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.1 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.2 It was first described by German physician, Dr. Wilhelm Friedrich von Ludwig, in 1836.3 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%.4-6 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 was made based on patient history and physical examination. 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.

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.7-8 Odontogenic infections account for the majority of cases.9 The most commonly cultured organisms include Staphylococcus, Streptococcus, Peptostreptococcus, and Bacteroides species.9 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.10 In a German registry of patients with head and neck piercings, 92 of 273 (33.7%) reported having their tongues pierced.11

The typical presentation of Ludwig’s angina includes swelling, pain, and protrusion of the tongue.12 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.12,13 Blind oral or nasotracheal intubation is contraindi-
cated due to the risk of laryngospasm or abscess rupture. If fiber-
optic-assisted intubation fails, then a cricothyrotomy and trache-
ostomy can be performed, which was not required in this patient.13

The management of Ludwig’s angina is largely dependent on clinical judgment and experience. Traditionally, airway management with endotracheal intubation or surgical inter-
vention with tracheostomy was pursued given the high mortal-
ty rate, but recently treatment has evolved from aggressive airway management to more conservative therapy.13-15 The patient should undergo close observation on a specialized airway
unit with serial clinical airway assessments. Imaging modal-
ties, antibiotic therapy, surgical skills, and clinical experience
are the key factors behind this change in practice. Conserva-
tive management includes early intravenous antibiotics and
close airway observation.15 Larawin et al.16 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 ther-
rapy and only four (10%) patients required a tracheostomy.

Antibiotics should cover both gram positive and gram nega-
tive organisms in addition to anaerobes.16-18 A combination of
penicillin, clindamycin, and metronidazole is commonly used.
Some authors recommend the addition of gentamycin and cer-
tain 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.19,20

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 otolarynologist 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 otolarynologist.

CONCLUSION

We recommend conservative management of Ludwig’s an-
gina 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 inva-
sive maneuvers. Both piercers and their clients should be aware

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