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Original article

Infectious emergencies in odontology: retrospective study in a french hospital

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Key words:
cellulitis / dental abcess / emergency treatment / antiinflammatory agents

Abstract – Infectious emergencies occupy a very significant part of odontology consultation. So, a retrospective study undertaken in 2003 in a french hospital (Dijon) was down to analyze the distribution of infectious pathologies in odontological emergencies. 352 patients were admitted during 2003 for an infectious dental etiology. The age of patients lies from 4 to 96. The pathology most frequently met is firstly the endodontical abscess and secondly cellulitis. The causal teeth from all confused arcades are first molars. And more surprising is the prevalence of the infectious emergencies on the left side. Regarding the distribution according to the period of the year, a slight prevalence is noticed in summer. This analyse permits to evaluate the various parameters which can influence infectious etiology urgencies.

Mots clés :
cellulite / abcès dentaire / traitements en urgence / anti-inflammatoires

Résumé – Urgences infectieuses en odontologie. Les urgences infectieuses occupent une place non négligeable dans les urgences odontologiques. Une étude rétrospective a été menée en 2003 dans un hôpital français (Dijon) afin d'analyser les urgences infectieuses en Odontologie. 352 patients ont été admis en 2003 pour une infection d'origine bucco-dentaire. L'âge des patients allait de 4 ans à 96 ans. La pathologie la plus fréquemment rencontrée est l'abcès endodontique compliqué par une cellulite faciale. Les dents causales à l'origine de ces urgences infectieuses sont le plus souvent les premières molaires. Ces urgences infectieuses prédominaient légèrement du côté gauche et pendant l'été.

The odontological emergencies are increasingly frequent with the regional service of reception of emergencies. The dental abscess is a practical and odontological reason for a nearly daily consultation. It presents a very exceptionally vital risk. However, expressing itself in various clinical, unquestionable and specific cases requires an immediate assumption of responsibility by their particularly fugacious gravity, and sometimes involving the vital forecast [1]. The infectious emergencies are very often a complication of pulpar pathology; they occupy a very significant part of the consultation in odontology and touch the various social classes. These dental and periodontal infectious complications which are local (abscess, teeth), regional (let us phlegmons, cellulitis and osteitis) or remote (endocarditis, brain abscess, acute rheumatoid arthritis...), sometimes threaten the vital forecast [2].

A retrospective study undertaken in 2003 at the Dijon hospital makes it possible to analyze the distribution of infectious pathologies as well as the various parameters which can influence them.

Aim of the study

The principal objective of this study is to describe the management in the urgency of the infections of dental origin by the odontology team from the Dijon hospital. The second objective is to analyze these types of infections according to certain factors such as the age, the etiology or the season. The third objective is to show that there is an infectious complication which deserves a catch of load in urgency.

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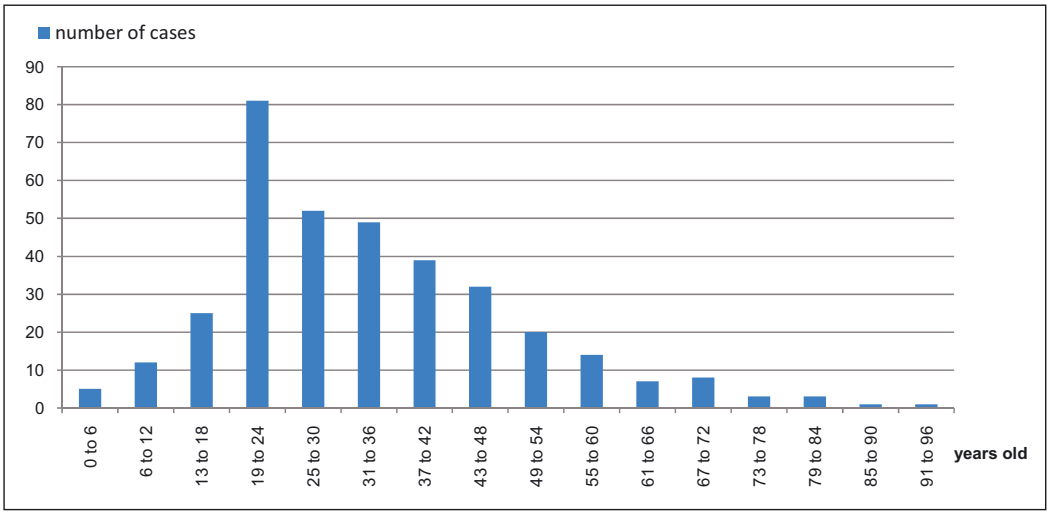

Table I. Distribution of infectious emergencies by 6 year old section.
Tableau I. Distribution des urgences infectieuses par tranches d'âge de 6 ans.

