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Research Article

Involved Factors of Occurrence of Odontogenic Cervico-Facial Cellulitis: A Case-Control Study

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Abstract

Objective: To determine the sociodemographic and behavioral factor vis avis tooth decay for the occurrence of cervico-facial cellulites.

Materials and Methods: This is an control-case study in the "University Hospital of Mahajanga" from January 2015 to January 2017. This study included patients with cervico-facial cellulitis and tooth decay vs patients with tooth decay alone.

Results: 79 patients were included against 158 control cases. Sex ratio of 1.2, the mean age was 33.4-year-old (+/- 16.4). Stable work status constitutes a protective factor for the occurrence of cervico-facial cellulitis OR = 0,43 [0,22 - 0,44], p = 0,015. Rural zone with OR = 5,10 [2,86 - 9,12], self-medication OR = 4,69 [2,57 - 8,54], antibiotics OR = 3,96 [2,17 - 7,26] were contributing factors. Poor oral hygiene and anti-inflammatory agents are highly associated with the cervico-facial cellulitis.

Conclusion: This study exhibits the importance of sociodemographic and behavioral factors in determining the occurrence of cervico-facial cellulitis among patients with tooth decay. Prophylactic measures would be highlighted for the management of this unsafe pathology.

Keywords: *Anti-Inflammatory; Tooth Decay; Cellulitis; Oral Hygiene; Self-Medication*

Abbreviations

OR: Odds-Ratio; IC: Interval of Confidence; N: Number; PZaGa: Professeur Zafisaona Gabriel

Introduction

Cervico-facial cellulites is a celluloadipose tissue disorder extended into the face and neck related to a dental infection in 56,1% to 95% [1]. This condition can be life-threatening by its extension into the mediastinum. Untreated tooth decay is the most prominent cause in Africa (79 - 90%) [2], otherwise other pathologies may contribute, such as tooth extraction, periodontal disease, pericoronitis, endodontics, dental traumatism.

Cervico-facial cellulitis have their common infection gateway, easy to prevent and needs multidisciplinary management [3]. Contributing factors in most of the cases, according to the descriptive study are self-medication with anti-inflammatory drugs, poor oral hygiene and immunosuppression [3-5]. Correlations between these different factors and occurrence of cellulitis are beyond the scope of the present study.

Objective of the Study

The main objective of this study is to determine the sociodemographic and the behavioral factors face to teeth decay which progress into Cervico-facial cellulitis.

Materials and Methods

This is a control-case study, carried out in the Professeur Zafisaona Gabriel (PZAGa) University hospital of Mahajanga, Madagascar, the only reference universitary hospital center for ENT, Head and Neck department of the Boeny Region, from January 2015 to January 2017. Individual inquiry cards respecting the anonymity and confidentiality were used to collect data. Inclusion criteria were the age of 15-year-old or above and presented Cervico-facial cellulitis with tooth decay as the main infection's gateway. The population-based control study was patients with caries of 3rd degree or more. In this study, one case vs two control patients were used.

Patients were retained in the exhaustive way at the ENT, Head and Neck surgery department of the Professeur Zafisaona Gabriel University hospital of Mahajanga, controls were sampled randomly. Each patient has been requested to fill individual inquiry card. Datas were treated by using 2pi info 7.2, associating measurement of the odds-ratio (OR) with its confidence interval of 95%, OR above 1 means high risk factor, while OR less than one constitutes protective factor. When OR is 1, no conclusion was taken. Statistical calculation was Khi2 test in which p value < 0,05 was significant.

Results

Our study lasted 36 months period, 79 Cervico-facial cellulitis related to tooth decay were detected, representing the 94.4% of the all Cervico-facial cellulitis in the university hospital PZAGa of Mahajanga, Madagascar. Control case study population were 158. Predominance of male gender was noticed with sex ratio of 1.2. Mean age (± standard deviation) was 33.4 (± 16.4). Table 1 represent the distribution gender and age group, table 2 and 3 represent the analyses of sociodemographic and behaviour factors of patients.

Monthly income for the patients with Cervico-facial cellulitis related to dental caries were very low compared with controls p = 0.002, higher level of education than primary was noticed as protective factor for Cervico-facial cellulitis with OR 0,44 [0,25 - 0,77] p = 0,005. Patients living in the area more than 50 km from the university hospital of Mahajanga were 58.9% vs 28.5 for the controls.

