

## Case Report:

# Ludwig's angina: a case report and review of airway management options

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### Abstract:

Ludwig's angina is a rare, but potentially life-threatening, diffuse cellulitis of the neck and the floor of the mouth, usually secondary to odontogenic infection. It has an acute onset and spreads rapidly, affecting the deep spaces of the neck and leading to oedema, distortion and obstruction of the airway. Early diagnosis and immediate treatment are essential to avoid complications. The appropriate use of antibiotics, airway protection techniques, and formal surgical drainage of the abscess remains the standard protocol of treatment in cases of Ludwig's angina. We report a case of a 65 year old male, diagnosed with Ludwig's angina of odontogenic origin, which later got complicated with necrotising fasciitis, along with a review of the available airway management options during surgical drainage.

**Keywords:** Ludwig's angina, odontogenic infection, surgical drainage, airway management

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### Introduction

Ludwig's angina, first described in 1836, is a rapidly progressive, gangrenous cellulitis of the floor of the mouth and bilateral submandibular and sublingual regions, leading to progressive and often fatal airway obstruction<sup>1</sup>. It is characterised by fever, malaise, dyspnoea, dysphagia and a tender, hard, indurated swelling of the neck and the floor of the mouth<sup>1</sup>. Early stages of the disease can be controlled with intravenous antibiotics, but advanced infections necessitate surgical drainage. Pain, trismus, airway oedema and tongue displacement make securing the airway challenging.

### Case report

A 65-year male, weighing 75 kg presented with pain and swelling in the lower jaw and neck and

inability to open the mouth since eight days. He had difficulty in breathing and swallowing since two days.

He gave history of recurrent dental infection since two months. On examination, he had fever (101°F), tachycardia (heart rate 110/min), blood pressure 140/90 mmHg, tachypnoea (25 breaths/min), restricted mouth opening (inter-incisor distance 1.5cm). Extra-oral swelling was indurated, nonfluctuant, extending over submandibular and sublingual glands bilaterally. Extension and flexion of neck were restricted due to pain. Systemic examination and routine blood investigations were unremarkable, except leucocytosis. Emergency surgical drainage of neck abscess under local anaesthesia with intravenous sedation was planned.

Anticipating airway difficulty, difficult airway cart was kept ready. Procedure was explained to the patient, high risk consent and consent for tracheostomy taken. Aspiration prophylaxis, dexamethasone and adrenaline nebulisation given 30 minutes pre-operatively and intravenous broad-spectrum antibiotics started. Standard ASA monitors were attached, head-up position and oxygen through nasal prongs given.

After premedication with intravenous inj. glycopyrrolate 0.2mg, inj. hydrocortisone 100mg and incremental doses of inj. midazolam and inj. fentanyl, aspiration with 18G needle revealed pus. 8ml of 2% lignocaine with adrenaline (1:200,000) was infiltrated circumferentially around the swelling, stab incisions made in submandibular and submental spaces bilaterally and pus drained. Pus trickling into the oral cavity was immediately sucked out. The wound was irrigated with normal saline and a separate tube drain was inserted. Infected molars were removed under local anaesthesia.

Intra-operatively, vitals were stable. SpO<sub>2</sub> remained between 95-100%. Patient was able to obey verbal commands and upper airway reflexes were preserved. Analgesia was supplemented with inj. paracetamol 1g and inj. diclofenac 75mg intravenous infusion. Patient was comfortable and swelling subsided postoperatively. On tenth postoperative day, patient developed necrotizing fasciitis, which was successfully treated with eight cycles of hyperbaric oxygen therapy and antibiotics. Patient recovered well.

#### **Discussion**

Ludwig's angina is a rapidly progressive, potentially lethal cellulitis of the soft tissues of the neck and floor of the mouth. Beginning in the vicinity of submandibular space, it spreads in continuity rather than by lymphatic spread

to cause a "brawny supra-hyoid induration"<sup>2</sup>. Dental infection (especially affecting the second and third lower molar teeth) is responsible for approximately 80% of the cases<sup>3</sup>. Other causes include sialadenitis, peritonsillar abscess, open mandibular fractures, trauma, tongue piercing, compromised immune status, sickle cell disease, etc<sup>2,4,5,6</sup>. The causative organisms usually are  $\alpha$ -haemolytic streptococci, staphylococci and bacteroides group<sup>2</sup>. The initial stages of the disease are treated with intravenous broad spectrum antibiotics (typically, combinations of penicillin clindamycin, and metronidazole) and steroids, but advanced infections require surgical drainage<sup>8</sup>. Use of antibiotics has reduced the mortality from 54% to 0-8.5%<sup>4</sup>. Hyperbaric oxygen therapy is indicated in severe infections like necrotizing fasciitis<sup>7</sup>.

Various anaesthetic techniques suggested for the drainage of abscess include local infiltrative anaesthesia, cervical plexus block and general anaesthesia. Choice of anaesthesia depends on severity of disease and available resources. There is no consensus regarding airway management in such cases airway associated with neck swelling and restricted mouth opening. Airway may be secured by tracheostomy, conventional laryngoscopy and intubation, awake blind nasal intubation and awake fibre-optic intubation<sup>8</sup>. The method preferred depends on the available resources and the personal experience of the anaesthesiologist. However, emergency surgical airway access like cricothyrotomy/ tracheostomy should always be ready.

