

## Early recognition of life-threatening cervicofacial infections of dental origin

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### Summary

**Aim:** Cervicofacial infections of dental origin are a difficult and complex issue in oral and maxillofacial surgery. Recognition in due time of the situations which are likely to develop a life-threatening condition and the prompt medical surgical intervention, reduce significantly the rate of complications.

**Material and method:** Between May 2000 and April 2004 in the Clinic of Oral and Maxillofacial Surgery of Timisoara, 14 patients with severe cervicofacial infections were hospitalized in emergency status and they needed complex medical surgical treatment in accordance with a plan (protocol) established together with the intensive care department.

**Results:** Assessing the presented situations, we noticed a difficult, prolonged time of recovery, process which needed a hospitalization period of around 22 days. A decease was recorded because of cervical necrotizing fasciitis, the most severe form of cervicofacial infection.

**Discussions:** The severity of the condition of patients with cervicofacial infections must be figured and energetic therapeutical attitude must be adopted as quickly as possible. The experience shows frequent resistance to antibiotics such as penicillin, ampicillin and oxacillin. The patients must be guided in due time to a clinic which is provided with an intensive care department, where surgical treatment must be administrated together with an intensive treatment in support of the general condition.

**Conclusions:** The reduction of the vital risk of cervico-facial infections of dental origin will be done through attentive assessment of the general and local condition of out-patients, before dental extraction. The absence of treatment adapted to the situation and to the clinic development, increases meaningfully the rate of complications and the length of hospitalization, the lethal evolution not being excluded.

**Key words:** cervicofacial infections, infections of dental origin, cervical necrotizing fasciitis.

### Introduction

The diagnosis and the treatment of severe cervicofacial infections represents a challenging problem to the oral and maxillofacial surgeon. These infections remain an important health problem, with significant risks of morbidity and mortality, if the situations likely to develop a life threatening condition are not recognized in due time. Because of the variety of antibiotics, the development of new therapeutical schemes and of the safety of surgical techniques as well, the complications rate of cervicofacial infections is decreasing, especially when the medical-surgical intervention is performed in due course. The phlegmon and the cervical necrotizing fasciitis, the most severe forms, are the consequence of acute, diffuse infections, favoured by the deficient immunologic background, having a

mandibular molar tooth as the most frequent etiologic factor. The infectious process has a local expansive tendency, through the infiltration and destruction of cervical tissues, following the anatomic cleavage plans and an aggressive evolution, with rapid deterioration of the general condition, jeopardizing the patient's life.

### Objectives

The cervicofacial region presents peculiarities which can complicate the evolution of an infection in such location. The anatomic complexity of the region and the deep location of the infection, render the diagnosis more difficult. The spread of the infection is favoured by the natural connection between deep neck spaces, the infection being able to exceed the limits of the region and to invade the adjacent spaces, as the

mediastinum and endocranial cavity. The covering layer of unaffected soft tissues can be substantial, increasing the risk of neurovascular injury during the surgical approach.

In spite of the progress achieved by modern antibiotics and sophisticated diagnosis methods (CT, MRI), an increase of the rate of severe cervicofacial infections is ascertained, with complicated dental lesions previously treated through dental extraction without careful examination of the local and general condition of the patient. Consequently, complete assessment of the biological condition of the out-patient together with the indication of prophylactic antibiotic treatment are necessary.

### Material and methods

Our study, accomplished between May 2000 and April 2004, comprises 14 patients with cervicofacial infections of dental origin exclusively, who needed complex medical and surgical treatment in collaboration with the intensive care department. The patients, 7 men and 7 women, aged between 20 and 64 years old (an average of 42 years), came to the emergency department and were hospitalized in the Clinic of Oral and Maxillofacial Surgery of Timisoara with the following diagnoses:

