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Research Article

A CLINICAL STUDY FOR EVALUATION OF DISTRIBUTION OF ODONTOGENIC INFECTION IN VARIOUS FASCIAL SPACES

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ABSTRACT

Odontogenic infections are frequently encountered in the practice of oral and maxillofacial surgery. The predominant organism which are found in odontogenic infection are streptococci and staphylococcus. The prevalent odontogenic infections may spread and involve the potential spaces in head and neck region leading to fascial space infection. This article deals with the evaluation of distribution of odontogenic infection in various fascial spaces.

Key words:- Space Infection, Fascial Spaces, Endocarditis, Odontogenic Infection.

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INTRODUCTION

Shapiro defined fascial spaces as potential spaces between the layers of fascia. These spaces are normally filled with loose connective tissues and various anatomical structures like veins, arteries, glands, lymph nodes. Odontogenic infection is frequently caused by dental caries, periodontitis, pericoronitis. There is spread of infection through the potential spaces of head and neck. The most common space involved space being submandibular space. Focal sepsis from oral infection leads to bacteremia and spread of infection to CVS and subacute bacterial endocarditis.

Role of lipoproteins and atherogenesis plays a vital role in acute infection. Thus, odontogenic infections may have long-term effects on human health. The presence of local or systemic risk factors predisposes for locally invasive spread of infection to adjacent structures, or dissemination as sepsis and/or by a hematogenous route to various sites in the organ system. Odontogenic infections with cellulitis and abscess formation if left untreated or treated with delay, spread to multiple fascial spaces of neck and may require hospital admission in medically compromised and elderly patients.

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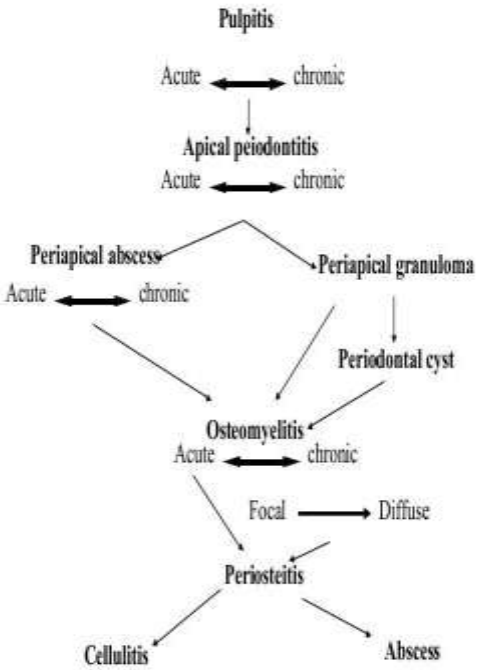
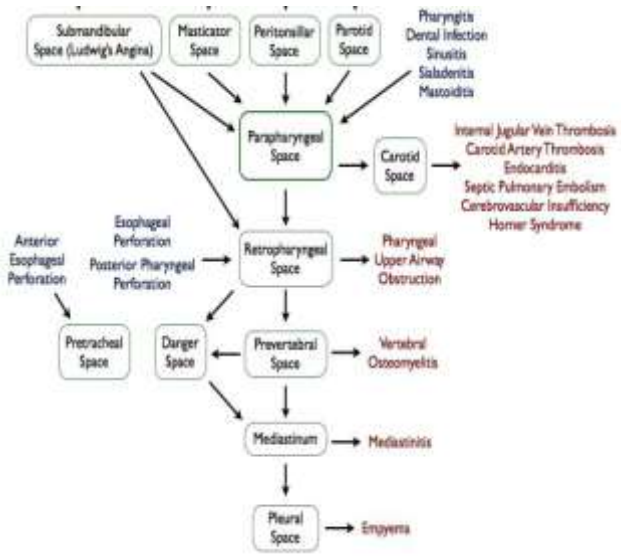
SPREAD OF SPACE INFECTION

