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OLD AGE AND LESIONS ON THE ORAL MUCOSA STAROŚĆ I ZMIANY CHOROBOWE BŁONY ŚLUZOWEJ JAMY USTNEJ

The oral mucosa reflects the condition of the entire human body. In elderly people there is a higher prevalence of periodontal, and oral mucosal diseases. The substrate for these changes can be local factors/processes (limited to the area of the oral cavity) as well as systemic diseases.

Pathologies observed in the oral cavity are also often a side effect of medications taken, and therapies used (e.g., radiation therapy). Both local factors as well as chronic systemic diseases lead to changes in the oral microflora oral cavity, and also disrupt the body's normal immune response.

The higher prevalence of pathological changes in the oral cavity in the elderly is also strongly associated with the lifestyle of the subjects (malnutrition, lack of physical activity, or coexisting addictions).

The objectives of the study were to present the most common diseases of the oral mucosa, occurring in elderly patients. Internet databases were searched, via: Pubmed, Scopus, Google Scholar, Science Direct, and Springer Link. The following inclusions of publications reviewed were used: Polish and English language, topics related to old age and oral mucosa, and open access availability. The exclusion that was used was clinical trials conducted on animals.

The clinical cases presented indicate that a varied, and properly balanced diet, proper treatment of general diseases, as well as regular visits to the dental office are an effective way to prevent, and properly treat diseases of the oral cavity.

ABSTRACT

KEY WORDS: old age, oral mucosal changes, oral cavity.

Błona śluzowa jamy ustnej odzwierciedla stan całego organizmu człowieka. U osób starszych obserwujemy częstsze występowania chorób przyzębia i błony śluzowej jamy ustnej. Podłożem tych zmian mogą być czynniki/procesy miejscowe (ograniczone do obszaru jamy ustnej) jak również schorzenia ogólnoustrojowe.

Obserwowane w obrębie jamy ustnej patologie niejednokrotnie są także skutkiem ubocznym przyjmowanych leków i stosowanych terapii (np. radioterapia). Zarówno czynniki miejscowe jak również przewlekłe choroby ogólnoustrojowe prowadzą do zmian w mikroflorze jamy ustnej a także zaburzają prawidłową reakcję immunologiczną organizmu.

Częstsze występowanie zmian patologicznych w jamie ustnej u osób starszych jest również silnie powiązane ze stylem życia badanych (niedożywieniem, brakiem aktywności fizycznej czy współistniejącymi nałogami).

Cele pracy było przedstawianie najczęstszych chorób błony śluzowej jamy ustnej, występujących u pacjentów w podeszłym wieku. Przeszukano internetowe bazy danych tj.: Pubmed, Scopus, Google Scholar, Science Direct oraz Springer Link. Zastosowano następujące włączenia przeglądanych publikacji: język polski oraz angielski, tematyka dotycząca wieku podeszłego i błony śluzowej jamy ustnej oraz dostępność open access. Wyłączenie, które zastosowano to badania kliniczne przeprowadzone na zwierzętach.

Zaprezentowane przypadki kliniczne wskazują iż zróżnicowana i odpowiednio zbilansowana dieta, prawidłowe leczenie chorób ogólnych a także regularne wizyty w gabinecie stomatologicznym są skutecznym sposobem profilaktyki i prawidłowego leczenia chorób jamy ustnej.

STRESZCZENIE

SŁOWA KLUCZOWE: podeszły wiek, zmiany błony śluzowej jamy ustnej, jama ustna.

INTRODUCTION

The human oral mucosa is a very important indicator of the health of the whole body. Many of the symptoms of various diseases appear in the oral mucosa, but they may also appear in other parts of the body, or internally (Al-Maskari et al., 2011).

As we get older, the mucous membrane becomes thinner, and less elastic, and there is less saliva production due to the reduced function of the salivary glands. All of this makes the mucous membrane more susceptible to injury, and infection, resulting in conditions such as atrophy of the tongue papillae, ulcerative candidiasis, periodontal inflammation, or the appearance of bad breath. The processes of exfoliation, cell renewal, and programmed cell death ensure cellular homeostasis. (Misra et al., 2016) Furthermore, adverse mucosal changes that negatively affect the mucosa include a higher incidence of systemic diseases such as cardiovascular disease, diabetes, or even medication use (Li et al., 2000). Systemic diseases caused by oral infection (Li et al., 2000).