Conventional laryngoscopy and intubation is difficult due to limited mouth opening, oedema in neck, distorted anatomy, tissue immobility and chances of rupture of the abscess<sup>9</sup> resulting in aspiration of blood, pus and secretions, if airway is

not secured. Securing the airway in the awake state therefore, is the safest option.

Blind nasal intubation should be avoided due to high failure rate and risk of laryngospasm, airway oedema, catastrophic bleeding and drainage of pus into the oral cavity<sup>2</sup>. Complete airway obstruction may necessitate an emergency cricothyrotomy.

**Elective tracheostomy** under local anaesthesia was considered gold standard for establishment of a definitive airway. However, anatomical distortion of the anterior neck may make it difficult/impossible in advanced cases<sup>10</sup>. Further, there is risk of spread of infection to the thorax/mediastinum, rupture of innominate artery, aspiration of pus, loss of airway and tracheal stenosis<sup>11,12</sup>.

**Awake fibre-optic intubation (FOB)** with topical anaesthesia has high success rate<sup>10</sup> in skilled hands, though distorted anatomy, airway oedema and secretions make it challenging. CO<sub>2</sub> monitoring during FOB is difficult and can be overcome by use of awake fibreoptic intubation (AFcI), wherein a suction catheter advanced through the working channel of the bronchoscope allows repeated CO<sub>2</sub> measurements<sup>13</sup>.

Intravenous dexamethasone and adrenaline nebulisation reduce upper airway oedema and airway irritation during anaesthesia<sup>1</sup>.

Ludwig's angina in children poses special challenge, due to difficulty in administering local infiltrative anaesthesia. Arun K. Gupta *et al* reported use of cervical plexus block in such patients<sup>9</sup>. It can be a safe alternative in adult patients, too.

Recent trend in terms of management in cases of Ludwig's angina has evolved from aggressive airway management into a more conservative one<sup>14</sup>. In a retrospective analysis of all deep neck abscesses within a seven year period conducted by Wolfe *et al*, 65% patients had airway compromise, 42% of which required advanced airway control techniques. No surgical airway was required.

Our patient had severely restricted neck extension and limited mouth opening due to huge painful swelling over neck. Due to unavailability of fibre-optic bronchoscope and intentional avoidance of elective tracheostomy, surgical drainage (extra-orally) was planned under local anaesthesia with intravenous sedation. Airway reflexes being preserved, patient could cough out the pus that drained intra-orally during the surgery.

Multidisciplinary team approach, with meticulous pre-operative counselling, patient cooperation, proper planning and preparation of anaesthesia technique are key to successful outcome.

## References

1. Shamimul Hasan, Sarah Asif, Shakeba Quadri. Ludwig's angina – an alarming multidisciplinary challenge - overview of literature UJP 2013-02(05), page 1-44.
2. Saini S, Kshetrapal KK, Ahlawat G, Kamal H, Singh T. Anaesthetic challenges in a patient with Ludwig angina: A case report. SAJAA 2008; 14(5): 10-11.
3. Luqman Muhamed *et al* in ADVANCED LUDWIG'S ANGINA - A CASE REPORT Indian Journal of Medical Case Reports ISSN: 2319-3832 (Online) 2013 Vol.2 (3) July-September, pp.17-19.
4. Topazian R G *et al* oral and maxillofacial infection 4<sup>th</sup> ed. Philadelphia, Pa, W.B. Saunders 2002.
5. Kurien M, Mathew J, Job A, Zachariah N. Ludwig's angina. Clinical Otolaryngology 1997; 22(3): 263-65.

6. Perkins CS, Meisner J, Harrison JM. A complication of tongue flap piercing. *British Dental Journal* 1997; 182: 147-148
7. M. U. Anwar, A. K. M. F. Haque, J. Rahman, R. Morris, and J. McDermott. "Early radical surgery and antimicrobial therapy with hyperbaric oxygen in necrotizing fasciitis." *Plastic and Reconstructive Surgery* vol. 121, no. 1, pp. 360–361, 2008.
8. Ovassapian A, Tuncbilek M, Weitzel EK, Joshi CW. Airway management in adult patients with deep neck infections: a case series and review of literature. *Anaesth Anal* 2005; 100(2): 585-9.
9. Chetan Raval, Mohd Rashiduddin: Nasal Endotracheal Intubation under Fiberoptic endoscopic control in Difficult Oral Intubation, two Pediatric Cases of Submandibular abscess. *Oman Med J*; 2009 January; 24(1):51-53.
10. Arun k. Gupta et al "cervical plexus block for drainage of Ludwig's angina in paediatric patient" *Anaesthesia Paediatric Neonatal*, Vol. 7, N. 3, December 2009
11. Potter JK, Herford AS, Ellis E III. Tracheostomy versus endotracheal intubation for airway management in deep neck infections. *J oral maxillofac surg* 2002; 60:349-54.
12. Colnenro Ruiz C, Labajo AD, Yanez VI, Panaigua J. Thoracic complication of deeply situated serous neck infection. *J craniomaxillofac surg* 1993;21:76-81.
13. Durand M, Joseph M: Infections of the upper respiratory tract. In *Harrison's Principles of Internal Medicine. Volume 1*. 16th edition. McGraw-Hill; 2001:191.
14. MM Wolfe, JW Davis and SN Parks. Is surgical airway necessary for airway management in deep neck infections and Ludwig's angina? *Journal of Critical Care*, vol.26, no.1, pp.11-14, 2011.