



Wiadomości Lekarskie

Czasopismo Polskiego Towarzystwa Lekarskiego



Pamięci
dra Władysława
Biegańskiego

TOM LXXII, 2019, Nr 5 cz I, maj

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OPIS PRZYPADKU
CASE REPORT**INSECT BITES AS THE CAUSE OF INFECTIOUS AND ALLERGIC INFLAMMATORY PROCESSES OF THE MAXILLOFACIAL AREA IN CHILDREN**

Pavlo I. Tkachenko, Ivan I. Starchenko, Serhii O. Bilokon, Oleksii K. Prylutskyi, Nataliia M. Lokhmatova, Olha B. Dolenko, Nataliia M. Korotych, Andrii V. Vakhnenko, Andrii M. Gogol, Kateryna Yu. Rezvina
UKRAINIAN MEDICAL STOMATOLOGICAL ACADEMY, POLTAVA, UKRAINE

ABSTRACT

Introduction: The part of purulent inflammatory processes (IP) of the maxillofacial area (MFA) as a result of insect bites are increased.

The aim: To attract attention of the medical community to the problem of the complexity of the diagnosis and treatment of these dermatogenic forms of IP MFA.

Materials and methods: The work is based on the results of 5 year observations of 42 patients with acute IP MFA arising after insect bites, their comprehensive examination and treatment.

Conclusions: 1. IP of MFA, arising as a result of insect bites, is a very urgent problem of pediatric surgical dentistry and require an individual approach in the diagnosis and treatment of patients.

2. A large role in preventing the occurrence of these nosological forms is given to medical workers, a sufficient organization level of sanitary and educational work, and the treatment of such cases becomes a common task of doctors of different profiles. However, much depends on the parents, their level of responsibility and competency, ensuring of timely treatment and provision of qualified medical care to children, preventing the development of severe complications.

3. The issues related to the etiopathogenesis of this pathology require profound scientific research.

KEY WORDS: children, maxillofacial area, inflammation, insects

Wiad Lek 2019, 72, 5 cz. I, 950-955

INTRODUCTION

Nowadays, the number of inflammatory processes (IP) in the maxillofacial area (MFA) is steadily increasing in Ukraine. It unfortunately concerns children's surgical practice in full measure [1, 2]. It is recognized that the general reactivity of the macro organism plays an important role in the occurrence and development of IP, which determines its ability to resist microbial invasion, and the basis of disorders of specific mechanisms of immunological protection is mainly violation of t-cell link of immunity, which happen in the nursing and pubertal periods [3].

Against this background, the presence of secondary immune insufficiency in children and immunosuppressive effects of saprophytic microflora of the oral cavity in conditions of increased antigenic load on the tissues of MFA create prerequisites for the development of IP of different etiology [4].

According to statistical data, 4.11% of purulent IP MFA are dermatogen of origin, often accompanied by changes in the classical pattern of the disease in the direction of sluggish or aggressive course with the development of severe complications and causing significant difficulties in the rehabilitation of patients [5].

THE AIM

Constantly monitoring the frequency of occurrence of the IP MFA in children we drew attention to the fact that in recent years among dermatogenic forms the proportion of diseases

that develop after insect bites has increased. The lack of sufficient information on this subject in the available literature has prompted us to conduct our own research in order to draw the attention of the medical community to this problem.

MATERIALS AND METHODS

For an objective assessment of the situation, we analyzed the literature data on the structure of the skin of children and the reaction of soft tissues (ST) to insect bites.

The clinical part of the work is based on the results of 5 year observations of 42 patients with acute IP MFA arising after insect bites, their comprehensive examination and treatment in outpatient and inpatient settings in the clinic of the Department of pediatric surgical dentistry with propedeutics of surgical dentistry of the Ukrainian medical stomatological academy (Poltava).

General clinical and paraclinic methods were used for examination of patients [6].

The work does not contradict the conclusions of the ethical commission.

