

Factors Affecting the Outcome in the Management of Cervicofacial Infection

Mohammed Kamal Abbas Rashwan MSC, Tarek El Sayed ftohy MD, Ahmed Essa Ahmed MD, Kamal A-A.M. Hassanein ELSherkawy FRCS,Ph.D.

Corresponding author: Mohamed Kamal Abbas Rashwan, Faculty of medicine, Sohag university

Gmail: narutooo2013@gmail.com , Mobile:01003848370

Abstract

Introduction Facial cellulitis and abscesses are common in public health problems and early recognition and management is critical, as they are becoming more severe with a noticeable increase in hospitalization. **Aim of work** detection of factor affecting outcome in the management of cervicofacial infections and complication to reduce associated mortality and morbidity. **Patient and method** This study was a prospective study which was conducted at Sohag University Hospital, General Surgery Department. It included patients with cervicofacial infection of odontogenic or non-odontogenic origin either localized or diffuse infection attended to at the Oral and Maxillofacial Surgery Clinic or the Accident and Emergency Unit from October 2016 to October 2017. **Results** This study included 35 cases, the submandibular space was the most common single site affected (11-34.29%), followed by bilateral or multi- space involvement presented (13-37.14%) of study patients, Diabetes mellitus was the most common associated co- morbidity among study population (12-34.29%), and other systemic diseases (6-17.14%). **Conclusion** Diabetes, bad general condition, impaired laboratory parameters including an elevated blood sugar level and metabolic acidosis at time of admission were found to be significant risk factors for development of post intervention complications and/ or delayed recovery.

Keywords: cervicofacial infection, deep neck space infection, DM., odontogenic infection, trismus.

Introduction

Infection is one of the most commonly occurring head and neck pathologies. Spread of infection can be predicted by anatomic boundaries. Morbidity and mortality from head and neck infections declined dramatically over the past 60 years since the advent of antibiotics, but resistant organisms are spreading into the community⁷. Infection involving the orbit, lateral pharyngeal space, or multi facial and oral floor phlegmon and deep neck spaces are known as cervicofacial infections (CFI). When diagnosis and/or adequate treatment are delayed, such infections can be life-threatening¹. Dental caries is the most common etiology, followed by

oropharyngeal infections, Para nasal sinusitis, mastoiditis, foreign body infection, malignant necrotic lymph nodes, infected congenital cysts, cervical lymphadenitis and others¹⁰. CFI are common in poor patients lacking proper health resources¹⁷. Many risk factors could influence the outcome of odontogenic and non-odontogenic infections, various local and systemic factors have been reported. These included age, number of fascial spaces involved¹⁸, socioeconomic status, smoking⁴, patients' systemic health especially diabetes mellitus^{9,12}, space proximity to airway¹⁶, level of education and the nature of medical practice⁶. The

treatment of odontogenic infections is based on two main elements: surgical treatment and antibiotic therapy. Antibiotics are essential adjunct and are indicated when there are clear signs of systemic involvement such as pyrexia, lymphadenopathy, difficulty in swallowing, and lockjaw⁵.

Patients and Methods:

Study design:

This study was a prospective non-randomized study which was conducted at Sohag University Hospital, General Surgery Department. It included (35) cases with cervicofacial infection of odontogenic or non-odontogenic origin either localized or diffuse infection attended to at the Oral and Maxillofacial Surgery Clinic or the Accident and Emergency Unit from October 2016 to October 2017. All cases are committed a clear informed consent and the study had been approved by the Sohag Medical Ethics Committee.

Study population:

The patient clinical data were reviewed including: patient data (name, age, sex, occupation, date of complaint, date of admission, address and socioeconomic state), presence of other underlying comorbidity and the management protocol which was based on empirical intravenous antibiotics treatment with or without surgical intervention (preoperative, operative and post-operative parameters). The complication observed during hospital stay were also documented.

Preoperative parameters:

The choice of the technique of drainage of the abscess cavity intra oral or extra oral drainage depends on the anatomical site, size of abscess cavity and its extension and clinical evaluation of the patient.

Results

Emergency laboratory tests as (admission total leucocytic count, admission random blood sugar, admission coagulation profile and serum creatinine and others) emergency radiological investigation especially US., panorama x-ray, CT and MRI scan were performed in some cases.

Post-operative parameters:

We assessed the early outcomes and late outcomes as:

Early postoperative outcomes include:

- result of microscopic culture and sensitivity test if done and possible.
- recollection of pus.
- Occurrence of ischemia of edges and presence of necrotic tissue.
- trismus
- oral feeding.
- length of hospital stays.

Late postoperative outcomes (after discharge for one month weekly) include:

- recollection of pus.
- multi sinus developed or not.

