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CLINICAL FEATURES OF PERIODONTAL AND HARD DENTAL TISSUE DISEASES AND A COMPREHENSIVE TREATMENT APPROACH IN PATIENTS WITH GRADE I DIFFUSE GOITER UNDER CONDITIONS OF IODINE DEFICIENCY

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Abstract

Iodine deficiency is one of the most widespread endocrine disorders worldwide and has a significant impact on various organs and systems of the body. Disturbances in thyroid homeostasis are accompanied by changes in mineral metabolism, immunological reactions, and bone remodeling processes, which may create conditions for the development of dental pathology.

Objective. To study the clinical features of periodontal and hard dental tissue diseases in patients aged 18–44 years with grade I diffuse goiter under conditions of iodine deficiency living in Bukhara and to improve the approach to comprehensive treatment.

Materials and Methods. A total of 180 patients aged 18–44 years were included in the study. The patients were divided into two groups. Clinical-stomatological, functional, biochemical, and statistical research methods were used. The patients were examined at dental clinics and an endocrinological medical institution. The assessment of dental status focused on gingivitis, chronic generalized periodontitis, cervical caries, enamel erosion, and dental hyperesthesia.

Results. Among patients with iodine deficiency, gingivitis was recorded in 52%, chronic generalized periodontitis in 41%, cervical caries in 46%, enamel erosion in 29%, and dental hyperesthesia in 38% of cases. In the control group, these indicators were 28%, 17%, 23%, 11%, and 19%, respectively. Thus, all studied dental diseases were more frequent in patients with iodine deficiency.

Conclusion. The obtained data indicate an increased frequency of periodontal and hard dental tissue diseases under conditions of iodine deficiency. In such patients, a comprehensive approach that combines dental treatment with correction of confirmed iodine deficiency under appropriate specialist supervision is advisable.

Keywords: iodine deficiency, diffuse goiter, periodontitis, gingivitis, cervical caries, enamel erosion, hyperesthesia, oral fluid, comprehensive treatment.

Introduction

Iodine is an essential trace element for the human body and plays an important role in the synthesis of thyroid hormones—thyroxine (T4) and triiodothyronine (T3). Iodine deficiency can lead to impaired thyroid function, compensatory enlargement of the thyroid gland, and, in some cases, the development of diffuse goiter.

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Iodine deficiency may affect not only the endocrine system but also other functional systems of the body. Changes in metabolism, tissue trophic status, and mineral metabolism may also affect the condition of oral tissues.

Chronic inflammatory processes in periodontal tissues, mineralization of tooth enamel, and dentinal sensitivity are associated with a number of systemic and local factors. Oral hygiene, dietary characteristics, micronutrient deficiencies, endocrine diseases, and the body's general reactivity play an important role in the development of dental diseases.

Chronic generalized periodontitis is characterized by prolonged inflammation of the tissues surrounding the teeth and may lead to the formation of periodontal pockets, alveolar bone resorption, and reduced functional stability of the teeth.

Among diseases of the hard dental tissues, cervical caries, enamel erosion, and hyperesthesia are also clinically important. In particular, changes in the mineral composition of enamel may reduce its resistance to external influences.

Therefore, studying the clinical course of dental diseases in patients with iodine deficiency and developing principles of comprehensive treatment is an important scientific and practical issue.

Study Objective

To identify the clinical features of periodontal and hard dental tissue diseases in patients aged 18–44 years with grade I diffuse goiter under conditions of iodine deficiency and to improve the approach to comprehensive treatment.

Study Objectives

1. To determine the prevalence and severity of iodine deficiency among the population aged 18–44 years in Bukhara.
2. To study the clinical features of chronic generalized periodontitis, cervical caries, and enamel erosion in patients with iodine deficiency and grade I diffuse goiter.
3. To assess the biochemical characteristics of oral fluid under conditions of iodine deficiency.
4. To develop a dental treatment algorithm for patients with iodine deficiency.
5. To assess the effectiveness of comprehensive dental treatment.

