

# Possibilities of ultrasonography for the establishing of the causes of inflammation of the parotid-masseteric area

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**European Journal  
of Medical Technologies**

2018; 1(18): 7-11

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www.medical-technologies.eu  
Published online 09.05.2018

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## ABSTRACT

Inflammatory diseases diagnosed in the 25 - 30% of all dental pathologies. About 90% of patients treated in outpatient treatment in the dental clinic complaining of various odontogenic and nonodontogenic inflammation of maxillofacial area (MFA). Among which, according to different authors, 30-40% accounted for inflammation of the parotid-masseteric area (PMA).

The analysis of ultrasonographic studies of 125 patients aged from 18 to 85 years for the period from 2013 to 2015, which were directed on the cause of inflammation PMA. Patients were divided into groups: the first group consisted of 56 patients with inflammatory changes in lymph nodes; the second group included 38 patients with sialoadenitis; the third group – 9 patients with sialodohitis; the fourth group comprises 2 patients with venous dysplasia PMA; fifth group – 2 patients with inflammation of the masticatory muscles.

## Key words:

inflammation,  
lymphadenitis,  
parotid-masseteric  
area, salivary glands,  
sialoadenitis,  
ultrasonography

Inflammation in lymph nodes were found in 56 cases (52.3%). Sialoadenitis (mumps)– 38 (35.5%) patients. In 9 cases (8.4%) were found widening of the excretory duct of one of the parotid glands with concomitant inflammation of the parotid gland in 6 cases. Using of ultrasound significantly improves the accuracy of diagnosis of inflammatory diseases of parotid-masseteric areas.

## Introduction

Inflammatory diseases of soft tissues of the face and neck are found in 25-30% of ambulatory patients. Of these, according to various authors, up to 30-40% accounts for the proportion of inflammatory processes of the parotid-masseteric area (PMA).

At first glance it seems natural that sialoadenitis of the parotid gland (parotitis) is the most prevalent nosology of this anatomical site. But our experience of using ultrasonography simplifies these imaginations. Among the literature available for radiographic diagnosis available to us, the number of publications related to the examination of the face and the upper parts of the neck ultrasonography (USG) is very limited. Most of the sources are devoted to oncology issues, which is quite logical, due to the relevance of this problem. Only in several articles raised the question of differential diagnosis of tumors and inflammatory diseases of parotid glands [1-4]. Taking into account the similarity of clinical manifestations (complex of symptoms, anamnestic data) of inflammatory diseases, the physician faces the task of recognizing the true cause of the disease. Therefore, the analysis of our observations, we conducted not on nosological forms, but on the basis of clinical manifestations, namely, the presence of inflammatory process in the parotid-chewy area.

## Material and methods of the study

The analysis of ultrasonographic studies of 125 patients aged 18 to 85 years from 2013 to 2015, which were directed at identifying the causes of PMA inflammation, was performed. All patients included in the main group had clinical signs of PMA inflammation of varying degrees of severity. Subsequently, patients

were divided into groups: the 1st group consisted of 56 patients with inflammatory changes in the lymph nodes (serous lymphadenitis, purulent lymphadenitis, periadenitis, inflammatory hyperplasia of the lymph nodes); the 2nd group included 38 patients with sialoadenitis (acute parenchymal and interstitial mumps, chronic parenchymal mumps); the 3rd group is represented by 9 patients with sialodohitis; the 4th group is represented by 2 patients with venous dysplasia PMA; the 5th group – 2 patients with inflammation of chewing muscle.

Ultrasound studies were performed on the Logiq E machine (General Electric, USA). USG was performed in B mode using additional samples (compression and Valsalvi). In case of suspected vascular formation, Doppler methods of blood flow mapping were used. Transmitters with a frequency of 13.0-7.5 MHz and an aperture of 35-50 mm are optimal for PMA examination. The results of USG studies were verified later or by data of surgical intervention, or by puncture biopsy, or confirmation of the dynamics of the disease.

## Results of research

Distribution of patients with inflammatory diseases of PMA for nosological forms is presented in Table 1. From the table, it is seen that inflammatory changes of the lymph nodes - from reactive hyperplasia of the lymph nodes to various variants of lymphadenitis - are common among inflammatory diseases of PMA.

