Oral Cancer

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ABSTRACT

Oral cancer or mouth cancer is a type of cancer that forms in the oral cavity, resulting in the uncontrolled growth of abnormal cells that damage the surrounding tissue. There are several factors that accelerate oral cancer, including human papillomavirus (HPV) infections, genetic influences, UV light and substance use. Abnormalities, namely white or reddish patches, lumps and chronic sores in the oral cavity, may be noticed by the patient. Nowadays, many means of treatment are available, including surgery, radiation, chemotherapy, and targeted drugs. However, the risk factors can affect people at different levels. The treatment will be applied individually depending on personal physical and mental health conditions. Furthermore, most of the treatments rely on modern technology, they are progressively developing to maximize their efficiency. This article aims to provide an overview of cancer, oral cavity, diagnosis, complications, medical treatments and self-prevention to avoid risk factors. Overall, the authors have analyzed and reorganized so that the audience has a broader understanding of this disease.

Introduction

Cancer

According to world statistics, head and neck squamous cell carcinoma (HNSCC) is the sixth most common cancer or accounts for 2.5% of all new cancer cases and 1.9% of all cancer deaths per year. Over 90% of oral cancer (occurring in the mouth, lip and tongue) are oral squamous cancer cells. The incidence of oral cancer varies worldwide with significant prevalence in South Asian countries (Ali et al., 2017, 23-28).

Cancer is the second leading cause of death worldwide, following cardiovascular disease (Pérez-Herrero & Fernández-Medarde, 2015, 52-79). In the 20th century, cancer became one of the most feared diseases, and it continues to spread and increase in the 21st century. Research shows that one in four people has a lifetime risk of cancer. However, if detected early enough, cancer is treatable (Roy & Saikia, 2016, 441-442).

The main feature of cancer is the body cells can spread uncontrollably to other parts of the body. Moreover, cancer can occur almost anywhere in the human body (National Cancer Institute, 2021). As a result, there are more than a hundred specific types of cancer, which vary considerably in their symptoms and response to treatment (Cooper, 2000).

Cancer is considered a genetic disease because it is caused by changes in the genes involved in how our cells function, especially how they grow and divide. The defect in the process of cell division or exposure to harmful substances, such as drugs and UV rays, are two main factors that cause cancer cells. In addition, it is hereditary. Normally, human cells grow and multiply to form new cells when the body needs them. When cells age or become damaged, they die and new cells take their place. Sometimes this orderly process breaks down and abnormal or damaged cells grow and multiply when they should not. These cells can form tumours, which are lumps of tissue. Tumours can be malignant or non-cancerous (benign). Cancerous tumours spread or invade nearby tissue and can travel to distant sites in the body to form new tumours (a process called metastasis) (National Cancer Institute, 2021).

Cancer metastasis is one of the most common causes of death in cancer patients. Tumour cells are allowed to infiltrate in the process of cancer metastasis through a molecular mechanism. Several non-coding RNAs may be involved in cancer metastasis, including microRNAs(miRNAs) and long non-coding RNAs (IncRNAs) (Li et al., 2016, 205-217). Furthermore, metastasis occurs when genetically unstable cancer cells change into a tissue microenvironment that is isolated from the primary tumour. Not only the selection of traits that are advantageous to cancer cells, but also the connection recruitment of traits in the tumour stroma that fit invasion by metastatic cells are involved in this process (Gupta & Massagué, 2006, 679-695).

Oral cavity

The anatomy of the oral cavity includes the lips, gingiva (gum), the hard palate (the bony front part of the roof of the mouth), the soft palate (the muscular back part of the roof of the mouth), the trigoneretromolaris (the area behind the wisdom teeth), front two-thirds of the tongue, the buccal mucosa (lip and cheek lining), the floor of the mouth under the tongue, the uvula, the tonsils and the teeth (figure1) (PDQ Screening and Prevention Editorial Board, 2021).
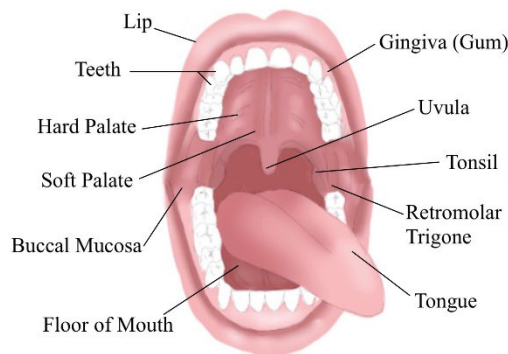

