

# CASE REPORT

## Ludwig's Angina Caused by Tongue Piercing

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### INTRODUCTION

Body piercing is an ancient practice and common sites include the ear, nose, eyebrow, nipples, genitalia, tongue and lips. The tongue is the second most popular piercing site in the western world and its popularity is increasing rapidly.<sup>1</sup> This procedure occasionally can be complicated by Ludwig's angina which is a rapidly progressive necrotizing cellulitis of the floor of the mouth involving the submandibular and sublingual spaces.<sup>2</sup> It was first described by German physician, Dr. Wilhelm Friedrich von Ludwig, in 1836.<sup>3</sup> Its life threatening complication is airway obstruction. The mortality rate without treatment is around 50%, but with early diagnosis and aggressive management the mortality rate can be reduced to 8%.<sup>4,6</sup> This case report discusses the anatomical basis, diagnosis, and treatment of Ludwig's angina with an emphasis on early diagnosis and aggressive management.

### CASE REPORT

A 39-year-old white male presented with tongue pain, neck swelling and trismus which developed one day after having a tongue piercing. He denied drooling, dyspnea, or stridor and had no smoking or alcohol history. On physical examination, he was not in respiratory distress and was not toxic in appearance. He was febrile with a temperature of 101 degrees, a pulse rate of 92 beats per minute, blood pressure of 135/85 mmHg, and a respiratory rate of 16 breaths per minute with an oxygen saturation of 99% on room air. The patient had limited ability to open his mouth with swelling and redness of the floor of the mouth, and his tongue was pierced but without swelling or redness. He had submandibular and sublingual induration and swelling, along with cervical lymphadenopathy. A presumptive diagnosis of Ludwig's angina

His white blood cell count was high at 14,000 cells/mcL with an elevated C-reactive protein. Blood cultures were negative. Computed tomography scan of the face and neck showed swelling of the tongue and floor of the mouth which was consistent with Ludwig's angina by imaging combined with clinical history (Figure 1). The patient was treated with intravenous piperacillin/tazobactam, clindamycin, and dexamethasone. The patient responded well to this treatment regimen and did not require intubation. During the hospital stay, the patient never complained of dyspnea and his oxygen saturation remained around 98 - 99% at room air. He was discharged on oral antibiotics after three days of monitoring.

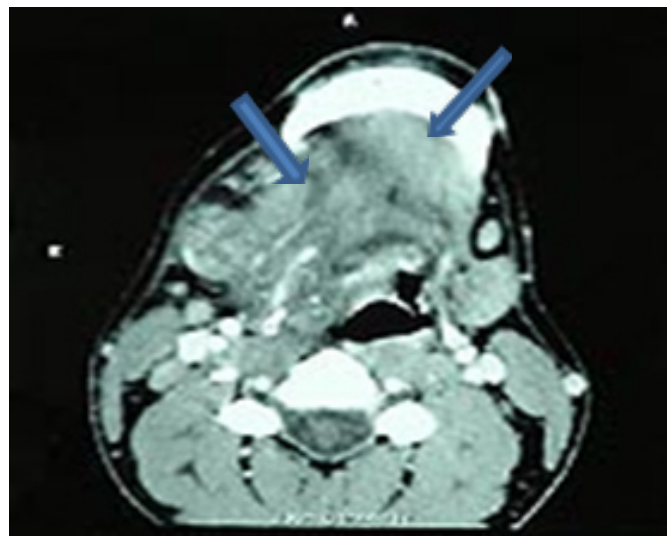


Figure 1. CT of the neck revealed thickening and inflammation of tongue, and floor of the mouth, compression of hypopharynx due to swelling of right lateral pharyngeal space.

