



Role of Contrast Enhanced CT in Odontogenic Space Infections – A 3D Based Management

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Type of Publication: Original Research Paper

Conflicts of Interest: Nil

Abstract

The most common head and neck infections are odontogenic in nature. These infections spread via the potential spaces along the fascial planes which are the weak areas of resistance¹. Such infections can be differentiated as superficial or deep depending on the depth of spread, primary or secondary based on the nature of involvement, and maxillary- mandibular or deep neck spaces based on its anatomical location. Early diagnosis and prompt treatment holds the key for the successful management of such infections from becoming fatal. Many a time Clinical evaluation alone underestimates the extent of the infection. So in order to know the spread Imaging plays a vital role. Contrast enhanced CT for various space infections were taken and managed effectively. We conclude that CECT is a must not only for the exact localization of the head and neck infection, but also for the correct guidance of appropriate incision and puncture for the drainage thereby patients can be managed successfully without leaving any secondary infections especially on immune compromised conditions.

Keywords: Head and neck infections; Facial spaces; Contrast enhanced Computed tomography; Dental Space Infections

INTRODUCTION

The most common head and neck infections are odontogenic in nature. These infections spread via the potential spaces along the fascial planes which are the weak areas of resistance¹. Such infections can be differentiated as superficial or deep depending on the depth of spread, primary or secondary based on the nature of involvement, and maxillary- mandibular or deep neck spaces based on its anatomical location. As Complications arising from untreated or neglected offending tooth which act as the foci of infection that eventually spreads to the surrounding fascial spaces and they become life threatening. Superficial spread lead to Ludwig’s angina, necrotizing cervical fasciitis while deep spread lead to aspiration pneumonia, lung

abscess, mediastinitis, cavernous sinus thrombosis, brain abscess, meningitis that may become potentially fatal^{2,3}. Immediate Medical treatment like appropriate antibiotic coverage and anti-inflammatory mediators alone may not be sufficient enough to relieve the infection completely unless timely surgical intervention by the evacuating of pus and establishing the drainage along with removal of involved foci needs to be coupled with for the management of such infections. Early diagnosis and prompt treatment holds the key for the successful management of such infections from becoming fatal. Many a time Clinical evaluation alone underestimates the extent of the infection. So in order to know the

spread Imaging plays a vital role. Considering these facts into account, we attempted to use CT contrast images for one such head and neck infections.

Case Series

A 47 yr old male patient reported to the Kauvery Hospital, Salem – Dental OP with pain and swelling over the right side of face for the past 5 days (Fig:1). The swelling started as a smaller one and increased gradually and attained the present size when on reported. He was a diabetic which was under control by medication (Insulin). He was a chronic smoker and used to take 5 cigars per day for the past 15 years. Upon examination, the swelling extended little away from the commissure of mouth to the lateral side of mandible resting on the cheek. The swelling was soft in consistency, tender in nature, no ulcer seen and no change in skin color. The submandibular lymph node on right side was tender and palpable. The mouth opening was limited and restricted to two finger breaths (10 mm) (Fig: 2). Intra orally tooth decay was detected on lower right 2nd molar. Also no vestibular obliteration was seen. He was provisionally diagnosed as Masticator space infection on right side of face. He was further advised for CT contrast imaging of head and neck region and complete blood profile. The axial section of the contrast imaging taken showed moderate hypo dense region located from the lateral mandible towards the skin superficially lying within the masseter muscle and that was the reason for restricted mouth opening

(Fig:3). The diagnosis was confirmed by the CECT imaging. His blood report revealed his CBG as 373mg/dl. The patient and the attender was informed of the nature of the infection, the spread and the risks involved if neglected, and the plan for the management and consent was obtained as per the routine surgical protocol.

He was admitted immediately and Physician opinion was sought for blood sugar level management and empirically Amoxicillin clavilunate and metronidazole were started twice a day. On that day surgical intervention was done with the incision and drainage established on the most dependent region with sinus forceps and corrugated rubber drain was kept (Fig: 4). The lower right 2nd molar was removed under LA. The pus obtained was given for culture sensitivity. The patient was irrigated with saline diluted betadine along the drain twice a day for 3 days. Appropriate antibiotics – Piperacillin – Tazobactam were started as per the culture report and the quantity of pus drainage via the drain was gradually reduced subsequently. The mouth opening was improved and the swelling got reduced. The drain was removed on 4rd post-operative day and dressing was given extra orally (Fig: 5 & Fig: 6). The patient was discharged and followed up for the past 1 month. Similarly 8 such cases of buccal space, sub mandibular space, masticator space and pterygo mandibular infections were managed successfully (Table 1).

