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REVIEW

Oral cancer, a health risk

Cáncer bucal, un riesgo para la salud

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ABSTRACT

A literature review on oral cancer was carried out with the aim of synthesising up-to-date information on this entity, its risk factors, diagnosis and prevention. Twenty-six bibliographic sources were consulted, including 12 journals, 9 books and 5 scientific articles. It was found to be one of the most common causes of death among all diagnosed cancers, which occurs more frequently in the male sex and in the older adult population, although everyone is susceptible to it. It is concluded that routine clinical examination and the use of diagnostic aids are the most effective measures to reduce the morbimortality of oral cancer, recommending healthy habits and lifestyles for its prevention.

Keywords: Oral Cancer; Risk Factors; Diagnosis; Prevention; Risk Factors; Oral Cancer.

RESUMEN

Se realizó un trabajo de revisión bibliográfica sobre cáncer bucal con el objetivo de sintetizar información actualizada sobre esta entidad, sus factores de riesgo, diagnóstico y prevención. Se consultaron 26 fuentes bibliográficas, de ellas 12 revistas, 9 libros y 5 artículos científicos. Se constató que es una de las causas de muerte más común entre todos los cánceres diagnosticados, que se manifiesta más frecuentemente en el sexo masculino y en la población adulta de edad avanzada, aunque todos son susceptibles a padecerla. Se concluye afirmando que el examen clínico rutinario y la utilización de medios auxiliares de diagnóstico son las medidas más efectivas para reducir la morbimortalidad del cáncer bucal, recomendando mantener hábitos y estilos de vida saludables para su prevención.

Palabras clave: Cáncer Bucal; Factores de Riesgo; Diagnóstico; Prevención.

INTRODUCTION

The World Health Organization defines cancer as a broad group of diseases that can affect any part of the body. Cancer is the uncontrolled growth of abnormal cells that can invade and destroy healthy tissues. It is a worldwide health problem and is one of the most important causes of mortality.[1,2]

Oral cancer is a multifactorial disease of disputed etiology where age, sex, race, and heredity are recognized as genetic determinants of risk, depending on the different locations. Diet, toxic habits, lifestyle, and the environment in general, including infection by microorganisms, are factors that act on the genome of the cells as tumor initiators or promoters in cellular transformation.[3] Other risk factors include smoking, alcoholism, oral sepsis, teeth with sharp edges, maladjusted dental prostheses, and excessive exposure to solar radiation. Combining two or more factors increases the likelihood of developing the disease. An adequate level of knowledge about the factors that cause oral cancer contributes to its prevention.[4,5]

The annual number of new cases is estimated to increase from 10 million in 2000 to 15 million by 2020. About 60 % of these new cases will occur in less developed regions. Of the 10 million new cancer cases per year, 4,7 million are in the most developed countries and almost 5,5 million in the least developed countries. In the United States, three out of every 100 people have oropharyngeal cancer, and in Argentina, between three and five out of every 100 people suffer from oral neoplasms. In Cuba, oral cancer remains among the first ten locations of tumors; since 1970, it occupies between the seventh and tenth place. In Holguin province, it remains among the first eight locations. The male sex is the most affected at the rate of three men for each woman.[6,7,8]

Oral cancer can be detected early if the population is educated to identify some early signs and symptoms of the disease. Because the oral cavity is one of the regions of the organism that can be directly examined, and the oropharynx is rich in manifestations of initial lesions, medical attention will be more effective.[9]

In Cuba, the Program for the Early Detection of Oral Cancer (PDCB) has been in place since 1982; it is unique worldwide due to its national coverage. Its objective is to reduce the morbidity and mortality of oral cancer. It was thus established that all patients who come to primary care for medical or stomatology consultation or screening would be examined by examining the buccal complex and chains and ganglionic groups of the head and neck. The patient should be referred to the second level of care 10 if any alteration is detected.

