



HEAD AND NECK INFECTIONS; SECONDARY TO DENTAL CAUSES; DIAGNOSIS AND TREATMENT

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ABSTRACT... Objectives: To analyse the risk factors responsible for different head and neck infections secondary to dental causes. **DESIGN:** Retrospective study. **Settings:** Department of ENT and Head & Neck Surgery, Allied Hospital, Punjab Medical College, Faisalabad. **Period:** October 2011 to September 2014. **Patients and Methods:** The study consisted of 50 patients who presented with history of head and neck infections secondary to dental causes in the department of ENT and Head & Neck Surgery at Allied Hospital Faisalabad. **Inclusions criteria:** Patients of head and neck infections of either sex ranging from 12 to 57 years of age and having history of dental infections / extractions were included in the study. **Exclusion Criteria:** Patients having head and neck infections secondary to some other cause other than dental etiology were excluded from the study. **Data Analysis:** SPSS software, version 10 was used to analyse the data. Chi square test was applied to analyse the data. **Results:** In our study 62 % patients with head and neck infections were males while 38 % patients were females. Age ranged from 12 years to 57 years with mean age 33.68 years. 96% of our patients presented with deep neck abscesses while only 02% of the patients had osteomyelitis of maxilla and further 02% of the patients presented with necrotizing fasciitis of the submandibular region. 58% of the patients had dental infections whereas 42% patients were having dental extraction as the root cause responsible for these head and neck infections. Moreover, all the patients had poor oro-dental hygiene. It was also observed that 76% of the patients, having history of dental extraction, were treated by unqualified dental practitioners without adequate aseptic conditions. Twelve patients out of fifty (24%) were found to have diabetes mellitus and one patient each was suffering from malignancy and chronic renal failure. 10 (20%) of our patients were smokers. Some of the patients (16%) were having anemia. Two patients out of fifty (04%) were suffering from pulmonary tuberculosis. **Treatment:** All these patients were managed with adequate parental antibiotics and surgical interventions. We had to perform an emergency tracheostomy in one patient. All the patients had good response to the management without any complication. **Conclusions:** Dental infections and dental extractions are still an important cause for potentially life threatening head and neck infections in developing countries like Pakistan. Unhygienic dental practices and lack of proper dental care facilities along with immunocompromizing conditions such as diabetes mellitus are most common risk factors for these avoidable head and neck infections. Therefore it is necessary that unhygienic dental practices as well as practices by unqualified dental practitioners should be strictly banned.

Key words: Dental infections, Ludwig's angina, Submandibular abscess, Retropharyngeal abscess, Para pharyngeal abscess.

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INTRODUCTION

Although we are living in an era of recent advances and effective antimicrobial chemotherapy yet dental infections and dental extractions are still the most important predisposing factor for head and neck infections.^{1,2,3,4} Some of the studies conducted in developing countries show a high mortality rate approaching 3.3% following such

infections.⁵ Many risk factors have been shown to cause such head and neck infections secondary to dental causes.^{1,5,6,7,8} The aim of this study is to analyze and identify the risk factors responsible for different head and neck infections secondary to dental causes in our community. This information may thus be utilized to find high risk groups in the community which may be helpful to plan the

preventive strategies for head and neck infections secondary to dental causes.

PATIENTS AND METHODS

The study comprised of 50 diagnosed cases of serious head and neck infections requiring hospitalization secondary to recent dental infection/extraction. These patients were managed in the department of ENT and head & neck surgery at allied hospital Faisalabad between October 2011 to September 2014. The youngest patient was 12 years old while the oldest one was having 57 years of age. The mean age of the patients was 33.68 years. Patients of either sex ranging from 12 to 57 years of age with history of dental infection/extraction were included in the study. Patients having head and neck infections secondary to some other cause other than dental etiology were excluded from the study. All the 50 cases were diagnosed on the basis of comprehensive history, clinical examination and radiological investigations such as plain radiographs and CT scan of head and neck. All these patients were completely analyzed depending upon age and sex of the patient, site of infection in the head and neck region, presenting signs and symptoms, history of prior dental infection/extraction, history of some other predisposing factor such as diabetes mellitus, personal history such as smoking habits, radiological and laboratory investigations including the wall biopsy. At the end treatment given was analyzed including both medical as well as surgical intervention. All the data was analyzed and computed by SPSS software, version 10. Chi square test was applied to analyse the data. P values less than 0.05 were considered statistically significant.

RESULTS

In this study, 31 patients (62%) were males and 19 patients (38%) were females (Fig.1.). The age of the patients ranged from 12 years to 57 years with mean age 33.68 years (Fig.2.).