Figure1: Anatomy of the Oral Cavity

Oral Cancer

When the cancerous cell develops in the area of the mouth (oral cavity), it is defined as oral cancer or mouth cancer (WebMD Medical Reference, 2019). Oral cancer is included in head and neck cancers (Mayo Clinic, 2020). Predominantly, it often originates from the squamous cells, the flattened cells that make up the lining of the oral cavity where the surfaces of:

1. The lips.
2. The front two thirds of the tongue.
3. The gingiva.
4. The buccal mucosa.
5. The floor of the mouth under the tongue.
6. The hard palate.
7. The retromolar trigone.
  (PDQ Screening and Prevention Editorial Board, 2021)

However, less common types of oral cancer include adenocarcinoma (cancers that develop in the salivary glands), sarcoma (cancers that emerge from abnormalities in bone, cartilage, muscle or other tissue), Oral Malignant

Melanoma (cancerous cells in melanocytes) and lymphoma, which grows from cells normally found in lymph glands but can also grow in the mouth (National Health Services UK, 2019).

Causes and Risk factors

HPV

Human Papillomavirus (HPV) infection is the most frequent transmitted infection (STI) in 9-13% of the world's population, or 630 million people. There are 6 million people diagnosed each year. HPV(OPSCCs) causes Head and Neck Squamous Cell Carcinomas (HN-SCCs) and Oropharyngeal Squamous Cell Carcinomas (OSCCs) (Candotto et al., 2017, 209-220).

Human papillomavirus (HPV) infects the basal cells of the stratified squamous epithelium that emerge after minor injury or trauma. Virus particles are only formed on the surface of the epithelium, where they are released into the environment to diffuse into new target cells. In the nucleus of stem cells, the viral genome is still a low duplicated plasmid. The expression of viral proteins is controlled by the difference in infected cells when transferred to the epithelial cell (Syrjänen, 2018, 49-66).

The infectious papillomavirus in humans, the development of cervical cancer Squamous Cell Carcinomas (SCC) has been widely demonstrated. Moreover, there is strong evidence for the causal role of these viruses in the etiology of SCC in both reproductive and head organs (e.g. pharynx, larynx and mouth) (Candotto et al., 2017, 209-220).

Genetic Influences

People who recieve certain gene defects are at a higher risk of developing central oral and throat cancer. People with Fanconi anemia usually have anomalies about blood since their early age. This can lead to leukemia or myelodysplastic syndrome. Furthermore, they may also be at high risk for oral cancer. Another disease is Dyskeratosis congenita, a genetic syndrome, which causes aplastic anemia, skin rash and irregular nails. This disease contributes to a high risk in having oral cancer, especially young people (American Cancer Society, 2021).

Several processes such as chromosome separation, copying genome, heterozygosity extinction, telomere stabilization, regulating cell cycle, repairing DNA damage and fault in the notch signal transmission path may initiate oral cancer. To advance options for prevention and treatment of disease, it is essential to understand the underlying molecular mechanisms that govern oral tumor formation. Consequently, genetic variations are considered responsible for the onset of oral cancer (Ali et al., 2017, 23-28).

Substance use

More and more published evidence on the effects of main categories of drug abuse on oral health is growing. The aforementioned categories include tobacco, alcohol, cannabis, opiates, hallucinogens, cocaine and amphetamine-type stimulants, and various club drugs. It is shown that direct exposure of oral tissues to drugs during smoking or ingestion, biologic interaction of drugs with normal physiology of the oral cavity is the main factor that affects the oral health complications. Moreover, it is widely known that it also results in brain function which results in a spectrum of addictive behaviors (Shekarchizadeh et al., 2013, 929-940). However, this research only includes three most prevalent categories which are tobacco, alcohol, and cannabis, respectively.