Nowadays, prevention and health promotion occupy a top place in the field of stomatology, so it is necessary to evaluate and renew programs so that they are increasingly preventive and educational, aiming to improve patient's quality of life. To implement preventive measures in their different stages, it is not only essential to prepare the stomatologist in the clinical-epidemiological aspects of oral cancer at a professional level but also to internalize the objectives of the program and the need to develop specific educational methods.[11]

Since this is a disease with a high risk of incapacity and eventually death, early diagnosis, and treatment are the key to reducing morbidity, which implies a reduction in the cost of treatment and even mortality.[11]

The high incidence of oral cancer at the national and international levels has motivated this work. As future stomatologists, we should know what this disease consists of, the risk factors that cause it, and, most importantly, the work strategies and behaviors to follow to prevent it.

Objective: to describe the main characteristics of oral cancer, its risk factors, diagnosis, and prevention.

DEVELOPMENT

Oral cancer is the abnormal growth of cells of the oral mucosa. It can settle on the lips, tongue, floor of the mouth, salivary glands, inner lining of the cheeks (jugal mucosa), gums, and palate. Its early detection and the control of risk factors are of great relevance since if detected in time, it can be solved in 9 out of 10 cases.[12]

Although heredity is also a risk factor, certain lifestyles and health conditions can increase the possibility of a person developing the disease, but as such, there is no specific pattern that manifests the appearance of the disease, risk factors, and diseases such as the following condition its development:

Smoking

Tobacco consumption is a significant risk factor for oral diseases such as periodontal disease and oral cancer. Every time cigarette smoke is inhaled, small amounts of these chemicals enter the bloodstream through the lungs, travel throughout the body, and impair the health of the individual and those around them.[13]

The harmful effect of tobacco on the oral mucosa is because it contains some 300 carcinogenic substances that become carcinogens in the mouth.

300 carcinogenic substances that are converted into active metabolites capable of interacting with DNA by the action of oxidative enzymes, including nicotine, arsenic, methanol, ammonium, cadmium, carbon monoxide, formaldehyde, butane, and hydrogen cyanide. Other carcinogenic substances such as nickel and cadmium, radioactive elements such as carbon-14 and polonium-210, and even pesticide residues have been detected in tobacco smoke. In addition to the action of carcinogens, exposure to the heat maintained by tobacco combustion can aggravate lesions of the oral mucosa.[13]

Smoking causes cancers, whether it is used in the form of cigarettes, cigars, pipes, chewed or snorted, or by reverse smoking. The risk of developing cancer varies not only according to the dose and duration of consumption (the risk increases significantly after 20 years of consumption) but also according to the quality and technique of consumption.[13]

Alcohol Consumption

Although the mechanism by which alcohol causes oral cancer is not well determined, it is, together with tobacco, its main etiological factor, and its harmful effects are enhanced when consumed simultaneously. Several mechanisms have been proposed oncogenic mechanisms of alcohol: it acts as a local irritant chemical factor, causes a decrease in the immune index, facilitates the absorption of other carcinogenic substances due to its caustic effect on the oral mucosa and its oxidation to acetaldehyde, a carcinogen that interferes with

DNA synthesis and repair.[13]

According to Zygogianni et al., about 80 % of alcoholic patients smoke cigarettes, and nicotine addiction is more severe in smokers with alcohol dependence. Smoking increases the acetaldehyde load following alcohol consumption, and alcoholic beverages favor the activation of tobacco procarcinogens, thus having additive effects. An attributable risk of oral cancer due to tobacco and alcohol is estimated to be more than 80 %; heavy drinkers and smokers have a 38-fold higher risk.[13]

Dietary factors

Nutritional deficiencies, especially in terms of vitamins and minerals, favor the development of oral cavity cancer. Iron deficiency anemia is the most essential dietary condition associated with oral cancer 14. In iron deficiency, mucosal atrophy, which is related to other risk factors, can increase mitotic activity and decrease the repair capacity of the epithelium. Nutritional iron deficiency is accompanied by micronutrient deficiencies favoring oral carcinogenesis.[13]

Patients with vitamin A deficiency are considered to be at high risk of malignant transformation of the oral cavity's mucosa. Vitamin A controls cell differentiation, and nutritional deficiency triggers cellular alterations similar to those induced by chemical carcinogens, although conclusive studies are required.[13]