REVIEW AND DISCUSSION

According to the literature, in healthy people, even if there is a massive amount of virulent microflora on the skin, IP

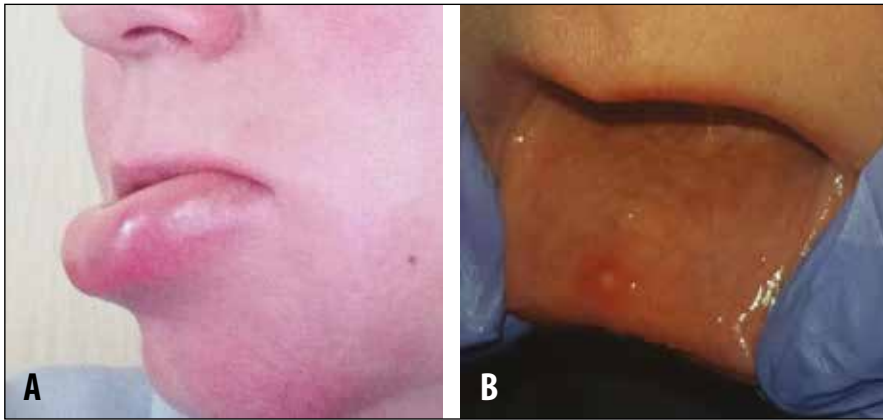


Fig.1. General view of a patient with Quincke edema, which developed as a result of a bee sting (A) and an element of lesion on the mucous membrane of the lower lip at the site of the bite (B)

Fig. 2. General view of a child with IP ST right cheek, caused by a mosquito bite



Fig.3. General view of the patient G., 5 years, case history № 8691, at the time of hospitalization

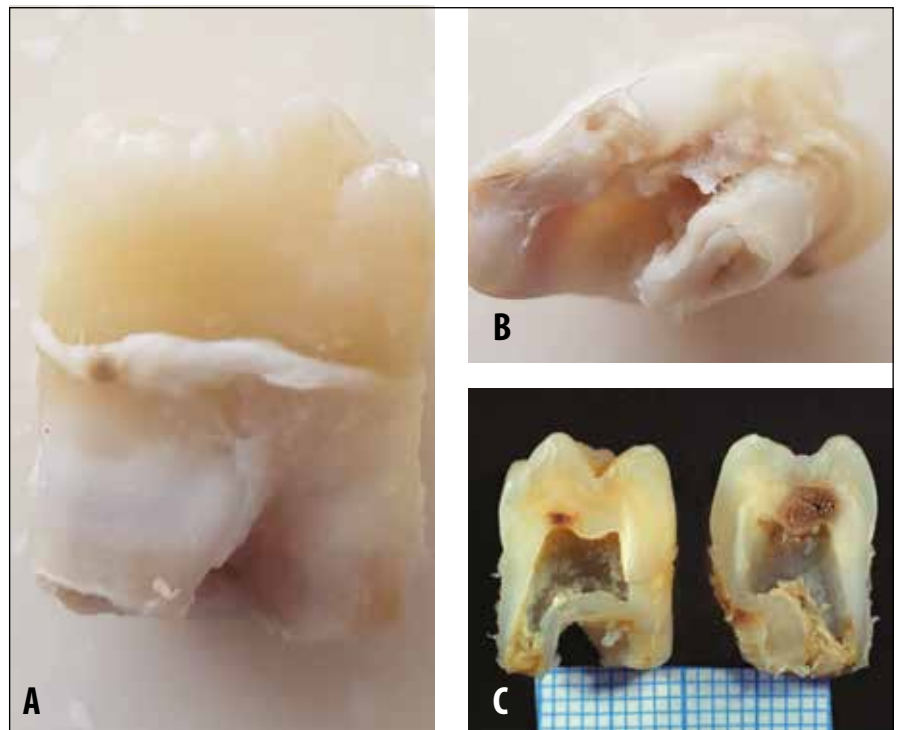


Fig.4. General view of the removed tooth 26 (A, B) and the view of its pulp chamber (C) after longitudinal cutting

do not occur due to various factors of skin protection which we discussed in previous publications [7, 8].

Remembering the factors of human skin protection, we should not forget about the anatomical and physiological features of the children's skin in MFA, which are of great importance in the development of neodontogenic IP in them, creating favorable conditions for the activation of even conditionally pathogenic strains of microorganisms, and the peculiarity of metabolic processes explains the special sensitivity of the skin of children to various toxic effects, including those of biological origin [9, 7, 8].

