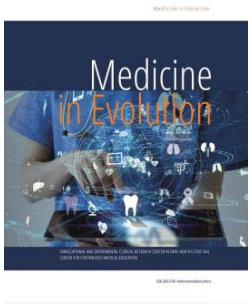
The importance of the anamnesis in the early diagnosis of oral cancer



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Abstract

Cancer, malignant tumor or malignant neoplasm, is the scientific name of the disease that involves the chaotic multiplication of cells, with the potential to invade and / or spread in all body systems. A number of 47 patients with various types of oral lesions were included in this study. The aim of this study was to evaluate two imaging methods in order to identify abnormal changes in soft tissues by fluorescent light emitted by VEL scope Vx and Oral-iD optical systems. The aim was to evaluate the accuracy of the diagnosis, the sensitivity and the specificity of these methods.

Keywords: Carcinogenesis, VELscope Vx, Oral-iD, neoplasm

INTRODUCTION

Carcinogenesis is the gradual process of transforming a normal cell into a cancerous one. In this process there is an acquisition of properties that allow the malignant phenotype an uncontrolled proliferation, local invasion and metastasis.

Over time, a number of theories and hypotheses have been issued that have led to the explanation of the mechanisms of cancer production. They can be grouped into four categories: the theory of genetic mutation; aberrant differentiation theory; viral theory and clonal selection theory: according to which carcinogenesis is the result of the selection of an autonomous cell population, with increased malignancy, which over time becomes predominant [3].

Currently, carcinogenesis is considered a multistage process that begins with the action of a particular carcinogen, includes all the transformations since the appearance of the first neoplastic cells and ends with the death of the host organism. Several exogenous and endogenous factors contribute to the development of the malignant phenotype - genetic, hormonal, metabolic and immunological [4].

Over time, considerable efforts have been made to determine the cause of cancer. Cancer is a monoclonal condition, originating in a first cell altered by progressively accumulated mutations. The frequency of mutations with oncogenic potential increases in the presence of certain factors. These factors can be classified into somatic factors such as uninfluential risk factors, directly dependent on individual genetic baggage (gastric or bronchopulmonary cancer is more common in men while thyroid cancer occurs more often in women) [6] or genetic factors (a number of pathological genes can cause cancer). This is why certain cancers occur more frequently in certain families, the so-called family aggregation. Lifestyle-dependent factors have a high potential for cancer risk for each individual and especially drugs that are undoubtedly the most carcinogenic [7] and last but not least there are the environmental factors, the microorganisms that cause chronic infections with oncogenic potential [8].

Symptoms are elements of subjective diagnosis found by the patient. A detailed history can highlight a number of relevant symptoms in the case of an oncological condition. Clinical signs are objective findings of the physician. A close clinical examination sometimes indicates the presence of tumors, locoregional lymphadenopathy or another sign suggesting the presence of a malignancy [9]. During the anamnesis, the doctor must take into account some peculiarities of oncological diseases. The open-ended questioning technique allows the patient to add new, potentially relevant diagnostic elements [10]. Rapidly progressive dysphagia or significant unprovoked weight loss in recent weeks / months suggests possible cancer [11].

Living and working conditions can also be an important clue in supporting a diagnosis of malignancy [12].

Some general symptoms and clinical signs of cancer are: Anorexia is present in 15-25% of patients with early malignancy and almost all patients in advanced stages have a decrease in appetite and asthenia.

Local symptoms and clinical signs should also be considered for a concrete diagnosis. The palpable tumor formation, with various locations, can raise the suspicion of malignancy. In malignancies, the tumor formation may be due either to the local evolution of the primary tumor or to its loco-regional or distant dissemination. Any tumor accessible to palpation will be documented as accurately as possible in terms of location, size, shape, consistency, mobility, infiltration of adjacent structures or the overlying skin. Most often the malignant tumor is painless, imprecisely delimited and tends to invade the surrounding structures [13].