This is explained by the fact that the lymph nodes of the PMA are the lymph collector from the surface tissues of the homolateral half of the face, the temporal and thymus regions, the upper lateral sections of the neck, the outer ear, the conjunctiva, the oral mucosa, and the teeth of the upper jaw. At the same time, the overwhelming majority of lymph nodes are

Nosological form	Quantity of patients	% from general amount (% in group)
Inflammation of lymph nodes	56	52,3
Serous lymphadenitis	21	19,6 (37,5)
Purulent lymphadenitis	5	4,7 (8,9)
Periadenitis	6	5,6 (10,7)
Inflammation hyperplasia lymphnodes	24	22,4(42,9)
Parotitis	38	35,5
Acute parenchymal	5	4,7 (13,2)
Acute interstitial	11	10,3 (28,9)
Chronic	22	20,5 (57,9)
Sialodohitis	9	8,4
Venous dysplasia PMA	2	1,9
Inflammation of masetter	2	1,9
Total	107	100,0

located in the intestine of the parotid gland. This can be explained by the fact that inflammatory changes in these lymph nodes can be misinterpreted as inflammation of the parenchyma of the parotid gland. As soon as possible, a differential diagnosis is necessary, due to the fact that, depending on the stage of lymphadenitis (serous or purulent), the treatment tactics is defined - respectively therapeutic or surgical; in turn, with sialoadenitis, treatment is always therapeutic.

Among the examined patients, inflammatory changes in the lymph nodes were detected in 56 cases (52.3%). In most of them, 24 (42.9% of this group) cases have been diagnosed with inflammatory hyperplasia of the lymph nodes of the parotid gland (Fig. 1).

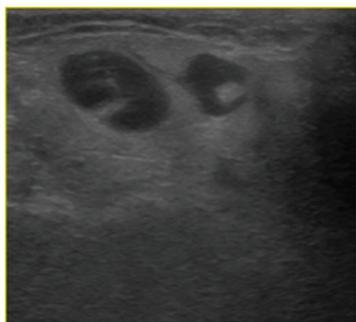


Fig. 1.

This condition occurs when the infection of a node in it increases the number of mature cells of the lymphoid series - develops compensatory hypertrophy of the lymph node to provide its barrier function. Such an option to increase lymph nodes is often accompanied by their moderate pain, which is quite logically treated as lymphadenitis.

In 21 patients (37.5% in this group), the patient was diagnosed with acute serous lymphadenitis (Fig. 2). Subsequently, in 5 of these, serous lymphadenitis became purulent with the formation of an abscess of the parotid gland. Purulent lymphadenitis at the initial treatment was found in 5 patients (8.9% in this group) (Figure 3). Lymphadenitis with periadenitis

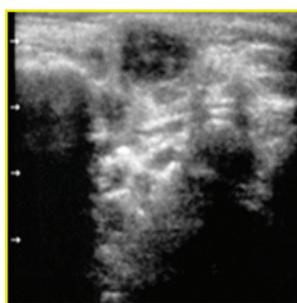


Fig. 2.

was diagnosed in 6 (10.7% in this group) of primary patients (Fig. 4).

Second place in frequency after inflammatory changes of lymph nodes was sialoadenitis (mumps) – 38 (35.5%) patients. Most cases in this group were cases of exacerbation of chronic parenchymal sialoadenitis - 22 (57.9% in this group) of patients. With acute parenchymal parotitis, 5 (13.2% in this group) of patients with acute interstitial mumps were detected - 11 (28.9% in this group). The ultrasonographic parenchymal parotitis was characterized by an increase in the size of the parotid gland and a decrease in its echogenicity; The degree of these signs depends on the severity of the inflammatory process.

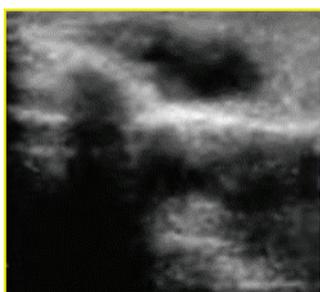
In the chronic course of the process in the gland visualized heavy structures of high echogenicity, which is a sign of proliferation of fibrous tissue in the parenchyma of the gland, the consolidation of inter-adjointing walls, walls of vessels and ducts. The above combination of echographic signs is characteristic of chronic parenchymal mumps (Fig. 5).

For acute viral (interstitial) sialadenitis, an enlargement of the gland is characteristic, which does not correlate with the degree of reduction of the echogenicity of the gland, which is caused by damage to the interstitial, and not parenchyma of the gland.