So, when insect bites through the skin, the microorganisms easily penetrate with the poison, the aggressive action of which is due to the components depending on the type of insect. The part of almost all insects' poisons can be melitene (actively destroys red blood cells, causes IP, muscle spasm and disturbance of tissue metabolism, reduces blood clotting), apamin (similar to neurotoxins of snakes' and scorpions' poisons considerably excites the elements of the nervous system), hyaluronidase (helps the poison to spread throughout the body), phospholipase A

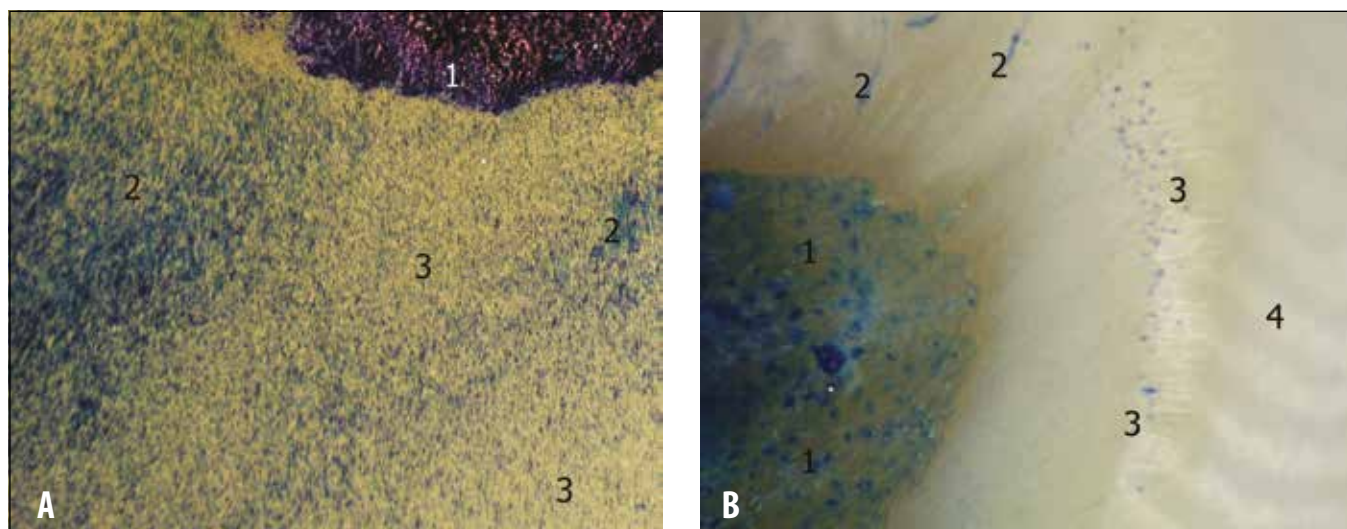


Fig.5. Microscopic picture of the removed tooth. Epoxy grinding, stain with methylene blue. Augmentation: A – 200x; B – 100x.
 A) 1-necrotizing dentine; 2-areas of hypermineralization with a chaotic arrangement of dentinal tubules; 3-areas of hypomineralization.
 B) 1 – necrotizing dentine; 2 – pathologically altered dentinal tubules; 3 – unchanged dentin-enamel border, enamel tufts and enamel spindles; 4 – the enamel prisms in unmodified enamel.