Staphylococci are frequently associated with abscess formation. These microorganisms produce coagulase, an enzyme that is deposited which can cause fibrin deposition in citrated or oxalated blood. Streptococci are associated more often with cellulites, which produce enzymes such as streptokinase (fibrinolysin), hylouronidaze, and streptodornase. These enzymes break down fibrin and connective tissue ground substance, and lyse cellular debris, thus facilitating rapid spread of bacterial invaders. Although there are barriers, these are violated by the end products of the microorganisms and guide the infection to spread into deeper planes. From the sublingual spaces, the infection may spread backwards in the substance of the tongue in the cleft between the hyoglossus and Genioglossus muscles along the course of sublingual artery. By this route the infection reaches the region of epiglottis and produces swelling around the laryngeal inlet. Due to anatomical continuity of various spaces with submandibular space, the infection may track to submasseteric, and pterygomandibular spaces; and more posteriorly, parapharyngeal, paratonsillar spaces; and worsening airway compromise. Infection from the submandibular region, can spread downwards along and beneath the investing layer of deep cervical fascia, towards clavicle and subsequently to mediastinum. Uncommonly infection can spread below and reach close to carotid sheath, pterygopalatine fossa, leading to cavernous sinus thrombosis with subsequent meningitis [1].





MATERAILS AND METHODS:

A total of 50 patients within the age group of 16 years to 60 years male and female patients attending the dental OP in our institution with swelling, cellulitis of face, abscess intraoral or extraoral, trismus and pain due to infection of odontogenic origin were included in the study. Routine blood investigations were done for all the patients. All the patients were started with empirical antibiotics. Surgical management included extraction of offending tooth intraoral and extraoral incision drainage of abscess was done case specifically. (patients who did not respond to the treatment required intravenous administration of antibiotics) Patients were followed up until regression of infection. All the patients were recalled and reviewed the day after the procedure and until the infection regressed.

INCLUSION CRITERIA:

Patients of 16 years to 60 years age groups, with odontogenic and fascial space infections of head and neck.

EXCLUSION CRITERIA:

Immuno-compromised patients (e.g. steroids therapy and human immunodeficiency virus (HIV) Patients undergoing anti-coagulant therapy, cardiac vascular diseases. Patients with uncontrolled diabetes (RBS value > 200) and patients who are not under medication.

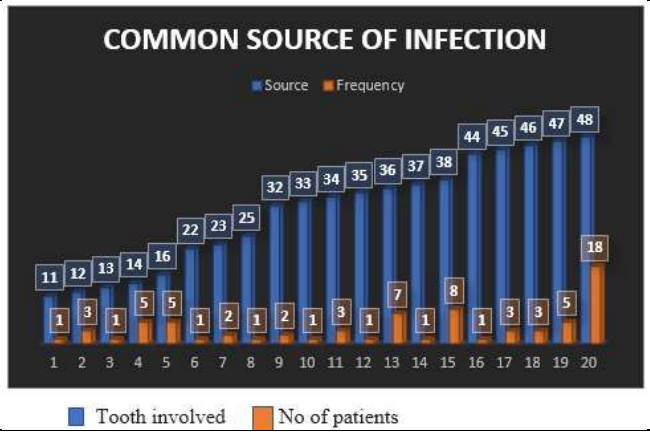
RESULTS

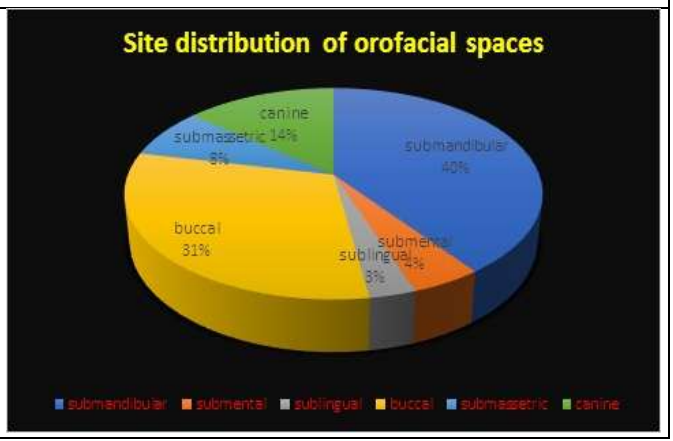
This study evaluated 50 patients who reported to the outpatient department with pain and swelling caused by odontogenic infection. All patients with odontogenic space infection were examined. In our study, mandibular third molars (36%) followed by mandibular first molar (13.9%) and mandibular second molar (8.3%).