Tobacco

One of the obvious effects of tobacco use is discoloration of teeth, in fact, since it reduces salivary pH and the buffering power, it potentially increases dental decay. Moreover, smoking is considered a cause of halitosis and may affect the ability of smell and taste. Generalized melanosis of the oral mucosa can be present in smokers which might often necessitate investigations to exclude other systemic disorders. Wound healing is impaired in tobacco smokers possibly due to local vasoconstriction and poor neutrophil function. Fair amounts of evidence have shown that tobacco use is a major factor in the progression of periodontal disease since smokers with periodontitis are more frequently found , and their disease severity is higher with greater alveolar bone loss resulting in deeper pockets compared with non-smokers. All of the aforementioned symptoms can be considered as factors that can accelerate the growth of the cancerous cells. According to statistics collected by WHO, over 80 percent of oral cancers are associated with tobacco use (European Association of Oral Medicine, n.d.) . Although there is a strong correlation between tobacco smoking and oral cancer, a further study needed to be done to determine whether it is the cause (Abrahão et al., 2018, 32-44).

Alcohol

Alcohol consumption results in more sensitivies of tissues to carcinogens by increasing the permeability of cell membranes (Mufti et al., 1989). Large quantities of alcohol have shown an obvious effect on oral epithelial cells by making it atrophy. Basal cell pleomorphism can also be detected in this case. Moreover, there is a tendency toward epithelial dysplasia. A study by Valentine et al. (1985) on humans who ingested known levels of alcohol and tobacco and have shown a correlation of alcohol and tobacco abuse and symptom of tongue biopsies. In high alcohol and tobacco users, the basal cell layer was hypertrophied, and the lingual epithelium was thinner. These changes are notable. Considering other factors like the nutritional deficiencies and liver diseases, which are commonly found in alcoholics, it may be interpreted that the host immune defences are suppressed, which will result in the individual to be more prone to malignancy. Oropharyngeal cancer has been proven to have a direct relationship to alcohol consumption coupled with tobacco smoking (Chris-ten, 1983; Craig and Triedman, 1986; McMichael and Puzio, 1988; Brugere et al., 1986). The rationale behind this is that ethyl alcohol may be a cancer promoter capable of causing chemical irritation and increased absorption of carcinogens dissolved in the alcohol (Rees, 1992, 163-184).

Cannabis

Heavy cannabis usage has been linked to precancerous alterations in the respiratory system and oral cavity, which are becoming progressively more prevalent. Furthermore, excessive cannabis usage has been linked to gingival enlargement similar to phenytoin-induced gingival hyperplasia (Baddour et al., 1984; Layman, 1978). Gingivitis and alveolar bone loss can also be observed in conjunction with the diseases. He also discovered a relationship between excessive marijuana usage and the development of Leukoplakia. Oral papillomas were found often in three groups of imprisoned patients who were strong marijuana users and had poor oral hygiene, according to Colon (1980). Lesions were seen in uncommon oral locations, such as the lingual gingiva, which are not typically subjected to severe trauma or persistent irritation (Rees, 1992, 163-184).

UV light

Ultraviolet radiation (UVR) exposure from sunlight or tanning bed can cause oral cancer mostly in the lip area by damaging DNA which might activate HPV (Adams et al., 2016, 233-237).

Symptoms

Physical

Initial stage of oral cancer can appear as numerous benign lesions, a harmless red or white change, an ulcer, or a lump on the lips, gums, or other areas inside the mouth (Silverman, 1988, 1796-1799). However, common symptoms of oral cancer include unexplained bleeding, numbness, soreness in any area of the face, mouth, or neck. In addition, some patients might experience disorganized teeth, ear pain, or dramatic weight loss (American Cancer Society, 2021).

Emotional

The study showed that oral cancer patients of any age group and gender are emotionally affected, including stress, social isolation, anxiety and depressive symptoms. Therefore, psychological counselling should be part of the comprehensive treatment plan for patients and family members. Psychological meetings for patients will help them to go through treatment with confidence. Thus, the outcomes and prognosis of patients' treatment will certainly increase by following the protocols carefully (Kamatchinathan et al., 2016, ZC72-ZC74).

