ECRONICON OPEN ACCESS

EC NEUROLOGY
Case Study

A Neurophysiological Method in Diagnostics of Pterygopalatine Ganglionitis

Shershever A[1]* and Samokhvalov D[2]

[1]*Sverdlovsk Regional Oncology Dispensary, Russia*

[2]*City Railway Hospital. Yekaterinburg, Russia*

***Corresponding Author:** Shershever A, Sverdlovsk Regional Oncology Dispensary, Russia.

Received: August 28, 2020; **Published:** October 29, 2020

Abstract

The study recruited 83 patients in the study group and 24 healthy people aged 20 - 67 years in the control group. The respondents were examined using thermal imaging examination to measure the changes in the facial skin temperature on the side of the affected autonomic ganglion, which was related to the peripheral vasomotor and sudomotor disorders. The examination was conducted with the TV-04 KST thermal imager at a constant air temperature of 19 - 21ºC and humidity of 60-75%. Temperature measurement on the affected side was 35.25°C, which was 1.40°C higher than the temperature of the surrounding tissues. Thermography confirmed the pathological state of the affected pterygopalatine ganglion. After comprehensive treatment of pterygopalatine ganglionitis, the skin temperature decreased from 34.9 ± 1.1°C to 33.9 ± 1.2°C ($p < 0.05$) in the study group compared with the control group - 34, 0 ± 1.1°C.

Keywords: *Ganglionitis; Autonomic Pterygopalatine Ganglion; Slader's Syndrome; Herpes Simplex Virus; Thermal Imaging; Thermal Imaging Examination*

Introduction

Autonomic pterygopalatine ganglionitis is one of the most common reasons of fascial pains, also called Slader syndrome [1,5,6]. The literature data on the role of viral infection, as well as diverse neurological symptoms in the clinical picture [3,4,7,11] are insufficient and underexplored. In particular, there are no detailed results of comprehensive examination of patients using both electrophysiological, serological and immunological methods.

Case Study and Discussion

The objective of the study was to reveal neurophysiological changes in the parasympathetic ganglion in viral pterygopalatine ganglionitis by thermal imaging.

The diagnosis of diseases accompanied by neurological symptoms of the facial area is extremely difficult.

The main complaints were unbearable, burning constant pain in the upper jaw with some pain attacks in the nasal bridge and medial corner of the eye on the affected side in PPG, irradiating to the temple, ear, lower jaw, soft and hard palate, neck, shoulder blade, shoulder, and forearm. The duration of the pain attacks ranged from several minutes, which was extremely rare, to several hours, and sometimes several days. The intensity of pain varied, however, in most cases it was so high that the patients were unable to work. Particularly severe pains were noted at nights. According to our observations and literature data, in two thirds of patients with Slader's syndrome, dull pains in the region of nasal bridge and in the depth of the eye persisted between acute pain attacks [12,13].

All patients underwent a complex clinical and laboratory examination: taking a medical history, physical examination, CBC, urine test, biochemistry, enzyme-linked immunosorbent assay - ELISA to detect antibodies to herpes simplex virus, and cytomegalovirus were made. Imaging methods included X-ray of the paranasal sinuses, orthopantomography, CT of the facial bones and paranasal sinuses, brain MRI. To diagnose the disorders of the pterygopalatine autonomic ganglion, thermal imaging examination of the facial skin was also carried out.

On examination, the patients showed slight asymmetry of the face due to edema of the soft tissues of the infraorbital and buccal regions, as well as hyperemia of the skin on the side of the affected autonomic ganglion.

With palpation, a painful area was determined in the projection of the affected ganglion behind the maxillary tuberosity. Then, a thorough examination of the maxillofacial region, and dentoalveolar system was performed to rule out acute inflammatory diseases, oncological diseases and traumatic injury to the affected region.

To identify the cause of the disease, all patients had serological blood tests to detect HSV and CMV antibodies. The laboratory tests: CBC and immune tests were also carried out.

