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Case Report

Bedside emergency tracheostomy in Ludwig neck- a dilemma: case report

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ABSTRACT

A stony hard rigid neck is the typical presentation in the angina of Von Ludwig. Suddenly with excruciating pain generalized severe cellulitis of the neck is noticed. It flares up quickly and extends on either side, in the submandibular, sublingual and submental triangles thereby manifesting as a medical emergency. This necessitates a prompt diagnosis and intervention medical or surgical as the case maybe, lest a life maybe lost. A neck swelling secondary to self-manipulation of a loose dental plate with impacted wire is being reported. This odontogenic infection had accessed the deeper tissues of a neck with elevation of the floor of the mouth obstructing the airway with consequent breathlessness and stridor; with need to regain his airway by emergency tracheostomy. At the same time a cervical fasciotomy was undertaken to drain the potentially involved spaces.

Keywords: Ludwig's angina, Odontogenic, Stridor, Fasciotomy, Surgical decompression, Tracheostomy

INTRODUCTION

Wilhelm Friedrich Von Ludwig a physician from Germany described this entity in 1836 and thereby is named after him. It is a rapid and often a fatal and a fulminant gangrenous cellulitis, with edema of the floor of the mouth and the soft tissues of the neck.[1]

Due to progressive swelling of the soft tissues, i.e. the mucosa of the floor of the mouth and the muscles of the tongue there is elevation and posterior displacement of the tongue with obstruction to the oro-pharyngeal airway which is a life-threatening situation.

In the pre-antibiotic era, the mortality in patients of Ludwig's angina was more than 50%.[2] In present era the mortality is approximately 8% due to availability of antibiotics, high resolution imaging and development of newer approaches to surgical intervention.[2,3]

The submandibular triangle is the primary site of infection in this entity of Von Ludwig.[4] This region has a hammock shaped diaphragm, the mylohyoid muscle that divides it into the upper sublingual and lower submaxillary region.

The majority of cases of Ludwig's angina are odontogenic in etiology, primarily localizing to the mandibular second and third molars. The roots of these teeth penetrate beneath the line of attachment of the mylohyoid muscle, thence suppuration in the respective dental socket is likely to "burst" into the submaxillary space. Infection initially maybe localized here but later may involve the sublingual space by going posteriorly along the deep lobe of the gland.

Moreover, if untreated the collection spreads around the constrictors and fills the pharyngomaxillary and retropharyngeal spaces, and hence compresses the lumen of the upper/cervical aero-digestive tract.

Peritonsillar or parapharangeal abscesses, fractures of the mandible, penetrating injuries of the oral cavity or the oropharynx, inflammations of the submandibular gland, and neoplasms of the oral cavity figure in the list of other aetiologies of Ludwig's angina.[5] Systemic ailments like diabetes mellitus, renal failure, immuno-compromised states like human imuno-deficiency virus (HIV) and post organ transplantation are the main predisposing causes in addition to dental caries and recent dental treatments. Habits like alcoholism and malnutrition too lower the immunity of the individual.[6-9]

CASE REPORT

A 36-year-old gentleman, an HCV positive, IV drug addict with a neck swelling secondary to self-manipulation of a loose dental plate with impacted wire was admitted with stridor in the emergency services of a tertiary health care facility of North India.

There was marked trismus with inability to open the mouth, pain, and swelling in relation to the lower jaw and neck for the last one day.

On physical examination, he had respiratory distress and was toxic in appearance and his vital signs. His temperature was 101.8°F with a pulse rate of 106 beats per minute, blood pressure of 140/90 mmHg, and a respiratory rate of 25 breaths per minute. Mouth opening was limited to 1.5 cm (inter incisor distance).

Extra-oral swelling was indurated, non-fluctuant with bilateral involvement of the submandibular and sublingual glands (Figure 1 and 2). An immediate diagnosis of Ludwig's angina was made, and the patient was prepared for urgent surgical decompression under (MAC) minimal anaesthesia care/general anesthesia. In view of reduced mouth opening an emergency "on trolley" tracheostomy was planned for airway maintenance in collaboration with the anaesthetist. The blood report was normal except for raise in erythrocyte sedimentation rate (ESR), eosinophilia.

Figure 1: Extra-oral swelling.

Emergency tracheostomy was undertaken under local anesthesia to secure the airway (Figure 3). Since the neck was rigid like a board and could not be manipulated i.e. neither could be extended nor flexed, the thyroid alae and the trachea could not be palpated. A vertical midline incision from the suprasternal notch extending upwards was made and deeper planes accessed. There was sudden gush of purulent material from the upper planes, in relation to the submandibular space bilaterally as well as submental space. A large blunt artery forceps was introduced to open up the tissue loculi and entrapped pus was suctioned out. This drainage was undertaken to facilitate visualization of the midline tracheal plane. The straps were separated and using blunt digital palpation the tracheal rings were identified and a vertical incision was given, followed by a cuffed tracheostomy tube insertion. He was ventilated by ambu bag.