Diagnosis

Biopsy

The affected tissue must be removed and diagnosed for cancer cells. The sample cell will be examined under a microscope by a medical professional. The pathologist will diagnose what type and degree of cancer (National Health Services UK, 2019).

Incision or punch biopsy

An incision biopsy is often used with topical anaesthetic. This method is used for the easily accessible affected area, for example the tongue or the inside of the cheek (National Health Services UK, 2019).

Fine needle aspiration with cytology (FNAC)

This is similar to a blood test. It uses a tiny needle to take cells and fluid from the lumb, which can then be used to diagnose the cancer. It is often done at the same time as an ultrasound scan (National Health Services UK, 2019).

Nasendoscopy

A nasendoscope is a slender elastic tube with a camera and a light at one end. It is passed through the nose and into the throat (Cancer Research UK, 2018). It is often done for cases involving the nose, pharynx or larynx area cases. It takes about 30 seconds. A topical anesthetic is injected into the nose and throat (National Health Services UK, 2019).

Panendoscopy

A panendoscopy is a tube connected with a camera and light and an eyepiece. The doctor puts the panendoscope through your nose and down into your throat (Cancer Research UK, 2018). It is similar to a nasal endoscopy, where a

larger tube is used to create better access. Before this process, the doctor will administer an anaesthetic as it can be inconvenient when being conscious between this step (National Health Services UK, 2019).

Physical examination

The doctor or dentist has the task of examining your oral organs and finding abnormalities of the irritation areas such as scars and white patches (Mayo Clinic, 2020).

Doctors usually discover oral cancer during a routine examination by finding a lump on the neck, lips, gums, cheeks, larynx and lymph nodes. When doctors find signs, they take a medical history and ask about the patient's condition and risk factors, as people with oral cancer are also at risk for other cancers (American Society of Clinical Oncology, 2021).

Tests

When doctors notice any sign of cancer, they will do a brush biopsy or a tissue biopsy. A brush biopsy is a cell-collecting method from the tumor, then brush them on the surface of the slide. A tissue biopsy is a tissue removing process. They will examine cancerous cells with a microscope. Furthermore, doctors may give you these following tests:

1. X-rays are used to check whether cancer cells have spread to the jaw, chest or lungs.
2. PET scan is used to see if the cancer has spread to lymph nodes or other organs.
3. CT scan is a technology that shows a picture of any tumours.
4. MRI scan is used to show more detailed pictures of the head and neck to see the extent or stage of the cancer.
5. Endoscopy is used to examine the nasopharynx, sinuses and trachea.
(Johnson, 2020)

HPV Testing

In an HPV test, a tumour sample must be examined. HPV infection is associated with a higher risk of oral cancer because it can help determine the stage of the cancer and treatment options. ASCO recommends that all patients with oropharyngeal squamous cell carcinoma that starts in flat, scale-like cells should have an HPV test. In contrast, it is usually not advised for oral cancer that begins in other types of cells (American Society of Clinical Oncology, 2021).

Barium Swallow

It can be used to look at the upper lining of the digestive system, especially the esophagus. In this method, patients drink a chalky liquid (barium) that coats the walls of your throat and esophagus. To diagnose oral cavity cancer, X-rays are taken continuously while you swallow. It is also helpful to see if the cancer is causing difficulty in swallowing (American Cancer Society, 2021).

Ultrasound

Ultrasound uses sound waves and echoes to create images. A tiny microphone-like instrument called a transducer emits sound waves and collects the echoes that bounce off the organ. Then the computer program converts them into an image on the screen. During a neck ultrasound, the technician moves the transducer along the skin of your neck to

look for abnormalities in the lymph nodes, which could be a sign of cancer. In addition, the ultrasound can guide the needles for an FNA biopsy and be used after treatment to check cancer recurrence (American Cancer Society, 2021).

