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Complications of Odontogenic Infections

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Abstract:

The term, odontogenic infection refers to an infection that originates in the tooth proper or in the tissues that tightly surround it; said infection then progresses along the periodontal down to the apex, involving periapical bone and from this area, it then spreads through the bone and periosteum towards nearby or more distant structures. The relevance of this type of infection lies in that it can cause infections that compromise more far structures (via direct spread and distant spread), for example, intracranial, retropharyngeal and pulmonary pleural infections. Dissemination by means of the bloodstream can lead to rheumatic problems and deposits on the valves of the heart (endocarditis), etc. The conditions or factors that influence the spread of infection are dependent on the balance between patient-related conditions and microorganism-related conditions. Patient-related conditions include certain systemic factors that determine host resistance, which may be impaired in situations such as immunodeficiency syndrome or in brittle diabetes, as well as local factors that will also exert their impact on the spread of the infection.

Introduction:

Odontogenic Infection (OIs) have been one of the most common disease in an Oral and Maxillofacial region [1] in relation with mortality rate of 10-40%. [2] With the discovering and evolution of Modern antibiotics, mortality rate have significantly been reduced.[3,4,5] Such infections are usually self-limiting, purulent material may occasionally burrow deep into fascial spaces. Propagation can be produced by direct continuity by lymphatic or hematogenous dissemination and depends on the virulence of the pathogen. Multiple complications of OIs have been reported, Such as airway obstruction, mediastinitis, necrotizing fasciitis, cavernous sinus thrombosis (CST), sepsis, thoracic empyema, and Osteomyelitis. [6]

The aim of this report is reviewing complications of OIs.

Discussion:

In odontogenic infection it sometimes consists of primary dental caries and periodontal disease. In the United States, it's estimated that 25% of adults over the age of 60 have lost their teeth (edentulism), approximately one-half from periodontal disease and one-half from dental caries. In addition to producing pain and discomfort, odontogenic infections can extend beyond natural barriers and result in potentially life-threatening complications, it can be associated with a number of systemic disorder. These include fever of unknown origin, bacteremia seeding of heart valves and prosthetic devices, pretern birth of low birth weight children, and an increased risk of coronary heart disease, and cerebrovascular events. [7]

Sepsis:

Is defined as the presence of confined or suspected infectious agents with two or more of the systemic inflammatory response syndrome. [8]

Systemic inflammatory response syndrome:

Due to elevation of one of the vital signs or an imbalance of the WBCs count, in search conducted by Wong, 18 deaths were reported out of 2790 patients. [9] The direct cause of death were sepsis (55%), preexisting organ failure (33%), and upper airway obstruction (5%), a risk that is negligible. Kim et al; encountered a 64-year-old patient with a diagnosis

of right temporal infraorbital, buccal, pterygomandibular space abscess. Fardy et al; encountered one case of a 9-year-old patient developing toxic shock syndrome secondary to dentoalveolar abscesses, Despite the treatment, the patients died 2 days after led to ICU because of multiple system organ failure. [10]

Buccal and submental spaces:

An orofacial space infection, Infections arising from mandibular or maxillary bicuspid and molar teeth tend to extend in a lateral or buccal direction. The relation of the root apices to the origins of the buccinators muscle determines whether infection will exit intraorally into the buccal vestibule or extraorally into the buccal space. Infection of the buccal space is readily diagnosed because of marked cheek swelling with minimal trismus and systemic symptoms. Involvement of a mandibular incisor can perforate below the mentalis muscle and present as a submental space infection. The chin appears grossly swollen and is firm and erythematous. [11]

Masticator spaces:

Masticator spaces consist of the masseteric, pterygoid, and temporal spaces, all of which are well differentiated but intercommunicate with each other as well as with the buccal, submandibular, and lateral pharyngeal space. Infection of the masticator spaces arises most frequently from molar teeth, particularly the third molars (wisdom teeth). The clinical hallmark of masticator space infection is trismus and pain in the area of the body or ramus of the mandible. [12]

Canine and infratemporal spaces:

Involvement of the maxillary incisors and canines may result in a canine space infection, which manifests as dramatic swelling of the upper lip, canine fossa, and frequently the periorbital tissues. Pain is usually moderate, and systemic signs are minimal. Occasionally, direct extension of infection into the adjoining antrum leads to purulent maxillary sinusitis. [13] The infratemporal space is bounded medially by the lateral plate of the pterygoid process and the pharynx, posteriorly by the parotid gland, anteriorly by the maxilla, and superiorly by the roof of the infratemporal fossa, adjacent to which is the inferior orbital fissure. Primary infections of the infratemporal fossa usually originate from involvement of the posterior maxillary molar teeth, particularly the third molar. [14]

Respiratory Obstruction:

Due to swelling of floor of mouth, trismus, edema, loss of airway. Intubation if required. [15]

Descending Necrotizing Mediastinitis:

It's appear due to odontogenic infection, 60-70% DNM originate from odontogenic source. [16]

Thoracic Complications:

Early signs of thoracic involvement are difficult to interpret. According to Estrera *et al.*, diffuse brawny induration, with pitting edema or crepitation at the base of the neck and the thorax are suggestive. George C. Economopoulos *et al.* has documented the first case of an intrathoracic vascular complication involving the descending aorta appearing as an aortopulmonary fistula, secondary to a gravitating OI of submaxillary and parapharyngeal spaces, and from there to the mediastinum and pleura, through the retrovisceral space and

Sibson's fascia. Thrombophlebitis of the internal jugular vein (IJV) is dangerous, and it requires ligation to avoid septic emboli. Erosion of the internal carotid or the common carotid artery within the sheath is lethal. [17]

Cavernous Sinus Thrombosis:

7% of all cases of CST are of dental origin. Less than 40% of patients fully recovers. Death generally occur over 4-7 days it's usually due to meningitis, brain abscesses, or generalized sepsis. [18]

Brain Abscesses:

Haymakers says of 28 death resulting from CNS infection. Hollin and gross indicated a report of a subdural empyema of an odontogenic origin. [19]

Osteomyelitis:

Odontogenic infections can spread contiguously to cause osteomyelitis of the jaw. The mandible is much more susceptible to osteomyelitis than the maxilla, primarily because the cortical plates of the former are thin and vascular supply to the medullary tissues is relatively poor. Despite this, osteomyelitis secondary to odontogenic infection is relatively uncommon. When it does occur, there is usually a predisposing condition, such as compound fracture, irradiation, diabetes mellitus, or steroid. In a review of 141 cases of jaw osteomyelitis in Nigeria, Adekeye, and Cornah found OIs to be the cause of 38% of mandibular and 25% of maxillary involvement. Wang *et al.* described the first case in which recurrent vertebral osteomyelitis and psoas abscess developed in a patient with a previously unrecognized atrial septal defect and disease recurrence was ascribed to the presence of dental disease, which served as the source of infection. [20]

Conclusion:

Owing to the widespread availability of preventive dental care and the development of effective antibiotics for the treatment of orofacial infection, the incidence of serious OIs has decreased dramatically over the past 50 years. However, they can still carry the potential for lethal complications, especially in the immunocompromised patient. However, attention to airway maintenance, appropriate antibiotic therapy, and judicious surgical intervention enable the health care professions to continue their remarkable progress in treating these once-dreaded infections. Recognition of the classic signs of severe OIs by the general practitioner and expeditious referral to a higher level of care benefits the patient and may be life-saving.

Recommendation:

The use of antimicrobial prophylaxis to prevent bacterial endocarditis and prosthetic joint infections in selected patients undergoing dental procedures are to be present.

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