### DISCUSSION

The risk factors of Ludwig's angina are dental procedures, dental caries, an immunocompromised state, such as diabetes, alcoholics, immunosuppressive medications, HIV, and oral procedures including tongue and lip piercing.<sup>7,8</sup> Odontogenic infections account for the majority of cases.<sup>9</sup> The most commonly cultured organisms include Staphylococcus, Streptococcus, Peptostreptococcus, and Bacteroides species.<sup>9</sup> The precise statistics on the prevalence of tongue piercing and associated bacterial infection are not known. In a survey of college students, 47 of 454 (10.4%) respondents reported having their tongues pierced.<sup>10</sup> In a German registry of patients with head and neck piercings, 92 of 273 (33.7%) reported having their tongues pierced.<sup>11</sup>

The typical presentation of Ludwig's angina includes swelling, pain, and protrusion of the tongue.<sup>12</sup> Induration, swelling, erythema, and pain of the submandibular tissues also are common manifestations. Systemic symptoms will include fever, chills, and dysphagia. In severe cases, stridor, dyspnea, tachypnea, drooling, and sepsis can occur. Stridor and drooling raise the concern of imminent airway compromise due to elevation and posterior displacement of the tongue. Immediate nasal fiberoptic evaluation should be performed when imminent airway obstruction is

suspected.<sup>12,13</sup> Blind oral or nasotracheal intubation is contraindicated due to the risk of laryngospasm or abscess rupture. If fiberoptic-assisted intubation fails, then a cricothyrotomy and tracheostomy can be performed, which was not required in this patient.<sup>13</sup>

The management of Ludwig's angina is largely dependent on clinical judgment and experience. Traditionally, airway management with endotracheal intubation or surgical intervention with tracheostomy was pursued given the high mortality rate, but recently treatment has evolved from aggressive airway management to more conservative therapy.<sup>13-15</sup> The patient should undergo close observation on a specialized airway unit with serial clinical airway assessments. Imaging modalities, antibiotic therapy, surgical skills, and clinical experience are the key factors behind this change in practice. Conservative management includes early intravenous antibiotics and close airway observation.<sup>15</sup> Larawin et al.<sup>16</sup> retrospectively studied a total of 103 patients with deep neck space infections from 1993 to 2005. Ludwig's angina was the most commonly encountered infection, seen in 38 (37%) patients. Thirteen (34%) patients were managed successfully with medical therapy and only four (10%) patients required a tracheostomy.

Antibiotics should cover both gram positive and gram negative organisms in addition to anaerobes.<sup>16-18</sup> A combination of penicillin, clindamycin, and metronidazole is commonly used. Some authors recommend the addition of gentamycin and certain case reports have advocated the use of intravenous steroids. In these reports, corticosteroid administration helped to avoid the need for more aggressive airway management. To date, there are no randomized controlled trials that demonstrate the efficacy of corticosteroids in patients with Ludwig's angina.<sup>19,20</sup>

From our clinical experience we propose early intravenous broad spectrum antibiotic use and close airway observation (oxygen saturation, respiratory rate, and serial fiberoptic laryngoscopy) in a high dependency unit (HDU) or an otorhinolaryngology ward. Initial airway assessment is based on respiratory rate, oxygen saturation, and findings on fiberoptic laryngoscopy. After the initial clinical assessment and airway decision, patients should undergo CT scanning of their neck and thorax for further evaluation of detailed airway and deep neck spaces. Any abscess or collection cavity should be drained, along with removal of the piercing. Intravenous antibiotics is continued for 48 - 72 hours, then switched to oral antibiotics for 14 days along with outpatient follow-up with otorhinolaryngology.

## CONCLUSION

We recommend conservative management of Ludwig's angina in selective cases, provided that early antibiotic therapy is initiated and any abscess is drained. Our review suggested that this is the preferred approach, as compared with previous invasive maneuvers. Both piercers and their clients should be aware

of this potential complication, and standardized infection prevention and control practices should be adopted to reduce the risk. Health care professionals should obtain a history of tongue piercing in unexplained cases of infective endocarditis, brain abscess and intraoral infections for which piercing may be a risk.

