

# Ludwig's Angina

## Background

### 1. Definition

- First described by Wilhelm Fredrick von Ludwig in 1836 as characterized by
  - Inflammation of cellular tissue around submandibular gland, neck and floor of mouth
  - Symmetrical hard sublingual swelling
  - Induration of floor of mouth
  - Extreme difficulty w/deglutition, speech and respiration<sup>9</sup>
- Potentially fatal, rapidly progressing submandibular & sublingual necrotizing cellulitis<sup>1</sup>

### 2. General information

- Usually originates from 2nd and 3rd mandibular molar infection
- Potential therapeutic emergency w/risk for life threatening complication of air way obstruction<sup>2</sup>

## Pathophysiology

### 1. Pathology of dz

- Originates from oropharynx
- Spreads by continuity rather than by hematogenous or lymphatic spread<sup>1,3</sup>
- Extends
  - Superiorly and posteriorly → elevation of floor of mouth & tongue
  - Anteriorly → distortion and "bull neck" appearance<sup>1</sup> → upper airway obstruction<sup>2,3</sup>
- Mixed infection of aerobic & anaerobic bacteria including predominately oral flora<sup>3,4</sup>
  - Staph spp, Strep spp and Bacteroides commonly isolated<sup>2,5</sup>
  - Atypical organisms eg. G- rods & fungi in immunocompromised host<sup>1,2,5</sup>

### 2. Incidence/ prevalence

- Quite rare where health access not generally a problem
- Less common in antibiotic era

### 3. Risk factors

- Dental caries, recent dental Tx, poor dental hygiene (accounts for 75-90% of cases)<sup>1,4,5,7</sup>
- Systemic dzs<sup>1,4</sup> (Sickle cell dz, DM, SLE), alcoholism, malnutrition
- Immunosuppression (HIV, transplant recipients, chemotherapy); IVDA<sup>1,4,6</sup>
- Trauma: mandibular fracture, facial trauma, tongue piercing,<sup>1,2,5</sup> frenuloplasty
- Submandibular sialoadenitis
- No apparent cause (especially in peds<sup>4,6</sup>)

### 4. Mortality

- Currently around 10%<sup>1</sup>; close to 100% if untreated<sup>3</sup>
- In pre-antibiotic era 60%

## **Diagnostics**

1. History
  - Tooth pain
  - Painful neck swelling
  - Restricted neck movement
  - Dysphagia
  - Dysphonia
  - SOB
  - Sore throat
  - Fever, malaise
2. Physical exam
  - Carious molar teeth
  - Tachypnea
  - Tachycardia
  - Fever
  - Erythema
  - Swelling
  - Drooling
  - Dyspnea
  - Cyanosis
  - Stridor
  - Tenderness to palpation of submandibular area
  - Neck rigidity
  - Trismus
  - Tongue displacement indicate imminent airway compromise
3. Diagnostic testing
  - Laboratory evaluation
    - WBC count
    - ESR
    - Possible blood culture or other tests to assess severity of illness
  - Diagnostic imaging
    - Xray neck and chest<sup>2</sup>
      - Most important
    - Contrast enhanced CT<sup>7</sup> of neck
      - Dx test of choice
  - Diagnostic criteria
    - No validated criteria available in primary care

## **Differential Diagnosis**

1. Peritonsillar abscess
2. Parotid space infection
3. Mumps
4. Parapharyngeal or retropharyngeal space infection
5. Paravertebral space infection
6. Suppurative jugular thrombophlebitis

## Therapeutics

1. Acute Tx
  - Requires hospital admission and Tx
  - Prompt airway mgmt if compromised<sup>2</sup>
    - Fiberoptic intubation preferred
    - Direct laryngoscopy for intubation can precipitate air way collapse
    - Cricothyrotomy & tracheostomy in emergency for severe cases
  - IV antibiotics (immunocompetent pts)<sup>2-7</sup>
    - Ampicillin/sulbactam 2 g IV q4hr
    - Penicillin G 2-4 MU IV q4-6hr plus metronidazole 500 mg IV q6hr
    - Clindamycin 600 mg IV q6hr for PCN allergy
  - IV antibiotics (immunocompromised host)
    - Cefotaxime 2 g IV q6hr
    - Ceftizoxime 3 g IV q8hr
    - Imipenem 500 mg IV q6hr
    - Piperacillin-tazobactam 3.375 g q6hr
  - Dexamethasone 10 mg IV x1, then 4 mg q6hr x48hr<sup>6-8</sup>
  - Nebulized epinephrine 1 ml of 1:1000 diluted to 5 mL w/0.9% NS<sup>6</sup>
2. Further mgmt
  - I&D of abscessed carries; decompression of submandibular space<sup>8</sup>
  - Removal of carious molars

## Follow-Up

1. Potential surgical and airway emergency requiring hospital level care and aggressive antibiotic Tx

## Prognosis

1. Guarded

## Prevention

1. Oral hygiene

## References

1. Marcus BJ, Kaplan J, Collins KA. A case of Ludwig angina. A case report and review of the literature. *Am J Forensic Med Path* 2008;23(3):255-9.
2. Barakate M, Jensen M, Hemli J, Graham A. Ludwig's angina: Report of a case and review of management issues. *Ann Otol Rhinol Laryngol*. 2001;110(5):453-6.
3. Abramowicz S, Abramowicz JS, Dolwick MF. Severe life threatening maxillofacial infection in pregnancy presented as Ludwig's angina. *Infect Dis Obstet Gynecol*. 2006;doi:10.1155/IDOG/2006/51931
4. Yu-Kung C, Chao-Yi L, Hai-Hsuan C. An upper airway emergency: Ludwig Angina. *Pediatr Emerg Care*. 2007;23(12):892-6.
5. Hartmann RW Jr. Ludwig's Angina. *Am Fam Physician* 1999;60:109-112. <http://www.aafp.org/afp/990700ap/109.html> Accessed 2.27.2010.
6. Saifelddeen K, Evans R. Ludwig's angina. *Emerg Med J*. 2004;21(2):242-3.
7. Furst I, Ersil P, Caminiti M. A rare complication of tooth abscess - Ludwig's angina and mediastinitis. *J Can Dent Assoc*. 2001;67(6):324-7.

8. Lin HW, O'Neill A, Cunningham MJ. Ludwig's angina in the pediatric population. *Clin Pediatr*. 2009;48(6):583-7.
9. Weisengreen HH. Ludwig's angina: Historical review and reflections. *Ear Nose Throat J*. 1986;65:457-61.

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