Weakening of the immune system is another very important aspect of the condition of the mucosa as we age. As we age, the immune system becomes less effective in fighting off pathogens, which significantly increases the risk of oral mucositis, and other health problems (Weyand & Goronzy, 2016).

Oral health is also affected by increased use of various medications. Some medications can contribute to dry mouth, change the composition of saliva produced, or even alter taste sensations. All of these also increase the risk of oral mucosal disease (Zhang et al., 2002).

This article reviews the most commonly reported oral mucosal conditions in older people. These include oral dermatoses, oral candidiasis, lichen planus, leukoplakia, erythroplakia, and oral squamous cell carcinoma. There is also a very strong relationship between the condition of the oral mucosa, and the quality of life of elderly patients.

ORAL MUCOSAL STATUS AND QUALITY OF LIFE IN OLDER PATIENTS

The oral mucosa provides protection against masticatory forces, and other potentially damaging factors. As the oral mucosa ages, changes in the epithelium have been observed, such as decreased mean epithelial thickness, less prominent reticular ridges, decreased cell density, decreased mitotic activity, and slower tissue regeneration, and healing (Cho et al., 2011).

A study by the Graduate School of Medical, and Dental Science, Niigata University, Japan, examined 42 samples of normal, non-diseased oral mucosa from people of different ages (from nine decades of life). The results of the study suggested that morphological differences occurred between the 3 main age groups: 0-20 years, 21-50 years, and over 50 years (Eid et al., 2011). With age, the roundness, and sphericity of the cells that make up the oral mucosa decreases, the cells become flatter, and their size increases. Such changes have little effect on the irregularity of the epithelial connective tissue junction, but may cause changes in the epithelium.

Most of these observations are interpreted as progressive atrophy of the oral mucosa, i.e. a decrease in both epithelial thickness, and cell proliferation with age.

According to Azzolino et al. (2019), in the elderly, the mucosa loses elastic, and resilient fibres, accompanied by thickening of collagen bundles in the connective tissue (Azzolino et al., 2019). Occasionally, epithelial thinning, and loss of keratinisation may occur, making the mucosa vulnerable to injury. There is a decrease in the ratio of ground substance to collagen, a decrease in water content, and a decrease in hyaluronic acid content. These changes are the cause of the loss of immunity, and the consequent susceptibility to inflammatory effects (Khamis et al., 2023).

There have also been studies on sensitivity in the oral cavity. In a study carried out in five age groups, variations in proprioceptive, somatic, and thermal sensitivity were found only in a group of people aged over 80. In these patients, there is a two-point discrimination on the upper lip, lower lip, and cheeks (Calhoun et al., 1992).

The health of oral tissues is a factor that significantly affects basic functions of vital functions such as eating, speech, and interpersonal interactions, which also affect the patient's mental health (Dutkowska et al., 2017). Due to the increasing comfort of life, and thus extending the time for seniors to retain their own teeth, modern dentistry is facing an increasing number of problems related to the treatment of elderly patients (Barc-

zak et al., 2016). In the process of aging, the body undergoes various changes that prevent all metabolic needs from being met. In the oral cavity, among other things, there is a decreased secretion of saliva, and a lower content of digestive enzymes in it, as well as atrophic changes in the oral mucosa, and esophagus (Dutkowsk et al., 2017). The mucosa becomes thinner, and less elastic. As time passes, the resistance of cells to mechanical, and infectious agents decreases. The wound healing process in the oral cavity is hindered, and prolonged. Furrows deepen in the mucous membrane covering the tongue, and taste papillae disappear, causing taste disorders. As a result, the sensation of sweet, and sour taste decreases, and bitter taste increases. Often patients complain of a burning sensation in the mouth, which may be due to reduced saliva secretion. Disorders in water, and mineral metabolism, as well as systemic diseases, and the associated treatment of many medications, lead to reduced secretion, and qualitative changes in saliva. Fibrosis, and steatosis occur in the salivary glands. Less saliva contributes to prolonged wound healing in the oral cavity, which accelerates the development of caries, and periodontal disease, makes it more difficult to eat, and increases oral discomfort.

With age, the epithelial junction between the gingiva, and the tooth surface begins to move toward the root apex, following the root cementum. This phenomenon is known as passive tooth eruption, which manifests itself in the elongation of the clinical crowns of teeth. At the same time, there is atrophy of the alveolar processes, and slow exposure of the tooth necks, and then the roots. This is known as senile periodontal atrophy (Barczak et al., 2016). All the conditions mentioned in the paper affect the well-being of the geriatric patient. Changes in the oral cavity are closely related to the patient's general condition. Therefore, cooperation between a dentist, and a doctor can significantly improve the health of seniors (Bijowski et al., 2021).