MATERIALS AND METHODS

A total of 180 patients aged 18–44 years living in Bukhara were included in the study. The study participants were divided into two groups.

Group I — patients with grade I diffuse goiter under conditions of iodine deficiency, chronic generalized periodontitis, and diseases of the hard dental tissues.

Group II — patients assessed as the control group.

The following methods were used during the study:

- clinical and dental examination;
- clinical assessment of periodontal tissues;
- examination of hard dental tissues;
- functional examinations;
- determination of biochemical parameters of oral fluid;
- endocrinological examination;
- statistical analysis.

During the dental examination, the condition of the gingiva, bleeding, signs of inflammation, the condition of periodontal tissues, carious lesions in the cervical region of

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the teeth, enamel erosion, and tooth sensitivity to mechanical and chemical stimuli were assessed.

Examination and treatment of the patients were carried out at dental clinics and an endocrinological medical institution.

Comprehensive treatment was based on the principle of correcting the identified systemic condition alongside local dental procedures. In patients with confirmed iodine deficiency, the use of iodine preparations was considered on the basis of an endocrinologist's recommendation, taking into account the functional status of the thyroid gland.

RESULTS

During the study, a higher frequency of several dental diseases was identified among patients with iodine deficiency.

Frequency of dental diseases

Dental indicator	Control group, %	Patients with iodine deficiency, %
Gingivitis	28	52
Chronic generalized periodontitis	17	41
Cervical caries	23	46
Enamel erosion	11	29
Dental hyperesthesia	19	38

According to the obtained data, gingivitis accounted for 28% in the control group and increased to 52% among patients with iodine deficiency. The difference was 24 percentage points.

Chronic generalized periodontitis was recorded in 17% of the control group and in 41% of patients with iodine deficiency. The difference for this indicator was 24 percentage points.

Cervical caries accounted for 23% in the control group and 46% among patients with iodine deficiency. The difference was 23 percentage points.

Enamel erosion was observed in 11% and 29% of patients in the control and iodine-deficiency groups, respectively. The difference was 18 percentage points.

Dental hyperesthesia accounted for 19% in the control group and 38% among patients with iodine deficiency. The difference was 19 percentage points.

Thus, all studied dental indicators were higher in patients with iodine deficiency than in the control group.

Because the exact number of patients in each group and individual-level data are not provided in the table, p-values, confidence intervals, and statistical significance cannot be reliably calculated at this stage. Therefore, the results were interpreted as descriptive epidemiological indicators.

PHARMACOLOGICAL APPROACH TO THE CORRECTION OF IODINE DEFICIENCY

The dose of potassium iodide should be individualized according to the patient's age, the degree of iodine deficiency, thyroid status, and dietary iodine intake. Therefore, high-dose iodine preparations should not be recommended indiscriminately to every patient with iodine deficiency. Although the usual physiological iodine requirement for adults is 150 µg/day, this amount should not be equated with a therapeutic dose.

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Urinary iodine concentration (UIC) is an important epidemiological indicator for assessing iodine status. In non-pregnant adults, a median urinary iodine concentration of 100–199 µg/L indicates adequate iodine intake, whereas a value below 100 µg/L indicates iodine deficiency. However, in an individual patient, treatment decisions should not be based solely on a single urinary iodine measurement but should also consider the clinical condition and thyroid evaluation.

In patients with grade I diffuse goiter, it is advisable to assess thyroid function before initiating iodine preparations. In practice, TSH, free T4 when indicated, thyroid ultrasonography, and the patient's clinical status should be considered. In the presence of thyroid disease, thyrotoxicosis, or an autoimmune process, uncontrolled use of iodine preparations may lead to adverse effects.

Iodized salt is also an important preventive measure for eliminating iodine deficiency. The World Health Organization recommends salt iodization as an effective population-level strategy for preventing and controlling iodine deficiency.