Treatments

Surgery

In the past, the main purpose of cancer surgery was to cure the cancer by removing all the cancer from the body, including the healthy tissue around the cancer. The surgeon may remove some of the lymph nodes from the area to check if the cancer has spread, assess your chances and plan the next treatment (Mayo Clinic, 2020). There are 2 main types of surgical biopsies: incisional biopsy and external biopsy. The former removes a piece of the suspicious area to study whereas the latter, the entire suspicious area, such as a mole or lump, will be removed. Tumor removal, also known as curative or primary surgery, is usually used to remove the tumor and some of the nearby healthy tissue, the margin. This treatment may be accompanied by other treatments, such as chemotherapy or radiation therapy (American Society of Clinical Oncology, 2019).

After an operation, people may experience pain and infection in the part where the operation was performed. The pain felt depends on the extent of the operation, the part of the body and patience. Infection is preventable if following the doctor's instructions and taking care of the surgical area. However, if the operation area is infected, antibiotics will be administered (National Cancer Institute, 2015). The effects of the surgery may differ in each area. As for glossectomy, the patient may lose the ability to speak and swallow. After the removal of the larynx (laryngectomy), the patient will breathe through the stoma, located at the front of the neck, by a process called tracheostomy. This means that the air breathed does not pass through the nose and mouth. As a result, it can irritate the lining of the esophagus and cause thick or crusted mucus. Some head and neck cancers treated with operations remove part of the facial bone structure, causing a major impact on self-perception and also on speaking and swallowing (American Cancer Society, 2021).

Radiation Therapy

Radiotherapy is a cancer treatment that uses high-energy X-rays or other forms of radiation to kill cancer cells or stop them from developing. Radiotherapy is divided into two methods: external radiation and internal radiation.

1. In external radiation, radiation is sent to the cancerous area from a machine outside the body.
2. Internal radiation, on the other hand, involves injecting a radioactive material into or near the area through needles, seeds, wires or catheters. The type and stage of cancer being treated will determine how radiation treatment is administered. For oral cancer, external and internal radiotherapy are used as a treatment method.

   In addition, several studies show that patients who quit smoking before starting radiotherapy may have a better outcome. Patients should also have a dental examination before starting radiotherapy so that any problems that may exist can be addressed (PDQ Screening and Prevention Editorial Board, 2021).

Intensity-Modulated Radiation Therapy (IMRT)

Intensity Modulated Radiation Therapy (IMRT) combines the use of sophisticated computer software with a collimator, a metal instrument. These instruments allow your treatment team to precisely tailor the beams to the dimensions of the treatment area.

Before starting radiotherapy, a team of experts, including radiation oncologists and experienced medical physicists, collects detailed information about the treatment area. This includes a CT scan to map the tumour in 3-D PET, CT and MRI scans to create an outline of the tumour, and advanced treatment planning software to determine the ideal amount of radiation beams and their exact angles. The collimator is changed during treatment to produce beams at the angles determined by the computer software. This approach allows us to deliver more precise doses of radiation to the tumour while reducing the risk of exposing healthy tissue (National Cancer Institute, 2018).

Image-Guided Radiation Therapy (IGRT)

Image-guided radiotherapy uses imaging tests (CT, MRI, or PET) and special computer software to optimize the real-time delivery of radiation to the treatment area. In this approach, imaging scans are performed daily to ensure accurate positioning when the radiation dose is delivered. The imaging scans are processed by special software to detect changes in the size or location of the tumor. Your radiotherapy team can use this information to improve the accuracy of the radiation treatments as you receive them.

Radiation not only kills cancer cells or slows their growth but can also damage healthy cells in the surrounding area. Damage to healthy cells can have unfavorable consequences. For instance, radiation treatment causes fatigue in many people. In addition, fatigue refers to the condition of being tired and exhausted. It can occur all at once or gradually. People experience fatigue in a variety of ways, and you may experience more or less fatigue than someone who receives the same amount of radiotherapy in the same area of the body (National Cancer Institute, 2018).