In 38 patients, single space involvement (75.5%) was seen and 12 patients had multiple space involvement (24.5%). Of these spaces the most predominantly involved space was the submandibular space which was seen in 26 patients (38.9%), followed by buccal space in 20 patients (30.6%), canine space in 9 patients (16.7%), subamassetric space in 5 patients (6.9%), submental spaces in 3 patients (4.2%) and sublingual space (2.8%).

Odontogenic infection involving buccal space. Intraoral incision and Drainage

Intraoral Periapical Radiograph of infected root stump in 37 region





DISCUSSION

Head and neck infections of odontogenic origins are routinely treated. Untreated or rapidly spreading odontogenic infections can be potentially life-threatening secondary to airway compromise or septicemia. In our series of 50 patients in age group of 16 to 60 years of which 30 patients were male (60%) and 20 patients were female (40%) with mean patient 44.5 years. In our study majority of the cases reported with odontogenic infection caused by dental caries, periapical periodontitis and pericoronitis from third molars. It was reported that local odontogenic infections usually originate from apical periodontitis (66.7%- 70.7%), or initially from dental caries (33.8%-80.6%) (Ylijoki et al. 2001[1], Flynn et al. 2006, Saito et al. 2011, Sanchez et al. 2011). Thomas Indresano et al. 1992 [2] reported the etiology of pericoronitis and third molar as a cause of deep neck space infection. Salih Bakir et al 2011 [3] reported dental infection, adenotonsillar infection, pharyngitis, and tuberculosis as etiology of deep neck space infection. Gerd Jürgen Ridder et al in 2005 [4] reported that deep neck infections can also be by tuberculosis, cat scratch disease and malignant tumor like chronic lymphoid leukemia. He also reported that incidence of deep neck infection is raised among chronic alcoholics and intravenous drug abusers. In our study, mandibular third molars (36%) followed by mandibular first molar (13.9%) and mandibular second molar (8.3%).

Storoe W Haug et al 2001 [5] reported that the commonest tooth involved was the mandibular third molars[2]. These findings were similar to studies previously performed by Nithin Suresh Fating et al 2013[6], Inderdeep Singh Walia et al 2013.

In our study the most commonly involved space was submandibular space (38.9%), followed by buccal space (31%), canine space (16.7%), subamassetric space (6.9%), submental space (4.2%), sublingual space (2.8%).As reported by Storoe et al 2001 [5] the most commonly affected spaces are the submandibular space followed by buccal space and canine space.

Salih Bakir et al 2012 [3] reported 15% of Ludwig's angina case involving bilateral submandibular space infection and 13.9% extended deep neck infection. Staphylococci are frequently associated with abscess formation. These microorganisms produce coagulase, an enzyme that is deposited which can cause fibrin deposition in citrated or oxalated blood. Streptococci are associated more often with cellulites, which produce enzymes such as streptokinase (fibrinolysin), hyaluronidase, and streptodornase. These enzymes break down fibrin and connective tissue ground substance, and lyse cellular debris, thus facilitating rapid spread of bacterial invaders. Although there are barriers, these are violated by the end products of the microorganisms and guide the infection to spread into deeper planes [6].

SUMMARY AND CONCLUSION

Odontogenic infection is generally polymicrobial. It is commonly treated with empirical antibiotics and extraction of offending infectious tooth.

Surgical management initiated with incision, drainage and decompression at early course of disease with appropriate oral or intravenous antibiotics avoids the spread of infection into multiple fascial spaces of head and neck.

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