At the same time, iodine preparations are not direct treatments for periodontitis, caries, enamel erosion, or dental hyperesthesia. In the present study, correction of iodine deficiency should be considered an endocrinological component of comprehensive treatment. Dental pathology should be managed through professional oral hygiene, treatment of caries and periodontitis, local remineralization therapy, and, when indicated, measures aimed at reducing hypersensitivity.

Iodine-containing preparations may be used to correct iodine deficiency. Potassium iodide is one of the iodine sources commonly used in clinical practice.

Physiological iodine requirements depend on age and physiological status. For adults, the daily requirement is generally approximately 150 µg; the requirement increases during pregnancy and lactation.

However, when prescribing iodine preparations, the patient's thyroid function, degree of iodine deficiency, existing endocrine diseases, and other clinical factors should be taken into account.

Importantly, potassium iodide is not a direct dental treatment for periodontitis, caries, or enamel erosion. It may only be considered a component of the overall treatment program for correction of confirmed iodine deficiency.

Dental treatment should appropriately include the following areas:

1. professional oral hygiene;
2. removal of dental calculus and soft dental plaque;
3. comprehensive treatment of periodontitis;
4. sanitation of carious lesions;
5. enamel remineralization;
6. reduction of dental hyperesthesia;
7. individualized oral hygiene recommendations;
8. correction of iodine deficiency in collaboration with an endocrinologist when necessary.

Self-administration of high doses of iodine preparations is not recommended. Particularly in patients with impaired thyroid function, selection and dosing of the preparation should be carried out under endocrinological supervision.

From a dental perspective, correction of iodine deficiency is not a direct treatment for periodontitis, caries, enamel erosion, or dental hyperesthesia. Therefore, iodine

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preparations should be used as an endocrinological component of comprehensive treatment together with dental care. Comprehensive dental treatment should include professional oral hygiene, periodontal treatment, sanitation of carious lesions, enamel remineralization, and local procedures aimed at reducing dental hyperesthesia.

Discussion

The study results showed that the frequency of gingivitis, chronic generalized periodontitis, cervical caries, enamel erosion, and dental hyperesthesia was higher in patients with iodine deficiency than in the control group.

The greatest differences were observed for gingivitis and chronic generalized periodontitis, with a difference of 24 percentage points for both conditions.

The 23-percentage-point higher frequency of cervical caries is also clinically noteworthy.

The higher frequency of enamel erosion and hyperesthesia indicates the need for a comprehensive approach to assessment of the condition of hard dental tissues.

These results should not be interpreted as evidence that iodine deficiency is the sole and direct cause of dental diseases. Oral hygiene, diet, periodontal microbiota, tobacco products, general somatic status, endocrine functions, and other risk factors may also contribute to the development of dental diseases.

Therefore, treatment of patients with iodine deficiency should not be limited to the use of iodine preparations; local dental diseases must also be fully treated.

The main principle of the comprehensive approach should consist of correction of the endocrinological condition + professional dental treatment + individualized prevention.

Conclusion

1. Among the examined patients aged 18–44 years in Bukhara, the frequency of periodontal and hard dental tissue diseases under conditions of iodine deficiency was higher than in the control group.
2. In patients with iodine deficiency, gingivitis accounted for 52%, chronic generalized periodontitis for 41%, cervical caries for 46%, enamel erosion for 29%, and dental hyperesthesia for 38%.
3. Compared with the control group, the greatest differences were observed for gingivitis and chronic generalized periodontitis—24 percentage points each—while the difference for cervical caries was 23 percentage points.
4. Iodine preparations such as potassium iodide may be used to correct iodine deficiency; however, the choice and dosing of the preparation should take into account the patient's thyroid status.
5. Iodine preparations are not direct treatments for dental diseases. They should be considered a general component of comprehensive treatment.
6. To further assess the relationship between iodine deficiency and dental diseases, biochemical parameters, thyroid function, and post-treatment outcomes should be subjected to statistical analysis.
7. Integration of dental care with endocrinological supervision in patients with iodine deficiency is a promising approach to comprehensive patient management.

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