The presence of an ulcer, either on the skin or on the mucous membranes may be suggestive of a neoplasm, especially if it persists and has no tendency to heal. Very worrying clinical sign if it occurs in the oral cavity. Ulcers can be painless and can escape examination, especially if they are located in the mucous membranes [14].

Hematic externalization in the form of hemoptysis, epistaxis, hematemesis, melena, hematochezia, rectorage, hematuria or meno / metrorrhagia may be the mode of onset or the only form of manifestation of a neoplasm. The presence of a hemorrhage is not pathognomonic for cancers, but its appearance in any of its forms must draw attention to a possible neoplastic condition. Hemorrhage may be secondary to injury to a blood vessel invaded by a tumor or a clotting disorder in malignant haematological diseases [15].

Pain in malignancies usually occurs in the advanced stages of the disease, when the growth of the primary tumor causes compression or invasion of neighboring structures, especially nerve plexuses.

There is a wide variety of signs and symptoms associated with neoplasms, depending on their location and which generally translate into an advanced stage of the disease [16]. Sometimes the primary tumor cannot be identified, with the secondary determination being the only evidence of malignancy. There are some more common sites of metastasis, but dissemination is possible in any other organ or tissue [17]. Palpation of a lymphadenopathy may be the only sign of lymphatic dissemination, but in the case of bulky lymphadenopathy, other symptoms related to compression of the surrounding organs may occur [18].

Despite the fact that the oncologist has at his disposal an increasingly varied range of investigative methods, some of which only raise a suspicion of neoplasia, and others highlight the tumor, the definite diagnosis of malignancy is always histopathological.

Oral cancer is a common disease in our country, this condition affects the population of Romania in proportion of 4%. One of the main causes is the lack of information among the inhabitants about this disease, the superficial treatment of diseases in the oral cavity and the lack of interest in maintaining its health. However, the prevention of this condition is possible. The aim of this study was to evaluate two imaging methods in order to identify abnormal changes in soft tissues by fluorescent light emitted by VEL scope Vx and Oral-iD optical systems. The aim was to evaluate the accuracy of the diagnosis, the sensitivity and the specificity of these methods.

Oral cancer is located in the head and neck and is any cancerous tissue located in the oral cavity. It can appear as a primary lesion originating in any of the tissues of the oral cavity, as a metastasis or as a congenital structure.

Histologically, the types of oral cancer can be: teratoma, adenocarcinoma derived from the minor or major salivary glands, lymphoma or melanoma. 90% of oral cancers are oral squamous cell carcinoma.

Among the main causes of this disease, of which the inhabitants of Romania are not very aware are the following: excessive tobacco and alcohol consumption, contact with Human Papilloma Virus (HPV), poor oral hygiene, chronic irritations of the oral mucosa, untreated atrogenic lesions (such as incorrectly adapted prosthetic works), root debris of fractured teeth, persistent root debris on the arch that maintains infectious processes, incorrect fillings.

As a general symptomatology the patient may present with apathy, unjustified weight loss, cervical lymphadenopathy and odynophagia (pain when swallowing). In contrast, clinically, oral cancer appears as a nodule or ulceration that is initially painless, but which in evolution is associated with pain, difficulty swallowing, and chewing. In the early stages, the cancerous lesion may be leukoplakia or erythroplasia. The most common symptoms include: erythroleukoplasia, erythroplasia with a smooth surface, which usually becomes malignant, persistent inflammation that does not show signs of healing regardless of treatment in the lips or oral cavity, the appearance of one or more cervical nodules.

MATERIAL AND METHODS

A study of 47 patients with various types of oral lesions was included in this study. In addition to the actual clinical examination, there were detailed discussions regarding the appearance of the lesions and the evolution. Following the anamnesis, a number of 37 patients were excluded from the study because their lesions showed no signs of cancerous or precancerous lesions, with a clear and recent cause. Ten patients were assessed by conventional EOC oral examination, followed by direct visual assessment by fluorescence using VEL scope Vx systems, and Oral-iD.

Areas clinically suspicious or with visual loss of fluorescence were further investigated by surgical biopsy. The association between conventional EOC oral examination and direct visual assessment by EDVF fluorescence was analysed and compared with the results of the histopathological examination.