Patients were scheduled for follow-up every week for the first month after discharge.

Study outcomes:

Patient recovery (good or complicated) was considered a primary outcome for the study.

Statistical analysis:

Data were recorded using Microsoft Excel 2010 program (Microsoft Co, USA). Normality of data distribution was checked by Shapiro Wilk test. The box plots were used to identify and exclude outliers. Mann–Whitney U test was used for comparison of quantitative variables, while Fisher Exact test was used to compare qualitative variables. Data were presented as median (25th and 75th percentiles) or Odds ratio (95% Confidence interval). P value <0.05 was considered statistically significant.

Thirty-five patients were recruited during the period of the study. The mean age was 27 (10-65.5) years, 18 (51.43%) male and 17 (48.57%) female. 24 (68.57%) patients had low socioeconomic status while the rest had moderate to high status. Urban residents constituted 14 (40%) of study population, while 21 (60%) were rural residents. Four (11.43%) of our patients were cigarette smokers and 5 (14.29%) of our patients were goza smokers. **Figure (1)** demonstrates patients' categorization according to site of infection (space affected). Submandibular space **figure (3)** was the most common single site affected (34.29%), followed by bilateral or multi- space **figure (5)** involvement presented (37.14%) of study patients. Twenty-two (62.86%) patients were presented with trismus **figure (4)**. As shown in **figure (2)**, Diabetes mellitus was by far the most common associated co- morbidity among study population (34.29%), while hypertension constituted (8.57%) and other systemic diseases 6 (17.14%).

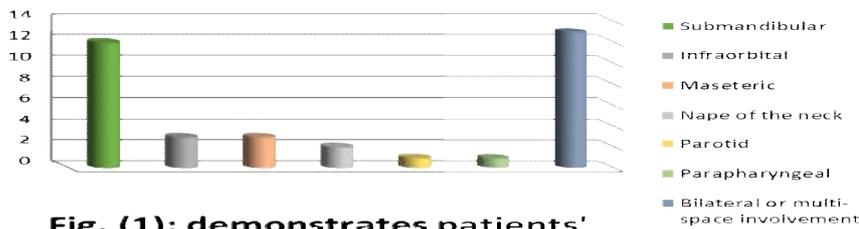


Fig. (1): demonstrates patients' categorization according to site of infection

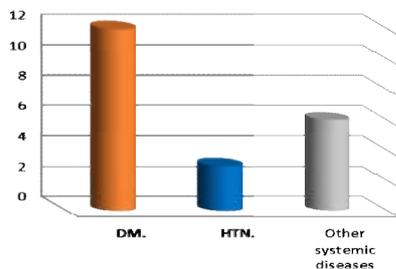


Fig. (2): Prevalence of Associated co- morbidities

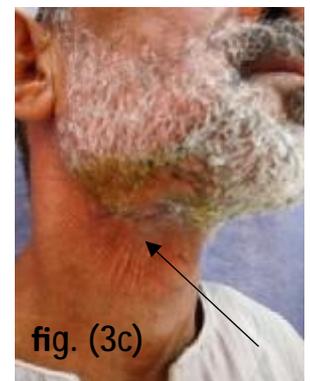
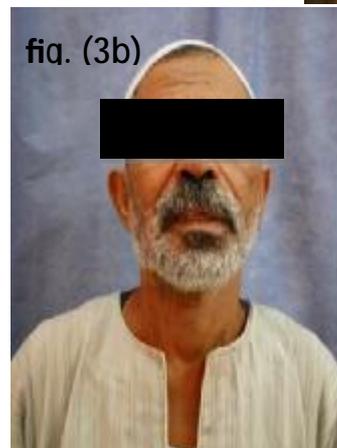


Fig. (3a) Male patient, 65yrs., diabetic, Presented with RT. Submandibular space infection (arrow).

Fig. (3d, c) see the same patient post-operative after drainage of the abscess (arrow). (fourth week of follow up).

Fig. (4) Female patient, 40yrs., diabetic, show sever form of trismus (about 0.5 cm.).

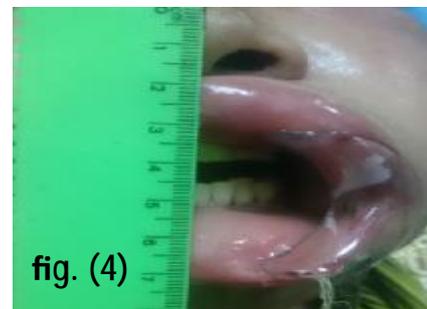




Fig. (5a) Male patient, 50yrs., diabetic, Presented with RT. Submandibular, submental, masseteric and supraclavicular space neck infections (arrows).

Fig. (5d, c) see the same patient post-operative after drainage of the abscess (arrows). (third week of follow up).