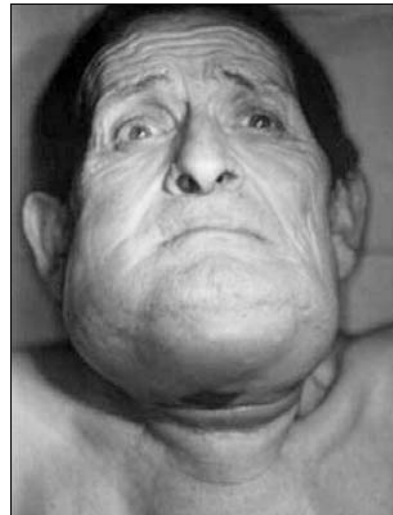
- orbit abscess - 1 case (*figure 1*);
- infratemporal space abscess - 6 cases;
- parapharyngeal space abscess - 2 cases;
- oral floor phlegmon (Ludwig angina) - 2 cases;
- hemifacial phlegmon - 1 case (*figure 2*);
- necrotizing fasciitis - 2 cases (*figure 3*).



**Figure 1.**  
**Orbit abscess**



**Figure 2. Hemifacial phlegmon**



**Figure 3. Necrotizing fasciitis**

The odontogenic etiology of the cervicofacial infections includes dentoalveolar infectious processes in evolution as well as recent dental procedures:

- periapical chronic osteitis in 4 cases;
- procedures involved in tooth extraction in 10 cases.

Considering the initiator event, the infection of the deep cervicofacial space was produced by the following ways:

- **direct**, by spreading along the anatomic cleavage plans and the connections between the deep cervical spaces;
- **lymphatic**, by spreading the infection from the oral cavity through the lymphatic system.

The microbiological examination performed under such situations, revealed the pres-

ence of *Staphylococcus aureus*, *Klebsiella*, *Pyocyanic bacillus* and *Escherichia coli* with variable tested sensibility to Amoxicillin, cephalosporine of second and third generation (Mandol, Fortum, Rocephin) or carbapeneme (Tienam), Gentamicyn, Ciprofloxacin, Colistin and resistance to ampicillin, oxacillin, erythromycin and tetracyclin.

The complex medical-surgical treatment was performed in cooperation with the intensive care department and followed the protocol:

1. Monitoring the hemodynamic parameters and the vital functions in the intensive care department.
2. Combating the toxico-septic shock through an energetic antiinfectious treatment. Associated antibiotic therapy with wide spectrum, administered parenterally, initially based on the clinical experience (cephalosporine in association with an aminoglycozid or quinolone with metronidazole), promptly modified according to culture and sensitivity results. If the patients are in shock, before any surgical procedures, we must establish a secure airway and in maximum emergency situations we employed cricothyroidotomy and tracheal intubation through oral way or tracheostomy.
3. The surgical treatment, usually applied simultaneously, is meant to ensure the drainage of all cervical spaces involved in the septic process, to ventilate them and to use antiseptics. Each approach must be wide; most cervical infections need transcervical approach, wich facilitates adequate exposure, with the protection of the neuromuscular structures.
4. The prophylaxis of cavernous sinus thrombosis (Heparine, Clexane, Fraxiparine).
5. Antiinflammatory and analgesic medication.
6. Stimulation of the general immunity through non specific vaccinotharapy, administration of gammaglobulines and vitamins.
7. Removal of etiologic factors through extraction of the causal teeth after local and general rehabilitation to secure healing and prevent relapse.

## Results

Assessing the presented situations we noticed a difficult long-term healing process which needed

hospitalization of 12-43 days. A patient with cervical necrotizing fasciitis needed intubation through tracheostomy after 2 hours of hospitalization because of severe respiratory distress, appeared together with toxico-septic shock. After 8 days of continous medical and surgical treatment, after a short improvement of the general condition, the patient died because of cardiorespiratory stop. In the other cases no relapse was noticed after the remission of the infection, the removal of etiologic factors and the release of the patient from hospital.

## Discussion

Patients with cervicofacial infections who arrived late in the Clinic of Oral and Maxillofacial Surgery and whose treatment was delayed or mis-conducted, can expect a greater number of complications and the recovering period is prolonged.