Out of 50 patients, 48 patients (96%) presented with infections of superficial and deep neck spaces while one patient (02%) had osteomyelitis of the maxilla and one further patient (02%) had necrotizing fasciitis of submandibular region. Out

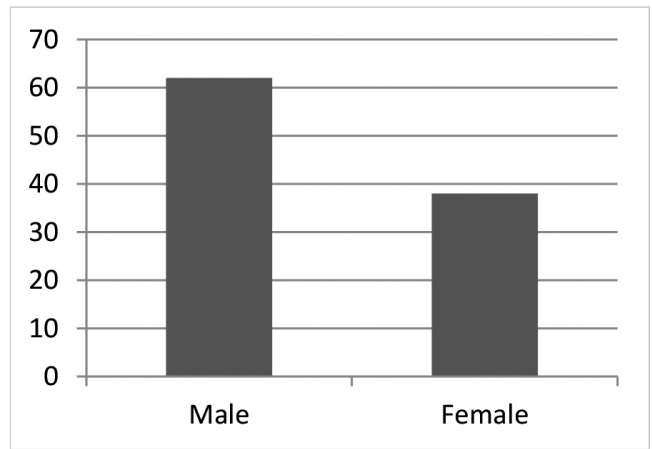


Fig-1. Showing gender distribution

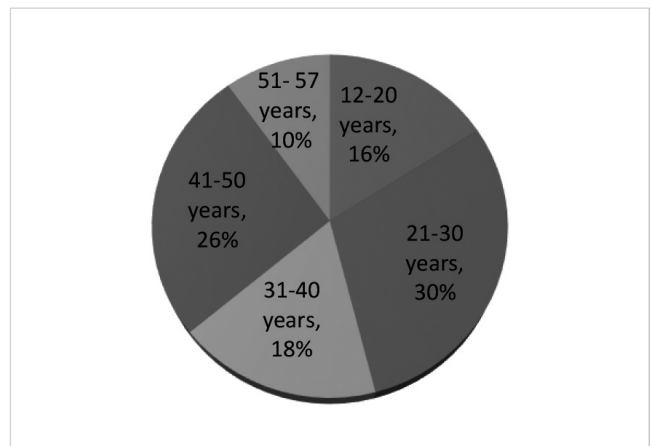


Fig-2. Age distribution

of 48 patients suffering from infections of head and neck spaces, submandibular abscess was the most common infection (54%), followed by Ludwig’s angina (16%), submental abscess (12%), retropharyngeal abscess (08%), parapharyngeal abscess (04%) and facial abscess (02%). One patient had an extensive gas forming infection involving the retropharyngeal space. One patient (02%) had osteomyelitis of maxilla while one another patient (02%) presented with necrotizing fasciitis of submandibular region (Table-I).

Neck space infections	No. of patients	%age
Submandibular abscess	27	54%
Ludwig’s angina	08	16%
Submental abscess	06	12%
Retropharyngeal abscess	04	08%
Parapharyngeal abscess	02	04%
Facial abscess	01	02%
Osteomyelitis of maxilla	01	02%
Cervical necrotizing fasciitis	01	02%

Table-I. Site distribution of head and neck infections

Dental infections were identified as etiology in 29 cases (58%), whereas, 21 patients (42%) were found having dental extraction as the main cause (Fig.3).

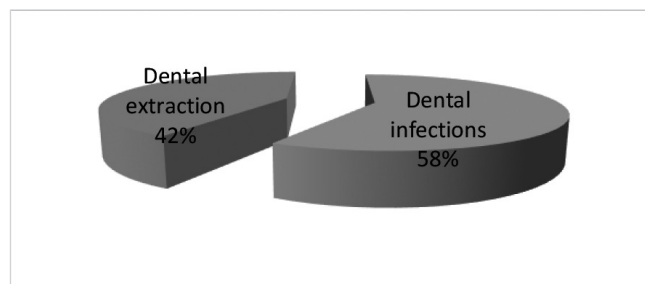


Fig- 3. Dental risk factors for head and neck infections

Dental infections most commonly involved the lower second and third molars as number 1 while upper premolars and lower premolars as number 2. The conclusion “association of head and neck infections with dental infection/dental extraction” was made purely on clinical grounds because all these patients gave history of dental infection / dental extraction just preceding the onset of head and neck infections. Out of 21 cases of dental extraction, 16 patients had tooth extraction done without observing aseptic precautions or done by unqualified dental practitioners. 12 patients (24%) were diabetic and one patient each (02%) were suffering from head and neck malignancy and chronic renal failure. Blood ESR, chest x-rays and sputum analysis were helpful to diagnose pulmonary tuberculosis in 02 patients (04%). Moreover 10 (20%) patients were smokers and 08 (16%) patients were found to have anemia (Table-II).

Risk Factor	No. of Patients	%age
Diabetes mellitus	12	24%
Smoking	10	20%
Anemia	08	16%
Pulmonary tuberculosis	02	04%
Head and Neck malignancy	01	02%
Chronic renal failure	01	02%

Table-II. Different co-morbidities in patients with head and neck infections

The causative organisms were isolated in 27 cases (54%) of head and neck infections, with staphylococcus aureus as the most commonly identified bacterium (Table-III).

