottic development in our investigation. Aryepiglottic folds were the most frequent subsite in the supraglottis, followed by false vocal cords and the epiglottis. The pyriform sinus is most frequently affected in the hypopharynx. Every patient had a direct laryngoscopy, and a biopsy was obtained from the lesion.

The histological diagnosis of squamous cell carcinoma was found in all of our patients. Moderately differentiated squamous cell carcinoma was the most often encountered histological grade. Squamous cell carcinoma that was well differentiated and poorly differentiated came next.

Stage III was the most common presentation for cancer supraglottis, with stages II, I, and IVA being the least common. Compared to supraglottic cancer, glottic cancer which presents in 16.67% of cases in stage II and 58% of cases in stage I, often presents in an earlier stage. There were just five instances that were advanced. The early diagnosis of cancer glottis may have been made due to the early onset of symptoms. But more hypopharyngeal cancer cases showed up for us in stage III. The majority of the instances of supraglottic carcinoma in our investigation lacked nodal metastases. Compared to our investigation, the literature indicates that supraglottic tumors have a higher likelihood of spreading to lymphatics. This may be because the patient or bystander is more aware of the signs and symptoms of carcinoma of the larynx and seeks treatment as soon as possible. Because glottic cancer had fewer lymphatics, there were lesser nodal metastases. The tumor's spread into the supraglottis is likely what caused lymph node metastases in two of the glottic cancer instances. When the hypopharyngeal tumors were first diagnosed, nine of the patients developed nodal metastases.

Numerous follow-up investigations of hypopharyngeal carcinoma revealed that it is hard to detect at an early stage and is prone to metastasis and recurrence.[. When patients with laryngeal cancer require tracheostomy due to airway compromise, this is a negative prognostic factor.[21]

CONCLUSION

Cancers of the larynx and hypopharynx can be prevented in great part by abstaining from risk factors such as alcohol and tobacco. If the illness is identified early and given the right care, there is a good chance of recovery. A video laryngoscopic examination should be performed on any patient who has complained of a change in voice for longer than three weeks, particularly if the patient is an elderly male who smokes and drinks frequently. Most of the patients in our research are in their sixth or seventh decade. More men are impacted than women. Early symptom presentation most likely contributed to the early presentation of glottic malignancies. On the other hand, stage III was when most hypopharyngeal and supraglottic malignancies first appeared. The majority of the instances of supraglottic carcinoma in our investigation lacked nodal metastases. Compared to our investigation, the literature indicates that supraglottic tumors have a higher likelihood of spreading to lymphatics. This might be as a result of the patient or bystander becoming more aware of the signs of carcinoma larynx and seeking treatment as soon as possible. Because glottic cancer had fewer lymphatics, there were lesser nodal metastases. The tumor's spread into the supraglottis is likely what caused lymph node metastases in two of the glottic cancer instances. At the time of presentation, nodal metastases were present in 52.9% of the hypopharyngeal tumors. Early detection is challenging for hypopharyngeal tumors, which also have a high risk of metastasis and recurrence. Imaging investigations aid in determining the severity of the condition. Patients with cancer of the larynx and hypopharynx may have an unfavorable prognosis if they have airway compromise

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necessitating a tracheostomy. The public's knowledge of the signs, risk factors, and need to seek medical care as soon as symptoms appear can significantly reduce the morbidity and death rate from laryngeal and hypopharyngeal cancer.

