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Case Series

Case Series on Spectrum of Presentation in Ludwig's Angina: Is Tracheostomy too Invasive?

Gunjan Badwaik[1], Shruti Goswami[2], Anjali Borkar[3]

[1]Professor, Department of Anaesthesia, Datta Meghe Medical College, Nagpur, Maharashtra, India
[2]Professor, Department of Anatomy, Datta Meghe Medical College, Nagpur, Maharashtra, India
[3]Professor and Head, Department of Anaesthesia, Datta Meghe Medical College, Nagpur, Maharashtra, India

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Corresponding author: Dr. Gunjan Badwaik
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Abstract:

Ludwig's Angina is a nightmare situation for anaesthesiologist as the induration of submandibular space and trismus pose extreme challenge to Airway management.

The Airway management remains a challenge even in post operative period as induration takes 48 to 72 hours to subside after incision and drainage is done. Hence preoperative evaluation of Airway is of utmost importance for safe conduct of Anaesthesia and uneventful postoperative period. We present a case series of such patients with different presentations. Hot potato voice and inability to swallow saliva leading to drooling remains the red flag symptom predicting utmost difficult Airway in whom even preoperative tracheostomy can be life saving if facilities of Fibreoptic Bronchoscopy are unavailable.

Keywords: Ludwig's Angina, Tracheostomy, Fibreoptic Bronchoscope, Difficult Airway.

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Introduction

Ludwig's Angina (LA) is a rapidly progressive necrotizing infection involving submandibular, submental and sublingual spaces. [1] It typically follows an episode of dental extraction or dental sepsis and involves both aerobic and anaerobic organisms. As the infection is rapidly progressing, inspite of good antibiotic therapy, they are routinely posted for incision and drainage procedure. This possess a unique challenge for anaesthesiologist as airway management is very difficult and airway is shared with surgeon [2,3]. Tracheostomy is considered gold standard in airway management but it is invasive procedure with potential complications and needs expertise.

Anatomy: Knowledge of head and neck anatomy is crucial to understand the spread of infection. The neck is composed of 2 layers of fascia: the superficial and deep, which are in communication with one another. The deep layer is composed of 3 separate layers: the general investing layer of deep cervical fascia (superficial), the pretracheal fascia (middle), and the prevertebral fascia [4]. The superficial layer of the deep cervical fascia encircles muscles of the neck, extending posteriorly to the spinous process, superiorly to the hyoid bone and submandibular gland, and along the mandible posteriorly to the parotid gland. The pretracheal layer extends from the hyoid bone to the thorax and encloses the trachea, thyroid, and esophagus. It is contiguous with the buccopharyngeal space inferiorly. [5] The buccopharyngeal space is made of loose connective tissue, which allows for infection to spread easily to the retropharyngeal space. Communication between the retropharyngeal space and the ''danger space,'' which lies immediately posterior, can serve as a conduit for spread of infection from the pharyngeal region to the mediastinum reaching the thoracic cavity [5,6]. Spaces that lie entirely above the hyoid bone include the submental, sublingual, submandibular, and lateral pharyngeal spaces [7,8]. The submental, sublingual, and submandibular spaces freely communicate with one another.

Clinical Presentation: In this case series, we retrospectively reviewed the medical records of 5 patients of LA in 15 months duration in our institution with varied presentation. This case series is to highlight various airway management plans according to symptoms.

All the 5 patients had fever, tachycardia, leukocytosis, swelling and pain in submandibular region associated with leucocytosis. All patients

had history of dental infection in recent past which was either medically treated or required dental extraction.

Following table compiles and compares the symptoms and signs of all the five patients.

Table 1:

	Case 1	**Case 2**	**Case 3**	**Case 4**	**Case 5**
Age/ Sex	42 yr/M	48yr/M	50yr/M	28yr/F	64yr/M
Co morbidities	Nil	BMI 31	Diabetes II, HTN	Nil	HTN
Fever, tachycardia	Yes	Yes	Yes	Yes	Yes
Durartion of sympotoms	4 days	4 days	3 days	5 days	5 days
Food intake in last 24 hrs	Semisolid	Liquids	Semisolid	Semisolid	Nil
Swelling crossing Midline	Yes	Yes	No	No	Yes
Trismus	+	+	+	+	+
Mallampati score	III	IV	IV	III	IV
Raised floor of mouth	Moderate	Moderate	Moderate	Mild	Gross
Hot Potato Voice	--	--	--	--	Yes
Drooling of saliva	--	--	--	--	Yes

Anaesthetic Management: All the cases were posted for incision and drainage of the swelling. Thorough preoperative evaluation of all the cases was done paying special attention to airway management. All the patients were premedicated with inj. Glycopyrollate, Midazolam and Fentanyl in appropriate doses. Induction was done with incremental doses of propofol and Sevoflurane administered via well-fitting facemask.