ORAL DERMATOSES IN THE ELDERLY

Geriatric patients are particularly susceptible to the most common types of oral dermatoses due to their age. They may be associated with gingivitis, mucosal ulceration, or intact vesicles, and blisters. The most common symptoms of oral dermatoses include epithelial sensitivity, ulceration, erythema from marginal to attached gingiva, and increased bacterial plaque accumulation in the affected areas. These conditions are often associated with extra-oral symptoms, particularly skin symptoms, but may also involve the eyes (conjunctiva, and sclera), nasopharyngeal mucosa, and genitalia (Schifter et al., 2010).

The cause of plaque accumulation is inadequate oral hygiene, which is often overlooked in these areas due to patient discomfort, and differs from plaque-related lesions in that it does not resolve after removal of plaque, tartar, and calculus deposits. Correct and early diagnosis of the disease is crucial, as untreated oral dermatoses may be a factor in the development of malignant neoplasms, and ocular disease, and increase patient mortality (Baykul et al., 2010).

Patients' comfort can be improved by smoothing the surface of fillings, and acute nodules, and by maintaining a high level of oral hygiene. On the other hand, inadequate oral hygiene, and the accumulation of tartar, and bacterial plaque deposits lead to a more severe course of dermatoses.

Examples of immune-mediated oral dermatoses include oral lichen planus, erythema multiforme, oral bullous pemphigoid, pemphigus, and bullous epidermal separation (Parker and MacKelfresh, 2011).

ORAL CANDIDIASIS IN THE ELDERLY

Oral candidiasis is an opportunistic infection caused by fungi of the genus *Candida*. It is very common in older people (Reichart and Philipsen, 2005).

The most common forms are chronic atrophic candidiasis (candidiasis chronica atrophicans), angular cheilitis, chronic pseudomembranous candidiasis (candidiasis pseudomembranacea chronica), and chronic proliferative candidiasis (candidiasis chronica hyperplastica) (Bertolini and Dongari-Bagtzoglou, 2019; Abuhajar et al., 2023).

Chronic atrophic candidiasis most commonly develops under removable prostheses such as full dentures, especially in people who wear them while sleeping (Eisen et al., 2005).

It is characterised by diffuse erythema of the hard palate, epithelial exfoliation, and, in advanced cases, papillary hyperplasia. It is often associated with inflammation of the corners of the mouth (cheilitis angularis), with fissures, and painful lesions in the corners of the mouth (McNamara and Kalmar, 2019).

Causes include poor oral hygiene, poor hygiene of the tear film, nutritional deficiencies, vitamin, and mineral deficiencies, immune problems, diabetes, kidney disease, and cancer, and the use of drugs such as antibiotics, steroids, or cytostatics.

Chronic pseudomembranous candidiasis occurs mainly in elderly people with diabetes, hypoparathyroidism, immune disorders, or after chemotherapy. It manifests as white, diffuse patches resembling curdled milk that, when removed, leave erythema with haemorrhages involving the cheeks, soft palate, and tongue (Akpan and Morgan, 2002).

Chronic atrophic candidiasis is characterised by erythematous, shiny areas, often on the lateral surfaces of the tongue, or on the inner cheeks. These lesions are often painful, and can cause discomfort when eating, or speaking. Factors that increase the risk of this form of candidiasis include chronic stress, poor diet, hormonal imbalances, and a weakened immune system (Abuhajar et al., 2023).

Before making a diagnosis, it is important to make a differential diagnosis with other conditions that have a similar course, and symptoms, such as lichen planus, or tinea corporis.

LICHEN PLANUS IN THE ELDERLY

It is a chronic, mucocutaneous, immune-mediated disease of the oral mucosa. It often affects the elderly, and is more common in women. It affects 1-2% of the general population, with about 15% of cases having skin lesions in addition to mucosal lesions, and 20% of women having genital mucosal lesions. There are six known forms of lichen planus: reticular, erythematous (atrophic), erosive (ulcerative), papular, a rare bullous form, and a plaque form (Gorouhi et al., 2014).

