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Evolution and prognosis of severe cervicofacial cellulitis in a Cameroonian secondary hospital

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ABSTRACT

Background: Severe cervicofacial cellulitis is a fatal condition with a poor prognosis. It has a relatively high frequency in underdeveloped countries, and its treatment remains a challenge. This study aimed to document and evaluate severe cervicofacial cellulitis patterns observed in a secondary hospital in Cameroon.

Methods: A descriptive and prospective study was carried out in the Odontostomatology Department of the Garoua Regional Hospital, Cameroon. All patients with severe cervicofacial cellulitis were recruited between December 2020 and February 2021. The data concerning population analysis (age, sex), clinic (risk factors, symptoms, signs, aetiologies, evolutionary stages), treatment (medical, surgical, their evolution), and prognosis were analyzed.

Results: Out of the total consultations, 45 cases (13.76%) of severe cervicofacial cellulitis were diagnosed, and 55.55% were females. The mean age was 32.6 years. According to the severity criteria, 24.44% of cases had extremely high severity, and 33.33% of high severity cases. The treatment consisted of antibiotics (100%), surgical debridement (91.11%), etiological treatment (82.35%), short-course corticosteroids (46.67%), and supportive treatment (100%). Complications occurred in 13.33% of cases. The evolution was favorable in 95.56% of cases. The death rate was 4.44%.

Conclusion: Severe cervicofacial cellulitis remains alarming because of its life-threatening potential. An adequate treatment is required to have an evolution with little or no complications. Their prognosis remains strongly reserved with comorbidities.

KEYWORDS

Cervicofacial cellulitis; Cameroon; Prognosis; Infection; Sepsis

ARTICLE HISTORY

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Introduction

A cervicofacial cellulitis occurs when the cellular adipose tissue within the aponeurotic spaces of the neck and face becomes infected [1]. These contaminations can spread and cause severe complications such as airway obstruction, mediastinitis, cavernous sinus thrombosis, sepsis, thoracic empyema, and cerebral abscess [2]. It is important to balance the patient's condition with microbial factors to prevent the infection spread. Host resistance is determined by the germ's virulence as well as the local and systemic conditions of the patient. Thus, several systemic conditions, such as chronic alcoholism, decompensated diabetes mellitus, and HIV/AIDS disease, can alter the immune system, favoring the spread of the infection [3,4].

Because of the severity of the complications, these infections can be life-threatening conditions. They are, therefore, a medical surgical emergency. The treatment of choice is a combination of rapid surgical drainage, proper medical treatment, and careful patient monitoring in an intensive care unit [5,6]. The increased infection severity and the complication incidences can extend hospitalization duration, complicate surgical management, and lead to increased demand for Special Care Units [4,5]. The prognosis remains poor, with a mortality rate reaching 42% for the extensive forms [7]. This study aimed to identify the outcome of treatment of severe cervicofacial cellulitis in a secondary hospital in Cameroon.

Methodology

Patient recruitment

A prospective and descriptive study was conducted of all cases of severe cervicofacial cellulitis seen at the Department of Odontostomatology of the Garoua Regional Hospital (Cameroon) from December 2020 to February 2021. This hospital had the main stomatology referral unit of the North Region of Cameroon during the study time period and was then considered the highest level of medical care concerning the oral and maxillofacial pathologies in this part of the country.

Collection of data

The data collected were age and sex, risk factors, causes, signs and symptoms, evolutionary stage, severity criteria, treatment carried out, evolution, complications, and prognosis. Anatomic location, fever, aphagia, sepsis, dyspnoea, dysphagia, and necrotic stage were the severity criteria used in this study. They were graded separately in 4 stages: lower,

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moderate, high, and extremely high risk.

Flynn and col classification was used for anatomic location gradings. It takes into consideration the degree to which the respiratory tract is impaired along with the vital organs and structures, such as the cranial contents, heart, and mediastinum [8].

Pineau and Jackson classification was used to grade dyspnoea, which categorizes dyspnoea in 4 stages per the five criteria of skin coloration, arterial blood pressure, pulse rate, consciousness, and the intercostal draw.

The severity of dysphagia was based on the swallowing of the hardest food by the patient. It was adapted from the International Dysphagia Diet Standardization Initiative (IDDSI) as follows [9]: lower (soft diet or IDDSI 6), moderate (minced and moist diet or IDDSI 5), high (pureed and liquidized diet or IDDSI 3 and 4), extremely high (thin to mildly thick liquid or IDDSI 0 to 2).

