

ORAL SYSTEMIC INFECTION - ENDOCARDIAL INVOLVEMENT

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ABSTRACT

The aim of the present study is to investigate oral systemic infections and their complications, with a closer look to the endocardial involvement. **Material and methods** The present study was performed on 31 patients diagnosed with oral sepsis between 2004-2010, in "Sf. Cuv. Parascheva" Infectious Diseases Hospital from Iasi. The link between dental intervention and bacterial endocarditis was anamnestic documented. The organic damages or dysfunctions occurred in sepsis were followed, and the aetiology and clinical response to the applied antibiotherapy were analysed. **Results** Patients included in this study, most men coming from rural areas, and having most affected group aged between 40 and 60 years, had presented in association predisposing conditions for the basic damage (oral sepsis). Other patients were accused of an oral hygiene lack and incomplete dental treatment for initial conditions. After interdisciplinary clinical examination and intraoperative assessment in Surgery Clinics (Oro-maxillo-facial Surgery, Ophthalmology) the diagnose of patients oriented to specific damages and then they were transferred to the Infectious Diseases Hospital and diagnosed with oral sepsis, on prone land to this pathology (valvular, implanted cardiac devices, diabetes, liver diseases, cancer, tuberculosis, pancytopenia). At 4 patients, the transthoracic echocardiography detected vegetation on mitral valve (specific for endocarditis) and prosthetic valve dehiscence in mitral position to a patient from rural areas, with periapical abscess and multiple root debris. Echocardiographic diagnosis of infective endocarditis subsequently confirmed by positive blood cultures (*Enterococcus faecalis*, anaerobic gram-negative bacilli) was found at patients with valvular heart diseases and a history of tooth extraction without prophylaxis. Regarding the therapy of these infections were used antibiotics as beta-lactams in association with quinolones and/or chloramphenicol in order to cover the specific polymicrobial spectrum, applying the de-escalation techniques, with an evolution and favourable prognosis in more than half cases. **Conclusions** Literature and guidelines for prevention and management of odontogenic bacteraemia were in constant review, regarding prophylactic antibiotics and invasive procedures with dental visa, expressing different opinions. Diagnosis of infective endocarditis (5 cases) on patients with valvular heart disease and a history of tooth extraction without prophylaxis, unfortunately indicate a low level of compliance of some practitioners to the specific recommendations, and non-recognition of the situations when the prophylaxis is absolutely necessary.

Key words: oral sepsis, infective endocarditis, oral infections, AHA guidelines.

INTRODUCTION

If in the past, "oral sepsis" was considered an important factor in the genesis of infective endocarditis, in our days, the focus has been on prevention of bacteraemia that results from

invasive procedures (1). Normally, it has been recommended that people with special medical conditions and cardiac devices to receive antibiotic prophylaxis before dental, gastrointestinal, genitourinary and other

invasive procedures (2).

Recently the guidelines had emphasized the dental procedures of patients with cardiac conditions whom the American Heart Association defines as being at "higher" risk of experiencing morbidity and mortality resulting from infective endocarditis, largely because most of the case reports and studies of bacteraemia related to dental rather than nondental procedures (3).

Gingivitis and periodontitis are inflammatory diseases, caused by specific bacterial species. There is evidence that the surface of inflamed and ulcerated gingival tissue around teeth is the portal of entry for the viridans streptococci bacteria that cause annually, more than 50 per cent of the infective endocarditis cases in the United States.

Some of these cases are found commonly or almost exclusively in the oral cavity (for example, *Streptococcus mitis*, *Streptococcus mutans*) (4). Mansur and colleagues estimated that *Streptococcus* species cause more than 56 per cent of recurrent endocarditis cases (5).

Oral infections are still a problem to debate, thinking of pluribacterial aetiology and severe evolution at immunosuppressive patients, despite the campaigns for oral hygiene education and complex antibiotic prophylaxis before dental interventions (6).

Bacterial endocarditis is a well-known complication of odontogenic bacteraemia and has been a matter of great concern for dentists, infectiounists, and cardiologists, alike for more than a decade, especially when is documented the relation between transitory bacteraemia during different dental manoeuvres, and bacterial endocarditis or

infectious of cardio-vascular prosthetic devices (7).

The aim of the present study is to investigate oral systemic infections and their complications, with a closer look to the endocardial involvement.

MATERIAL AND METHODS

The present study was performed on 31 patients diagnosed with oral sepsis between 2004 and 2010, in "Sf. Cuv. Parascheva" Infectious Diseases Hospital from Iasi. They came mostly from Oro-maxillo-facial Surgery Clinic Iasi, where intervention of effusion was proposed. The link between dental intervention and bacterial endocarditis was anamnestic documented. The organic damages or dysfunctions occurred in sepsis were followed, and the aetiology and clinical response to the applied antibiotherapy were analysed.

RESULTS AND DISCUSSIONS

A number of 31 of patients were included in the present study, in majority they came from the Oro-maxillo-facial Surgery Clinic, Iasi and had the most affected group aged between 40 and 60 years, most men from rural areas (Table 1, Table 2, and Table 3).