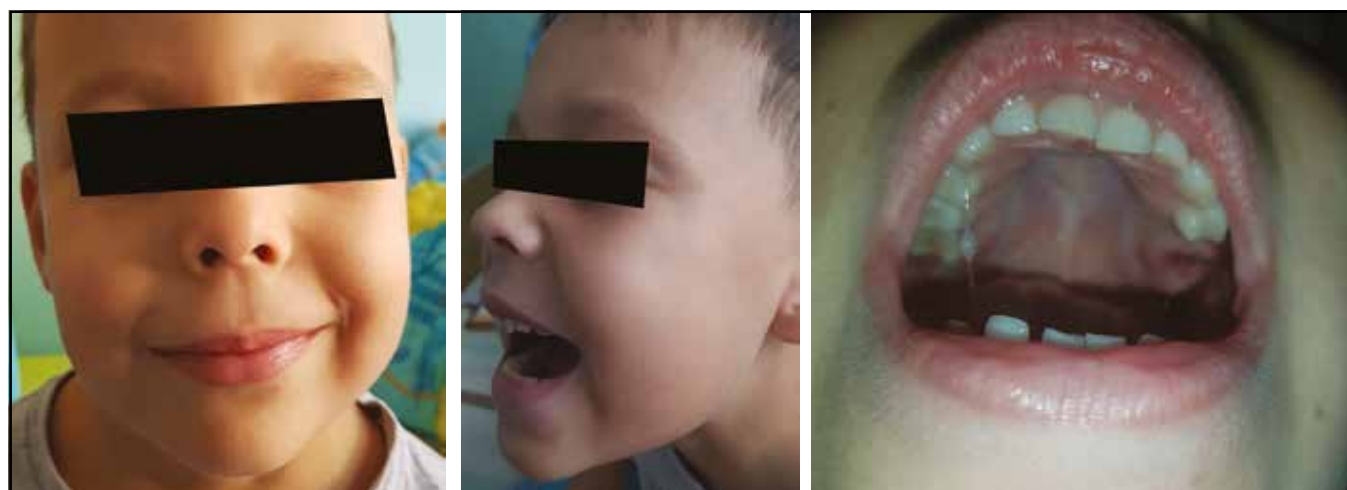


Fig.6. General view of the patient G., 5 years, case history № 8691, at the time of completion of in-patient treatment.

(strengthens IP and stimulates the hemolysis of red blood cells), histamine (dilates blood vessels, causes inflammatory-allergic process). In addition, a special protein of bee toxin causes mast cells of the affected tissues to release their own histamine. The venom of wasps contains kinin, which promotes vasodilatation and contraction of smooth muscles with provoking IP. The toxins of various types of hornets contain acetylcholine able to reduce heart rate and bronchial muscles, decrease blood pressure, and increase the secretion of bronchial glands [10, 11, 12].

Remembering that in the early twentieth century N. Arthus and G. P. Sakharov gave the sensitization of the body an important role in the development of infectious and inflammatory diseases [3], we believe that this fully concerns the IP MFA, which arose as a result of insect bites.

In general, the reactions of the child's body on insect bites are quite diverse, differing in nature and severity of

symptoms. Thus, we can generically observe urticaria, conjunctivitis, rhinitis, weakness, fever, difficult breathing, decrease of blood pressure, frequent pulse of weak filling, heartache, dizziness etc. In severe cases Quincke edema (Fig.1A) and anaphylactic shock which can threaten life may develop [13, 10].

In turn, local reactions also differ in intensity and external signs: -passionate pain, hyperemia, swelling or sealing of the skin with itching and rashes: blisters, nodules, erythematous spots, erosion or other variations that can remain for several days (Fig.1B). In severe cases, hemorrhagic, bullous or necrotic rashes occur. Severe itching at the site of the lesion provokes scratching of the skin, contributing to infection with subsequent complication of IP [13].

According to our observations, the most common complications of insect bites occurred in summer and autumn: 21 (50%) and 13 (31%) cases respectively, and 8

observations (19.0%) were in spring. All patients sought help within 1-2 days from the initial signs of the disease. In the overall structure 40 cases (95,2%) were IP MFA, which were complicated in 7 patients (16,7%) by abscess and in 2 patients (4,8%) by widespread phlegmon of the subcutaneous fatty fiber. 2 (4.8%) of patients had phlegmon accompanied by inflammation of the bones of the facial skeleton.

In all cases of complications the disease began from the area of inflamed skin with significant collateral edema and infiltration of the surrounding tissues, where subsequently bleeding erosions, rounded or irregularly-shaped, with pink-red bottoms and thick gross straw-yellow «honey» crust were formed. The nidi had a tendency to rapid peripheral growth, could interflow with each other, covering large areas of the skin (Fig. 2). The reactive changes in regional lymph nodes or even their abscessing (3 patients, 7.1 percent) [2] were always observed.