Necrotizing fasciitis, a streptococical infection, with morbidity and mortality rate of 70-80%, was the most severe form of cervicofacial infection, one of the two cases treated in our clinic having a lethal end. The gravity of the situation of such patients must be inferred as soon as possible and an energetic therapeutical attitude must be adopted. We have to administrate antibiotics in high doses, with good penetration in the soft tissues and bone, based on antibiotics with wide spectrum, like cephalosporine of the second or third generation (*Mandol*, *Rocephin*), or carbapeneme (*Tienam*), associated with a second antibiotic of the aminoglycozide group (*Gentamycin*, *Neomycin*) and *Metronidazole* to also cover the anaerobic bacteria, present in the deep, unventilated cervicofacial deep spaces. The patient must be sent to an emergency hospital, at the intensive care department. It is compulsory to obtain microbial cultures from the pathological secretions, as well as blood cultures, consequently adapting the antibiotherapy according with the sensitivity tests. The experience proves frequent resistance to antibiotics such as *Penicillin*, *Ampicillin*, and *Oxacillin*, these being used nowadays only when their bactericide action is indicated by tests. *Amoxicillin* is more efficient associated with *Clavulanic Acid* (*Amoxyclav*, *Augmentin*). Surgical treatment is instituted as soon as the preoperational conditions are fulfilled, accomplished simultaneously

with the intensive antiinfectious treatment and supporting of the general condition.

## Conclusions

The abscess of the orbit, zygomatic space and latero-faringian space, the hemifacial and oral floor phlegmon are the cervicofacial infections which, when the diagnosis and/or institution of an adequate treatment are delayed, can threaten the life of the patient.

Necrotizing fasciitis is a dangerous disease which mobilizes all the efforts in an attempt to save the patient's life, which is really endangered.

The occurrence of severe cervicofacial infections in young people is favoured by the

decrease of the general immunity, because of certain exhausting factors (stress, deficient nourishment, pollution), as well as by the increased resistance of microorganisms to usual antibiotics with wide spectrum.

In patients with cervicofacial infections, who do not receive treatment adapted to the situation and to the clinical evolution, complications can occur which prolong the healing time, and the lethal evolution cannot be excepted.

The reduction of the vital risk of those infections will be done through careful assessment of the general and local condition of outpatients and the through the institution of a prophylactic antibiotherapy, according with therapeutic plans based on the latest clinical researches and findings.

## References

1. Burlibaşa C. et al. Chirurgie orală și maxilofacială, Ed. Medicală, București, 1999, pp. 332-338.
2. Chow A.W. Life-threatening infections of the head and neck. *Clin Infect Diseases*, 1992; **14**: 991-1004.
3. Grandon J.D. Space-occupying and life-threatening infections of the head, neck and thorax. *Infect Dis Clin N Amer*, 1996; vol **10**(4): 857-878.
4. Har-El G., Aroestry J.H., Shaha A. et al. Changing trends in deep neck abscess: A retrospective study of 110 patients. *Oral Surg Oral Med Oral Pathol*, 1994; **77**: 446-450.
5. Indresano A.T., Hang R.H., Hoffman M.J. The third molar as a cause of deep space infections. *J Oral Maxillofac Surg*, 1992; **50**(33).
6. Petrone J.A. Mediastinal abscess and pneumonia of dental origin. *J NJ Dent Assoc*, 1992; **63**: 19-23.
7. Ramirez R.G.A., Arenas O.J., Gonzales D.H., Pacheco R.M. et al. Stay days in odontogenic cervicofacial infections at a third level hospital. *Educ Invest Clin*, 2000; **1**(3): 154-167.
8. Tung-Yiu W., Jehn-Shyun H., Ching-Hung C., Hung-An C. Cervical necrotizing fasciitis of odontogenic origin: a report of 11 cases. *J Oral Maxillofac Surg*, 2000; **58**(12): 1347-1352.
9. Wall D.B., de Virgilio C., Black S., Klein S.R. Objective criteria may assist in distinguishing necrotizing fasciitis from nonnecrotizing soft tissue infection. *Am J Surg*, 2000; **179**(1): 17-21.
10. Walsh L.J. Serious complications of endodontic infections: some cautionary tales. *Australian Dental J*, 1997; **42**(3): 156-159.

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