Materials and method

The eligible files were the admissions in urgency at the Dijon hospital for dental infections between January 1, 2003 and December 31, 2003. The urgency was defined by the entries carried out during the night duties, the bank holidays and the weekends or patients consulting the day in the odontology service. The collection of the data was carried out retrospectively starting from the medical files. The collected data were linked to the age, the sex, the etiology, the type and study of affections, the geographical origin of the patients as well as the seasonal variations. The statistical analysis was carried out under Stata and the comparisons of percentages were made by the tests of Chi2, with an α risk fixed at 5%.

Results

Population of study

In the 1061 patients admitted in emergency during 2003, this retrospective study finds an infectious etiology for 352 patients, which represents 33.17%. The most affected age bracket is from 19 to 36 years (51.7%). Males prevail on females (58.2%). The age of patients lies from 4 to 96.

Distribution according to the age

The patients aged from 19 to 24 are concerned with the infectious emergencies (22.7%). With an infectious peak in the age bracket of 19 to 36 (Table I). The patients are from 4 to 96. The average age of our population is 33.7.

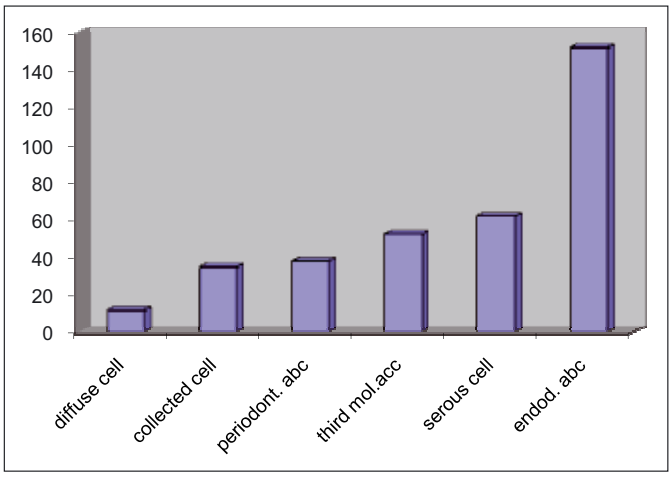

Table II. Various listed infectious diagnosis (abc: abcess, acc: accident, cell.: cellulitis, endod: endodontic, mol: molar, periodont: periodontal).
Tableau II. Différentes étiologies des urgences infectieuses.

Various types of infectious emergencies

The endodontical abscess is the pathology most frequently met in emergencies (42.3%). secondly sereuses cellulitis (17.6%) then infectious accidents concerning the third molars (15%), periodontal abscesses (10.7%), collected cellulitis (9.9%) and diffuse cellulitis (3.4%) (Table II).

Odontological origins of the infectious urgency

As statistics indicate it, the causal teeth from all confused arcades are molars (71.8%) with a prevalence for the

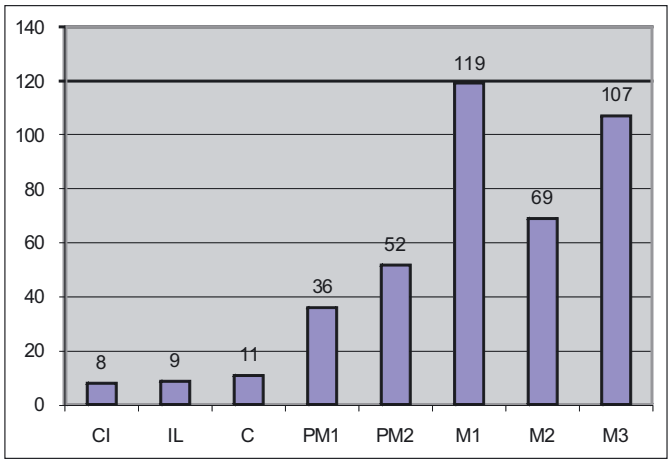

Table III. Distribution of infectious emergencies according to causal teeth, two arcades confused.
Tableau III. Distribution des urgences infectieuses en fonction de la dent responsable, les deux arcades confondues.

