


APPLICATION OF SALIVA CRYSTALLOSCOPY METHODS IN THE DIAGNOSIS OF MALIGNANT TUMOURS OF SALIVARY GLANDS AND SJÖGREN DISEASE

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High informational content of saliva crystalloscopy in the diagnostics of the salivary glands tumours was proven; typical symptoms of the Sjögren disease and malignant tumours of the salivary glands were found on the ground of the analysis of the presented research method.

Keywords: Sjögren disease, saliva, salivary glands tumours, saliva microcrystallization, saliva crystalloscopy.

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Introduction. Sjogren disease (SD) – organ-specific autoimmune disease of unknown aetiology, accompanied by the lesions of exocrine glands. Symptoms of xerostomia and xerophthalmia under SD may last for a long time remaining unrecognized, despite of their steady growth. Sjogren syndrome (SS) is expressed in lymphoid infiltration of salivary and lacrimal glands. It occurs in 5-25% of patients with systemic connective tissue diseases, more often with rheumatoid arthritis, less - with systemic lupus erythematosus and other autoimmune diseases.

At the heart of the pathogenic mechanisms of SD/SS there is B-cell hyperactivity, that comes out in lymphoid infiltration of both secreting epithelial glands and other organs and tissues, in the formation of autoantibodies (RF, ANF, Ro / La) and cryoglobulins with monoclonal RF, and also in the development of predominantly B-cell MALT lymphomas in 5-16% of patients [3].

Diagnostics of salivary gland tumours is provided by a range of measures. The main role of these is the clinical analysis of data available to the physician [10].

One of the most notable trends in medicine in recent years is active development and practical implementation of non-invasive methods of diagnostics, defined primarily by the desire to obtain diagnostic information about the most important functions of the body in a “bloodless” way and, if possible, without damage to natural barriers [8].

A number of methods of radiation diagnostics of salivary glands diseases were proposed, but they are not widely used in the clinical practice, because of the frequency of diagnostic errors (19 to 60%) [9].

In recent years the crystallographic research methods of various biological substrates have become more widely used in clinical medicine. The potential of use of these methods is determined by their high informational content, because the nature of crystallization reflects the peculiarities of pathological processes occurring in the body quite reliably [2, 7]. This allows prompt and early diagnosis of diseases using completely safe method, which does not require time-consuming and expensive equipment.

In the available literature, we could not find any information about the use of crystallographic methods for diagnostics of salivary glands tumours, thus the **purpose** of this study was to improve the methods of early diagnostics of lymphoproliferative lesions of the salivary glands in patients with Sjogren disease and malignant tumours using the crystallography and crystalloscopy of saliva.

Materials and methods. We observed 12 patients with the Sjogren disease, 83.3% of which have uncomplicated tumours, and 16.7% - compound. Uncomplicated tumours here are those found on the initial stages of SD/SS development, accompanied by lesions of the gastrointestinal tract (reflux, indigestion, diarrhea,

constipation), respiratory tract (chronic cough, recurrent bronchitis), kidney (proteinuria, tubular acidosis, interstitial nephritis, glomerulonephritis), other organs and systems (cutaneous vasculitis, peripheral neuropathy, lymphadenopathy, fever of non-infectious aetiology, dental caries, ulceration and clouding of the cornea, chronic infectious and ulcerative processes in the oral cavity and sialoadenitis). In most cases (91.6%) parotid salivary glands were affected. Control group was 15 boys-recruitees - healthy men.

Upon hospitalization of patients in rheumatologic department we used conventional diagnostic methods, which included a full clinical and laboratory examination, biopsy and salivary glands puncture followed by morphological examination. According to the goal of the research a crystallographic and crystalloscopic examination of pure saliva was conducted after its collection using the Lashley-Krasnogorsky capsule [11].

To assess microcrystallization of pure saliva a modified methodology of P.A. Leus was used and its three types were determined [5, 6]:

- 1st – per field of vision there are big tree-like crystal formations and drops occupying the entire surface;
- 2nd - prismatic structure in the centre of the drop, as in the first type, but smaller; on the periphery there are irregularly shaped crystals;
- 3rd - throughout the saliva droplets a large number of irregular crystal structures are seen.

For a complete quantitative characteristics of microcrystals we were guided by proposed algorithm [4]. The general background of the agent was studied at low magnification (h40) and microcrystals were studied at an average magnification (X100) [1]. A detailed description of crystalloscopic presentation was studied at high magnification (h400) according to the following criteria: continuity of main body (**Fig. 1**), the connection of the first order sprout with the main body, the nature of branch tops - sharp or rounded (**Fig. 2**), the width of the main body. In addition to the description of microcrystals, organic inclusions were also evaluated (**Fig. 3**): the ratio of their area to the field of view, location (on the periphery, in the centre or around the field); position towards the crystal (sticking or insulation).

Results and discussion. Results and discussion. According to the conclusion

of the histological laboratory all tumours in patients were represented by B-cell MALT lymphomas.

Data analysis of the crystalloscopic picture (**table**) has shown that in individuals with apparently healthy oral cavity there were at least 1-2 kinds of crystals and 13-15 variants of dendritic crystals formed in the saliva; 6 signs of dendritic crystals were always present in crystallogram.

In 60% of patients with the Sjogren disease the 3rd type of crystallogram was noted, and 40% had the 2nd type. This indicates the violation of crystallization properties of saliva in the development of tumours in the salivary glands.