Unfortunately, at this very juncture he had a cardiac event, for which CPR and thrice defibrillation was carried out. He was revived and shifted to intensive care unit for further management

The wound was irrigated with normal saline, and the tracheostomy tube was secured to the skin with silk sutures (Figure 2).

Figure 2: Bilateral involvement of the submandibular and sublingual glands.

Figure 3: Emergency tracheostomy undertaken.

Intravenous administration of cefotaxime 1 g Bd, gentamycin 80 mg Bd, metrogyl 500 mg, Tid were given for 5 days with a tapering dose of decadran 8–4 mg Bd for first two postoperative days.

Post-operative irrigation was done through the drain which was removed after 36 hours along with the infected tooth.

Tracheostomy tube care was taken in the post-operative period, and the skin was strapped on the fifth postoperative day after the removal of the tracheostomy tube (Figure 4).

Figure 4: Tracheostomy tube care in the post-operative period.

DISCUSSION

Ludwig's angina and deep neck infections are dangerous because of their normal tendency to cause edema, distortion, and obstruction of airway and may arise as a consequence of airway management mishaps.

Conservative management i.e. intravenous third generation broad spectrum antibiotics and close monitoring of vitals and the airway is undertaken in the initial phase of the disease. Advanced stage necessitates to secure the airway and surgical intervention for draining the suppurative collection. The latter phase usually manifests with marked trismus, excruciating pain swelling and odema of the upper airway often displacement of the tongue upwards narrows the airway. β-hemolytic streptococcus associated with anaerobic germs such as peptostreptococcus and pigmented bacteroides have been described as causative agents. *Streptococcus viridans* (40.9%), *Staphylococcus aureus* (27.3%), and *Staphylococcus epidermis* (22.7%) are usual bacteria cultured in deep neck infections. Intravenous penicillin G, clindamycin or metronidazole are the antibiotics recommended before one gets the culture and sensitivity reports. Utility of gentamycin too in these in addition has been documented in recent studies.[11,12] Moreover isolated case reports suggest the use of intravenous steroids in compromised airway situations.[1,4] If patients present with swelling, pain, elevation of the tongue, malaise, fever, neck swelling, and dysphagia, the submandibular area can be indurated, sometimes with palpable crepitus. Inability to swallow saliva and stridor raise concern because of imminent airway compromise. The most feared complication is airway obstruction due to elevation and posterior displacement of the tongue.[3] To reduce the risk of spread of infection, needle drainage can be performed.[13]

Airway compromise is always synonymous with the term Ludwig's angina, and it is the leading cause of death. Therefore, airway management is the primary therapeutic concern.[3] The stage of the disease and comorbid conditions at the time of presentation, physician experience, available resources, and personnel are all crucial factors in the decision making.[14] Immediate involvement of an anesthetist and an otolaryngology team is crucial.[15] Blind nasotracheal intubation should not be attempted in patients with Ludwig's angina given the potential for bleeding and abscess rupture.[4,14,15] Flexible nasotracheal intubation requires skill and experience, if not feasible, cricothyrotomy and tracheostomy under local anesthesia are occasionally performed in the emergency department in those with advanced stages of the disease.[16] Elective awake tracheostomy is a safer and more logical method of airway management in patients with a fully developed Ludwig's angina.[17] The consensus in airway management in deep neck infections, is a tracheostomy under local anaesthesia facilitated by presence of anaesthetist to monitor the vitals. Tracheostomy using local anesthesia has been considered the “gold standard” of airway management in patients with deep neck infections, in delayed presentation of neck infections with swollen, rigid and immobile neck, tracheostomy is difficult or impossible and fraught with complications due to inability to attain the position needed for tracheostomy or because of anatomical distortion of the anterior neck.[18-20] Progressive stages of the disease should be treated as they develop with primary emphasis on the maintenance of airway followed by surgical decompression under antibiotic coverage. The appropriate use of parenteral antibiotics, airway protection techniques, and formal surgical drainage of the infection remains the standard protocol of treatment in advanced cases of Ludwig's angina.

Tracheostomy using local anesthesia has been considered the “gold standard” of airway management in patients with deep neck infections, but it may be difficult or impossible in advanced cases of infection because of the position needed for tracheostomy or because of anatomical distortion of the anterior neck.[18-20]

CONCLUSION

In odontogenic infections that have accessed the deeper tissues of the neck with elevation of the floor of the mouth obstructing the airway with consequent breathlessness and stridor,there is a need to regain the airway by emergency tracheostomy. At the same time a cervical fasciotomy has to be undertaken to drain the potentially involved spaces.

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