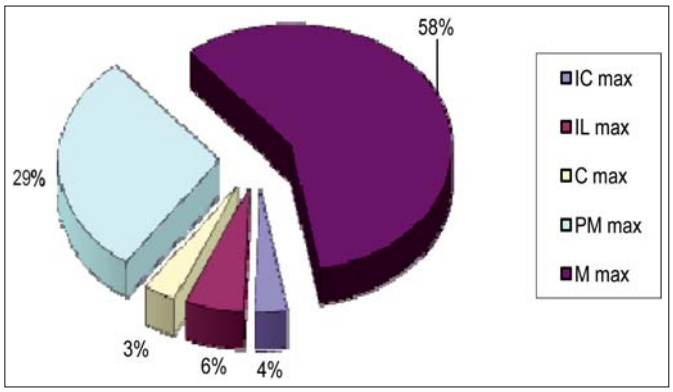

Table IV. Distribution of infectious emergencies according to group of maxillary causal teeth.
Tableau IV. Distribution des urgences infectieuses en fonction de la dent maxillaire responsable.

first (40.3%) and the third ones (36.3%) (Table III). It is now interesting to specify these data while focusing on each arcade.

Causal maxillary teeth

According to the statistics, the molar groups and the premolars cause these infections. The molars are responsible for a total value of 59% of the odontological emergencies of infectious origins, closely followed by the premolars with a total value of 29% (Table IV). By pushing the investigation further and considering as if there was a difference between the right and left side in our sample, a prevalence of the infectious emergencies on the left side was observed (54%) (Table V).

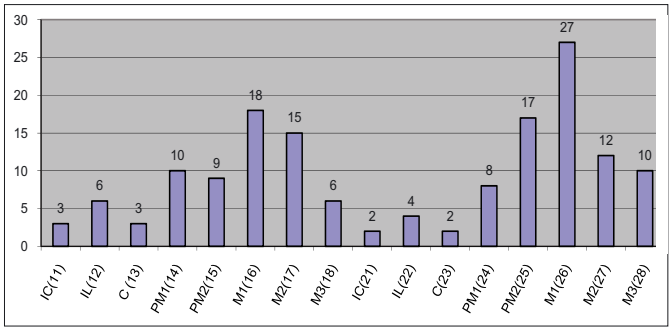

Table V. Distribution of infectious emergencies according to causal maxillary teeth.
Tableau V. Distribution des urgences en fonction de la dent maxillaire responsable.

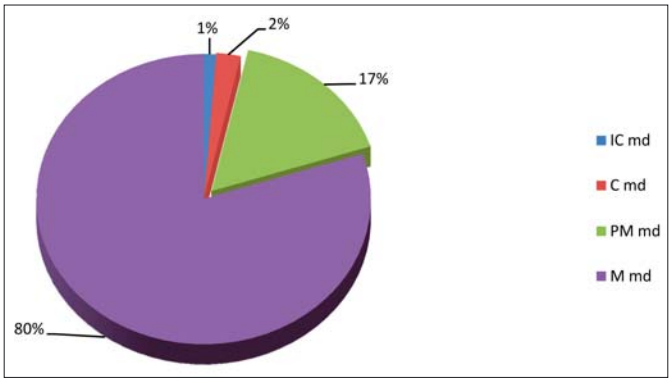

Table VI. Distribution of infectious emergencies according to group of mandibular causal teeth.
Tableau VI. Distribution des urgences infectieuses en fonction du groupe de dents responsable.

Causal mandibulary teeth

Just like the groups of maxillary teeth, the groups of mandibulary causal teeth are molars (81%), the premolar group being responsible for 16% of the infectious emergencies (Table I).