The severity of the fever was obtained using Ogoina's published classification [10]. The diagnosis of sepsis was made with regard to the Sepsis-2 International Consensus. According to this definition, sepsis is a host's systemic inflammatory response syndrome to an infection [11]. The overall severity score was obtained as follows:

Lower: One or more criteria with lower severity, except dysphagia + dyspnoea

Moderate: One criterion with moderate severity, or Low severity of dysphagia + Low severity of dyspnoea

High: One criterion with high severity, or at least two criteria with moderate severity

Extremely high: One criterion with extremely high severity, or at least two criteria with high severity, or Aphagia, Sepsis, or Necrotic stage

This study considered severe cases of cervicofacial cellulitis when the overall severity score was moderate, high, or extremely high. Patients who had lower severity scores were excluded.

Patient management

The patient was examined clinically upon admission, and emergency treatment was initiated immediately. Intravenous treatment was administered to the patients until the severity score was reduced. The treatment was then continued orally until the patients were fully recovered. When pus collection or necrosis was observed, surgical debridement was started. The debridement of patients with these evolutionary stages was done on admission after an initial dose of 2g of amoxicillin + 500mg of metronidazole was given 30 minutes earlier. A daily evaluation of clinical signs and symptoms was conducted.

Ethical consideration and statistical analysis

The study was designed following the guidelines of the Declaration of Helsinki, as amended in Edinburgh 2008, and was approved by the Institutional Ethical Review Board of the Faculty of Medicine and Biomedical Sciences, Yaounde, Ref Number No 102/UY1/FMSB/VDRC/CSD. Informed written consent was taken from all patients.

SPSS 20.0 software was used to analyze the data. The average was calculated for quantitative data and the percentage for qualitative ones.

Results

Out of 88 cervicofacial cellulitis observed during the study period, 45 were severe (51.13%), and prevalence was seen in 13.76% of the 327 patients consulted. There were 25 (55.6%) females and 20 (44.4%) males. The mean age was 32.55 years, ranging from 9 to 70 (Figure 1). The unemployed were 29 (64.44%), and those living in rural areas were 35 (77.78%).

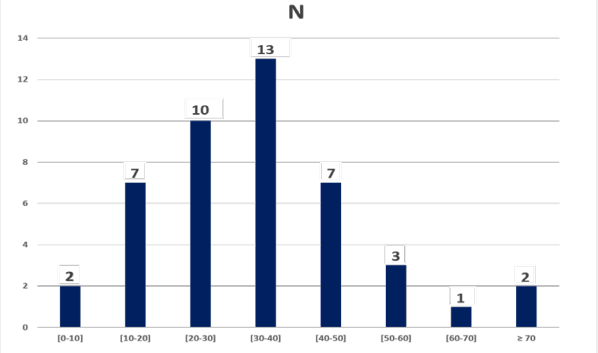

Figure 1. Distribution of the population according to age groups.

The main contributing factors were nonsteroidal anti-inflammatory drugs (NSAIDs) intake in self-medication in 28 cases (62.22%), traditional herbs medications in 24 cases (53.33%), diabetes in 6 cases (13.33%), and HIV infection in 3 cases (6.67%). The average consultation time was 5.2 days, with extremes of 2 and 13 days. With regard to the duration, it was acute in 43 cases (95.56%), and chronic in 2 cases (4.44%). Swelling and pain were found in all patients. The aetiology was odontogenic in 42 cases (93.33%) and secondary to a mandibular fracture in 3 cases (6.67%). According to the stage of evolution, 26 cases were suppurative (57.78%), 10 cases were serious (22.22%), and 9 cases were necrotic (20.00%) (Figure 2). Submandibular location was primarily found in 34 cases (75.56%) (Table 1). According to the overall severity score proposed, 11 cases had extremely high (24.44%), 15 cases had high (33.33%), and 19 cases had moderate (42.22%) severity. The compromised anatomic locations in 31 cases (68.89%) and the severe dysphagia in 21 (46.6%) were the most severe criteria (Table 2). The antibiotic therapy was probabilistic in all patients. It consisted of Amoxicillin-Clavulanate in 3 cases (6.67%), Amoxicillin-Clavulanate + Metronidazole in 40 cases (88.89%), and Ciprofloxacin + Tinidazole in 2 cases (4.44%). The daily posology in adults was 1g x 3/day for Amoxicillin (those with high or extremely high overall severity score received 2g x 3/day during the first 2 days), 500mg x 3/day for Metronidazole, and 500mg x 2/day for Ciprofloxacin and Tinidazole respectively. In children, it was 80mg/kg/day and 30mg/kg/day, respectively, for Amoxicillin-Clavulanate and Metronidazole. Corticosteroids were administered during 3 to 5 days in 21 patients (46.67%). It was methylprednisolone (1.5mg/kg/day intravenously) in 12 cases (26.67%), prednisolone (1mg/kg/day orally) in 6 cases (13.33%), and dexamethasone (8mg intravenously twice a day) in 3 cases (6.67%). In 40 patients (88.89%), surgical treatment consisted of a mechanical knife incision with daily pus evacuation, necrotic tissue debridement, and heavy washing with Dakin® and hydrogen peroxide, with the placement of a drainage slide (Figure 2). In all patients, it was done under local anesthesia.

