APPROACHES TO THE ISSUE OF SCREENING FOR DISEASES OF THE ORAL MUCOSA: A PRESENT VIEW

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Actuality

According to statistical data, the percentage of pathological processes of oral mucosa in the structure of visits to the therapeutic department varies from 0.5 to 0.9% of all initial visits, depending on age [1].

However, in everyday clinical practice, patients seeking dental care for diseases of the mucous membranes present one of the most difficult problems in dentistry due to difficulties in diagnosis and treatment [2]. Therefore, the search for cytological markers-indicators of the individual state of oral mucosa is promising not only for improving the quality of diagnosis and correction of dental status, but also for determining the general somatic health of patients. It has been clinically proven that the mucous membrane is the most accurate indicator for assessing the pathological processes of the digestive tract, the immune status of the body, the general level of activity and proliferation of cellular systems [3].

At a young age, diseases of the oral mucosa develop against the background of decreased salivaion and local tissue resistance, disruption of the processes of differentiation and keratinization of epithelial cells, as well as changes in the microbiocenosis of the mucous membrane [4, 5].

In connection with the above, in the treatment of diseases of the oral mucosa, it is important to include in the complex of diagnostic and preventive measures that are minimally invasive and accessible at a dental appointment and would help accelerate the restoration of the mucous barrier and microcirculation, while having minimal side effects on the body in general and providing the possibility of dynamic observation [6, 7, 8].

The aim of the research

Analyze literary sources for a comprehensive analysis of modern approaches to the issue of screening for diseases of the oral mucosa.

Materials and methods

Review and analysis of scientific and medical literature based on Scopus, Web of Science, MedLine, PubMed, NCBI databases, the study of which does not exceed 5-7 years, including literature reviews and results of clinical studies.

Results of the study and discussion

In recent years, thanks to the practical implementation of the National Programs for the Prevention of Dental Diseases [1], a downward trend has emerged in children, which opens up the prospect of improving the dental health of this age category of patients. However, the prevention program does not actually cover generations of the adult population and in the near future there is no reason to expect a decrease in morbidity among patients aged 25-35 years and older. Moreover, due to the trend of an aging population, special and complex dental care challenges are expected among older adults.

The work of clinicians has shown [9] that changes in the oral mucosa can be of a very specific nature, when the appearance can make a diagnosis and determine treatment tactics. However, in most cases, the diagnosis of diseases manifested by oral mucous membranes is complicated, since the clinical picture is nonspecific and is often aggravated by additional unfavorable local (poor hygiene, trauma, secondary infection) and general (hypovitaminosis, somatic pathology) factors [10]. A detailed clinical examination and additional research methods are required to establish the correct diagnosis.

Diagnosis of most diseases of the oral mucosa is based on a thorough assessment of clinical and laboratory data. The effectiveness of treatment depends on the correct diagnosis. The epithelium of the oral mucosa is a traditional object of cytological studies, which makes it possible to identify the development of pre-tumor and tumor processes, impaired cell differentiation, and infectious lesions [11, 12, 13].
The studies show that cytological analysis of prints from affected areas of the oral mucosa provides valuable information about the morphofunctional state of the mucosa in various lesions [14].

When collecting cytological material, minimally invasive methods of imprinting and reimprinting are usually used. The cytological research method is quite reliable and has a number of advantages over biopsy - it is low-traumatic, easy to obtain material, allows a preliminary diagnosis to be made within 20-30 minutes, and can be used repeatedly to monitor the dynamics of the process and assess the effectiveness of treatment measures [15, 16, 17, 18].

The course of differentiation processes of the oral mucosa epithelium is assessed by cytological examination. According to the cytological classification, in the epithelium of the oral mucosa there are basal, parabasal, intermediate and superficial cells, and in areas that experience keratinization - horny scales. The cellular composition of the epithelium of the oral mucosa is normally dominated by intermediate cells. The maximum level of maturation of the non-keratinized epithelium corresponds to the appearance of surface cells, and the appearance of keratinized epithelium - horny scales. The content of the latter increases sharply with hyperkeratosis [19]. In recent years, methods have been developed for assessing the parameters of oral mucosa epithelial cells using automatic image analysis systems [20, 21].

