

Summary

Introduction

Squamous cell carcinoma is the most common neoplasm in the upper gastrointestinal tract. The development of the disease depends on many factors. It most often affects people after the 6th decade of life and exposed to contact with numerous carcinogenic factors. The best known are the effects of smoking, alcohol abuse, hygiene negligence irritating the mucosa, a diet low in nutrients and genetic disorders. The influence of infection with EBV and HPV viruses on the development of neoplasms was also confirmed. The presence of LMP1 and p16 proteins may be a marker of the EBV and HPV infection. Actions against cancer are based on several elements, which include: anti-cancer prophylaxis, early cancer diagnosis and appropriate therapy. It has been proven that the treatment of HPV positive cancers has a better prognosis and enables the use of less invasive methods.

Aims of the study

The aim of the study was to evaluate the frequency of EBV and HPV viruses in patients suffering from OSCC and to evaluate the expression of the viral LMP1 protein for EBV infection and the p16 protein for HPV infection. The relationship between age, gender, smoking, alcohol consumption, oral hygiene quality, place of residence of patients and the location of the neoplasm in the oral cavity and the occurrence of viral infection in patients suffering from squamous cell carcinoma was also assessed.

Material and methods

The material used for the study was a tumor tissue collected from 51 patients treated in the years 2013-2017 at the Clinic of Maxillofacial and Plastic Surgery, archived at the University Center for Pathomorphological Diagnostics and Molecular Genetics of the Medical University of Białystok in the form of paraffin blocks, intended for histopathological examination. Patients' medical records provide information on age, gender, place of residence and contact with potential cancer risk factors, such as tobacco, alcohol, and poor oral hygiene. DNA isolation was performed using a DNA isolation kit from formalin-fixed material stored as paraffin blocks. The ability of the isolated DNA for further studies was checked by amplifying the β -globin cell gene. EBV and HPV prevalence was assessed by using the polymerization chain reaction -

PCR. The expression of p16 and LMP1 proteins was visualized using an immunohistochemical method with specific anti-p16 and anti-LMP antibodies, at the concentration prepared by the manufacturer.

Results

Based on the results, there was no clear correlation between the age of the patients and the increase in susceptibility to viral infection. HPV infection was more common in patients under 45 years of age. In the case of EBV infection, a slightly higher number of patients infected with the virus was found in the 45-90 age group. In the case of HPV, a higher infection outcome was obtained in the group of men compared to the group of women. EBV infection was more common in women. It has been shown that neoplastic disease (OSCC) in non-smoking patients was mostly initiated by EBV and HPV, while in smoking patients a low percentage. The obtained results were statistically significant. Patients with oral squamous cell carcinoma who consumed large amounts of alcohol were mostly infected with EBV or HPV. Half of the non-alcoholic patients were infected with viruses. An increased risk of developing squamous cell carcinoma has been noted in patients with poor oral hygiene, regardless of EBV or HPV infection. Infection with EBV or HPV viruses was shown in slightly more than half of the patients with poor hygiene, while all patients with good hygiene were infected with viruses. No viral infection was found in patients living in a small town. This result was the same in the test group and the control group. The medium size city patients were mostly infected with EBV or HPV. This is confirmed by obtaining significance between place of residence and a positive EBV or HPV result. The tongue and the bottom of the mouth have been shown to be the most common locations of squamous cell carcinoma in the mouth. There was also an increase in viral infection in the above locations compared to the rest of the OSCC oral cavity. Oncogenic proteins were assessed, showing that the p16 protein is an important marker in the assessment of HPV occurrence, and the LMP1 protein in the presence of EBV. There was no correlation with the age and gender of patients, and the presence of the above-mentioned proteins. Most of the non-smoking patients had the p16 protein or the LMP1 protein. The smoking subjects showed the presence of proteins in a small percentage. The result was statistically significant. There was no correlation between the quality of oral hygiene and the presence of p16 and LMP1 proteins. As in the case of viral infection, the presence of proteins was not found among the inhabitants of a small town. Significance was demonstrated between the presence of p16 and LMP1 proteins and the place of residence. More than half of the patients from the medium size

city showed the expression of the p16 protein, and about 36% of the LMP1 protein. No relationship was found between the presence of proteins and the location of the cancer in the oral cavity.

Conclusions

EBV and HPV viruses may be the important factors initiating the process of oncogenesis. The LMP 1 and p16 proteins may be the markers of the presence of EBV and HPV viral infection. Men under 45 years of age who suffer from OSCC are more often infected with HPV. The EBV virus may contribute to the development of cancer among patients after the 5th decade of life, occurring slightly more often in ill women. The incidence of EBV or HPV infection is higher in non-OSCC patients. Excessive alcohol consumption increases the risk of cancer development and the risk of infection by viruses. Chronic inflammation of the mucosa as a result of improper oral hygiene is one of the reasons for the initiation of the carcinogenesis process. OSCC patients with good oral hygiene are more likely to develop EBV or HPV infection. The lifestyle of cancer patients from medium and large cities increases the risk of infection with EBV or HPV viruses. The most common localization of OSCC and the highest concentration of EBV and HPV viruses in the mouth is the tongue and the bottom of the mouth. Oncogenic proteins p16 and LMP 1, confirming viral infection, may contribute to cancer development, especially in non-smoking patients. There was no correlation between the presence of proteins and other examined features.