So, to investigate risk factors in the outcomes patients in this study, we must get focus in the patients whose got complicated recovery [n= 16, (46%)]. **Table (1)** shows identified risk factors for complicated recovery. Prevalence of **diabetes** was significantly higher [n= 9, (56.25%)], (**P=0.02**), these patient's median hospital stay was longer by mean of (4.65 %) than the non-diabetic patients. **Pulse** was significantly higher [110(110- 120) BPM], (**P=0.03**). **Respiratory rate** was significantly higher [25(23- 27) CPM], (**P=0.002**). Incidence of **impaired arterial blood gases** was also significantly higher [n= 3, (18.75%)], (**P=0.04**).

Table (1): Identified risk factors for complicated recovery					
Variables	Good recovery (n= 19)	Complicated recovery (n= 16)	Odds ratio (95% CI)	P value	Test used
DM.	3 (15.79%)	9 (56.25%)	.14 (.03-.7)	0.02	Fisher Exact test
Impaired ABG	0 (0%)	3 (18.75%)	0	0.04	
Pulse (PBM)	110 (100,110)	110 (110- 120)	0.03	Mann Whitney u test
R.R.(C/M)	23 (23, 23)	25 (23- 27)	0.002	
RBS (mg/ dl)	140 (130,175)	276 (137.5-418.5)	0.02	

Discussion

Our study aimed to investigate factors affecting the outcome in the management of cervicofacial infections and patient recovery (either uncomplicated or complicated) following management (either conservative or surgical) was considered a primary outcome for the study.

Regarding patients' demographics and study population characteristics, both genders were found to be nearly equally affected in our study. However, there was a higher prevalence of rural residents and those with low socioeconomic status. These findings are

consistent with what was previously reported^{4,6}. The submandibular space was found to be the most common site of infection among our study population. Many other studies reported similar findings^{2,3,5,6}.

While 50% of patients with complicated recovery had a bilateral or multi-space involvement, only 26.32% of patients recovered of **elevated random blood sugar level** and well had a similar condition. Even though, this **metabolic acidosis** finding was not statistically significant.

Regarding patients' symptomatology, patients who had complicated recovery were found to have a higher incidence of severe symptoms (trismus, odynophagia and dysphagia) at time of presentation. A recent study has found a positive correlation between severity of trismus and duration of hospitalization³, which is consistent with our finding.

Patient's medical history and general health are another 2 important items to be considered. In our study, **Diabetes** was found to be a **significant risk factor** for complicated recovery following management of CFI. These findings

are consistent with what was previously reported^{8,9,15}. Prevalence of other systemic diseases was also higher among those patients but did not reach a statistical significance.

Regarding intervention data, all our patients included in the study had a CFI that necessitated study between patients' vital signs at time of admission and their post intervention recovery. Patients with **tachycardia** and **tachypnea** had a **significant higher risk** of complicated

recovery. This finding emphasizes the rule of patient general condition in predicting outcome of management of CFI. Also, this should be put into consideration when choosing intervention population. Most common antibiotic given in overall maxillofacial surgeons would choose operative intervention if a single fascial space is affected by edema and no pus¹¹, most of our patients who received 4th generation cephalosporin + metronidazole had a complicated recovery. This or affection of more than one fascial space was due to the relatively bad general condition, Neither intraoperative drainage maneuver nor presence of co-morbidities and poly-microbial performance of tooth extraction was found to correlate with patient recovery in our study.

Antibiotics were started empirically then modified according to results of culture and sensitivity. Amoxicillin-clavulanic acid was the most common antibiotic given in overall maxillofacial surgeons, with no consistent

widely implied management protocols and poly- microbial culture. Although none of many factors affecting the outcome of these factors reached a statistical significance, they were reported by other studies and hence management.

Many assessed parameters in our study were worth to be mentioned.

found to be significant risk factors for In conclusion, this study investigated factors complicated recovery following CFI governing outcome of CFI management, management. Among them, Diabetes seems to adopting post intervention patients' recovery as be the most important single one. Elevated a primary outcome. Diabetes, bad general random blood sugar and metabolic acidosis are condition, impaired laboratory parameters another 2 important factors.

Patients' bad general condition at time of metabolic acidosis at time of admission were admission was also found to negatively correlate found to be significant risk factors for with post intervention recovery. Patients with development of post intervention complications uncontrolled diabetes affecting their general and/ or delayed recovery. According to these health are- therefore- a high risk group that need finding, were recommend to consider patients to be managed meticulously and properly when with uncontrolled diabetes affecting their presented with CFI.

Other possible risk factors are: severity of managed meticulously and properly when symptoms at time of presentation, bilateral or presented with CFI. multi- space involvement, leukocytosis, anemia

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