Vitamin E enhances immunity, controls free radical-associated disorders, maintains membrane integrity, and inhibits cancer cell growth, although further studies are needed. In addition to vitamin A, vitamin C and some elements, such as zinc and copper, have been associated with oral carcinogenesis in humans and animals.[14]

Consumption of fruits and vegetables reduces the risk of oral cancers. A single study in the United States found an inverse association between fruit and vegetable intake and the 5-year incidence of head and neck cancer. In Italy, an 8-year consumption of abundant vegetables, fruits, cereals, olive oil, and wine, and a low intake of meat and dairy products was shown to protect against oral and pharyngeal cancer compared to those who consumed fewer components of this Mediterranean diet. This suggests that dietary antioxidant deficiency is a predisposing factor for oral cancer, although clinical trials exploring the effectiveness of dietary supplementation in reducing this risk are required.[13]

Dietary polyphenols decrease the incidence of oral carcinomas and protect against oral cancer by inducing cell death and inhibiting tumor growth, invasion, and metastasis, which may explain part of the beneficial effect of fruit and vegetable consumption. Other studies have found an association between foods and nutrients consumed with oral cancer, although the studies are inconclusive.[13]

Immunosuppressed states related or not to nutritional disorders also favor the development of cancer due to the difficulties of the immune system in eliminating cancer cells.[13]

The following should be considered regarding the role of diet in oral carcinogenesis: First, the long time elapsed between the onset of cancer makes it difficult to assess dietary patterns that fluctuate over time accurately. Second, carcinogenesis is influenced by numerous risk factors that accelerate this process. This makes it challenging to identify and control these factors, which can act as confounding variables and could explain part of the contradictions found in the published literature.[13]

Environmental factors

Environmental factors such as ionizing radiation from natural or therapeutic sources or nuclear accidents contribute to the risk of cancer, although there are few data on oral cancer. Lip cancer is more frequent in fair-skinned people exposed to the sun's rays. In predisposed individuals, the sun can cause exfoliative cheilitis or solar keratosis on the lips, especially on the lower lip. Most of these carcinomas start on chronic cheilitis; among them, the most malignant are those of actinic origin.[13]

Actinic carcinogenesis in the lip is caused by ultraviolet rays from sunlight. These rays cause mutations in the DNA of epithelial cells, activating oncogenes and inactivating tumor suppressor genes. This slow developmental process explains the long latency period in the emergence of these cancers.[13]

Heavy metals such as chromium, nickel, and arsenic are carcinogenic to humans. Chromium and nickel are industrial and environmental pollutants. Chromium is a potent inducer of oral cavity tumor growth in animal models and transformed cells in cell culture. Nickel can induce cancerous transformation in animals. One study found an association between heavy metal content in soil and oral cancer mortality. Differences in oral cancer incidence rates in different geographic regions may be related to environmental factors.[13]

Bacterial infections

Bacterial, fungal, and viral infections are linked to the emergence and development of oral cancers through different mechanisms that are not fully understood.[13]

Bacteria participate in oral carcinogenesis by inducing chronic inflammation, directly or indirectly interfering with the eukaryotic cell cycle and signaling pathways, or metabolizing potentially carcinogenic substances such as acetaldehyde, which causes mutations, DNA damage, and secondary proliferation of the epithelium. Bacteria

also secrete cellular toxicants such as actinomycin D, which causes karyotype changes, leading to salinization. Certain bacterial infections can evade the immune system or stimulate immune responses that contribute to carcinogenic changes through the mutagenic and stimulatory effects of cytokines released by inflammatory cells.[13]

Bacterial toxins destroy cells at reduced concentrations and alter cellular processes that control proliferation, apoptosis, and differentiation. These alterations are associated with carcinogenesis and may stimulate cellular aberrations or inhibit standard cellular controls.[13]

Poor oral hygiene is an independent risk factor for oral cancer—patients with this type of cancer often present with oral health problems such as tooth loss and periodontitis. The number of missing teeth has been associated with oral cancer. Still, variables related to oral health are also linked to tobacco and alcohol consumption, a confounding factor that is difficult to control in epidemiological studies. In addition, periodontal disease increases the risk of head and neck cancer, and this association holds in subjects who have never smoked or drank. Patients with periodontitis are also more likely to have more undifferentiated oral squamous cell carcinomas.[13]