More than half of the patients had presented in association predisposing conditions for the basic damage (oral sepsis) (Table 4). Other patients were accused of an oral hygiene lack and incomplete dental treatment for initial conditions.

Errors in adjuvant antibiotic selection or underdosing, also contributed greatly to the unfavourable evolution of these diseases.

2 years	10-20	21-30	31-40	41-50	51-60	61-70	71-80
1	4	4	4	6	5	4	3
3,22%	12,90%	12,90%	12,90%	19,35%	16,12%	12,90%	9,67%

Table 1. Distribution of cases by age groups

Total	Females	Male	Total	Urban	Rural
31	11(35, 48%)	20(64, 52%)	31	9 (29,03%)	22 (70, 97%)

Table 2. Distribution of cases by gender**Table 3. Distribution of cases by origin area**

Type of associated disease	Number of cases
<i>Valvular</i>	
- <i>Mitral stenosis</i>	4 cases
- <i>Prosthetic mitral valve position</i>	1 case
<i>Liver diseases</i>	
- <i>Decompensated cirrhosis</i>	1 case
- <i>Chronic viral hepatitis</i>	3 cases
- <i>Chronic hepatic toxicity</i>	5 cases
<i>Active pulmonary tuberculosis</i>	1 case
<i>Diabetes</i>	
- <i>type 1</i>	2 cases
- <i>type 2</i>	3 cases
<i>Neoplasm</i>	1 case
<i>Pancytopenia</i>	1 case
<i>Chronic alcoholism</i>	10 cases

Table 4. Distribution of cases according to the associated pathology

After interdisciplinary clinical examination and intraoperative assessment in Surgery Clinics (Oro-maxillo-facial Surgery, Ophthalmology), diagnose of patients has been oriented to specific damages.

From diseases of the upper molars, in 2 cases, the evolution was to maxillary sinusitis and osteitis. In one case, the starting point of systemic infection was represented by the neoplasm of the palate (Table 5).

In the Surgery Clinic occurred the effusion, and the established treatment included associating of antibiotics with broad spectrum, depending on the suspected aetiology, and followed by total or partially reshuffled according to bacteriological exams.

After specific surgical treatment, in association with antibiotherapy, patients were transferred to the Infectious Diseases Hospital and diagnosed with oral sepsis.

Diagnosis after interdisciplinary assessment	Number of cases
<i>Suppuration of submandibular lodge</i>	4
<i>Extended submento-submaxillary suppuration in the anterior mediastinum</i>	2
<i>Left latero-cervical and necrotic submandibular fasciitis</i>	1
<i>Left orbital cellulitis</i>	2
<i>Periorbital cellulitis</i>	1
<i>Left maxillary sinusitis</i>	1
<i>Phlegmon of the mouth floor</i>	4
<i>Latero-cervical adenoslegmon</i>	1
<i>Adenoid cystic carcinoma of the palate</i>	1
<i>Cavernous sinus thrombosis</i>	1
<i>Mandibular osteitis</i>	1
<i>Fistulised dacrioadenitis</i>	1

Table 5. Distribution of cases according to the interdisciplinary conditions

The state of patients was generally stable, 2 of them having defining criteria for coma (Glasgow score of 4 and 6). The clinical and biologic evaluation on admission in our clinic, showed respiratory dysfunction as an infectious manifestation or post-aggression reaction, in 18 cases. They had tachypnea (respiratory frequency > 24 per minute) and lung X-ray showed: bronchopneumonia (4 cases), lobar pneumonia (1 case), and pleurisy (1 case).

Subsequently, the monitoring of cardiac function revealed to all patients tachycardia (cardiac frequency > 90 per minute) and 5 patients were diagnosed with paroxysmal atrial fibrillation. In 5 cases was detected systolic cardiac murmur.

Hypotension (systolic BP < 90mmHg, or 40 mmHg decrease to normal value) was noted in 18 cases, requiring fluid balancing and cardiac drugs in 9 cases.

Following laboratory exams in all cases was showed intense inflammatory syndrome: leukocytosis with polinucleosis, elevated fibrinogen (>400mg %) and ESR (>40 mm/h). Determination of procalcitonin serum was possible in 10 cases, with test values more than 5ng/ml.

Transthoracic echocardiography reveals for 4 patients, mitral valve vegetation (endocarditis) and prosthetic valve dehiscence in mitral position to a patient from rural areas, with periapical abscess and multiple root debris.

Echocardiographic diagnosis of infectious endocarditis subsequently confirmed by positive blood cultures (*Enterococcus faecalis*, anaerobic gram-negative bacilli) was found at patients with valvular heart diseases and a history of tooth extraction without prophylaxis.

Other investigations were performed for detection of organic or dysfunctional involvement.