While following the same reasoning and by comparing the right and left side, we find a percentage of infectious emergencies related to left mandibular teeth was 51.2% against 48.8% (Table VII). Less significantly, an imputability with the left sector was also observed.

Causal temporary teeth

Very few patients consulted for an infectious urgency with a starting point in the temporary teeth (3.4%). The implied temporary teeth are distributed as in the figure below (Table VIII). The second temporary molars are implied at 59%.

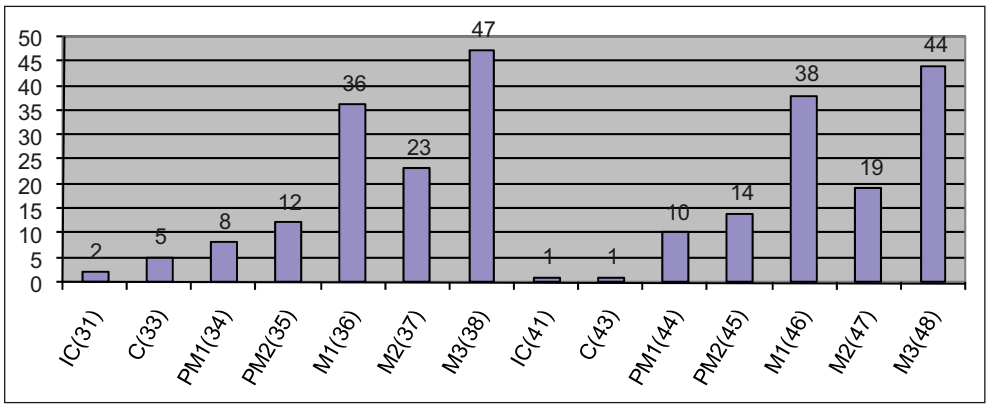

Table VII. Distribution of infetious emergencies according to mandibular causal teeth.
Tableau VII. Distribution des urgences infectieuses en fonction des dents mandibulaires responsables.

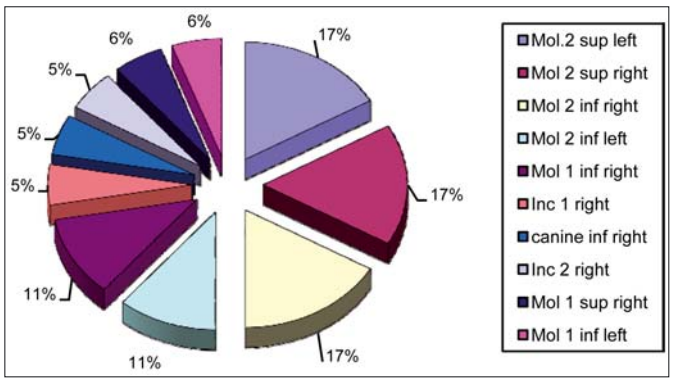

Table VIII. Distribution of infectious emergencies according to causal temporary teeth.
Tableau VIII. Distribution des urgences infectieuses en fonction des dents temporaires responsables.

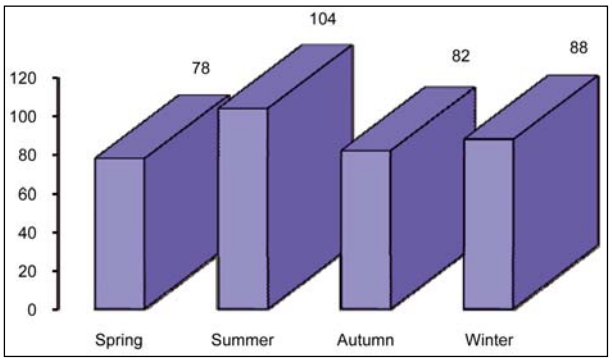

Table IX. Distribution of infectious emergencies according to the seasons.
Tableau IX. Distribution des urgences infectieuses selon les saisons.

Distribution according to the period of the year

Dental cellulitis and other oral infections are uniformly distributed all over the year. Nevertheless, in our sample, a slight prevalence in summer is noticed (Table IX).