The optical fluorescence diagnostic system emits a blue light, with a wavelength between 400 and 460 nm, which helps to detect abnormalities or various stages of malignancy of oral soft tissues. The method by which the optical system acts on oral soft tissues is a very simple but very effective. The photons in healthy tissues reflect the light emitted by the optical system, so that they become a neon green colour; while the photons in the diseased tissues no longer react to the light stimulus, and because of this they will appear dark in colour. These colour differences can be seen through the VEL scope Vx optical system due to the filters it contains, but at the same time the differences in reaction to the light stimulus can be captured by a camera attached to the optical system. VEL scope Vx technology is recognized by the World Health Organization as the most widely used adjuvant system for improving the visualization of oral mucosal abnormalities, such as precancerous lesions or premalignant dysplasia.

More than 25 million examinations performed with the VEL scope Vx optical system have been performed by over 15,000 dentists in 23 countries. This technology is more supported by clinical trials than any other adjuvant optical system used for tissue fluorescence diagnosis.

The lesions with malignant potential that were observed in patients were examined twice: the first examination consisted of direct visual evaluation by fluorescence, and the second by surgical biopsy. Malignancy was determined at each lesion, only 3 cases presented a high risk. Specificity, sensitivity, negative predictive value and positive predictive value were calculated using the following formulas:

Sensitivity = [true positive/ true positive + false negative)] x 100

Specificity = [true negative/negative + false positive)] x 100

Accuracy = sensitivity + specificity

Predictive value for a positive result (PV +) = [true positive/(true positive + false positive)] x 100

Predictive value for a negative result (PV -) = [negative negative/(negative negative + false negative)] x 100

The recommended use of the VEL scope VX for dentists is as follows:

- careful evaluation, review and documentation of relevant medical and dental history;
- performing a thorough extra-oral and intra-oral examination, both visually and manually, palpating all head and neck structures;
- repeating intra-oral examination using VEL VX purpose and visualizing the oral cavity with the VEL scope handpiece to facilitate visualization of the tissue's natural fluorescence.

When viewed with the VEL scope handpiece, the abnormal tissue normally appears as an irregular, dark area that stands out from the normal, green fluorescent pattern of the surrounding normal tissue. This difference in appearance helps the doctor to differentiate

between healthy mucosa and suspicious areas that may require extra attention. If an abnormal mucocutaneous lesion is suspected, the patient will be scheduled for re-examination in approximately two weeks. If the lesion has not healed after this period, more detailed investigations of the tissue in question should be performed according to the usual standards or the patient should be referred to a specialist.

The technology used by the Oral-iD optical system is based on the same functionality as the VEL scope Vx system. However, the method used is blue (fluorescent) light with a wavelength this time between 435-460 nm.

The device comes with a filter for the mobile phone camera, patient goggles and practitioner goggles. By simply wearing goggles, at the touch of a button, the doctor can notice the difference between healthy and diseased tissues. The technology that Oral-iD uses provides a step ahead of oral cancer. Early detection of oral cancer can improve the chance of successful treatment. This system has been evaluated by 1622 uses by 36 practitioners.

Also, as in the case of the VEL scope Vx optical system, the specificity, sensitivity, negative predictive value and positive predictive value were calculated according to the same formulas, in order to detect its effectiveness. Using the same operating concept, the results were centralized and noted in a table, along with the results of histopathological examinations which show their concordance with the evaluations performed in this study.

Patients underwent conventional oral examination before undergoing direct fluorescence examination. This assessment was performed by palpating and inspecting the tissues of interest, but without omitting the rest of the oral soft tissues. The targeted areas were the following: labial mucosa, jugal mucosa, hard and soft palate, tongue: ventral, dorsal and lateral face, inner lips, buccal vestibule, buccal floor.

After the end of the conventional oral evaluation, the direct visual evaluation by fluorescence was performed. The distance of 5-8 cm between the device and the area of interest was observed. The aim was to identify areas of dark soft tissue. With the help of the digital camera attached to the head of the VEL scope Vx, we were able to capture the problem areas, and the camera of the mobile phone was used in association with the machine Oral-iD.