Gender Age (year-old)	Male n (%)	Female n (%)	Total n (%)
15 - 24	7 (15,9%)	6 (17,1%)	13 (16,5%)
25 - 29	16 (36,3%)	8 (22,8%)	24 (30,3%)
30 - 44	12 (27,2%)	8 (22,8%)	20 (25,4%)
45 - 49	3 (6,8%)	7 (20%)	10 (12,6%)
50 and above	6 (13,6%)	6 (17,1%)	12 (15,2%)
Total	44 (55,7%)	35 (44,3%)	79 (100%)

Table 1: *Distribution of cases by gender and age group.*

	Cases	Controls	OR [IC à 95%]	p
Monthly income (stable job)				
Yes	15 (18,9%)	55 (34,8%)	0,43 [0,22 - 0,44]	0,015
No	64 (81,0%)	103 (65,2%)		
Profession requiring significant physical efforts				
Yes	48(60,7%)	87 (55,0%)	1,26 [0,72 - 2,18]	0,48
No	31 (30,7%)	71 (44,9%)		
Educational status (limited at primary school or not educated)				
Yes	44 (55,7%)	57 (36,08%)	2,22 [1,82 - 3,86]	0,005
No	35 (44,30%)	101 (63,92%)		
Location: from the rural zones				
Yes	49 (62,0%)	39 (24,2%)	5,10 [2,86 - 9,12]	0,000
No	30 (38,0%)	122 (75,8%)		

Table 2: *Sociodemographic factors associated with the occurrence of odontogenic cervico-facial cellulitis.*

	Cases	Controls	OR [IC à 95%]	p
Tobacco use				
Yes	30 (37,97%)	81 (50,31%)	0,60 [0,34 - 1,04]	0,096
No	49 (62,03%)	80 (49,69%)		
Irregular brushing teeth				
Yes	73 (92,4%)	60 (37,3%)	20,48 [8,39 - 49,95]	0,000
No	6 (7,6%)	101 (62,7%)		
Yearly dental check up				
Yes	5 (6,83%)	22 (13,92%)	0,41 [0,15 - 1,14]	0,083
No	74 (93,67%)	136(86,61%)		
Self-medication				
Yes	59 (74,7%)	61(38,6%)	4,69 [2,57 - 8,54]	0,000
No	20 (25,3%)	97(61,3%)		
Traditional management				
Yes	21 (26,5%)	32 (20,2%)	1,42 [0,75 - 2,68]	0,32
No	58 (73,4%)	126 (79,7%)		
Anti-inflammatory agents use				
Yes	75 (94,9%)	110 (69,6%)	8,18 [2,83 - 23,64]	0,000
No	4 (5,1%)	48 (30,4%)		
Antibiotics use				
Yes	60 (75,9%)	70 (44,3%)	3,96 [2,17 - 7,26]	0,000
No	19 (24,1%)	88 (55,7%)		
Immunosuppression				
Yes	19 (24,1%)	33 (20,5%)	1,22 [0,64 - 2,33]	0,645
No	60 (75,9%)	128 (79,5%)		

Table 3: *Behavioral factors of patients associated with the occurrence of odontogenic cervico-facial cellulitis.*

Among smoking patients, 40% used chewing tobacco vs 32.1% of controls p = 0.437. Brushing of the teeth for 2 or more times a day constitutes a protective factor OR = 0,04 [0,02 - 0,11], p = 0,000.

The most anti-inflammatory agents taken were Ibuprofen (54,6%), Diclofenac (28%), ketoprofen (10,6%), prednisolone (5,33%). Difference between our cases and controls was not significant p = 0.85. Antibiotics such as penicillin was used in 45%, in association such as ampicillin-Gentamicin in 26.6%, Amoxicillin in 16.6%, and Ceftriaxone in 11.6%.

Among patients with immune issues, 57.8% are diabetics, 26.3% pregnant and 15.7% have HIV.

Discussion

Odontogenic Cervico-facial cellulitis interests young adult and male gender (Table 1) the same as other authors findings in Madagascar and other countries in Africa [4,6-9].

Occurrence of Cervico-facial cellulitis in the male gender is associated with poor oral hygiene, smoking and, fear of dental care delays the odontological check up. Otherwise, female gender has a good immune response [4]. Young age associated to CFC were reported in many African literatures with mean age of 30.36-year-old and 34-year-old. Paradoxically, in Europe, mean age was much older, 49 [3] to 50-year-old, with extremes ranging from 17 to 93 year old. This might be related to the age of the population relatively young in Africa.