CASE REPORT

In order to illustrate the received data, we represent a clinical case from our own observations, which demonstrates the difficulties of the course, diagnosis and complex treatment of children with this pathology.

Patient G., age 5, case history No. 8691, a resident of Poltava, hospitalized to the clinic of the chair on the basis of the surgical department of Poltava city children's clinical hospital with a diagnosis of infiltration of the left cheek after an insect bite.

The boy's parents complained of weakness, chills, nausea, deterioration of sleep and appetite, loose stools, fever up to 39°C, pain and swelling of the ST of the left cheek, which were accompanied by itching.

It was established from anamnesis that a day ago the boy was bitten in the left cheek area by an insect, probably a hornet. Swelling and hyperemia with significant pain and subsequently skin rashes immediately arose in the site of bite. The parents did not consult the doctors employing self-treatment. The child was getting worse, the scratching has led to the violation of the integrity of the skin and the tissues of the cheek have thickened. The boy's condition gradually deteriorated, the infiltration increased significantly and cyanotic areas were formed in some places of the skin.

The parents went to the doctor and the child was immediately hospitalized. At the time of hospitalization: general condition was of moderate severity, body temperature 38.5°C, skin pale. The pronounced asymmetry of the face due to a significant swelling of the left cheek ST, where the skin is significantly hyperemic and hard, signs of collateral edema and the erosion in the affected area were determined. The red border of the lips was dry with flaky scales. The mouth opening was limited (Fig. 3). Bad breath. In the oral cavity - there was a small amount of foam, turbid, viscous oral fluid, and the mucous membrane (MM) - without visible pathological changes. Dentition intact. Teeth 65 and 26 were of the II degree of mobility

with sensitive percussion, although their crowns were intact, and the gums in their area from the vestibular side were hyperemic.

General blood test: leukocytosis with the increased number of segmented neutrophils and eosinophils, and increased erythrocyte sedimentation rate up to 45 mm/hour.

A slight proteinuria was determined.

According to the parents, the child did not have any somatic pathology that could affect the occurrence and course of the disease.

According to the results of an objective examination of the patient and taking into account the anamnesis, a clinical diagnosis was established: infiltration of the left half of the face after an insect bite, retrograde acute periodontitis of the teeth. 65 and 26.

The decision to carry out the conservative treatment and dynamic monitoring of the disease was made

The drug therapy was applied according to the classical principles of treatment of acute IP (antibacterial, anti-inflammatory, hyposensitizing, general restorative and infusion therapy) based on calculations per kg of body weight [6].

The oral cavity and dentition monitoring revealed a significant progression of retrograde periodontitis of the teeth 65 and 26 with the probable death of their pulp. Taking into consideration the fact that the teeth could not be trephined due to insufficient opening of the mouth, on the 3rd day from the beginning of treatment a more mobile tooth 65 was removed under local anesthesia. A small amount of serous-bloody exudate was obtained from the hole.

Despite the complex of therapeutic measures, the general condition of the boy became worse, the body temperature reached 39.5°C, the inflammatory phenomena progressed. Edema and the degree of ST infiltration of the cheek and zygomatic areas increased with spreading to the lower pole of the temporal area.

The opening of the mouth was limited to 1.0 cm, to which the child reacted with crying, and that indirectly indicated pain.

In the mouth threshold there was a hyperemia of MM and smoothness of the transitional fold from the removed tooth 65 and further behind the hill of the upper jaw. The palpation determined infiltration on a transitional fold from the tooth 65 up to the hill of the upper jaw with extension to the anterior edge of the branch of the mandible.

The presence of other symptoms could not be established in detail because of the lability of the child and his inadequate motor activity, which testified to the existence of other disorders that caused discomfort to the child. The tooth 26 remained movable

According to the clinical symptoms the patient was suspected to have the phlegmon of infratemporal and wing-palatal fossae and the surgical intervention by means of the classical method of intraoral access under intubation anesthesia was carried out. After opening, purulent-bloody exudate was obtained in a significant amount. The cavity of the abscess was sanitized, and a rubber drainage, fixed by the sutures to the MM of the cheek was introduced into

the wound passage. The tooth 26 was left because of the intact crown with the hope that after fading of the IP, it could remain for further endodontic treatment.