Methods of treatment

100% of the patients had an antibiotherapy combined with a therapeutic operation in 23% of the cases. This emergency surgical act consisted of an incision for a drainage, an avulsion or a pulpar opening of room. Moreover, 12 patients from our sample group were hospitalised, i.e. 3.4%.

Discussion

As results show it, a third of the patients consulted the Service of the odontological emergencies at the Dijon hospital for infectious complications. In 2001, Ngapeth et al. found a prevalence of 14.63% on their retrospective study of 1100 patients carried out over 4 years [2]. Just like the literature, our study finds a majority of infectious problems concerning the male sex (Fig. 1). In the same way, Ngapeth-Etonudi et al. reported 62% of the infectious complications for the male sex against 38% for the female sex [2]. On their retrospective study undertaken on 13 cases of cellulitis, Potard et al. noticed 4 women (31%) against 9 men (69%) [3]. The proportion of men in the various series varies from 54% in the study of Romain et al. with 11 cases [4] to 80% in the study of Ennouri et al. with 20 cases [5]. On the other hand, Hunt et al. found a female prevalence of 59% against 41% of men [6]. And also, in his study carried out with Lomé university hospital center between January 1, 1987 and December 31, 1989, Kpemissi put forward a female prevalence, with 15 patients of the female sex (58%) against 11 patients of the male sex (42%) [7]. As for Wang et al. in 2002, their study highlighted a male prevalence in the 184 examined patients, since 122 men against 62 women consulted [8]. In the comparative study of Storoe et al., in the eighties, 45 men against 34 women (56.9%) developed an infectious

Fig. 1. Collected cellulitis caused by 36.
Fig. 1. Cellulite collectée due à la 36.

Fig. 2. Submylohyoïdien cellulitis.
Fig. 2. Cellulite submylohyoïdienne.

Fig. 3. Maximal opening mouth in the patient in Figure 2.
Fig. 3. Trismus serré et état bucco-dentaire du patient de la Figure 2.

complication, and in the nineties, they were 40 men against 31 women (56.3%) [9].

Kannangara et al. reported a male prevalence in their study with 66% versus 34% women [10]. The retrospective study of Dodson et al. carried out on 113 children consulting for an infectious odontological urgency also noted this prevalence for the male sex (59% against 41%) ([11]. A better immunizing system in women was put forward in other articles [10, 12]. It would seem that the female immunity is of better quality. They have more balanced food hygiene. Indeed, they usually consume many dairy products since their youth. Moreover, they present less excess weight than the male sex and bring more vitamins to their food, thus reinforcing their immune system. But only a good immunity cannot explain this prevalence. The other possible hypotheses would lie in the daily concern of their oral hygiene and especially their health. They look after their teeth more easily and have a more rigorous follow-up in the odontological prevention and care in their everyday life. However, concerning the physiological states, some linked infectious episodes can be found. In our study, three pregnant women presented a cheek cellulitis. Thus, the pregnancy seems to be a factor supporting the development of a latent infection.

The distribution of our sample according to the age enables to identify a peak towards the second and third decades (Figs. 2 and 3). In comparison, the average age of the study of Ngapeth-Etonudi et al. is around the 30 years with a variation from 3 to 88 years [2]. In a rather traditional way in the literature, it appears that the infectious accidents are particularly frequent in the age bracket from 20 to 30 years [4]. However, the average age of the various series remains rather variable: 27 years for Romain et al. [4], 28 for Kpemissi et al. [7], 32 for Storoe et al. [9], 45 for Sethi and Stanley [13], 46 for Jezequel et al. and Ennouri et al. [5, 14]. In their study, Kannangara et al. found much more patients in the 20–29 year-old section [10]. As for Dodson et al., from their study, they put forward an average age of 4,5 years [11] (Fig. 6).

Distribution according to the infectious stage

Just like ours, the study of Ngapeth-Etonudi et al. bearing on 161 patients finds a prevalence of abscesses (54%) against cellulitis (33%) (Fig. 4). Some subjective causes responsible for these emergencies can be advanced such as the negligence of oral hygiene, the fear of the odontologist and the increasingly frequent self medication. Indeed, a misuse of anti-inflammatory antibiotics or worse delays a good assumption of responsibility and leads to extremely serious complications like sepsis or coma.