RESULTS

The two optical systems showed 100% sensitivity, 50% specificity in discriminating normal mucosal carcinoma in situ or invasive carcinoma compared to histopathological examination. The positive predictive value was 88.89%, and the negative predictive value was 100%.

Eight of the ten selected patients who were examined by additional methods, showed a positive result of malignant lesion following the biopsy. This lesion was also suspected by conventional oral examination. Therefore, we can easily realize that the first "free" analysis we can offer the patient, to which we must also pay close attention, is the very objective clinical examination of the oral cavity.

The dentist must be careful, just to be able to observe almost instantly any change in the oral soft tissue; changes in color, texture, volume, shape. The objective diagnosis of a single lesion was not consistent with the objective clinical examination, is one lesion was considered malignant on conventional oral examination but proved to be benign following histopathological examination. Usually, the most uneven, ulcerated lesions, easily observable clinically, do not present as much risk as the least creepy lesions, which unfortunately extend inwards and sometimes go unnoticed. Thus, a past lesion almost unnoticed by conventional oral examination, proved to be malignant, following the biopsy.

Regarding the results of histopathological examinations, in terms of direct visual assessment by fluorescence, they are the same as in the conventional oral examination. Eight patients, out of the ten examined, presented identical results in all examinations performed:

conventional oral examination, direct visual evaluation by fluorescence and histopathological examination. Two lesions, detected by direct visual evaluation by fluorescence were not consistent with histopathological examination. However, with respect to the presumptive correct diagnosis rate, sensitivity and accuracy may be taken into account.

Table 1. Results of histopathological examination

Location of the lesion	Clinical changes	Intensity VFL (Velscope + Oral ID)	Histopathological results
Posterior area of the soft palate near the left posterior amygdala pillar	Moderately erythematous area, poorly delimited with extensive proliferation	Area of visual loss of fluorescence, dark in color, well delimited	Invasive squamous cell carcinoma
Hard and soft palate on the left	Poorly demarcated ulcerative area		
Buccal floor	Moderately erythematous area, poorly delimited		
Lip	Moderately erythematous area, poorly delimited		Moderate epithelial dysplasia
The left dorsal face of the tongue	Slightly erythematous area, poorly delimited	Moderate area of visual loss of fluorescence, poorly delimited	Oral carcinoma with squamous cell carcinoma in situ
Hard and soft palate	Moderately erythematous area, poorly delimited with extensive proliferation	The area of visual loss of fluorescence, dark in color, well delimited	Invasive squamous cell carcinoma
The posterior area of the soft palate near the left posterior amygdala pillar	Moderately ulcerated area poorly delimited		
Lower left gum	Moderately ulcerated area poorly delimited		
Upper gum on the right side, hard and soft palate	Moderately erythematous area, poorly delimited with extensive proliferation		
Upper right gum	Moderately erythematous area, poorly delimited		

CONCLUSIONS

These imaging methods are very promising, they are simple and effective for the early detection of premalignant or malignant lesions, but histopathological examinations cannot yet be replaced. They are extremely useful for clinical examination, monitoring of oral lesions and guiding the biopsy. These methods can be considered to add sensitivity to the examination of oral tissues and may be a real adjunct in high-risk patients.

Following the age categories studied, the typology of patients, the conclusion is that males have a greater predisposition to the development of various types of oral carcinomas, as well as heavy smokers who consume excessive alcohol. Oral hygiene is also a contributing factor to the presence of untreated carious lesions, or overflowing fillings, incorrectly treated, temporary fillings long present in the teeth, incorrect prosthetic restorations, complete edentulism incorrectly repaired, persistent decubitus lesions, allergies to various materials.

It is the duty of every dentist to perform a detailed clinical examination, and where he suspects the existence of a malignant lesion or with the potential for malignancy, to resort to complementary examinations; an early detection has a much better chance of healing than a deep lesion, which can spread to different areas.

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