X-ray of the paranasal sinuses in a half-axial projection was performed in 28 (33.7%) of 83 patients. No abnormalities of the paranasal sinuses were found in the groups (Figure 1).

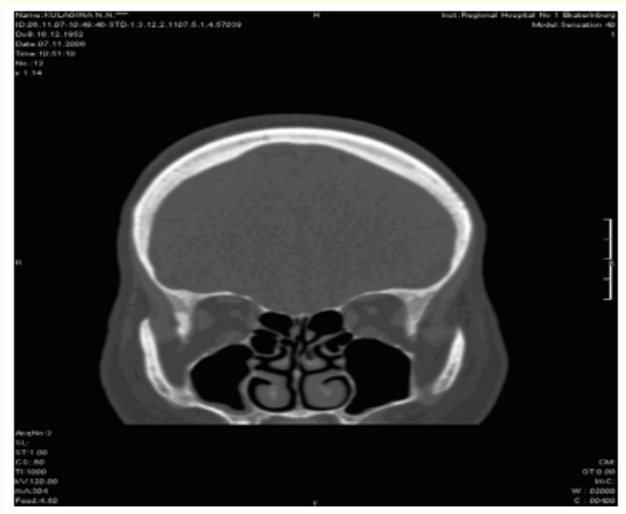

Figure 1: *CT scan of the paranasal sinuses: axial section. Nothing abnormal detected (NAD).*

All patients of the study group (n = 83) and the control group (n = 24) were examined using thermal imaging examination to measure the changes in the facial skin temperature on the side of both affected and unaffected autonomic ganglion, which could be related to peripheral vasomotor and sudomotor disorders [2,8,9,10,11]. Thermal imaging of the facial skin was carried out with a TV-04 KST thermal imager manufactured by the Nizhny Novgorod Radio Equipment Plant in a specially equipped room with a constant air temperature of 19-21ºC, at humidity of 60 - 75%.

We used a remote thermal imaging examination, which recorded the thermal infrared emission of the facial skin. Thermal imaging examination revealed the functions of the autonomic nervous system, the symmetry of the infrared emission which depended on the temperature of the studied skin areas and controlled by the pterygopalatine parasympathetic ganglion. The TV-04 KST thermal imager could measure the skin temperature with an accuracy of 0.05ºC. Abnormal thermal asymmetry was characterized by a temperature rise above the physiological thermal asymmetry values for a given area.

The results of the thermal imaging were compared with medical history data, physical examination, and laboratory and imaging data.

Thermal imaging examination was performed in order to measure the facial skin temperature, as well as autonomic functions of the parasympathetic ganglion before and after the treatment: one month and one year after medical treatment. A total of 284 measurements were carried out.

Thermal imaging examination carried out in the control group (n = 24) revealed that the temperature on the right and left was 34.1 ± 1.1°C; $p < 0.05$.

The presented thermograms showed that in the control group, the luminescence of the facial skin areas was symmetric with pale blue and green color in the center (Figure 2 and 3).