Airway management was different in all the patients. Case 1,3 and 4 were managed with gentle Oxygen and Sevoflurane mask with only head tilt and chin lift maneuver. Case 2 was obese with short neck and moderately raised floor of mouth and hence had repeated obstructed breathing inspite of good head tilt and chin lift maneuver, hence a well lubricated No. 6.5 nasal airway was inserted intraoperatively. Airway patency was maintained and surgery went on uneventfully after nasal airway insertion.

Case 5 had typical hot potato voice and he was unable to swallow anything including saliva. Decision of preoperative elective tracheostomy was taken. Informed consent was obtained for the same. Tracheostomy was done under local anaesthesia with No. 7.5 cuffed tracheostomy tube. Pt was then premedicated and induced similar to previous patients. Procedure was uneventful. Patient was successfully decannulated on 4th postoperative day.

Discussion

LA is rapidly progressing cellulitis of submental, sublingual and submandibular spaces. These spaces are inter connected and hence the infection spreads more rapidly. The swelling in LA is more of induration and hence it is hard and non-compressible unless it is liquefied to pus [7]. Difficult mask ventilation is anticipated because the swelling under the neck is often found to be ‘‘woody,’’ ‘‘calloused,’’ and tense [8]. This induration elevates the floor of mouth, tongue is pushed backwards and hence the Modified Malampatti grade is increased. Trismus adds to difficulty in airway assessment. Hence Malampatti Score is further enhanced. Laryngoscopy becomes difficult as floor of mouth becomes indurated and hence the structures in the floor of mouth become non compressible [9]. If the LA has progressed to stage of abscess formation, then it involves huge risk of intraoral bursting of abscess and subsequent aspiration during laryngoscopy. Hence direct laryngoscope is better avoided in advanced LA. Fibreoptic bronchoscopy and intubation is gold standard for intubation in LA in expert hands [9]. Care should be taken to avoid forceful thrusting of ET tube or bronchoscope which may cause bursting of abscess inside oral cavity. Nasal airway introduction is relatively safe and a good means to maintain airway especially in cases where TIVA is the primary plan of anaesthesia and patient is obese with or without history of obstructive sleep apnoea.

In our patients 1,3 and 4, signs of severe airway obstruction were not present. The primary plan of anaesthesia was TIVA (Total Intravenous Anaesthesia). Airway could be easily managed by simple mask holding and head tilt chin lift manoeuvre.

Case 2 was obese patient with BMI of 31 and history of snoring. He was taking only oral liquids since 24 hrs and was unable to swallow semisolid food. His MPC was IV and floor of mouth was grossly raised. Though there was no change in voice or drooling of saliva, but the trismus was severe. Considering all these parameters, a well lubricated nasopharyngeal airway was introduced before induction. Standard induction protocol was followed and patient maintained his airway under TIVA. Nasopharyngeal airway was kept for 2 hours postoperatively and then removed uneventfully when the patient was fully awake.

Fifth patient showed signs of severe airway obstruction. Hoarse voice or hot Potato voice is typically associated with airway complications. Patients in severe pain have inability to swallow the saliva and the same can be seen drooling from the angle of mouth. These patients can hardly swallow liquids and are invariably dehydrated when they present in the operating room. Our fifth patient had all these symptoms including drooling of saliva, change in voice (hot potato voice), trismus, inability to swallow anything including liquids. Fibreoptic bronchoscope guided gentle intubation an ideal choice for such patient10. But fibreoptic bronchoscope was not available, hence elective tracheostomy was considered in him as a better and safer option [11]. In very advanced cases where induration has increased upto the lower part neck, tracheostomy also becomes technically difficult. But in our case, though the patient presented 5 days after the symptoms, still the swelling was confined to the upper part of neck and the usual tracheostomy site was fairly spared from swelling. Hence the decision of elective tracheostomy was taken. Same was informed to the patient and his relatives and informed written consent was obtained.

Tracheostomy was done uneventfully under local anaesthesia and then patient was induced as per institutional protocol. Surgery and postoperative period were uneventful. Patient was decannulated on 4th postoperative day.

Conclusion

Airway management of a patient with Ludwig's angina depends on the condition of the patient and the facilities available in the institution. The presence of an experienced anaesthesiologist and the decision making regarding the airway is very important as there are no set guidelines for airway management. Fibreoptic laryngoscope is a very useful aid in such situations. Though elective tracheostomy may seem too invasive choice of airway management, but in anticipated severe airway compromise, tracheostomy offers the best choice of airway management when fibreoptic bronchoscope is not available. Anesthesiologist should not hesitate in taking such decision. These patients usually have a good recovery following surgery.

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