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Table 1. Distribution of anatomic locations involvedagents.

Anatomic locations	N	%
Buccal	23	51.11
Labial	2	4.44
Orbital	10	2.22
Submandibular	34	75.56
Submasseteric	17	37.78
Sublingual	18	40.00
Submental	24	53.33
Temporal	10	22,22
Neck	21	46.67
Mediastinal	6	13.33

Figure 2. Severe cervicofacial cellulitis with an extension of necrotic tissues towards the right submandibular and the lateral cervical regions.

Table 2. Distribution of the severity criteria.

Scoring grades	Anatomic locations N (%)	Dysphagia N (%)	Aphagia N (%)	Dyspnoea N (%)	Fever N (%)	Sepsis N (%)	Overall score N (%)
Extremely high severity	6 (13.33)	4 (8.89)	8 (17.78)	0	2 (4.44)	2 (4.44)	11 (24.44)
High severity	15 (33.33)	9 (20.00)	0	6 (13.33)	2 (4.44)	0	15 (33.33)
Moderate severity	21 (48.89)	7 (15.55)	0	3 (6.67)	4 (8.89)	0	19 (42.22)
Low severity	2 (4.44%)	4 (8.89)	0	0	3 (6.67)	0	0
Total	45 (100)	24 (53.33)	8 (17.78)	9 (20.00)	11 (24.44)	2 (4.44)	45 (100.00)

Antibiotic therapy's average duration was 11.9 days, ranging from 6 to 30 days. There was no statistical difference between the different stages of evolution according to the duration of treatment. The dysphagia disappeared during the first week of treatment in 19 of the 21 patients taking corticosteroids and 6 of the 11 patients without corticosteroids. The dyspnoea was absent after 6 days in all cases, all of them taking corticosteroids. Complications occurred when there was poor compliance with the treatment. It consisted of cutaneous fistulae in 3 patients (6.67%), mandibular osteitis in 1 patient (2.22%), and septic shock in 2 patients (4.44%), one having sepsis on admission and the other having a decompensated diabetes mellitus. An unsightly scar in 6 patients (13.33%) marked aesthetic prognosis. One of them was reconstructed with a local transitional flap. A cure rate of 95.56% (43 cases) indicated a good prognosis. (Figure 3). In two cases of septic shock (4.44%), the patients died after 4 and 6 days, respectively.

Figure 3. Evolution of the same patient 7 weeks after the initiation of the treatment.

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Discussion

Severe cervicofacial cellulitis is important in head and neck pathology because of the fatal conditions they can represent. They are still frequent in underdeveloped countries, reaching an incidence of 48 cases per year in Brazzaville in 2020 [12]. In our series, severe cervicofacial cellulitis had a hospital prevalence of 13.76% and a monthly rate of 15 cases. This frequency seems to be high in the rural zones compared to the urban ones, as seen in Bouake (3.4 cases per month) [13], and Yaounde (2.6 cases per month) [1]. The high frequency of the severe forms among all the cervicofacial cellulitis in our series can be the result of socioeconomic factors. The great poverty observed in this part of the country and the high frequency of unemployment are probably the main factors of malnutrition observed. This malnutrition, with his immunosuppressive potential, was a contributing factor to the poor evolution of cellulitis. Moreover, the lack of trained healthcare providers in oral medicine in rural areas of underdeveloped countries and the poor technical support of the existing healthcare structures could encourage self-medication with nonsteroidal anti-inflammatory drugs and other traditional medicines. These drugs might aggravate a pre-existing odontogenic infection without adequate antibiotic therapy.

