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Epidemiology and prevention of oral cancer

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Abstract
The global incidence of cancers of the oral cavity, pharynx and larynx is about 500,000 cases per year with mortality of 270,000 cases per year. Oral cancer, due to its location in an accessible part of the body i.e. mouth, can be detected at an early stage. However, because of lack of symptoms, especially pain, in early stages, medical attention is not sought till the disease is advanced which leads to a poor prognosis. Squamous cell cancer constitutes the most common head and neck malignancy and is related to tobacco and /or alcohol usage. Therefore, it is important for all oral health professionals to equip themselves with the knowledge to detect this disease at the earliest possible stage.

Keywords: pharynx, symptoms, larynx, oral

Introduction
Oral cancer is largely a preventable disease. Oral health is an integral part of general health and with increasing life expectancy, Oral health is bound to play a major role in improving the quality of life. The term 'Oral Cancer' is used to describe any malignancy that arises from the oral tissues. Squamous cell carcinoma is the most common, representing 90-95% of all the oral malignancies [1]. Globally, oral cancer is one of the 10 most common cancers. It is a major health problem in India, forming about 10% of all the estimated 644,600 new cancers that occur in all parts of the body each year[1]According to the WHO, about 90% of oral cancer in South-east Asia is attributable to tobacco use.

Oral cancer, due to its location in an accessible part of the body i.e. mouth, can be detected at an early stage. However, because of lack of symptoms, especially pain, in early stages, medical attention is not sought till the disease is advanced which leads to a poor prognosis. Therefore, it is important for all oral health professionals to equip themselves with the knowledge to detect this disease at the earliest possible stage. Squamous cell cancer constitutes the most common head and neck malignancy and is related to tobacco and /or alcohol usage [2]. Men are two to three times more commonly affected than women and the incidence increases with age with 98% of cases occurring in patients over 40years of age. The most important factors in the aetiology of head and neck cancer are tobacco and alcohol. There is synergistic interaction between these two agents which is super multiplicative for the mouth, addictive for the larynx and between multiplicative and addictive for the oesophagus [3].

Aetiology
Tobacco
1. Cigarettes
Tobacco is the most important factor and over 90% of the patients have history of smoking. There is a synergistic interaction with alcohol due to the increased mucosal absorption of these carcinogens as a result of the increased solubility of the carcinogens in alcohol compared with aqueous saliva. The use of filtered cigarettes reduces this exposure [4, 5]. The risk of oral cancer is reduced by 30 per cent in those who have discontinued for between one and nine years and by 50 per cent for those over nine years.

2. Smokeless tobacco
Oral cancer is strongly associated with different forms of smokeless tobacco consumed by chewing including bidi, chutta, pann, khaini and toombak. In India and parts of Asia, oral tobacco is mixed with betal leaf, slated lime and areca nut to form a quid called 'paan'. The lime lowers the pH which accelerates the release of alkaloids from both the tobacco and the areca nut. Paan is strongly associated with a premalignant lesion oral submucous fibrosis [6].

3. Marijuana
When marijuana is smoked, a wide range of potential carcinogens are released and absorbed including polycyclic aromatic hydrocarbons, benopyrene, phenols, phytosterols, acids and terpenes. The overall risk of 2.6 compared to non-users has been reported.

Alcohol
Alcohol is believed to act in a synergistic fashion with tobacco in the aetiology of oral and oropharyngeal cancer [4, 5]. The precise mechanism by which alcohol causes cancer is not clearly defined as alcohol itself is not a carcinogen. Possible mechanisms include:

1. Alcohol may act as a solvent thereby increasing the cellular permeability of tobacco carcinogens through the mucosa of the upper aero digestive tract [7].
2. Metabolite of ethanol is acetaldehyde and may have locally damaging effect on cells.
3. The non-alcoholic contents of various alcoholic beverages may have carcinogenic activities.
4. Alcohol decreases the activity of DNA repair enzymes thus resulting in increased chromosomal damage.
5. Alcohol impairs immunity due to a reduction in T-cell number, decreased mitogenic activity and macrophage activity.
6. Alcohol is high in calories, which supresses appetite in heavy drinkers. Metabolism is further damaged by liver

disease resulting in nutritional deficiencies and therefore lowered resistance to cancer.