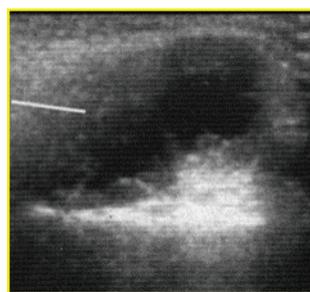
Therefore, we observe the echography of an increase in the size of the gland, practically with the unchanged echogenicity of the gland itself (Fig. 6).

In 9 (8.4%) cases, the expansion of the ducts of one of the parotid glands with concomitant inflammation of the parotid gland in 6 cases was detected. Stomatitis is diagnosed in all 6 patients in whom concomitant parenchymal mumps has been diagnosed. In 2 cases when in the presence of an expanded duct, no changes in the side of the gland were detected, the professional sialodychitis was diagnosed – one patient was a bladder and one professional trumpeter (Fig. 7).

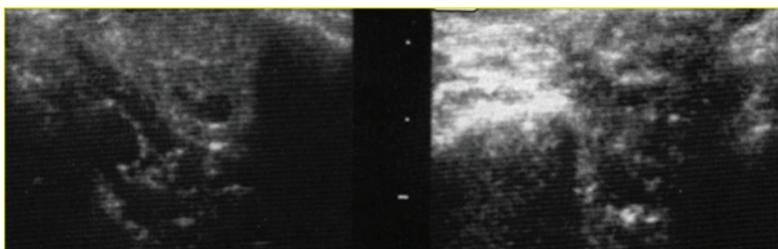
One patient has 80 years of bilateral extension of the parental ducts of the parotid glands without significant structural changes from the side of both parotid glands. In 2 patients (1.9%), arteriovenous dysplasia was observed, which was accompanied by persistent swelling, and patients were referred in connection with the association of the pain symptom. The differential diagnosis of parotitis was performed by the USG method; in one case, a thrombus of dysplastically altered veins was detected (Fig. 8).



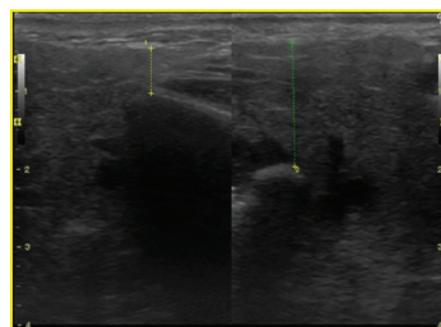
**Fig. 3.**



**Fig. 4.**



**Fig. 5.**



**Fig. 6.**

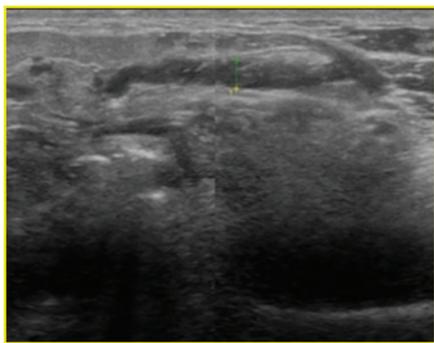


Fig. 7.

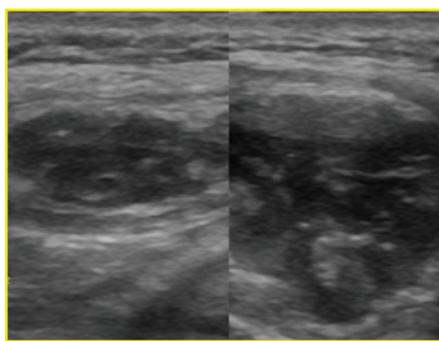


Fig. 8.

In 2 (1.9%) patients with suspected acute parotitis, we found an inflammatory process in the masticatory muscle, which was treated as inflammatory infiltrates.

## Discussion

The use of ultrasonography significantly increases the accuracy of the diagnosis of inflammatory diseases of the PMA. Repeated ultrasound studies provide an opportunity to trace the evolution of the pathological process, which is important for the adequate planning of treatment tactics and the evaluation of the effectiveness of the treatment. USG study allows to accurately determine individual topographic and anatomical features of the pathological process, which is important in the planning of surgical interventions. All of the above suggests that the USG method is an important component of the entire diagnostic algorithm in patients undergoing inflammatory diseases of the parotid chewing area.

## Acknowledgements

Great acknowledgement to chief of Department of radiological diagnostics prof. Ivaniv J. and associate professor, PhD Kucher A. as a chief of private ultrasound clinic, where USG investigation was performed.

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