REFERENCES

[1] Nallathambi C, Yumkhaibam SD, Singh LJ, Singh TT, Singh IY, Daniel N. Clinico-epidemiologic patterns of laryngeal cancer: 5-year results from a regional cancer centre in northeastern India. Asian Pac J Cancer Prev APJCP 2016;17(5):2439-43.
[2] Nocini R, Molteni G, Mattiuzzi C, Lippi G. Updates on larynx cancer epidemiology. Chin J Cancer Res 2020;32(1):18-25.
[3] Mathur P, Sathishkumar K, Chaturvedi M, Das P, Sudarshan KL, Santhappan S, et al. Cancer Statistics, 2020: report from national cancer registry programme, India. JCO Glob Oncol 2020;(6):1063-75.
[4] Ciolofan MS, Vlăescu AN, Mogoantă CA, Ioniță E, Ioniță I, Căpitănescu AN, et al. Clinical, histological and immunohistochemical evaluation of larynx cancer. Curr Health Sci J 2017;43(4):367-75.
[5] Bobdey S, Awasthi A, Balasubramanium G. Epidemiological review of laryngeal cancer: an Indian perspective. Indian J Med Paediatr Oncol 2015;36(3):154-60.
[6] Garneau JC, Bakst RL, Miles BA. Hypopharyngeal cancer: a state of the art review. Oral Oncol 2018;86:244-50.
[7] Scott-Brown's Otorhinolaryngology and Head and Neck Surgery, Eighth Edition Volume 3: Head and Neck Surgery, Plastic Surgery - PDF Drive [Internet]. [Cited 2021 Jan 25]. Available from: https://www.pdfdrive.com/scott-browns-otorhinolaryngology-and-head-and-neck-surgery-eighth-edition-volume-3-head-and-neck-surgery-plastic-surgery-e176218246.html
[8] Laryngeal and Hypopharyngeal Cancer - Statistics [Internet]. Cancer.Net. 2012 [cited 2023 Jan 21]. Available from: https://www.cancer.net/cancer-types/laryngeal-and-hypopharyngeal-cancer/statistics
[9] Stell PM. Stell and Maran's Textbook of Head and Neck Surgery and Oncology. Hodder Arnold 2012: p. 1156.
[10] Throat Cancer Statistics. Cases of Throat Cancer Per Year [Internet]. [Cited 2023 Jan 4]. Available from: https://www.cancer.org/cancer/laryngeal-and-hypopharyngeal-cancer/about/key-statistics.html
[11] Larynx and Hypopharynx Cancers_0.pdf [Internet]. [Cited 2023 Jan 19]. Available from: https://main.icmr.nic.in/sites/default/files/guidelines/Larynx%20and%20Hypopharynx%20Cancers_0.pdf
[12] Rzewnicki I, Biszewska J. Epidemiology of laryngeal and hypopharyngeal cancer in the period 1988–2012 in the material of the Otolaryngology Clinic of the Bialystok Medical University. Otolaryngol Pol 2013;67(6):265–73.
[13] Lam KY, Yuen APW. Cancer of the larynx in Hong Kong: a clinico-pathological study. Eur J Surg Oncol 1996;22(2):166-70.
[14] Clinicopathological study of tumous of hypopharynx - PubMed [Internet]. [Cited 2023 Jan 19]. Available from: https://pubmed.ncbi.nlm.nih.gov/23119991/
[15] Groome PA, Schulze KM, Keller S, Mackillop WJ, O'Sullivan B, Irish JC, et al. Explaining socioeconomic status effects in laryngeal cancer. Clin Oncol 2006;18(4):283-92.

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 03, 2024

[16] Laryngeal and Hypopharyngeal Cancer - Risk Factors and Prevention [Internet]. Cancer.Net. 2012 [cited 2023 Jan 19]. Available from: https://www.cancer.net/ cancer-types/laryngeal-and-hypopharyngeal-cancer/risk-factors-and-prevention

[17] Jayalekshmi PA, Nandakumar A, Akiba S, Gangadharan P, Koriyama C. Associations of tobacco use and alcohol drinking with laryngeal and hypopharyngeal cancer risks among men in Karunagappally, Kerala, India -Karunagappally cohort study. PloS One 2013;8(8):e73716.

[18] Kapil U, Singh P, Bahadur S, Dwivedi SN, Singh R, Shukla N. Assessment of risk factors in laryngeal cancer in India: a case-control study. Asian Pac J Cancer Prev APJCP 2005;6(2):202-7.

[19] Sapkota A, Gajalakshmi V, Jetly DH, Roychowdhury S, Dikshit RP, Brennan P, et al. Smokeless tobacco and increased risk of hypopharyngeal and laryngeal cancers: a multicentric case-control study from India. Int J Cancer 2007;121(8):1793-8.

[20] Lian X, Ji W. Clinical characteristics of 97 hypopharyngeal carcinoma cases. Lin Chuang Er Bi Yan Hou Tou Jing Wai Ke Za Zhi J Clin Otorhinolaryngol Head Neck Surg 2015;29(6):542-6.

[21] MacKenzie R, Franssen E, Balogh J, Birt D, Gilbert R. The prognostic significance of tracheostomy in carcinoma of the larynx treated with radiotherapy and surgery for salvage. Int J Radiat Oncol Biol Phys 1998;41(1):43-51.