Some oral microorganisms can produce carcinogenic acetaldehyde from alcohol, which may explain why poor oral hygiene is associated with oral cancer in heavy drinkers and heavy drinkers, in whom salivary acetaldehyde concentrations increase with poor hygiene. Whether removing these bacteria reduces cancer incidence has not been demonstrated.[13]

Viral Infections

Viruses cause 10-15 % of human cancers. Their main effects on genetic instability include mutations, aberrations, and DNA damage.[13]

Virus infections: Human papillomavirus (HPV) DNA has been detected in up to 30-50 % of oral cancer cases. There is an inverse correlation between the prevalence of HPV infection and the age of oral cancer patients, which is rare above 60 years of age. Both initially affect the genital region and are transmitted by sexual contact. Infection is considered an early oncogenic event, followed by a long latency period before the appearance of squamous cell carcinoma.[13]

Herpes simplex virus has also been associated with carcinogenesis. Nucleic acids of these viruses have been found in lip cancer, levels of antibodies to type 1 and 2 are higher in patients with oral cancer, and seropositivity to herpes simplex virus, together with smoking, appears to increase the risk of cancer. Another virus, Epstein-Barr, is also implicated in oral cancer, although the evidence is controversial.[13]

Oral cancer is a prolonged process that lasts for years, usually originating from premalignant lesions and conditions. Its multifactorial nature in which multiple risk factors are involved and the variation in individual susceptibility to cancer make it difficult to specify the cause-effect relationships, so this disease and its associated risk factors are being intensively investigated worldwide, with many controversial and controversial aspects that will require clarification in future research.[13]

Other conditional factors include premalignant lesions or other pre-cancerous states, lichen planus, atrophic mucosa, chronic trauma, especially from ill-fitting dentures and sharp teeth, oral sepsis, oral submucosal fibrosis, florid oral papillomatosis, chronic candidiasis infections, exposure to high ionizing radiation and AIDS among others.[13]

All benign neoplasms, although not potentially malignant, can constitute cancer-promoting elements.[13]

For the recognition of oral cancer, both the patient and the practitioner should be alert to the appearance of.[15]

- White spots that do not come off when scraped.
- Wounds that do not heal in more than one week.
- Mobility and/or loss of teeth without apparent cause.
- Anesthesia or paresthesia in any area of the mouth.
- Progressive facial asymmetry.
- Limitation of mouth opening.
- Limitation of tongue mobility.
- Painless ganglions (fixed or mobile).
- Any localized growth of tissues.
- Persistent hoarseness.
- Difficulty and/or pain when swallowing.

It can be detected early by regularly observing the mouth for any change in a routine examination with the specialist or the patient's self-examination.[15]

The buccal complex self-examination (BCEA)

The BCCS is a variant of the oral complex examination; it is not performed by a specialized practitioner but by the subject, who has been motivated to examine his mouth and neck to identify possible preneoplastic conditions or incipient malignant neoplasms. The AECB is a valuable and complementary maneuver in any Oral Cancer Screening Program. In the educational part of these programs, all community members should be trained on the methodology of self-examination. The message should be brief and straightforward so people of all cultural levels 16 can carry it out. The mass media, such as television, radio, video, etc., should be used to promote OCBD. Also, the distribution of allegories, legends, or posters with photographs or drawings represents the steps to follow to execute the AECB. It should be emphasized that the BCSE is only the beginning of a possible diagnosis that, without the assistance of a specialized center to rectify or ratify the suspicions or doubts of the self-examination, the objective of early detection will not have been achieved.[16]