A change in the nature of epithelial differentiation, which is normal in a certain area of the oral mucosa, indicates local or systemic disorders. The presence of signs of cellular atypia with a high probability indicates the development of pre-tumor and tumor changes in the oral mucosa and in 96% of cases allows reliably diagnosing these diseases using the cytological method [22]. Changes in the differentiation of the epithelium of the oral mucosa may also be a consequence of metabolic and hormonal disorders, the action of mechanical factors and chemicals [23].

In imprints from the mucosa of healthy individuals, only cells of late stages of differentiation are found: single cells of stage III, about 10% of cells of stage IV, about 40% of stage V and 50% of stage VI according to the classification of D. E. Lange.

During inflammatory processes of various origins, less differentiated cells, down to basal ones (stage I), are found in imprints with oral mucosa. With hyperkeratosis, on the contrary, there are more stage VI cells [24].

In lichen planus, cytological examination usually reveals a large number of lymphocytes in the affected area, many activated macrophages, and plasma cells are less common [25].

Analyzing the material of cytological studies for aphthous stomatitis, lymphocytes, neutrophils, polymorphonuclear granulocytes and epithelial cells were found in the fingerprint smears. Moreover, the quantitative and qualitative composition of smears depends on the severity of the disease [26, 27].

Analyzing the literature data, we see that the cytological picture of cellular elements in pathological processes of oral mucosa is characterized by certain features. Cytograms from the lesion, reflecting the dynamics of changes in the mucous membrane during the process of epithelialization, are one of the objective tests for assessing the general condition of the body [28].

Often, the works of different authors provide quantitative data on the ratio of cell types in cytological preparations of the mucous membranes of the oral mucosa, which differ significantly. Such inconsistencies occurred even in cases where the authors used the same classification of epithelial cells and studied similar areas of the oral mucosa. The main reasons for such differences are different methods of fixing smears and subjective assessment of cytograms, as well as gender and age differences not taken into account by predecessors [29].

For this purpose, leading researchers [30], to increase the reliability and comparability of the results of cytological studies, one should turn to quantitative estimates - values that can be measured and expressed through quantitative indicators and, necessarily, in the dynamics of treatment.

For this purpose, leading researchers [31] have proposed various indices: nuclear-pyknotic (percentage of cells with a pyknotic nucleus), keratinization (percentage of anucleate cells), eosinophilic (percentage of cells with eosinophilic-hematoxyphilic cytoplasm) among superficial epithelial cells.

Numerous studies in recent years demonstrate that in the etiology and pathogenesis of a number of pathological processes of oral mucosa, a significant role belongs to the microbial factor, in particular representatives of saprophytic and opportunistic microflora. Most dental diseases do not have a specific pathogen and develop as a result of the proliferation of opportunistic microflora under conditions of a sharp decrease in the natural factors of the body's protective and adaptive reactions [32].

A number of clinical developments have demonstrated that a significant problem of today is the timely diagnosis of dermatoses with an autoimmune component, such as lichen planus and acantholytic pemphigus, at a dental appointment. The difficulty of the diagnostic process is associated with the lack of clear quantitative data on the regional percentages of epithelial cells, taking into account the age and gender of patients, as well as stable cytological landmarks of these diseases at the preclinical stage. In this case, isolated lesions of the oral mucosa account for 30-35% of the total number of cases. Erosive-ulcerative and hyperkeratotic forms of lichen planus are optional precancers with a probability of tumor transformation of 7% [33].

Conclusion

An analytical review of the literature indicates that the mechanisms of disruption of the homeostasis of the oral epithelium are closely related to the processes of regeneration, differentiation and desquamation and play a leading role in the patho-
genesis of diseases of the oral cavity. In recent years, many diagnostic criteria for primary and secondary lesions of the mucous membranes have appeared, the possibility of their clinical use has been studied, but the effectiveness of treatment of diseases of the mucous membranes is still insufficient. There are only a few studies assessing the percentage of normal epithelial cells, but they do not take into account age and gender aspects. Therefore, the study of the processes of differentiation of oral mucosa with an in-depth analysis of the cytological features of various anatomical areas in normal conditions and morphological and cytospecific changes in the presence of an inflammatory process in periodontal tissues is a relevant and promising area of research.

Prospects for further research

In the future, it is planned to study the immunological activity of the oral mucosa in somatic pathology.