Most severe cervicofacial cellulitis cases are of odontogenic origin, but they can also arise from a traumatism, a peritonsillar infection, a tumor, or a cutaneous wound. Their clinical features are mostly dominated by an inflammatory cervicofacial swelling, with complications such as a compromised airway, diffused necrosis, a thoracic spread, or sepsis [13-15]. The main location in the submandibular and cervical regions can explain the dysphagia/aphagia observed in 71.11% and dyspnoea in 20% of our series. These symptoms alert the practician on the upper aerodigestive tract status. Fever and anatomical locations were investigated to assess the severity of cervicofacial cellulitis and the presumed duration of hospitalization [14]. Moreover, necrosis and septic shock have been associated with a high mortality risk [13,16]. Thus, they can be considered as severity factors of cervicofacial cellulitis, and their assessment should take an important place in the initial evaluation of the severity of the pathology.

The management of severe cervicofacial cellulitis is a combination of adequate medical and surgical treatment. The need for early probabilistic antibiotic therapy is supported by the potential for these infections to rapidly degenerate into life-threatening conditions. The choice of the initial antibiotics is based on the data of the literature that reveal the presence of a bacterial polymorphism. The use of beta-lactams and metronidazole is the first choice, but it should be adapted to the bacteriological exams [15-17]. High doses of amoxicillin are recommended on first intention and should be associated in severe cases with metronidazole [18]. In the absence of trained laboratories in this geographical area and with financial difficulties in sending biological samples to foreign ones, bacteriological examinations were unavailable. Thus, the high doses of amoxicillin were preferred in the early presentation of the pathology, and then this posology was reduced to avoid toxicity and organ failure in the absence of well-equipped Intensive Care Units.

The maintenance of the patency of the airways can be achieved by a surgical means of tracheal intubation [15,19]. But corticosteroids were used intravenously, such as methylprednisolone or dexamethasone, for experiments by some authors to maintain airway integrity. They can reduce the edema, thus representing an alternative to tracheal intubation in the context of a lack of an appropriate technical board [1,12]. Their morbidity influence or the mediastinal extension risk has been suspected but never demonstrated.

The surgical debridement of the infected site will decrease the local bacterial load. This is well achieved by an opening of the anatomic spaces involved and daily irrigation with an antiseptic solution [3,16,17]. Since the face and neck's deep faces communicate with each other, it is important to drain the collection early to prevent its spread. This was well achieved in our series with daily irrigation with Dakin® and hydrogen peroxide. After the suppuration stopped, we used isotonic saline solution until the healing of the wound.

The mean duration of the antibiotic therapy varies from 1 to 3 weeks, but it can be more [3,5,15]. It depends on the severity and the evolution of the infection. The evolution of the airway obstruction shows a difference with or without corticosteroids. It regressed more rapidly when the corticosteroids were added to the medical treatment, suggesting their additional effect on the reduction of the edema. This was marked by the reduction of the dysphagia or aphagia during the first week observed in 90.48% of patients taking corticosteroids and just in 54.55% of those without it. Under appropriate antibiotic therapy, an adequate supportive treatment, and a good surgical debridement, the risk of infection's extension due to the corticosteroids seems to be very low, rendering their use in short-course administration more efficient.

Many complications of severe cervicofacial cellulitis are reported by authors, such as cutaneous or pharyngeal fistulas, sepsis or septic shock, osteitis of the jaw, thoracic and intracranial diffusion, venous thrombosis [16,17]. They were observed in our series when the treatment was not respected and was the cause of death in 4.44% of cases. They compromise the prognosis of the patient and increase the demand for monitoring in an intensive care unit [20]. The unsightly scars were observed in cases of necrosis with tissue loss and were associated with a poor aesthetic prognosis in 13.33% of cases. The vital prognosis was good in 95.56% of cases, suggesting that severe cervicofacial cellulitis, when treated adequately, is less dangerous than what it seems to be at the admission of the patient.

Conclusions

Severe cervicofacial cellulitis has the potential to directly affect vital functions by obstructing the respiratory tract or by spreading to nearby noble organs. Their management is still a challenge in underdeveloped countries because of the lack of technical and financial support. This requires a good planning of available medical and surgical resources, as well as an optimal follow-up for early detection of any complications. Their prognosis remains strongly reserved in the presence of comorbidities or poor compliance with the treatment.

Disclosure statement

No potential conflict of interest was reported by the authors.

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