## REFERENCES

- 1 Chen M, Scully C. Tongue piercing: A new fad in body art. *Br Dent J* 1992; 172(3):87. PMID: 1739510.
- 2 Spitalnic SJ, Sucov A. Ludwig's angina: Case report and review. *J Emerg Med* 1995; 13(4):499-503. PMID: 7594369.
- 3 Saifeldeen K, Evans R. Ludwig's angina. *Emerg Med J* 2004; 21(2):242-243. PMID: 14988363.
- 4 Bansal A, Miskoff J, Lis RJ. Otolaryngologic critical care. *Crit Care Clin* 2003; 19(1):55-72. PMID: 12688577.
- 5 Moreland LW, Corey J, McKenzie R. Ludwig's angina. Report of a case and review of the literature. *Arch Intern Med* 1988; 148(2):461-466. PMID: 3277567.
- 6 Britt JC, Josephson GD, Gross CW. Ludwig's angina in the pediatric population: Report of a case and review of the literature. *Int J Pediatr Otorhinolaryngol* 2000; 52(1):79-87. PMID: 10699244.
- 7 Owens BM, Schuman NJ. Ludwig's angina. *Gen Dent* 1994; 42(1):84-87. PMID: 8005408.
- 8 Finch RG, Snider GE Jr, Sprinkle PM. Ludwig's angina. *JAMA* 1980; 243(11):1171-1173. PMID: 7359670.
- 9 Mayers LB, Judelson DA, Moriarty BW, Rundell KW. Prevalence of body art (body piercing and tattooing) in university undergraduates and incidence of medical complications. *Mayo Clin Proc* 2002; 77(1):29-34. PMID: 11794454.
- 10 Krause H, Bremerich A, Sztraka M. [Complications following piercing in the oral and facial region] *Mund Kiefer Gesichtschir* 2000; 4(1):21-24. PMID: 10662915.
- 11 Quinn FB Jr. Ludwig's angina. *Arch Otolaryngol Head Neck Surg* 1999; 125(5):599. PMID: 10326824.
- 12 Bross-Soriano D, Arrieta-Gomez JR, Prado-Calleros H, Schimlitz-Idi J, Jorba-Basave S. Management of Ludwig's angina with small neck incisions: 18 years experience. *Otolaryngol Head Neck Surg* 2004; 130(6):712-717. PMID: 15195057.
- 13 Shockley WW. Ludwig's angina: A review of current airway management. *Arch Otolaryngol Head Neck Surg* 1999; 125(5):600. PMID: 10326825.
- 14 Marple BF. Ludwig's angina: A review of current airway management. *Arch Otolaryngol Head Neck Surg* 1999; 125(5):596-599. PMID: 10326823.
- 15 Neff SP, Merry AF, Anderson B. Airway management in Ludwig's angina. *Anaesth Intensive Care* 1999; 27(6):659-661. PMID: 10631426.
- 16 Larawin V, Naipao J, Dubey SP. Head and neck space infections. *Otolaryngol Head Neck Surg* 2006; 135(6):889-893. PMID: 17141079.
- 17 Har-El G, Aroesty JH, Shaha A, Lucente FE. Changing trends in deep neck abscess. A retrospective study of 110 patients. *Oral Surg Oral Med Oral Pathol* 1994; 77(5):446-450. PMID: 8028865.
- 18 Kurien M, Mathew J, Job A, Zachariah N. Ludwig's angina. *Clin Otolaryngol Allied Sci* 1997; 22(3):263-265. PMID: 9222634.
- 19 Chueng K, Clinkard DJ, Enepekides D, Peerbaye Y, Lin VY. An unusual presentation of Ludwig's angina complicated by cervical necrotizing fasciitis: A case report and review of the literature. *Case Rep Otolaryngol* 2012; 2012:931350. PMID: 22953129.
- 20 Parthiban SV, Muthukumar SR, Alagappan M, Karthi M. Ludwig's angina: A rare case report. *Indian J Multidiscip Dent* 2012; 2:518-21.

*Keywords:* Ludwig's angina, edema, tongue, body piercing