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

P.A. Moskalenko, Cand. of Medicine, Assistant
Yu.V. Lakhtin, Dr. of Medicine, Associate Prof.
Sumy State University, Ukraine
A.A. Levkov, Cand. of Medicine, Assistant
Ukrainian Medical Stomatological Academy, Ukraine
Yu.V. Smeyanov, Assistant, Postgraduate Student
Sumy State University, Ukraine

Conference participants,
National championship in scientifi c analytics,
Open European and Asian research analytics championship

A high informational content of saliva crystalloscopy in the diagnosis of salivary glands tumours was proven; typical symptoms of Sjogren disease and malignant tumours of the salivary glands were found on the ground of the analysis of the presented research method.

Keywords: *Sjogren disease, saliva, salivary glands tumours, saliva microcrystallization, saliva crystalloscopy.*

Introduction. Sjogren disease (SD) – organ-specifi c 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) expresses in lymphoid infi ltration of salivary and lacrimal glands, which 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 is B-cell hyperactivity, that comes out in lymphoid infi ltration 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 which is in clinical analysis of available to the physician data [10].

One of the most notable trends in medicine in recent years is an active development and implementation in practice of noninvasive methods of diagnosis, defi ned primarily by the desire to obtain diagnostic information about the most important functions of the body by "bloodless" way and, if possible, without damage of natural barriers [8].

A number of methods of radiation diagnosis of salivary glands diseases were proposed, but they are not widely used in the clinic, because the frequency of diagnostic errors is 19 to 60% [9].

In recent years in clinical medicine the crystallographic research methods of various biological substrates become more widely used. The perspective of these methods use is determined by their high informational content, because the nature of crystallization

refl ects quite reliably the peculiarities of pathological processes that occur in the body [2, 7]. This allows prompt and early diagnosis
of diseases using completely safe method that does not require time-consuming and expensive equipment.
In the available literature, we could not fi nd information on using crystallographic methods for diagnosis of salivary glands
tumours, thus the **purpose** of the study was to improve the methods of early diagnosis of lymphoproliferative lesions of the salivary
glands of patients with Sjogren disease and malignant tumours using crystallography and crystalloscopy of saliva.

Materials and methods. We observed 12 patients with Sjogren disease, 83.3 % of which have uncomplicated tumours, and 16.7%
- compound. We refer to uncomplicated the tumours that was found on the initial stages of SD/SS development, accompanied by
lesions of the gastrointestinal tract (refl ux, 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.
On patients hospitalization 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 with a Leshle-
Krasnogorskyi capsule [11].
To assess a microcrystallization of pure saliva a modifi ed methodology of P.A. Leus was used and its three types were determined
[5, 6]:
1st – per fi eld 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 fi rst 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 guided by proposed algorithm [4]. The general background of
the agent was studied at low magnifi cation (h40) and microcrystals -was studied at an average magnifi cation (X100) [1]. A detailed
description of crystalloscopic presentation was studied at high magnifi cation (h400) according to the following criteria: continuity of
main body (**Fig. 1**), the connection of the fi rst order sprout with the main body, the nature of branches tops - sharp or rounded (**Fig. 2**),
the width of the main body. Besides the description of microcrystals, organic inclusions were also evaluated (**Fig. 3**): the ratio of their
area to the fi eld of view, location (on the periphery, in the centre or around the fi eld); position towards a crystal (sticking or insulation).

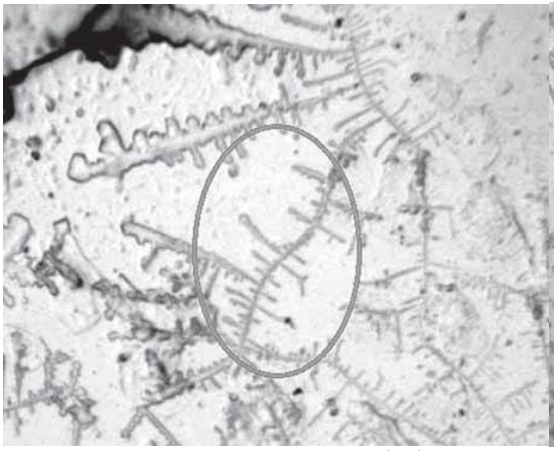
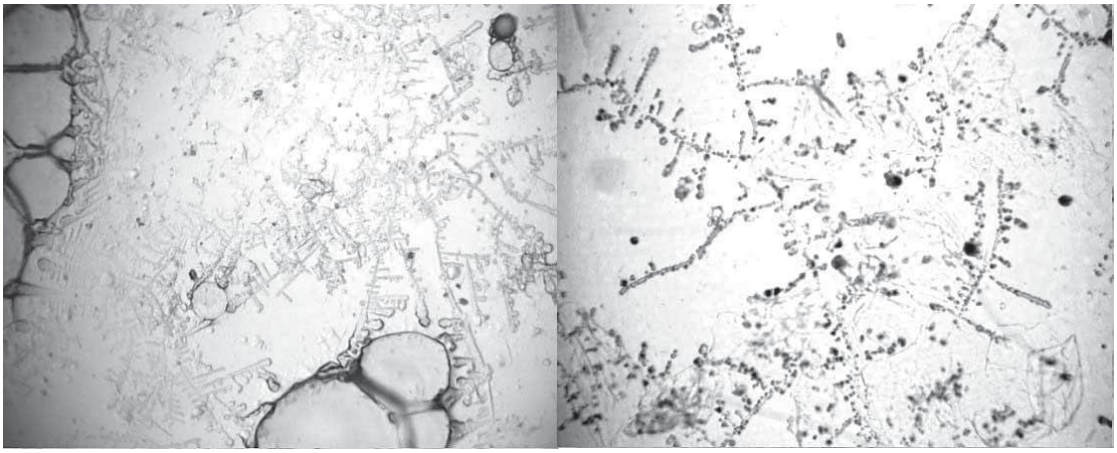


Fig. 1. Continuity of main body

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



A B

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

Results and discussion. According to the conclusion of histological laboratory all tumour in patients were represented by B-cell
MALT lymphomas.

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

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

In malignant tumours the 3rd type microcrystallization was determined in 100% of patients. They had the following crystallographic
picture of pure saliva: the location 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. Rays collected in the form of bundles, the number of which reached 8,
proceeded from the centre of crystallization. Kinks and sharp thickening of crystals rays were observed. They become less transparent,
in the central part their colour was dark gray, 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, on the matted crystallization surface a short needle deformed shape crystals were found. They had a
tendency to crystallization centres, whose number ranged from 10 to 20. In the centre of crystallization there was a dark-gray mass,
in which, even with a signifi cant increase, it was not possible to fi nd the form of small and large pieces of crystals. This peculiar
arrangement of crystals resembled a dark-gray "cruciform" shapes. In the fi eld of crystallization they were located at a considerable
distance.

Tab. 1.

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 fi gures			
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

Conclusions. Thus, when comparing saliva crystallographic pictures of patients with lymphoma and Sjogren disease, the most
characteristic for the fi rst one is the formation of a large number of short and wide needle-shape crystals and the presence of socalled
cruciform shapes. By most criteria in these patients the distinct crystallographic differences of saliva, compared with healthy
individuals, are observed.
Such specifi c criteria enable 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 the examination of
patients with suspected B-lymphoma of salivary gland enables its early diagnosis and differentiation. High research precision,
noninvasiveness of this atraumatic method makes possible its wide application in daily work of practicing physicians in
outpatient and hospital facilities.

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