TABLE – 1Details of Space Infections managed with CECT

S.No	Type of Space Infection	Co - Morbidities	Pre op Radiographs Taken	Treatment Done
1	Buccal Space Infection	Diabetes	CT Contrast	I&D and removal of foci
2	Canine Space Infection	No	CT Contrast	Removal of teeth and established Drainage
3	Buccal Space Infection	Diabetes	CT Contrast	I&D done
4	Submandibular Space Infection	Diabetes	CT Contrast	I&D and removal of foci
5	Sub lingual Space Infection	No	CT Contrast	I&D and removal of foci

6	Buccal - Vestibular Space Infection	Diabetes	CT Contrast	I&D and removal of foci
7	Masticator Space Infection – Submassetric region	Diabetes	CT Contrast	I&D and removal of foci
8	Buccal Space Infection	No	CT Contrast	Removal of foci and established Drainage
9	Masticator Space Infection – Temporal and Pterygomandibular Region	No	CT Contrast	I&D and removal of foci

Discussion

The spread of odontogenic infection depends on the host defense like loco - systemic factors and the virulence nature of the microorganism involved. The systemic immune compromised factors like diabetes contribute much to such infections and thereby result in acute exacerbation of the chronic disease process⁴. In uncontrolled diabetes, the immunity becomes compromised due to decreased recruitment and functions of PMNLs and Lymphocytes, defective chemotaxis and phagocytosis. Furthermore when the blood sugar level is high, the microorganisms become more virulent and antimicrobial resistance is high⁴. If neglected, could be fatal by landing in any of the complications ranging from Ludwig’s angina, necrotizing fasciitis, mediastinitis, aspiration pneumonia, cavernous sinus thrombosis, brain abscess and meningitis to finally death. So early diagnosis and timely intervention by both medically and surgically is necessary in managing such infections. CECT plays a vital role in knowing the extent of the infection especially in secondary or deep areas which may clinically go unnoticed and also act as guidance for the surgeon to decide where exactly the incision be given⁵.

Not most dental space infections coming to tertial clinics would respond to incision and drainage at outpatients set up but few may land up in complications due to undiagnosed Secondary spread. It’s not routinely in practice of taking a diagnostic CT for all space infective patients unless they are been referred to the institution based or well-equipped

hospitals. Conventional OPG alone might be useful in diagnosing the etiology; but we need contrast CT to know the extent of the spread of space infections. The use of contrast enhanced CT can be made as a routine evaluation for such clinically suspicious spread of infections having specific parameters like extra oral or intra oral swelling and restricted mouth opening.

Conclusion

Management of head and neck space infections is been a challenge to the facio maxillary surgeon and dentists due to its complex anatomical extent into the loose areolar connective tissues. Clinical diagnosis may not give a clear picture of the spread of infections. So, we conclude that CECT is necessary not only for the exact localization of the head and neck infection, but also for the correct guidance of appropriate incision and puncture for the drainage thereby patients can be managed successfully without leaving any secondary infections especially on immune compromised conditions.

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CASE -1

Pre op Image – 1 Profile View



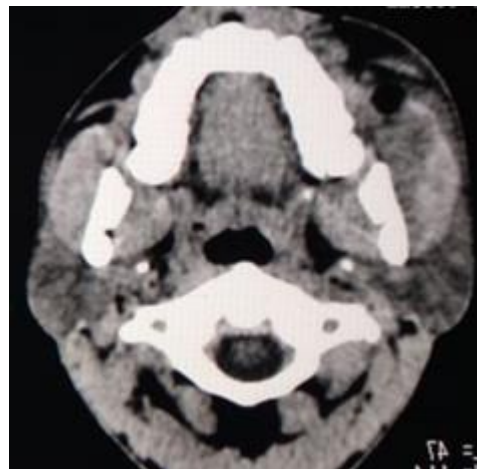
Pre op Image -3 Pre op CECT Taken

Pre op Image 2 - Image with restricted mouth opening

Post op Image 5 Profile view



Pre op – CECT



Post op view image 6 – Mouth opening



I & D done



After I & D



CASE -2

Pre op Image -1



Post op image