Several methods can be used to perform the BCSE, but we recommend that, when choosing a variant, it should always be performed in the same order. In this first step, manual palpation can be added to those that follow visual observation. In the second step, the mucosa of the cheek should be observed, from where the exploration of the lip ended up to the most posterior part, including the gum on its external part, up to the end where the teeth end. In the third step, the roof of the mouth is explored, that is, the hard and soft palate or palatine vault, and the uvula is reached, also including the upper gum on that side; here, it is helpful to say "ah" to see the movement of the soft palate. In the fourth step, we examine the tongue; we start with its protrusion or take out the tongue and move it to check its mobility and if it does not deviate to one side or the other when it presents some obstacle that prevents its exit from the mouth: we continue observing all its parts, the upper surface, edges, tip, and its lower face; we can help with manual palpation. In the fifth step, the lower part or floor of the mouth is explored, from the anterior to the posterior part, next to the gum, which is the most difficult maneuver. The observation of the inside of the gum is also completed; in the sixth or last step, the entire neck is observed, and it is seen if there is any increase in volume, nodule, or hardness. When in doubt or to complete the examination, manual palpation is used, which is essential when nodules or other alterations are suspected. This procedure should be used at least every 6 months. If any abnormality is found, the dentist or family physician should be consulted immediately.[16]

In turn, the signs that can be observed are ulceration without pain, induration, paresthesia of the tongue or lip, papillary growth, and difficulty opening the mouth due to the decrease in tissue mobility. We will suspect that a lesion may be cancer if it persists for more than three weeks in the mouth.[1]

Oral cancer can affect any part of the oral cavity, but its most frequent location is usually on the tongue's lateral border and mouth's floor. However, it can also affect other structures, such as the oropharynx, soft palate, jugal mucosa, or lower lip. It has been observed that when the patient is a smoker or ingests alcohol, the lesions are seen mainly in the anterior zone of the tongue, floor of the mouth, oral mucosa, and alveoli. At the same time, HPV lesions appear more in the posterior regions of the oral cavity, such as the base of the tongue, oropharynx, pillars of the mouth, and alveoli, Oropharynx, tonsillar pillars, and tonsils.[1]

The first thing to do is to take a good clinical history and find possible risk factors that may cause this lesion to develop at the oral level. For example, If the patient is a smoker (the risk increases five to nine times more in patients who smoke than in non-smokers) or only drinks (they have thirty times more chance of developing oral or pharyngeal cancer) or both (synergistic effect increasing the risk a hundred times more than usual), accompanied by an exhaustive and good clinical examination, both extra and intraoral, which requires adequate lighting, 2×2 gauze, protective gloves, and mirrors, thanks to which, all areas of the oral cavity are explored. The oral mucosa should be thoroughly examined in the latter, including palpation of the cervical lymph nodes. Special attention should be paid to the areas of the mouth most susceptible to carcinoma, such as the lip, floor of the mouth, lateral edges of the tongue, and jugal mucosa. Early diagnosis depends on clinical astuteness or even on the patient himself when he can identify a suspicious lesion at an early stage. Primary stages may be asymptomatic or cause small changes, so it is recommended that healthcare professionals have a high index of suspicion and know how to identify precancerous oral lesions. Patients who do not visit the dentist frequently are at greater risk of being diagnosed with lesions in very advanced stages. The study by Thomas Yu observed that there was more delay in diagnosis in women than in men, but more research is needed to investigate the reason for this.[1]

On many occasions, in case of any doubt, health professionals need complementary techniques to support the diagnosis. Biopsy is a method that we use as a supplement to the diagnosis. This will be performed when the lesion has been in the mouth for more than 3 weeks, lesions that raise suspicion of malignancy. Histologically, it is observed that in carcinoma, there is an extended dysplasia along the thickness of the epithelium and invasion through the membrane.[1]

In Cuba, the Oral Cancer Detection Program (PDCB), unique worldwide for its national coverage, began to be applied in 1982 and was officially established by the Ministry of Public Health in 1984. This Program allows for raising the population's health level through prevention, promotion, protection, cure, and rehabilitation.