The main manifestations of lichen are white-grey, flat-topped papules that form lacy, linear, tree-shaped patterns, and this is the safer form for the patient. Mucosal lesions with erosions, and bullae, which are long, and difficult to heal, have a poorer prognosis. Lichen planus can also affect the scalp with follicular involvement, and the genital area. Mi L, Zhang H, Zhang D, Zhang M. Lichen planus with multiple system involvement including the mouth, vagina, urethra, and scalp: a case report (Mi et al., 2019).

The disease manifests in a variety of ways, from asymptomatic to painful, burning, sensitive to spicy, salty, and acidic foods. The reticular, papular, and plaque forms, although asymptomatic, are often discovered by chance by the dentist.

Oral lesions are most commonly found in the posterior buccal mucosa, and on the tongue, gums, and lips. It most commonly occurs in the absence of skin lesions. Extensive ulceration of the oral mucosa is also rare. Oral mucosal lesions are multiple, and almost always have a symmetrical distribution. A characteristic feature is the presence of fine white lines (Wickham's striae) radiating from the papules. In some patients the lesions are erythematous, or ulcerated. Different types of lichen may coexist in the same patient (Chaturvedi et al., 2019).

The causes of the different lichenoid lesions are not known, but all lesions are characterised by typical lichenoid tissue reactions. These reactions may be the result of several different possible triggers, but all end in a common pathological process directed by T lymphocytes, and mediated by the immune system, i.e. damage to the basal cells of the oral epithelium (Kamath et al., 2015).

The diagnosis of lichen planus is based solely on the examination of clinical features. A biopsy of the affected oral tissue is indicated. Laboratory tests are indicated in patients on high-dose systemic corticosteroids to exclude underlying infectious diseases that may be reactivated by corticosteroids, e.g. HIV, HBV. It is a chronic condition that requires long-term treatment, and monitoring (Boch et al., 2021). Treatment of the disease includes topical administration of corticosteroids, anti-inflammatory, shielding, and antifungal agents. Corticosteroids can be administered in the form of pastes, ointments, and gels. The basic principle of therapy is to use the lowest potency medication possible. The aim of treatment is not to cure the condition, but to relieve the symptoms. If the gums are affected by lichen planus, the use of additional oral hygiene products such as alcohol-free chlorhexidine rinses may be helpful. In many cases, lichen planus disappears spontaneously, but some patients may experience a cycle of chronic inflammation followed by healing with scarring (Chiang et al., 2018).

LEUKOPLAKIA AND ERYTHROPLAKIA IN THE ELDERLY

They are classified as precancerous lesions. They are most common in senile patients. Their incidence increases after the age of 50, especially in men, and smokers.

Causes of precancerous lesions include mechanical irritation of the oral submucosa, poorly fitting dentures, ionising radiation, chemical agents, especially aromatic hydrocarbons, cadmium, lead, and arsenic compounds. A 10-year study of 142 patients at the University of Murcia in Spain found that smoking, elevated blood glucose, and low-density lipoprotein levels were associated with the risk of oral leukoplakia (Walsh et al., 2021). High blood glucose levels can lead to excessive production of free radicals, which can lead to tumour formation (Chaturvedi et al., 2019).

Leukoplakia can develop in almost any area of the oral mucosa. The most common lesions occur on the buccal mucosa from the corner of the mouth along the line of the teeth. The disease is slow, and chronic. Traditionally, two main types of leukoplakia have been distinguished - homogeneous, and heterogeneous. The homogeneous type is characterised by a thin, flat, whitish appearance. The heterogeneous type is divided into subtypes such as macular, and erythematous, called erythroleukoplakia (Mortazavi et al., 2019).

In the early stages of leukoplakia, there is sensitivity to spicy, and acidic foods, pain, burning, and sometimes dryness of the mouth. In the next stage, flat lesions of various sizes form, slightly protruding above the healthy mucous membrane. In the final stage of the disease, the lesions become diffuse, and thickened, with the appearance of an inflammatory seam called Schwimmer's seam. This is followed by proliferation, rupture, and proliferation of the base (Mortazavi et al., 2019).

Treatment options include observation, possible surgical excision of the lesion, and chemotherapy. Early biopsy is recommended. Untreated leukoplakia lesions develop into cancer in 5-10% of cases (Brouns et al., 2013).

