



**INFECTED RADICULAR CYST CAUSING LUDWIG'S ANGINA: EARLY
RECOGNITION AND AVARICIOUSNESS CAN REDUCE FATALITY**

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ABSTRACT

Ludwig's angina relatively, uncommon remains a potentially life-threatening condition due to the risk of impending airway obstruction, so early identification and management of Ludwig's angina is extremely important. Here we present a case of Ludwig angina which was associated with infected radicular cyst in lower anterior region and was well managed via flexible fiberoptic nasal intubation, incision and drainage under complete antibiotic coverage.

KEYWORDS: Radicular cyst, Ludwig's angina, management.

INTRODUCTION

Ludwig's angina is a notorious condition known for its aggressiveness, rapid progression to airway compromise, and high mortality when not treated promptly. It is most commonly associated with infected tooth and submandibular space is the primary site of infection. Identification of source of infection, proper antibiotic coverage, intubation and incision & drainage are important factors for successful treatment Ludwig's angina. Here we present a case of Ludwig angina which was associated with infected radicular cyst along with two other infected teeth.

CASE REPORT

A 30 year old female presented to maxillofacial OPD with the chief complaint of difficulty in breathing since 12 hours [Figure: 1]. Patient was asymptomatic 10 days back when she experienced mild pain in the right lower first molar i.e. 46 [Figure: 2] and left lower second molar i.e. 37, which slowly progressed to extensive bilateral neck and facial swelling, difficulty breathing and dysphonia, after two days. With the progression of swelling pain also progressed, with which she presented to our OPD. The patient initially sought medical attention at the private medical practitioner who prescribed her only medication. There was no other significant dental history. She had no history of pus discharge from any oral region. She was unable to eat and her diet significantly reduced by past last one week.

On physical examination, she had respiratory distress and was toxic in appearance and her vital signs were

monitored immediately. Her temperature was 101°F with a pulse rate of 106 beats per minute, blood pressure of 140/90 mmHg, and a respiratory rate of 22 breaths per minute.

Extra oral examination revealed gross disfigurement of face. Swelling was indurated, nonfluctuant with bilateral involvement of the submandibular and sublingual glands, also involving infraorbital spaces. Mouth opening was limited to 1 cm.

Intraoral examination revealed inability to protrude tongue and floor of the mouth was raised which pushed the tongue backwards and upwards towards palate. 46 was grossly carious and 38 tender on percussion. No evidence of pus discharge from intraoral site.

It was an emergency condition and surgical drainage was planned immediately, so patient was shifted to OT. Intravenous line procured and Inj. ceftriaxone, metronidazole and amikacin were given empirically along with dexamethasone 8mg to reduced upper airway edema. The patient was intubated with the help of fibre optic and 6.5 mm cuffed endotracheal tube. A written consent was taken from patient for emergency tracheostomy, if needed. Extraction of 46 and 38 was done. Intraorally there was no discharge. So, proceeding further three stab incisions were given at left, right submandibular and sub mental region respectively. Also an incision was made intraorally at labial vestibule of 23 to relief the pressure build up infraorbital region. Pus was discharged from all three sites, but most of the

discharge was there from left incision site. Approximately 25 ml of purulence was drained. Corrugated rubber drain was placed at all the three sites, stabilized with sutures and extra oral dressing was done. The patient remained intubated and on positive pressure support for next 24 hours following surgery and was shifted to CCU for the same.

After 24 hours when she was stable, she was shifted to ICU. X-ray was advised, which showed bone loss in the extracted teeth regions. At ICU regular intraoral suctioning was done to remove any collections, as still she had difficulty in spitting. Irrigation with diluted hydrogen peroxide, 5% betadine and metrogyl was done thrice a day. On post-operative day two the cultures from the sub mental and submandibular abscesses and the extraction sites revealed gram positive cocci (normal oropharyngeal flora, *S. milleri*, *S. constellatus*, *C. albicans*, and *C. tropicalis*) which were determined to be sensitive to specific antibiotics. With the result of the cultures and sensitivities, the Department of Microbiology decided to continue on the current course of antibiotics.

Post operative second day [Figure 3, 4 & 5] few remarkable signs were seen as, 1) whenever irrigation was done in sub mental region, floor of mouth raised and it used to reduce itself few minutes after irrigation, 2) patient was still not able to protrude her tongue, 3) extra orally swelling started extending lateroposterior direction towards the neck on left side and 4) the white blood cell count didn't dropped much on post-op day two, which suggested the patient was not responding well to the treatment. After seeing such signs a cross examination was carried out for the same. Intraoral examination revealed mild discoloured right lower anterior i.e. 41. Uvula was centralized and also the mucosa appeared normal, so chances lateral pharyngeal space infection was not there. Due to hard and raised floor of mouth a probable commencement infection was doubted in lower anterior region. Later patient gave history of trauma 15 years back in lower anterior region, so an OPG (orthopantomogram) [Figure: 6] was advised, which revealed radicular cyst in relation to 41 and 31. So after discovering the final and third source of infection, extraction of 31 & 41 was done followed by enucleation of cyst under local anesthesia, also incision and drainage at sublingual region was done. Enucleated cyst was sent for biopsy and diagnosis of cyst was confirmed. Ample amount of pus was drained from the same region. After treating the same patients swelling started to decrease from the second day. The white blood cell count dropped significantly to $10.9 \times 10^9/L$ on post-op day two, which suggested the patient, was responding well to the treatment. Regular irrigation was continued until there was omission of discharge. Corrugated drain was removed one by one, starting with right submandibular, then sub mental and at last left submandibular region. On day of discharge, white blood cell count was reported at $4.6 \times 10^9/L$. The patient was discharged from the hospital on 12th day and placed on oral antibiotics for an