Authors’ contributions

The authors confirm their contribution to the work in this way: study concept and design – Bilozetskyi I.I.; data collection – Radchuk V.B.; analysis and interpretation of results – Dzetsiukh T.I., Bilozetskyi I.I.; preparing the manuscript for publication – Radchuk V.B., Dzetsiukh T.I.

All authors reviewed the results and approved the final version of the manuscript.

Conflict of interest

The authors declare no conflict of interest.

References


Summary

Pathological processes in the oral mucosa in the structure of visits to the therapeutic dentistry clinic occupy a significant niche among all initial visits. In this regard, in the treatment of diseases of the oral mucosa, it is important to include in the complex of diagnostic and preventive measures, which would make it possible to diagnose the pathological process at the preclinical stage, and would be characterized by minimally invasiveness, long-term accuracy, ease of use and would help accelerate the recovery of the mucous membrane, and microcirculation, while having minimal side effects on the body as a whole and providing the possibility of dynamic observation.

The purpose of the research is to analyze literature sources in order to comprehensively monitor modern approaches to the issue of screening for diseases of the oral mucosa.

Materials and methods. Review and analysis of scientific and medical literature based on Scopus, Web of Science, MedLine, PubMed, NCBI databases, the study of which does not exceed 5-7 years, including literature reviews and results of clinical studies.

Research results. In a number of nosological units, changes in the oral mucosa are of a specific nature, when the appearance can make a diagnosis and determine treatment tactics. However, in most cases, the diagnosis of diseases manifested in the oral mucosa is complicated, since the clinical picture is nonspecific and is often aggravated by additional unfavorable local factors. The cellular composition from the lesion, reflecting the dynamics of changes in the mucous membrane during its epithelization, is one of the objective tests for assessing the general condition of the body. Therefore, the study of the processes of differentiation of oral mucosa with an in-depth analysis of the cytological features of various anatomical areas in normal conditions and morphological and cytospecific changes in the presence of an inflammatory process in periodontal tissues is a relevant and promising area of research.

Key words: epithelium, oral cavity, mucous membrane, laboratory research.
ПІДХОДИ ДО ПИТАННЯ СКРИНІНГУ ЗАХВОРЮВАНЬ СЛИЗОВОЇ ОБОЛОНКИ ПОРОЖНИНИ РОТА: ПОГЛЯД СЬОГОДЕННЯ

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Резюме
Патологічні процеси на СОРП у структурі звернень у клініку терапевтичної стоматології займають вагому нішу серед усіх первинних відвідувань. У зв'язку з цим, у терапії захворювань СОРП важливе значення має включення в комплекс діагностично-профілактичних заходів, які б дали можливість діагностики патологічного процесу на доклінічній стадії, і характеризувалися мінімізацією дії, доступністю у застосуванні та сприяли б прискоренню відновлення слизового бар’єру і мікроциркуляції, маючи при цьому мінімальний побічний вплив на організм в цілому і забезпечуючи можливість динамічного спостереження.

Метою дослідження є аналіз літературних джерел з метою всебічного моніторингу сучасних підходів до питання скринінгу захворювань слизової оболонки порожнини рота.

Матеріали і методи. Огляд та аналіз наукової та медичної літератури на основі баз даних Scopus, Web of Science, MedLine, PubMed, NCBI, вивчення яких перевищує 5-7 років, включаючи огляди літератури та результати клінічних досліджень.

Результати дослідження. При ряді нозологічних одиниць, зміни на СОРП носять специфічний характер, коли за зовнішнім виглядом можна встановити діагноз та визначити тактику лікування. Однак, у більшості випадків діагностика захворювань, які проявляються на СОРП складністью, оскільки клінічна картина неспеціфічна і часто обтяжена додатковими несприятливими місцевими факторами. Клітинний склад із вогнища ураження, відображає динаміку змін СОРП у процесі його епітелізації, водночас є одним із об’єктивних тестів оцінки загального стану організму. Тому вивчення перебігу процесів диференціації СОРП із поглибленим аналізом цитологічних особливостей різних анатомічних ділянок в нормі та морфологічних і цитоспецифічних змін за наявності запального процесу в тканинах пародонта є актуальним та перспективним напрямком досліджень.

Ключові слова: епітелій, ротова порожніна, слизова оболонка, лабораторне дослідження.