At 12 patients was objectified the liver dysfunction with elevated transaminase

having values between 60-400UI/l. A patient with decompensated cirrhosis has been documented the superinfection of the ascites liquid, and the abdominal ultrasound showed hepatic abscess. Acute renal failure with oligo-anuria was noted in the evolution of 2 patients, one of them with previously normal renal function, showing nephritis at abdominal ultrasound. Meningeal contracture syndrome was clinically observed at 2 patients, and lumbar puncture was necessary. Etiologic agent was not detected. Cerebral Computer Tomography scan reveals brain abscess and cavernous sinus thrombosis in the case of the 2nd patient, and was required the transfer in the Neurosurgery service.

Eight patients presented neuropsychiatric manifestations (psychomotor agitation, confusional syndrome, and fatigue) explained by the electrolyte disturbances, hypoxia, acidosis or fever.

The bacteriological exams were positive in few situations (10 cases), the specific germs of these infections reflecting the residential oral flora, because of the first initiated antibiotherapy in Surgery Clinics (Table 6).

The antibiotherapy was according to the spectrum of sensibility showed by bacteriological tests, and followed the de-escalation principle for a period of 3 to 26 days, especially because of the severity of these infections and the specific bacterial spectrum.

2 or 3 antibiotics as beta-lactams (amino penicillin with beta-lactamase inhibitors, 3rd generation cephalosporin, carbapenems) quinolones and/or chloramphenicol were used in association (Table 7).

Evolution was favourable in 22 cases, 5 patients required transfer to other clinics for treatment of complications (purulent pleurisy, cavernous sinus thrombosis, and brain abscess, prosthetic valve dehiscence). There have been 3 exitus by multiorgan failure in severe sepsis, 2 of them even within 48 hours of admission.

Plague secretions	
<i>Anaerobic gram-positive cocci</i>	<i>Spectrum of sensibility: Vancomycin, Cefotaxime, Amikacin, Linezolid, Teicoplanin, Ertapenem</i> <i>Resistant: Ciprofloxacin, Pefloxacin</i>
<i>Alpha haemolytic streptococcus</i>	<i>Spectrum of sensibility: Penicillin, Amoxicillin – clavulanic acid</i> <i>Resistant: Piperacilin - Tazobactam</i>
<i>Acinetobacter baumannii</i>	<i>Spectrum of sensibility: Imipenem, Amikacin Tobramycin</i> <i>Resistant: Ciprofoxacin, Targocid</i>
<i>Fusobacterium nucleatum</i>	<i>Spectrum of sensibility: Imipenem, Clindamycin, Chloramphenicol, Piperacilin - Tazobactam</i>
Blood culture	
<i>Enterococcus faecalis</i>	<i>Spectrum of sensibility: Amoxicillin – clavulanic acid, Imipenem, Pefloxacin</i> <i>Resistant: Vancomycin, Oxacillin, Ampicillin</i>
<i>Anaerobic gram-negative bacilli</i>	<i>Spectrum of sensibility: Amoxicillin – clavulanic acid, Chloramphenicol, Metronidazole, Imipenem, Ciprofloxacin</i>
Urine culture	
<i>Enterococcus faecalis</i>	<i>Spectrum of sensibility: Amoxicilin – clavulanic acid, Imipenem</i> <i>Resistant: Ampicilin, Oxacilin, Vancomycin</i>

Table 6. The isolation of the pathogen agent from different biological samples

Type of antibiotic	Number of cases
Betalactams + Chloramphenicol (3g/day)	7 cases
- ampicillin-sulbactam (4,5g/day)	- 1 case
- amoxicillin-clavulanic acid (2,4g/day)	- 1 case
- imipenem(3g/day)	- 3 cases
- meropenem(2g/day)	- 1 case
- ertapenem(1g/day)	- 1 case
Quinolons + Beta lactams	3 cases
Ciprofloxacin 400 mg/day	
Pefloxacin 800 mg/day	
Quinolons + Imipenem 3g/day + Chloramphenicol	10 cases
Betalactams + Clindamycin 1,2g/day	3 cases
Ampicillin + Gentamycin	5 cases (infective endocarditis)

Table 7. Antibiotherapy

CONCLUSIONS

Literature and guidelines for prevention and management of odontogenic bacteraemia were in constant review, regarding prophylactic antibiotics and invasive procedures with dental visa, expressing different opinions.

Given the fact that oral infections are still a problem to be considered, especially in

terms of morbidity and mortality by their frequency, their pluribacterial aetiology, and the possibility of severe evolution, mainly at the immunosuppressed patients, we are oriented to a prompt approach and to support the prevention of patients with such risks (valvular heart diseases, cardiac special implanted devices with invasive dental procedures).

Diagnosis of infective endocarditis (5 cases) on patients with valvular heart disease and a history of tooth extraction without prophylaxis, unfortunately indicate a low level of compliance of some practitioners to the specific recommendations, and non-recognition of the situations when the prophylaxis is absolutely necessary.

Regarding the therapy of these infections were used antibiotics as beta-lactams in association with quinolones and/or chloramphenicol in order to cover the specific polymicrobial spectrum, applying the de-escalation techniques, with an evolution and favourable prognosis in more than half cases.

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