Infected group teeth

In this study, the mandibular teeth are a predilection source of infectious complications (63.1%) (Fig. 1). Storoe

Fig. 4. Periodontal abcess regarding vestibular face of 27.
Fig. 4. Abcès parodontal vestibulaire sur 27.

et al. also shared this view [9]. Whatever the etiology of the infectious urgency, the mandibular dental arch is most frequently reached.

Causal teeth

Chow et al. discussed the potential ways for the spreading of the infection and how these odontological infections more generally imply the mandibular molars [15]. Indeed, the explanation is in the anatomical position of these molar apexes. At the mandibular level, the first molar is in axial position. In front of it, all the teeth are closer to the external table and behind, they are near to the internal table. We can notice that the apexes of the two last molars are located at the lower part of the line of mylohyoïdien's insertion. Thus, the infections resulting from the molars can reach the cervical area directly where the paratonsil area constitutes a strategic crossroads for the mediastinal dissemination [1].

Our study highlights the importance of the infectious emergencies caused by the mandibular molars (Fig. 5). Various authors have advanced the same idea: the mandibular molars are the teeth most frequently responsible for odontological infections [13, 16].

The only causal tooth responsible for a significant difference between the 80s and 90s is the first left mandibular molar [6].

According to Vuillecard et al. [17] and Romain et al. [4], the most often responsible teeth are the lower molars too (37, 38, 47, 48). We realize that the first molar (16 and 26) is as frequently implied as the second and third molars.

Fig. 5. Masseterin cellulitis.
Fig. 5. Cellulite massétérine.

Fig. 6. Cellulitis caused by 53.
Fig. 6. Cellulite due à 53.

Third molars

In our study, 28% of the infectious emergencies, all confused arcades, are connected to the third molars. Besides, we find 13.2% of the third jawbone molars against 35% of third mandibular molars (Figs. 7 and 8).

Fig. 7. and 8. Cellulitis caused by an accident of evolution of 38.
Fig. 7. et 8. Cellulite due à un accident d'évolution de la 38.

A retrospective analysis of troop of 1.972 soldiers posted at the air base of Seeb, Sultanate of Oman, was carried out during a deployment from March to September 2002. Hundred thirty-five dental visits of help were recorded, corresponding to a rate of 137 dental emergencies for 1.000 soldiers per year. The majority (34.8%) were due to a decay. The pain in the third molars was the second common reason to visit the dental private clinic (19.3%) [18].

Supporting factors

The study of Potard et al. found the existence of a supporting factor in 7 cases out of 13 (53%): it was about the NSAI catch (3 cases), corticoid catch (2 cases), diabetes (2 cases), and a therapeutic immunodepression (hemopathy) [3]. The anti-inflammatory drugs appear from now on to exceed diabetes and to become the factor of risk more found in the genesis of the cervico-facial cellulitis [3].

Seasonal variations

There is a slight increase in the infectious accidents in the summer. The retrospective study of Harlfinger et al. carried out on 596 odontogenic acute abscesses treated from 1974 to 1978 in the dental private clinic of Freiburg and evaluated from the medical weather aspect (decimal system) found a coincidence in the results. There are more abscesses to be developed during the transition from the anticyclonic atmospheric conditions to the cyclonic conditions with the intensified advection of hot air. On the other hand, the advection of cold air affects the abscesses which are distinctly reduced [19]. These results are discussed. Thus, the results of the study of Meningaud et al. in 1997 carried out in 301 patients suggested that the appearance of an odontogene cellulitis is not influenced by the weather, at least according to the temperature and the atmospheric pressure [20]. Another study sought any correlation between the heating effects of the weather and the frequency of the odontogenic infections, especially according to the felt temperature (WP); 2111 patients between 1992 and 1996 underwent this retrospective study. They had an incision because of a collected odontogenic infection. Each case was correlated with the weather data of Aachen. Then, these data were gathered and calculated by the "Deutsche Wetterdienst". In order to describe the heat change which influences the human organization and the environment in a significant way, the WP was selected. The WP is the temperature felt by humans. It is a complex weather parameter calculated through factors such as the wind, the solar radiations which enable to evaluate the thermal environments of humans. During the whole study, there was no impressive correlation between the WP and the frequency of the odontological infections. Nevertheless, there is a statistically significant negative correlation between the values or the changes of the WP and the frequency of the odontogenic infections in winter and less in spring. Statistically, a similar significant correlation could not be found for summer or fall [21].