Chemotherapy

Chemotherapy, shortened as chemo, is an anti-cancer treatment in which anti-cancer medicines are injected into a vein or eaten orally, allowing them to enter the bloodstream and reach most areas of the body. Chemotherapy medicines target and kill fast-growing cells, including cancer cells. Unfortunately, these medicines also have negative effects on normal cells that grow quickly including hair follicles, intestines, the lining of mouth and throat, and bone marrow (Stanford Children's Health, n.d.). Side effects of chemotherapy are gastrointestinal tract problems, hair loss, low blood cell counts, skin rashes, fatigue, and infertility (The Oral Cancer Foundation, n.d.). However, the side effects of chemotherapy vary among each individual and end as the therapy process terminate.

Chemotherapy can be administered in several ways. Oral and intravenous chemotherapy are the most common methods, however chemotherapy can also be administered intramuscularly or through catheters. The oral version of a medication is in the form of a capsule or tablet that is taken by mouth. Oral administration is very convenient because the patient only has to swallow a tablet. The intravenous version, often known as IV, involves injecting a liquid medication directly into the circulation using a tiny needle inserted into the arm. Chemotherapy is given intramuscularly, which means it is injected directly into muscle tissue. It is similar to a routine injection. Chemotherapy drugs that are injected into the muscle tissue spread more slowly in the body than those that are given intravenously. Chemotherapy also involves the use of a catheter. A catheter is a tiny plastic tube that is placed in a central vein and remains in place for the duration of the therapy. It offers the advantage that the patient has a device available to receive chemotherapy at all times, thus numerous needle insertions are not required for each treatment. The catheters may be used in individuals with small veins or a limited number of easily accessible veins (The Oral Cancer Foundation, n.d.). The therapy might be used at different times in the treatment process for treatment of oral cavity or oropharyngeal cancers.

Adjuvant chemotherapy

After surgery, patients receive adjuvant chemotherapy, sometimes coupled with radiation treatment. The aim is to eliminate cancer cells that may have been missed during surgery because of their small size. This reduces the likelihood that the cancer will return (American Cancer Society, 2021).

Neoadjuvant or induction chemotherapy

Neoadjuvant or induction chemotherapy is given before surgery. Chemotherapy is sometimes given first, followed by radiotherapy. Sometimes it is given in conjunction with radiotherapy. The aim is to reduce some of the larger tumours so that surgery is easier and less tissue needs to be removed. As a result, there may be fewer significant side effects and complications after surgery (American Cancer Society, 2021).

Chemoradiation

Chemotherapy is sometimes suggested as part of a treatment regimen. Chemotherapy can make your tumor more sensitive to radiation treatment (National Health Services UK, n.d.). It is a treatment that combines radiation and chemotherapy (Memorial Sloan Kettering Cancer Center, n.d.). In addition, chemotherapy itself, with or without radiation treatment, can be used to treat advanced tumours that cannot be surgically removed. The purpose of chemotherapy is to prevent the progression of the cancer and at the same time to help relieve the cancer-related symptoms (American Cancer Society, 2021).

Targeted Drugs Therapy

Targeted cancer drugs work by 'targeting' specific characteristics in cancer cells to promote their growth and survival. In addition, some seek out and destroy cancer cells, while others assist the immune system of the body to attack cancerous cells. This is why some of these medicines are sometimes called immunotherapies (Cancer Research UK, 2018). This therapy can be acquired to treat oral cavity and oropharyngeal cancers by destroying cancer cells or slowing their growth. The side effects of targeted drug therapy are different from those of chemotherapy. It has milder effects in most cases. In addition, the most frequently used method of therapy is taking tablets. Some targeted drugs, for example monoclonal antibodies, suppress cancer cells and can be classified as immunotherapy because they stimulate the immune system (American Cancer Society, 2021).

Cetuximab is a novel form of medicine which is classified as a targeted therapy. It can occasionally replace standard chemotherapy for the treatment of oral cancer. It is also often used in conjunction with radiation because it does not have all the adverse effects of conventional chemotherapy. The medicine targets epidermal growth factor receptors, which are the proteins on the surface of the cancerous cell. By targeting them, it prevents the cancer from growing, as these receptors assist the cancer cell to survive (Gupta & Massagué, 2006, 679-695).