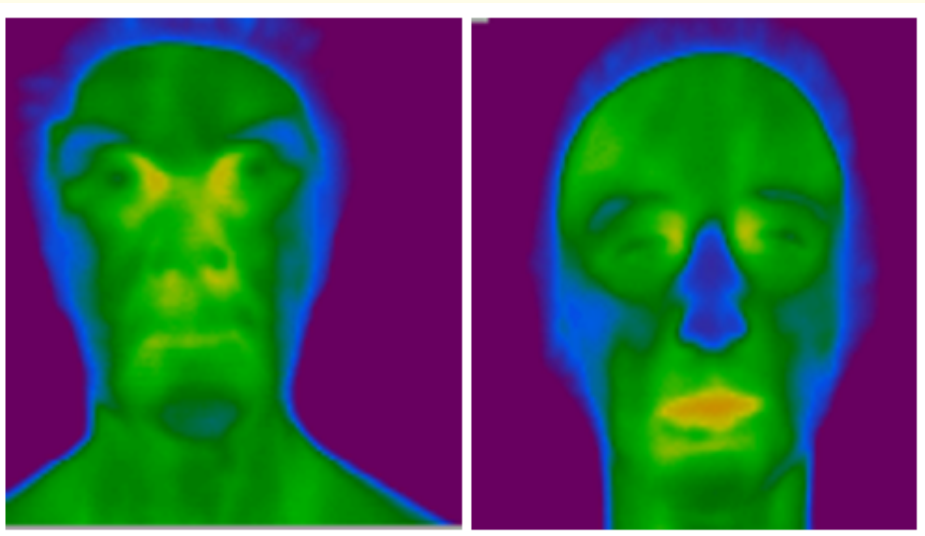

Figure 2 and 3: *Thermal imaging examination of the facial skin in the control group. Nothing abnormal detected (NAD).*

In patients with autonomic ganglionitis of the head, the areas of increased luminescence intensity (bright red) were determined. Such a thermal picture was obtained due to functional impairment of blood flow, the intensity of metabolism in the affected areas (Figure 4 and 5).

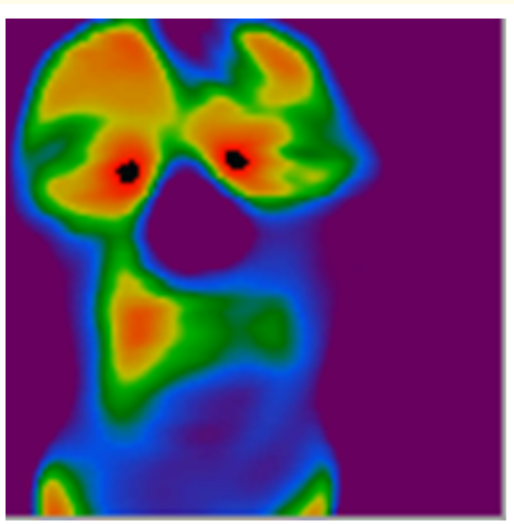

Figure 4: *Thermal imaging examination in ganglionitis of the right pterygopalatine ganglion.*

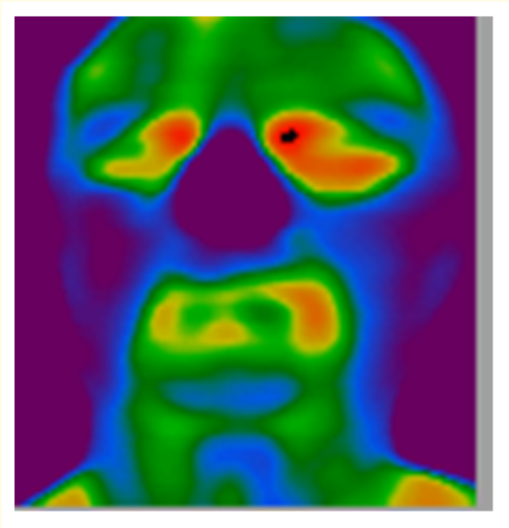

Figure 5: *Thermal imaging examination in ganglionitis of the left pterygoid ganglion.*

Abnormal thermal asymmetry is characterized by a temperature rise above the physiological thermal asymmetry values for a given area.

On the unaffected side, the temperature was within normal limits - 34.0°C ± 1.2°C ($p < 0.05$), the temperature in patients with pterygopalatine ganglionitis was 35.1°C ± 1.2°C ($p < 0.05$), i.e. above the normal limits. Thus, in the study group with clinical manifestations of pterygopalatine ganglionitis, changes in thermal imaging in the infraorbital regions were found. It was interesting to compare the severity of thermal imaging changes and intensity of pain syndrome in patients with ganglionitis: with an increase in pain intensity, an increase in temperature asymmetry was observed. This tendency was especially evident in patients with severe pain, and thermal asymmetry in the infraorbital areas reached a difference of 1.2 - 2.6°C.