Treatment

The therapeutic assumption of responsibility comprises three principal and indissociable shutters, that is to say the surgical treatment, the antibiotherapy and possibly, the stay in the intensive care unit [1].

The speed of the treatment is a major forecast criterion [1]. An antibiotherapy with a broad, prolonged and

parenteral spectrum must be found in emergency and, if it is possible, after doing a bacteriological aero-anaerobe test (preferably by transcutanous puncture) and another one of the hemocultures and secondly, must be adapted to the result of the latter. It will be with the probabilistic departure aiming at the streptocoque ones and the commensaux strict anaerobes [1].

The therapeutic attitude is established on an individual basis, according to the context of the whole data of the clinical examination and the complementary examinations. This differs little from the attitude mainly recommended in the literature, associating penicillin with the metronidazole [1, 4, 5, 17]. For Ennouri et al., the association with the aminosides is systematic [5]. The association metronidazole and penicillin is the antibiotherapy most often proposed at first. The duration of the antibiotherapy was for the majority of our patients is equivalent to the duration of hospitalization. In the literature, it remains badly codified and is generally a function of the locoregional evolution. The surgical treatment is the key to therapeutic success. The therapeutic principle is to carry out a broad access of cellulous place of the neck, the face and the mediastin if it is reached [3]. This allows the necrosed exerese tissues (provider of functional side-effects), the drainage of the purulent gatherings, the oral floor, and the mediastin if need be, and the treatment of the etiology. Profuse washings with iodized povidone hydrogen peroxide are carried out and will be continued in a way prolonged into postoperative by blades of drainage [3, 5].

A weakening of immunizing defenses must be suspected given the frequent self medication of the patients with antiinflammatory drugs for benign pathologies like cephalalgias instead of level-1 analgesics, and must be supported by the campaign made with these molecules and the recent free access to these on the market. A recrudescence of the virulence of the germs is also suspected, favored or not by the increasingly resistance to antibiotics.

It is necessary to prevent the evolution of any periapical infection or all pericoronaritis towards a more important infection by a preventive treatment, including a regular follow-up at the odontologist, a good oral hygiene and especially the absence of self medication by the NSAI for the "toothaches", as for the oropharynx and salivary gland infections, especially in the absence of appropriate antibiotherapy [3].

Storoe et al. carried out a retrospective and comparative study between two groups of populations having presented an infectious urgency. The groups were selected according to the year. Thus, the first group comprises 86 patients having consulted during the 80s and secondly, 73 during the 90s. They did not find any significant differences in the characteristics of assumption of therapeutic responsibility. On the other hand, the prevalence and the type of insulated bacteria are different [9].

137 patients (74.5%) of the study of Wang et al. carried out in 2002 had an operation which included a repeated needle aspiration (for 63.5%) and a surgical drainage (for 36.5%). 34.3% received only antibiotherapy. 18 patients developed complications such as a downward mediastinitis, a septicemia, an obstruction of the air ways and a thrombosis of the jugular vein. Two people died of septic shock [8].

Conclusion

The decays or periodontal complications are frequent causes for the development of the cervico-facial cellulitis. The sometimes associated trismus is explained by the bacterial diffusion with the chew muscles: pterygoïdiens, masseters and buccinateurs. Any cervico-facial tumefaction must be the subject of a detailed attention from the emergency team. These abscesses and cellulitis are due to the proliferation of aerobic and anaerobic germs present in the oral flora, generally starting with a decay or a necrosed pulpar. A bad assumption of responsibility can sometimes involve rather serious prognosis.

A precise diagnosis combined with an effective antibiotherapy and surgical incising enable to expect good curing in most of the cases [10].

Competing interests: none

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