Low financial status delays dental check up and dental care. Cervico-facial cellulitis is frequently found in unemployed and those who had work requiring significant physical effort in Mali [11] and in Madagascar [12] without established correlation. Keita., *et al.* [13] noticed that only after failure of traditional treatment, patients went to hospital. Stable job status with monthly income constitutes protective factor. Despite the high cost of dental care in this country, a monthly salary would provide better health and food coverage improving living conditions.

In this study, patients from rural areas are 5.10 times exposed to cellulite as the controls, in Antananarivo [12] 81.6% and 94.7% in Mali [11]. Distance was pointed as responsible of delay in management, accentuated by lack of health care centers in the rural zones. Again, remember that the university hospital of Mahajanga is the only place of reference managing Cervico-facial cellulitis in the region of Bony.

Smoking were frequent for the control study population but there was lack of evidence. The use of chewing tobacco contributes to a poor oral hygiene. Nicota., *et al.* founds no relation was established in the use of tobacco and the occurrence of Cervico-facial cellulitis. But smoking was associated with diffusion of the pathology into the mediastinum. For Rouadi., *et al*. [7], smoking constitutes the second risk factor just behind diabetes. Tobacco changes the oral flora, deteriorates the gum vascularization, responsible for the fragility of the latter which would make it vulnerable to the occurrence of odontogenic cellulitis [7,14].

Poor oral hygiene with lack of annual dental check up are the principal factors of dental infection complications as cellulitis [1,14]. This precarious oral hygiene would also be favored by a low level of schooling [13,15]. In this study, irregular dental brushing increases up to 20.48 folds the risk of Cervico-facial cellulitis occurrence. Mostly, this precarious oral hygiene train tooth decay which is the main etiology of Cervico-facial cellulitis. Improvement of oral hygiene education will constitute already a consistent attitude to prevent a Cervico-facial cellulitis.

The use of anti-inflammatory agents in the treatment of toothache has been considered to be a factor favoring the occurrence of cervico-facial cellulitis, however without a significantly established correlation [4,6,14]. Other authors have shown that there is no influence of anti-inflammatory on the occurrence of cellulite on unrepresentative sampling. Through this control cases study, taking Anti-inflammatory exposures 8.18 times more cases to the occurrence of cervical cellulitis compared to controls. Taking anti-inflammatory drugs

alone as an analgesic drug delays the consultation and creates local immunosuppression by attenuating the body's defense phenomena, namely inflammation. This results in virulence of the germs responsible for cellulite [13,16]. Their use alone in front of a toothache should be avoided.

The use of Broad-spectrum antibiotic for toothache is expected to minimize the risk of serious complications of dental infections [17]. However, poorly adapted antibiotic either by the molecule used or by its dosage, plays a role in the occurrence of odontogenic cervico-facial cellulitis by generating resistant germs. This kind of antibiotherapy allows a low noise evolution of these lesions, which delays the management. Antibiotherapy in this study was 3.96 times more likely to be associated with Cervico-facial cellulitis than for controls. This maladjustment is due to self-medication by antibiotic alone or in combination with anti-inflammatory or a lack of updated knowledge of health personnel on the management of oral pathologies.

Immunosuppression promotes the onset of cellulitis during a dental infection [16]. Although we have not been able to conclude on the imputability of immunosuppression, diabetes is a factor frequently associated with the occurrence of cervico-facial cellulitis [7]. Diabetes lowers host resistance promotes the development of the pathogen even if it is not very virulent and allows the initially minimal infection to proliferate and spread rapidly, locally and even remote. In pregnant women, in addition to decreased immunity, cellulite is favored by pregnancy gingivitis secondary to hormonal changes and demineralization of the alveolar bone. Hence the importance of promoting oral hygiene in these two immunocompromised sites [18].

Conclusion

Odontogenic Cervico-facial cellulitis is a serious pathology affecting especially the young adult man. The low standard of living and remoteness are the socio-demographic factors involved in their occurrence. Poor oral hygiene, taking anti-inflammatory and self-medication antibiotics in front of toothache are behavioral factors established at Mahajanga university hospital. These are accessible to the prevention of the occurrence of odontogenic cellulitis.

Conflict of Interest

We declared that there was no conflict of interest in this study.

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