The onset of thermal asymmetry was also associated with autonomic vascular disorders. It could be assumed that autonomic trophic disorders were the main cause of thermal asymmetry, resulted from the changes in the parasympathetic ganglion. The areas of hyperthermia were clearly localized and related to the innervated areas. Reflex vasodilation of the peripheral vessels and muscle relaxation occurred with damage to the autonomic ganglion.

The results of the thermal imaging examination were compared with medical history data, physical examination, laboratory and imaging data.

Thermal imaging examination revealed the functions of the autonomic nervous system. The symmetry of the infrared emission was determined, which depended on the temperature of the studied skin areas and controlled by the pterygopalatine parasympathetic ganglion.

Temperature measurement on the affected side was 35.25°C, which was 1.40°C higher than the temperature of the surrounding tissues. Thermal imaging examination confirmed the pathological state of the pterygopalatine ganglion. After a comprehensive treatment for pterygopalatine ganglionitis, the skin temperature was decreased from 34.9 ± 1.1°C to 33.9 ± 1.2°C ($p < 0.05$) in the study group; compared with 34.0 ± 1.1°C in the control group.

Thus, the treatment efficacy in patients with PPG was confirmed not only by an improvement in the course of the disease, but also by optimization of the main immunocompetent cells levels, and normalization of the facial skin temperature.

Conclusion

1. In the diagnosis of pterygopalatine ganglionitis, it is necessary to perform thermal imaging examination of the facial skin areas along with ELISA test, PCR, immunological tests. 2. The severity of PPG can be evaluated with clinical, laboratory and instrumental methods to detect the structure, and functioning of the pterygopalatine ganglion and the immune status of the patients with pterygopalatine ganglionitis.

Bibliography

1. Akhadov TA and YuV Grachev. "Neurostomatological signs and symptoms". *Journal of Neurology, Neurosurgery, and Psychiatry* 1 (1996): 70-74.
2. Belova AN and AV Novikov. "Thermal imaging studies in patients with neurological manifestations of lumbar degenerative disease". *Journal of Neurology, Neurosurgery, and Psychiatry* 4 (1989): 31-34.
3. AM Wayne. "Autonomic Disorders / Edition. by (1998): 125.
4. Gerasimenko MYu. "Differential approach to the choice of physiotherapy methods for trigeminal prosopalgia". *Current Issues of Balneology, Physiotherapy* 6 (1998): 41-43.
5. Grachev YuV. "Pathogenetic mechanisms and neurophysiological diagnostics of trigeminal neuralgia". *Journal of Neurology, Neurosurgery, and Psychiatry* 6 (1995): 20-24.
6. Erokhina LG. "Facial pains (trigeminal neuralgia and other forms of prosopalgia)". Medicine (1973): 176.
7. Zhuravlev VP and LP Malchikova. "Diagnostics and treatment of the main neurostomatological syndromes". Improvement of medical care for the population of the Sverdlovsk region: Collection of scientific papers of the State Institution of Clinical Hospital №1. Yekaterinburg (2006): 110-113.
8. Zenovko GI. "Thermography in surgery". Medicine (1998): 167.
9. Kolesov SN and LB Likhterman. "Neurothermal imaging: opportunities and prospects". Materials of the international scientific and practical". conf. Yalta (2002): 105-107.
10. Melnikova VP and MM Miroshnikov. "Clinical thermal imaging" (1999): 123.
11. AB Danilov. "Neuropathic pain". Neuromedia (2003): 21.
12. Puzin MN. "Neurostomatological diseases". Medicine (1997): 367.
13. Kon HE. "So-called atypical facial neuralgia". *Schweiz Rundacn Medical Principles and Practice* 41 (2004): 222.

Volume 12 Issue 11 November 2020