Oral erythroplakia is a rare type of lesion that occurs on the mucosa of the floor of the mouth, the lateral surface of the tongue, the soft palate, and in the triangle of the sinus. It is described as the red counterpart of oral leukoplakia because it is a red coloured lesion. The lesions are oval, or round in shape and have a shiny, granular, or smooth surface. The condition is more common in men.

Although the course of such lesions varies, a significant proportion will develop malignant neoplasia, and should therefore be monitored at short intervals (Chaturvedi et al., 2019; Ali et al., 2020).

Erythroplakia develops neoplasia in more than 40% of cases. It is the most malignant of all pathological lesions of the oral mucosa. It leads to the development of squamous cell carcinoma. Early diagnostic biopsy of such lesions shows epithelial dysplasia (Warnakulasuriya et al., 2020).

In some cases of oral erythroplakia, mutations of the p53 protein with varying degrees of dysplasia may be responsible for its formation. The treatment of choice is surgical treatment (Reichart and Philipsen, 2005).

SQUAMOUS CELL CARCINOMA IN THE ELDERLY

One of the most important factors in the occurrence of squamous cell carcinoma is old age. The likelihood of developing the disease increases particularly after the age of 65, including more often in men. Factors that increase the likelihood of this disease may be poor nutrition, a higher mutation burden, or exposure to carcinogens. Other risk factors in addition to those mentioned above are drinking alcohol, and smoking (Bugshan and Farooq, 2020).

This type of cancer is the second most common cancer of the body, and the most common of all oral cancers, and its incidence is increasing rapidly (Ali et al., 2022).

The lesions most commonly involve the surface of the tongue, and the floor of the mouth.

The most common symptoms are red, or white patches, ulcerations, or an easily injured mass growing exophytically with an ulceration in the centre. Biopsy of such lesions may reveal a number of histopathological abnormalities, including hyperkeratosis, proliferation, and epithelial dysplasia. In prophylaxis against this disease, bi-annual follow-up visits with a thorough examination of the mucous membranes, and lymph nodes of the neck are very important, as emerging lesions are easily overlooked due to the fact that they are often neither painful nor tender. At the time of diagnosis, metastases to the surrounding, or local lymph nodes, or

distant metastases are usually already present. The disease causes significant morbidity, and mortality, especially when diagnosed at a late stage. Studies show that early diagnosis at the precursor stage can improve the prognosis. Stage I oral cancer has a higher incidence of precancerous lesions (9.97%) than stage II, III, and IV oral cancer. Patients diagnosed at stage I have a lower risk of dying. A thorough clinical, and histological examination is required to diagnose squamous cell carcinoma (González-Guevara et al., 2022). Patients diagnosed with squamous cell carcinoma should be referred immediately to appropriate specialists. If the lesion can be removed surgically, they must be referred immediately for surgery, and postoperative radiotherapy (McCord et al., 2021).

In addition, a population-based study of a group of patients aged 65 years, and older in the USA showed that patients with oral squamous cell carcinoma who had previously had leukoplakia had a lower risk of local, or distant spread, and a lower mortality rate than patients with squamous cell carcinoma who had not previously had leukoplakia (Müller, 2018).

There is growing evidence that oral bacteria play an important role in the spread of oral cancer. The best established example is the carcinogenic effect of *Porphyromonas gingivalis* - a key pathogen in chronic periodontitis. This pathogen produces several virulence factors that cause oral infections, such as lipopolysaccharides, and cysteine proteases. *P. gingivalis* uses an immunosuppressive mechanism to protect itself from immune attack by the patient's body (Zhou and Luo, 2019).

CONCLUSION

The above studies show that geriatric patients are more susceptible to oral mucosal diseases. This is because the oral microflora, and histological structure of the tissues change with age. Diseases can also be caused by drugs, therapies, mechanical irritation of the oral mucosa, poorly fitting dentures, ionising radiation, chemical agents, especially aromatic hydrocarbons, cadmium, lead, and arsenic compounds, smoking, increased blood glucose, and low-density lipoproteins in the blood. Correct, and early diagnosis of the disease is crucial, as untreated pathologies can be factors in the development of malignant tumours, and diseases of other organs, and increase mortality in patients. Regular visits to specialists, and good oral hygiene are also important for the patient, as poor hygiene, and tartar, and plaque build-up increase the likelihood of new disease outbreaks. The elderly are at risk of more rapid deterioration, and spread of the pathological stage, in part due to co-morbid systemic diseases, diet, hygiene, and lifestyle, and these patients therefore require special comprehensive treatment by their dentist.

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