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## INTRAVENOUS ANTIBIOTICS IN FASCIAL SPACE INFECTIONS OF ODONTOGENIC ORIGIN – THE NONPAREIL THERAPY REVISITED: A CASE SERIES FROM KERALA, INDIA

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### ABSTRACT

Beyond doubt, in most cases improperly managed dental infections can result in fatal complications. Dental infections can lead to fatal complications if not properly managed. Three cases of oro-facial infection leading to life-threatening complications are reported here. The importance of supportive treatment, vigorous antibiotic therapy and elimination of source of infection in combating these complications have been stressed upon. Administration of high dose intravenous antibiotics is recommended, with the initial choice of antibiotics modified in the light of subsequent bacteriological reports.

### INTRODUCTION

Deep fascial space infections are rare yet potentially fatal complications of dental pulp necrosis. An odontogenic infection sometimes can progress rapidly from a seemingly harmless toothache to a life-threatening infection. In children, early management and recognition of orofacial infections is very essential to prevent systemic involvement including toxicity and airway compromise(1). Such complications can arise from neglected dental caries which leads to fascial cellulitis and systemic toxicity if left untreated(2,3).

Presented here are three case reports of rapid progression to multi-space infections due to various reasons including dental neglect of carious tooth and resorting to traditional medical practices for toothache relief.

#### Case 1

A 9 year old female patient(Fig 1) (accompanied by her mother)reported to the Department of Pedodontics, KMCT Dental College, Kerala, India with chief complaint of swelling on left side of the face including periorbital region. History taking revealed that she had toothache in the lower left back region two days back which was not given any medical attention. The swelling was associated with trismus, anorexia and fever. Parenteral antibiotics were advised but stating domestic and personal inconvenience the mother was unwilling for the recommended treatment. Oral antibiotics (Amoxicillin-Clavulanate plus Metronidazole) were prescribed

as an alternative, with strict instructions to report back immediately if symptoms aggravated.



Fig 1

Trismus limited the attempts for pus drainage through the infected tooth. The patient reported back the next day with aggravated symptoms including persisting fever, increased trismus and malaise (Fig 2). The swelling had extended to the contralateral side, now involving buccal and infraorbital spaces bilaterally. Patient was put on intravenous antibiotics as an emergency measure. Intravenous Ceftriaxone 1g and Metronidazole 100ml (250mg) were administered. Radical changes were noticed in the initial one hour itself (Fig 3). After the 5 day course of antibiotics, the offending teeth (lower left first and second deciduous molar) which served as the source of infection were extracted under local anesthesia.



Fig 2



Fig 3

**Case 2**

A 10 year old male patient presented to the Department of Pedodontics with bilateral swellings in submandibular and submental regions associated with difficulty in mastication and mouth openings since the previous day (Fig 4).



Fig 4



Fig 5

History revealed that there was pain and swelling in the lower right back tooth region since 2 weeks for which the child relied only on alternative traditional medication during this period. Rapid progression of swelling was noted one day prior to reporting for treatment. A diagnosis of Ludwig's Angina was made based on typical findings like difficulty in deglutition, fever, bilateral swelling of woody hard consistency crossing the midline, shortness of breath and limited mouth opening with elevated tongue and floor of the mouth. He was hospitalized and intravenous Amoxicillin- Clavulanate and Metronidazole were initiated. He was kept under observation for any potential upper airway obstruction. There was partial alleviation of symptoms and extraoral drainage of pus from the infected tooth followed by extraction of the lower right deciduous second molar and permanent first molar was done under general anesthesia the next day (Fig 5). The patient had an uneventful recovery and was discharged on the third postoperative day. A five day course of oral Amoxicillin-Clavulanate was prescribed. The patient had no postoperative sequelae when he reported for review a week later. (Fig 6).



Fig 6

**Case 3**

An 8 year old boy reported to the Department of Pedodontics with the chief complaint of pain and swelling on the left side of face since 1 day. Initial examination revealed space infection on left side (Fig 7).



Fig 7

The patient was febrile with loss of appetite, malaise and trismus. Parenteral antibiotic therapy (Amoxicillin-Clavulanate and Metronidazole) eighth hourly was initiated. Intraoral incision and drainage through sublingual region along with extraction of permanent lower first molar on left side which was the source of infection, was done under local anesthesia the next day(Fig 8). His subsequent recovery was uneventful with complete resolution of symptoms.



Fig 8

## DISCUSSION

Despite the fact that dental caries prevalence has diminished over the years with preventive dental programs, children in low socioeconomic groups remain greatly affected by this condition. Odontogenic infections tend to spread to soft tissues via planes of least resistance to adjacent potential spaces and perforates the bone before spreading to the deeper fascial spaces(4).

The basic principles in treating any space infection include antibiotic therapy and removal of the source of infection followed by incision and drainage of the infected space. Recent findings suggest excluding Penicillin as a choice in head and neck infections due to greater resistance of bacteria to the drug.

Early infections are primarily caused by aerobic streptococci for which are sensitive to extended spectrum antibiotics like Amoxicillin. Addition of Clavulanic acid broadens the spectrum of Amoxicillin against staphylococcus and other anaerobes. In late infections, the predominant microorganisms are anaerobes, particularly *Peptostreptococcus*, *Fusobacterium* or *Bacteroides*, that are resistant to penicillin(5). If not treated immediately, maxillofacial space infections can lead to life-threatening complications including respiratory obstruction, pneumonia, descending mediastinitis, septic shock, sepsis, pericarditis, cavernous sinus thrombosis and brain abscesses(6,7,8). Odontogenic infections usually spread from the mandible or maxilla into the sublingual, submandibular or masticatory spaces and then spread into the parapharyngeal space directly(9,10).

Empirical antibiotic therapy which covers gram positive and gram negative aerobic and anaerobic pathogens should be administered without waiting for the results of pus culture when patients are admitted to hospital. Second or third

generation Cephalosporins as primary antibiotics along with Metronidazole or Ornidazole, are usually employed(11). All three cases discussed here reported with swelling and pain which resulted from untreated dental caries. Swelling of the tissues surrounding the spaces in the floor of the mouth or larynx is extremely dangerous as it can lead to respiratory obstruction. Even death can result from sequelae as diverse as necrotizing fasciitis, brain abscess and disseminated intravascular coagulation. Bridgeman et al observed that 98% of patients presented for care only if there was a sudden onset of swelling(12). All these patients had limited opening of the mouth upon hospital admission, suggesting that the infection may have involved the masticatory spaces and could disturb the upper airway abruptly. Moreover, close monitoring of patients with trismus is necessary in case of the symptoms and signs of upper-airway compromise (eg: tongue elevation, stridor, difficulty in swallowing saliva, breathlessness)(7). The definitive treatment also includes the extraction of the offending tooth to allow for proper drainage of pus and removal of the source of infection.

## CONCLUSION

Timely intervention prevents the spread of infection from dental origin into the deep spaces of head and neck region averting lethal complications. Early detection and aggressive management are crucial in some cases.

Although the prevalence and complication incidences of deep space infections has decreased with advancement of diagnostic techniques, availability of effective antibiotics and improvement in oral hygiene; space infections still remain potentially life threatening especially in developing countries where these facilities are not properly utilized.

Since large number of deep space infections are of dental origin but are mostly referred to physicians, surgeons or otolaryngologists, it is of great importance that diagnosis and treatment be performed in close cooperation with dental surgeons.

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