In the future, unfortunately, despite the improvement in the clinical status of the child, in the area of projection of the distal cheek root of the tooth 26 the fistula was formed, tooth mobility increased, which was the reason for its removal. In 3 days after the extraction the fistula was closed, and the hole had an appropriate form for this period of healing.

During the longitudinal cutting of the removed tooth, homogeneous necrotic masses which were easily exfoliated from the solid tissues were determined in all parts of the pulp chamber. In the apical departments the necrotic pulp was in contact with the focus of pathologically altered dentin size 4x3 mm, which had the shape close to ovoid and relatively smooth contours. The nidus occupied nearly the entire thickness of the dentin, almost reaching the dentin-enamel border, and was covered with a layer of visually unchanged enamel from outside (Fig. 4).

In order to study the structure of the above mentioned formation and the state of the surrounding hard tissues, the fragments of the removed tooth were dehydrated and immersed in EPON-812 with the following grinding, polishing and colouring with methylene blue according to our own technique [14, 15].

The microscopic examination in reflected light of the samples obtained by the above mentioned method found that the described focus is a necrotic tissue with few cells of inflammatory infiltration, mainly neutrophil leukocytes, surrounded by dentin with the characteristic areas of uneven mineralization, which was manifested by different intensity of colour, uneven thickness and improper course of dentin tubes (Fig. 5 A).

The enamel in the surrounding departments had a typical unchanged structure with clearly visualized enamel prisms, and in the region of the dentin-enamel border had the enamel tufts and spindles (Fig. 5 B).

The totality of listed morphological changes allows to consider that the development of retrograde dentine caries with unaltered enamel, the initial mechanism of which is the pathological process in the pulp, takes place in this case.

On the 13th day from the beginning of treatment the general condition of the child was satisfactory. The insignificant final infiltrative changes in the tissues of the left cheek were present, and the holes of the removed teeth 65 and 26 were filled with granulation tissue (Fig. 6).

On the 14th day from the beginning of treatment the child was discharged under the supervision of a dentist surgeon at the place of residence with the provision of recommendations on the volume of rehabilitation measures.

Analyzing the presented clinical case, we can note that the IP, of course, had an infectious-allergic nature. However, interesting is the fact of its distribution with the development of retrograde odontopathology that can be explained by the anatomical and physiological features of MFA tissues in children and the characteristics of their common and local immunity.

It is clear that an important role in preventing the occurrence of such situations is given to medical workers, sufficient organization level of sanitary and educational work, and the treatment of such cases becomes a common task of doctors of different profiles. However, much depends on the parents, their level of responsibility and competency, ensuring of timely treatment and provision of qualified medical care to children, preventing the development of severe complications.

CONCLUSIONS

1. Inflammatory processes of MFA, arising as a result of insect bites, is a very urgent problem of pediatric surgical dentistry and require an individual approach in the diagnosis and treatment of patients.
2. A large role in preventing the occurrence of these nosological forms is given to medical workers, a sufficient organization level of sanitary and educational work, and the treatment of such cases becomes a common task of doctors of different profiles. However, much depends on the parents, their level of responsibility and competency, ensuring of timely treatment and provision of qualified medical care to children, preventing the development of severe complications.
3. The issues related to the etiopathogenesis of this pathology require profound scientific research.

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The paper is written within the research study entitled “Integrative-and- differential substantiation of the choice of optimal methods of surgical interventions and the scope of therapeutic activities in the surgical pathology of the maxillofacial area” (State Registration No. 0116U003821).

Authors’ contributions:

According to the order of the Authorship.

Conflict of interest:

The Authors declare no conflict of interest.

CORRESPONDING AUTHOR

Serhii O. Bilokon

Ukrainian Medical Stomatological Academy
Shevchenko 23 str., 36011 Poltava, Ukraine
tel: +380502869041
e-mail: s.o.bilokon@gmail.com

Received: 17.03.2019

Accepted: 29.04.2019