Dental factors

Poor oral hygiene is associated with oral cancer, although no causal relationship has ever been established. This maybe due to chronic inflammation of the gingiva [8]. Painful or loose fitting dentures have also been associated with oral and oropharyngeal cancer. This may also be due to chronic inflammation. There are some evidence suggesting mouth-washes containing alcohol may also be important, although it is possible that the cancer risk id due to other factors, for example, patients may use the mouthwash to disguise the smell of tobacco or disguise the smell of alcohol.

Occupational exposure

Wood dust exposure is associated with the risk of oral cancer, as well as pharyngeal and laryngeal cancer.

Infections

In head and neck cancer, several viruses have been implicated in carcinogensis, including human papilloma virus(HPV), Human Immunodeficiency Virus(HIV), Herpes Simplex Virus(HSV) and Epstein-Barr Virus(EBV).

Nutritional factors

Several studies suggest high fruit and vegetable intake is associated with a decreased risk of head and neck cancer. This maybe due to increased intake of the antioxidants or free radical scavenging vitamins A, C and E [9, 10].

Inflammatory

1. **Gastro-oesophageal reflux disease:** Reflux has been documented in 36-54% of the patients which would suggest reflux to be a risk factor in laryngeal and pharyngeal cancer. However, no direct causal association has been reported.
2. **Pre-cancer:** Leukoplakia and erythroplakia are significant factors important in the aetiology of oral cancer. Submucous fibrosis is a well-recognised precancerous condition, resulting in tumors of the oropharynx [11].

Genetic and immunologic predisposition

There are various genetic conditiond which are associated with increased risk including Li-Fraumeni Syndrome, Fanconi's anemia, Bloom syndrome and Atxia-Telangiectasia are autosomal recessive disorders associated with increased chromosomal fragility and cancer susceptibility. Immunologic factors are also important.patients treated for bone marrow transplants and organ transplants have an increased incidence of skin cancer and oral cavity cancer. This may be due to long term use of immunosuppressive drugs.

Prevention of cancer of the oral cavity and oropharynx

1. ***Screening:*** cancers of the oral cavity are generally easily amenable to early detection during routine screening examinations by doctor or dentist, or by self-examination. Regular dental checkups which include an examination of the entire mouth are important in helping to find oral and oropharyngeal cancers early. Many doctors and dentists recommend that patients look at their mouth in a mirror every month.
2. ***Reducing risk factors:*** Most oral cavity and oropharyngeal cancer can be prevented by avoiding known risk factors. tobacco and alcohol are the most important risk factors for these cancers. The best approach is never to start smoking and limit the intake of alcoholic beverages. Exposure to ultraviolet rays is an important and avoidable risk factor for cancer of the lips, as well as for skin cancer.Avoiding sources of oral irritation (loose fitting dentures) may also decrease the risk of oral cancer. The American Cancer Society recommends eating a variety of healthful foods, with emphasis on plant sources. This includes eating at least five servings of fruits and vegetables everyday, as well as servings of whole grain foods from plant sources such as breads, cereals, grain products, rice or beans. Eating fewer red mest, especially those high in fat is also recommended. A diet rich in antioxidants such as carotene, Vitamins C and E, seems to prevent head and neck squamous cell cancer in heavy smokers and drinkers.
3. ***Chemoprevention:*** Is beneficial in patients with leukoplakia and erythroplakia. For example isotretinoin is a drug chemically related to vitamin A. when used by patients with oral cavity or oropharyngeal cancer, isotretinoin may reduce the risk of developing a second cancer in the head and neck region. Unfortunately, side effects of this medicine limits its use.

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