However, according to the National Institute for Health and Care Excellence (NICE), cetuximab is not a cost-effective therapy in most situations. Therefore, it is recommended for patients who are financially stable, have a high tendency to recover, or cannot receive chemotherapy for medical reasons.

The side effects may include skin reactions, which often occur in the first three weeks of treatment. Statistics have shown that approximately 80% of patients who have received cetuximab are affected. In addition, the most common type of skin reaction is an acne-like rash (National Health Services UK, 2019).

Preventions

Preventing high risk behavior that influences oral cancer. First and foremost, avoid using tobacco, either smoked or chewed, as the cells in the mouth contain dangerous cancer-causing chemicals. Moreover, control alcohol consumption in moderation. Excessive alcohol consumption can irritate mouth cancer cells and make them vulnerable to attack. Also, avoiding sun exposure since the UV light can activate HPV (Prevent Cancer Foundation, n.d.). An additional way is visiting the dentist regularly to examine the oral cavity and look for abnormal areas that may be a sign of oral cancer or precancerous changes (Mayo Clinic, 2020).

Besides, some passive preventions can be done. Nowadays, vaccines that prevent HPV virus, which is one of the factors that accelerate the disease, function to prevent cervical cancer. They can also decrease the chance of having oral cancer (Mangalath et al., 2014, 131-138).

Discussion

In our aspect, as the paper mentions above, early observation of symptoms can help minimize the severity and reduce the chance of spreading. Furthermore, the risk factors are mostly involved in our daily lifestyle and behaviours which are often neglected by the majority of patients. From minor abnormalities, it can easily accelerate to a serious disease afterward. As a result, annual oral health check-ups with a specialist should be on a regular basis. This is due to the fact that early stages of oral cancer, which in most cases appear to be harmless tissue, are often found and diagnosed during this process.

Oral cancer to a large extent is a self-induced disease. However, risk factors, which consist of both preventable and non-preventable factors, play a vital role in accelerating the disease. Some of which are recognized as a life-threatening behavior with significant repercussions for oral health for example, alcohol consumption, tobacco and cannabis chewing. Although a vast amount of studies has shown a strong association and considered them as the cause of oral cancer, the exact cause remains controversial. Nonetheless, avoiding the risk factors may be a better option in the long term.

Currently, there are several treatments for oral cancer in which each of them has their own purposes, advantages, along with repercussions. In addition, we strongly believe that with the advancement of technology, the efficacy of the treatment scheme will be optimized to medicate and finally cure oral cancer. Furthermore, some vaccines are recently studied to prevent cancer directly by enforcing the immune system and attacking the cancerous cells. Another way is gene therapy. The method is adding new genes to cancer cells. New genes will make them more receptive to being killed by specific drugs. This method is still being developed at this time. Therefore, it may take years to ensure the efficiency (Mangalath et al., 2014, 131-138).

Conclusion

Oral cancer is regarded as the sixth most common cancer in humans. According to the preceding analysis regarding causes of oral cancer, the most frequent and well-known of which are tobacco smoking. Unfortunately, despite refraining from recognized lifestyle or environmental risk factors, many individuals are diagnosed with oral cancer, where variables such as genetic predisposition are thought to have a causative link. Oral cancer has both physical and mental effects on patients, however, the level of severity varies among different people. Several diagnosis methods can be used to identify tumors. The simplest way is physical examination performed by a doctor, whereas the others require machines or technology to diagnose including biopsy, HPV testing, barium swallow, and ultrasound. Nowadays, treatments can be done manually, technically, and chemically. To elaborate, the tumor can be either surgically removed, treated by radiation, or chemotherapy. Moreover, immunotherapy is considered effective in alleviating oral cancer. However, patients may experience some discomfort or unexpected issue after the treatment. The side effects

could be different and depend on types of treatment that are performed. In order to prevent oral cancer, individuals should avoid the risk factors and maintain a healthy lifestyle.

Limitations

Most sources are based on information from American and British sources. There may be discrepancy in other areas about the process of diagnosis and treatment due to the difference in advancements of technology and specific medical techniques in each country.

Acknowledgements

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