Bacteriology	No. of patients	%age
No growth / Sterile	23	46%
Staphylococcus aureus	11	22%
Streptococcus species	08	16%
Klebsiella species	04	08%
Bacteroids species	02	04%
E . Coli	01	02%
Pseudomonas	01	02%

Table-III. Bacteriology of head and neck infections

All the patients were managed with needle aspiration for culture and sensitivity report, followed by incision & drainage. In addition wall biopsy was done for histopathology. All the patients initially were put on Injectable triple regimen and then the antibiotics were modified according to culture and sensitivity report. One patient required emergency tracheostomy for airway management. The patient with necrotizing fasciitis of submandibular region was managed with surgical debridement and parenteral antibiotics. One patient having osteomyelitis of maxilla was managed with surgical debridement in the form of curettage under Injectable antibiotic cover. Additional dental, medical and radiological help was sought by appropriate referrals. All patients recovered fully.

DISCUSSIONS

It is a well-known fact that the medical disciplines of otolaryngology, fasciomaxillary surgery and dentistry are overlapping to some extent. A primary pathology in one of these disciplines, sometimes, may be responsible for a secondary pathology in another discipline for example the development of a head and neck infection that may present to an otolaryngologist or a fasciomaxillary surgeon, developing secondary to a dental infection/dental extraction.⁹ Moreover, these head and neck infections often present a true clinical challenge. Although antibiotics have reduced their incidence, yet they remain a relevant health problem.¹⁰ Dental infections have been reported as one of the most important and leading cause for head and neck infections.^{1,2,3,4,5,11}

Majority of the patients in our study were males (62%). A few of the studies from abroad reveal male preponderance.^{6,12} An equal sex distribution for such infections has also been reported.⁵ The

most common infection in our study was the submandibular abscess (54%) which is also the most common infection secondary to odontogenic causes reported in majority of the studies in the past.^{12,13} Other infections reported in our study were submental abscess, retropharyngeal abscess, parapharyngeal abscess, Ludwig's angina, facial abscess, cervical necrotizing fasciitis and osteomyelitis of maxilla. All these infections secondary to dental etiology have been reported in the international journals in the past.^{4,6,12} There are certain other complications as well that have been reported from abroad in the past such as mediastinitis,¹³ infratemporal fossa abscess,¹⁴ cranial osteomyelitis,¹⁵ and invasive fungal sinusitis of maxilla.¹⁶ Any way we did not find any such complications in our study. The causative bacteria were identified in 27 of our patients with aerobic bacteria more commonly identified than anaerobes. *Staphylococcus aureus* was the most commonly cultured bacterium followed by streptococcus and klebsiella species. Most of the studies report a mixed flora in most of such patients while some studies reporting anaerobes as most commonly isolated organisms,¹⁷ and still others reporting aerobes as the leading cause.⁹ The more commonly reported aerobic bacteria include *staphylococcus aureus*, streptococcus pyogenes and haemophilus influenzae. The most commonly reported anaerobes include *Bacteroids* species, *Peptostreptococcus*, *Prevotella*, *Porphyromonas* and *Fusobacterium*.^{9,17}

In our study dental infections were held responsible in 29 patients (58%) whereas dental extraction was the root cause in 21 patients (42%). Reports from abroad also reveal that dental infections/extractions are the leading cause of head and neck infections.^{1,2,3,4,5,11} The most commonly affected teeth in our study were the lower molars. Most of the studies in the past have reported similar results.^{6,18} Out of 21 patients having dental extraction, 16 patients (76%) had history of dental extraction done without observing aseptic precautions/unqualified dental practitioners. Risk factor in the form of diabetes mellitus in our study was identified in 12 patients (24%). Various studies from abroad show that

various inflammatory diseases and soft tissue pathologies in the oral cavity such as dental infections are associated with diabetes mellitus. However awareness of these complications is lacking all over the world.¹⁹ Moreover several studies have reported that patients with diabetes mellitus are having more risk to develop deep neck bacterial infections compared to patients without diabetes.^{20,21} A four-year prospective study conducted by Rao et al; concluded that spread of bacterial infection to submandibular space was more common in patients with diabetes. This study also showed that patients having diabetes were found to stay longer in the hospital due to more severe infection and required more time to control blood glucose level.²² Other co-morbidities in the form of chronic renal failure, pulmonary tuberculosis and malignancy were also identified in our study. Risk factors for such infections that have been reported include: substance abuse, psychiatric illness, diabetes mellitus, head and neck cancer and renal transplantation.^{1,5,6,7,8} All the patients in our study were managed by prompt surgical intervention with adequate airway control and under good antibiotic cover. All the patients were managed well without any complication.

CONCLUSIONS

Dental infections/extractions may be responsible for potentially life threatening head and neck infections, especially in patients having risk factors such as systemic immunocompromizing diseases and/or having treatment without observing proper aseptic conditions. This is an even bigger problem in developing countries like ours where a lot of patients (76% in our study) receive treatment from unqualified dental practitioners due to lack of availability of dental care services at primary health care level. Therefore it is very important to identify high risk patients and also to establish dental services at primary health care level. This will prove a strategic step in lowering the incidence of such potentially life threatening infections in our country.

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PREVIOUS RELATED STUDY

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“I have no friends and no enemies - only competitors.”

Aristotle Onassis



AUTHORSHIP AND CONTRIBUTION DECLARATION

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4	Dr. Muhammad Javaid Shareef	Collection of data	
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