Its main objective is to reduce morbidity and mortality of oral cancer through primary prevention and early diagnosis of lesions and precancerous conditions, increasing cure and survival. In the fight against oncologic disease of the oral cavity, the work of stomatologists and family physicians in the fulfillment of the actions of the in the fulfillment of the actions of the PDCB.[17,18]

Full coverage has not been achieved because the supposedly healthy population does not demand annual checkups of the oral complex, and this screening is essentially passive. However, it includes patients seen in active checkups by the stomatologist and the family physician.[19]

Health is a fundamental human right and indispensable for social and economic development; health promotion is essential for improvement. Health promotion is a global political and social process that aims to strengthen individuals' abilities and capacities and modify social, environmental, and economic conditions to mitigate their impact on public and individual health. It allows people to increase their control over the determinants of health and, consequently, to improve it.[19]

Functions of the Stomatologist about the PDCB[21]

1. Examine the oral complex of any patient requesting Stomatological Services.
2. To record the patient's outpatient medical record, including the stomatological visit and the PDCB examination.
3. Ensure that all patients 35 years of age and older who live in their area of care have an oral complex examination performed at least once a year.
4. Annually examine the at-risk population in their area: the population living in enclosed areas with or without chairs and in closed places with or without dental chairs (factories, nursing homes, etc.).
5. Refer any patient suspected of preneoplastic or malignant lesions of the oral complex to the Maxillofacial Surgery office, fill out the case referral form, and inform the family physician.
6. Dispense and keep a cardholder or control list of all patients referred to Maxillofacial Surgery consultation.
7. Actively collaborate in the location of patients not attending the Maxillofacial Surgery consultation.
8. To participate in the periodic evaluations of the Program's progress.
9. Actively participate in scientific activities to improve the Program's quality.
10. Actively participate, in coordination with the mass organizations, in the educational tasks of the Program and advise the Family Doctor in the examination and pathologies of the oral complex.
11. Comply with the procedures established by the Statistical Information System of the Program.
12. Perform prioritized stomatological treatment to patients referred by PDCB or who have received oncospecific treatment.[21,22]

As the first contact of the population with dental care, the General Comprehensive Stomatologist should include health education in his daily work to promote self-responsibility and collaboration in reducing this disease in the population, with emphasis on the elderly. It should disseminate and make the population aware of the importance of performing a thorough and systematic oral examination, which allows detection by simple observation of the changes that occur at the level of the oral cavity, especially the mucosa, early, and thus avoid the appearance of precancerous lesions. Patients should be referred to the second level of care, according to the PDCB program, and the stomatologist should carry out preventive treatment and rehabilitate the patients.

Concerning education, seek the most effective mechanisms to adequately motivate people to perform oral self-examination and make it a regular practice in families. Community education is the ideal method for uprooting the habit of smoking; primary prevention advocates, firstly, motivating people, mainly young people (in school activities, in youth societies, through the mass media) not to take up the habit; secondly, motivating those who already have the habit to give it up and, ultimately, to modify or reduce this habit. Also, exercise-conscious persuasion leads to behavioral changes in deleterious habits such as consuming alcoholic beverages, explaining the effects of risk factors, and emphasizing the importance of maintaining an adequate diet. The actions of the dentist and the family physician are vital; both can contribute positively and timely to prevention and health promotion. The challenge is to motivate patients and make them responsible for their health so that the balance is positive and they can improve their quality of life.

Oral cancer prevention and control measures[23]

Among the most important measures are the following:

- To perform PDCB screenings on all persons attending the institution.
- To carry out educational and outreach activities aimed at modifying the population's risk factors, such as smoking and alcoholic beverage intake.
- Identify and eliminate cheilophagia and chewing habits.
- Encourage the ingestion of non-irritating foods.

- Identify and control intrinsic risk factors.
- Identify and refer to maxillofacial surgery (MFS) patients with malignant or premalignant oral lesions and cervicofacial adenopathies.
- To establish the epidemiologic history of the disease.

CONCLUSIONS

Oral cancer is the abnormal growth of oral mucosal cells. It affects a large part of the oral mucosa and is a multifactorial disease.

The risk factors that can lead to the appearance of the disease are smoking, alcoholism, poor oral hygiene, rough teeth, and maladjusted prostheses.

Self-examination of the oral complex and routine clinical examination are the most effective tools for detecting oral cancer.

Educational and outreach activities aimed at modifying lifestyles are one of the main preventive measures.

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