In malignant tumours the 3rd microcrystallization type was determined in 100% of patients. They had the following crystallographic picture of pure saliva: the locations of crystallization centres on the surface of a Petri dish were mostly uniform; the number of

crystallization centres ranged from 8 to 12 and averaged 10. The rays collected in the form of bundles, the number of which reached 8, proceeded from the centre of crystallization. Kinks and sharp thickening of rays of crystals were observed. They became less transparent, in the central part their colour was dark grey, and clearing was closer to the periphery. Rays were deformed by numerous constrictions, interception, which led to their separation and consolidation. Index of average number of crystallization centres is higher in patients compared to crystallograms of healthy persons.

In patients with tumours, short deformed needle-shaped crystals were found on the matted crystallization surface. They had a tendency to crystallization centres, the number of which ranged from 10 to 20. In the centre of crystallization there was a dark-grey mass, in which, even with a significant

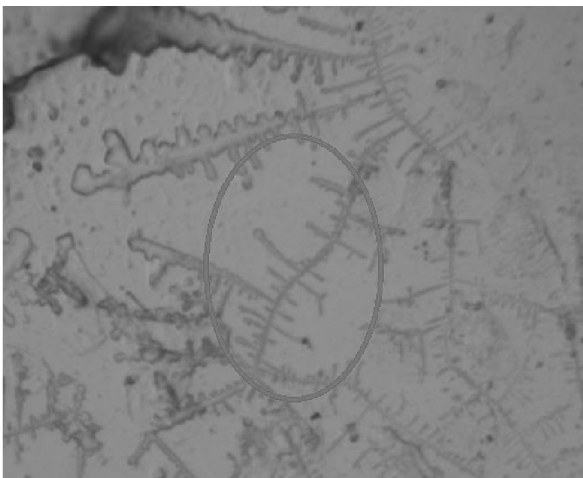
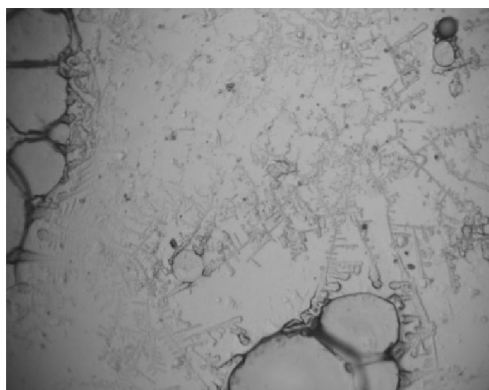


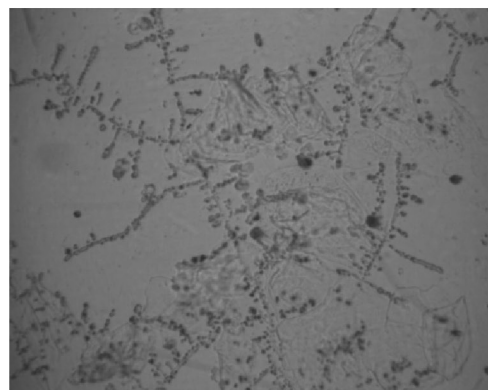
Fig. 1. Continuity of main body



Fig. 2. The nature of branches tops - sharp (left) and rounded (right)



A



B

Fig. 3. Organic inclusions: single (A) and multiple (B)

Crystalloscopic picture of saliva in healthy persons (P.A. Leus criteria) and patients with Sjogren disease and lymphoma

| Structures | Healthy persons | Sjogren disease | Lymphoma |
|----------------------------|-----------------|-----------------|----------|
| Monocrystalline figures | | | |
| Rectangles | 4 | 2 | 1 |
| Prisms | 2 | 0-1 | 0 |
| Pyramids | 1 | 0 | 1 |
| Octahedron | 0 | 1 | 0 |
| Polycrystalline structures | | | |
| Linear | 1 | 2 | 0-1 |
| Rectangles | 0-1 | 1 | 0-1 |
| “Moss” | 2-3 | 0 | 0 |
| “Cross” | 0-1 | 0 | 0 |
| “Horsetai” | 0 | 6 | 5-7 |
| “Rosette” | 0 | 0 | 0 |
| Amorphous bodies | | | |
| Size | Medium | Medium | Small |
| Quantity | Medium | Large | Medium |

increase, it was not possible to find the form of small and large pieces of crystals. This peculiar arrangement of crystals resembled a dark-grey “cruciform” shapes. In the field of crystallization they were located at a considerable distance.

Conclusions. Thus, when comparing crystallographic pictures of saliva of patients with lymphoma and the Sjogren disease, the most characteristic for the first one is the formation of a large number of short and wide needle-shaped crystals and presence of the so-called cruciform shapes. By most criteria in these patients the distinct crystallographic differences of saliva (as compared to healthy individuals) are observed.

Such specific criteria allow us to insist on features of crystallographic characteristics of saliva in lymphoproliferative diseases of salivary glands. The use of crystallography and crystalloscopy of saliva on the early stages of examination of patients with suspected B-lymphoma of salivary gland enables its early diagnostics and differentiation. High research precision and non-invasiveness of this atraumatic method makes it possible to widely use this method in daily work of practicing physicians in outpatient and hospital facilities.

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