additional two weeks. She was called regularly for irrigation and dressing for next 10 days. [Figure 7] Right submandibular incision area healed secondarily. Left submandibular and sub mental area were primarily closed.



Figure 1: Pre operative clinical presentation.



Figure 2: Lateral cephalometrics showing 46 with pathology.



Figure 3: Second day post operative.



Figure 4: Second day postoperative left side.



Figure 7: 22nd day postoperative.



Figure 5: Second day postoperative right side.



Figure 6: Orthopantomograph showing radicular cyst in relation to 31 & 41.

DISCUSSION

Ludwig's angina in the preantibiotic era which carried a very high mortality rate of around 50% has dropped down to around 8-10% today, with adequate surgical and antibiotic treatment. Although it has a much reduced rate of mortality however, it also has a potentially life-threatening condition because of the risk of impending airway obstruction. The treatment plan for each patient should be based on the phase of the infection and condition. The surgeon's experience, existing resources, and personnel are all essential factors for assessment.^[1,2]

Ludwig's angina occurs most commonly from odontogenic infection, especially of the second and third lower molars. Few other nidus of infection are reported for the same, namely; laceration of the floor of the mouth, extension of a peritonsillar abscess, sialadenitis, infection of an oral tumor mass, and mandibular fracture. Also in a small percentage of cases, no inciting pathology can be identified.^[3,4,5,6] Although in this present case source of infection is odontogenic, but it is unique in itself as, there were three sources i.e. 37 and 46 but the main source identified was a radicular cyst in relation to 31 & 41. A case was reported in the year 2012 by Cynthia Helena Pereira de Carvalho et al was infected orthokeratinized odontogenic cyst led to gross fascial cellulitis.^[7]

Anatomical relationships of the head and neck are complex and must be understood to appreciate the natural history of infections spreading within. The sublingual space is bound superiorly by the floor of the mouth, posteriorly by the base of the tongue, anterolaterally by the mandible, and inferiorly by the mylohyoid muscle.^[8] In our present case, probably the expanding cyst must have perforated the lingual cortical plate and approached the floor of mouth and then to sublingual space.

The bacterial organisms most commonly isolated from Ludwig's angina patients are *Streptococci viridans*,

Staphylococcus aureus, and *Staphylococcus epidermidis*. In this present case *S. milleri* and *S. constellatus* were isolated along with *C. albicans*, and *C. tropicalis*. *S. milleri* and *S. constellatus* bacteria are commonly isolated from radicular cyst.^[9]

Airway compromise is always synonymous with the term Ludwig's angina, and it is the leading cause of death of individual. So airway management is the primary therapeutic concern. Therefore the essential components of therapy for Ludwig's angina are assurance or establishment of a patent airway, administration of appropriate antibiotics and surgical decompression.^[10,11]

Orotracheal intubation by direct laryngoscopy is difficult in distorted airway anatomy, tissue immobility, and limited access to mouth. Induction of general anesthesia is dangerous in advance cases, because this may precipitate complete airway closure and make mask ventilation and intubation impossible.^[12]

Therefore it is always safe to secure airway in awoken state. But for this blind nasal intubation must be voided as, besides having a high failure rate, it could cause catastrophic bleeding, laryngospasm, airway edema, rupture of pus into the oral cavity, and aspiration. Classically, tracheostomy was always considered as the gold standard of care for establishment of a definitive airway until, flexible fiberoptic nasal intubation came into picture. Skilled and experienced hands may also face difficulty with fiberoptic intubation due to distorted anatomy, edema, and secretions. If fiberoptic bronchoscopy is not feasible, not available, or has failed, cricothyrotomy and tracheostomy are the options.^[13] In our present case patient was intubated via flexible fiberoptic nasal intubation, although consent of emergency tracheostomy was obtained, if required.

CONCLUSION

The present case describes a typical but severe case of Ludwig's angina due to a relatively atypical source of origin, i.e. radicular cyst. Ludwig's angina is a life threatening condition, which requires early intervention along with an interdisciplinary team. For successful treatment of Ludwig's angina it is essential to identify the source of infection in the earlier stages of the disease. In advanced cases, airway management and surgical drainage with organism specific antibiotic therapy are important in avoiding complications.

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