

CASE REPORT

Awake Fibre Optic Intubation with Dexmedetomidine for Ludwig Angina with Severe Trismus

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ABSTRACT

Ludwig angina is a submandibular space cellulitis secondary to oral cavity infection. It is strongly associated with difficult intubation due to limitation in the mouth opening. The presentation of Ludwig angina varies according to the severity of the infection. The extreme presentations include upper airway obstruction and respiratory failure. We present a female teenager with right submandibular abscess as the consequence of Ludwig angina, who was planned for incision and drainage. Successful awake fibre optic intubation was performed as a method of induction due to trismus, deferring the need for tracheostomy.

Keywords: Ludwig angina; Upper airway obstruction; Awake fibre optic intubation

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Introduction

The treatment of Ludwig angina should not be delayed. Amongst the 11% mortality rate, mediastinitis is the most feared complication comprises 80% of them (1). It is attributed to the descending infection via the retropharyngeal space. The most common causative microorganisms are Streptococcus and Staphylococcus (1). Failure of early treatment can lead to complete upper airway obstruction and severe sepsis with multi-organ failure. Broad spectrum antibiotic and incision and drainage should be performed as soon as abscess is confirmed. The gold standard setting of induction for such case used to be after a tracheostomy under local anaesthesia. The reason is to bypass the area of obstruction as well as able to avoid iatrogenic rupture of the abscess during airway manipulation which can cause aspiration to the airway and mediastinum. However, other methods of successful induction such as awake fibre optic intubation have been reported (2).

Case report

A 19-year-old female complained of 3-day history of right submandibular right swelling. The swelling was progressively increased in size and was associated with dysphagia and odynophagia. She gave a history of toothache about 2 weeks prior to neck swelling. There was no history of fever, difficulty in breathing or any history of trauma prior to illness. Other history was unremarkable. On examination, her mouth opening was limited to one finger breadth due to pain. There was gingival swelling lower right second molar (47) and third molar (48) teeth.

The right retromolar area was inflamed with halitosis present. The swelling at the right submandibular area measured 5cm x 5cm (Figure 1). The swelling the midline and extended to level II of the neck. It was inflamed, firm, tense and tender. Orthopantomogram showed the presence of retained root of 47 and impacted 48 (Figure 2). Lower first molar tooth (36) was badly carious (Figure 2). A diagnosis of Ludwig angina secondary to odontogenic infection was made. She was started on intravenous cefuroxime 1.5 gm 8 hourly and metronidazole 500 mg 12 hourly. She was planned for incision and drainage and extraction of 36, 47 and 48 teeth under awake fibre optic intubation.



Figure 1. Right submandibular swelling extending to the level II



Figure 2. Retained root of 47 with periapical abscess, impacted 48 and carious 36

The consent and procedures was explained to the patient during pre-operative assessment. At the induction room, the patient was given nebulized lidocaine 2% 4 ml for 20 minutes. The cotton buds soaked with cocaine 4% was applied to the most patent nostril. The standard monitoring was applied. Intravenous (IV) glycopyrrolate 200 mcg was given. The otolaryngologist was informed to standby. Fibre optic equipment and other difficult airways adjunct were prepared. Two drops of lidocaine 10% spray was applied to each side of the tonsil area and oropharynx. IV dexmedetomidine loading 1 mcg/kg (50mcg) over 10 minutes followed by maintenance 0.6 mcg/kg/hr was infused for 30 minutes. Therefore the total dose of dexmedetomidine required in our patient was 65 mcg.

The operator was standing behind the patient. The left hand held the scope. The right hand used to guide the scopes and inserts the endotracheal tube (ETT) size 7.0 mm. The scope was inserted into the left nostril.

It was kept straight and adjusted to keep glottis in the centre of screen. The epiglottis, glottis and trachea were anaesthetized by 'spray as you go' technique via a working channel of the scope. After passing the scope in to the trachea, the ETT was rerouted by screwing action until 2 cm above carina. Intubation was confirmed by the presence of end tidal CO₂ and air entry on both side of the lung via auscultation. Anaesthesia was deepened with sevoflurane 2-3% in 100% oxygen. IV propofol 100 mg was given followed by 30 mg of muscle relaxant rocuronium.

About 20 cc of pus collection was drained extraorally. Pus culture and sensitivity (C&S) grew *Parvimonas micra* and *Gemella bergeri*, both were gram positive anaerobic cocci that has been implicated significantly in dental disease. *Parvimonas micra* has the ability to grow and proliferate in oral biofilms. She underwent fast weaning in the ICU and was discharged well one day later.

DISCUSSION

Ludwig angina is an emergency medical condition in which the floor of the mouth swells causing the tongue to be pushed superiorly and results in upper airway obstruction. Irritation and inflammation to the pterygoid muscle causes trismus. The most important anaesthetic concern in managing Ludwig angina is mainly difficult airways. Mouth opening with one finger breadth 1.5 cm inter-incisor distance in our patient was one of the indications in favour of an awake fibre optic intubation (3). Rupture of the oral cavity abscess and causing aspiration and spreading of infection to mediastinum also needs consideration.

Tracheostomy under local anaesthesia is the other alternative safe option to prevent this complication. 44 % of patients with deep neck infection such as Ludwig angina underwent tracheostomy as the method of induction (2). However, Ovassapian et al reported that 100% of their patients are successfully intubated with awake fibre optic intubation without causing aspiration (3). Tracheostomy was not a choice if the patient was at early presentation without upper airway obstruction. Nevertheless, the tracheostomy under local anaesthesia is still a better option in case if awake fibre optic intubation fails.

The computed tomography (CT) scan of the neck will help to determine the size and extension of the collection (4). If the CT scan shows extension of the infection to retropharyngeal space and airway oedema, the tracheostomy is a better choice for induction. If the patient presents with symptoms of upper airway obstruction and huge collection, awake fibre optic may not be the best. In this case, tracheostomy is more appropriate. Fortunately, we managed to use less invasive method for induction.

In our patient, even though there was no CT scan of the neck done prior to the procedure, radiographic findings showed that there was no obvious airway obstruction and causative factors were retained root of 47 and impacted 48. Clinically, the swelling was confined to the right submandibular area. There was a significant trismus during the airway examination. The diagnosis of Ludwig angina was made. The danger of awake fibre optic intubation was possible with iatrogenic rupture of the oral cavity swelling during introducing the scope. Therefore, lidocaine jelly 2% was applied to the scope of fibre optic as a lubricant as well as an analgesic by dexmedetomidine to ensure the patient was well cooperative during the procedure. The fibre optic procedure will be abandoned if there was a huge friable abscess extended near the glottis area. These safety measures were planned to prevent iatrogenic rupture of the abscess. The rupture of the abscess can cause aspiration to the lung and spread to the mediastinum space.

Awake fibre optic procedure was successfully done by a single attempt. There was a lot of secretion accumulated at the glottis during fibre optic procedure most probably due to inflammatory reaction at the surrounding area. The epiglottis, glottis and trachea were anaesthetized by 'spray as you go' technique. However, the dose needs to be increased at one fold time than the usual to facilitate the fibre optic scope insertion into the vocal cord. The dosage of dexmedetomidine infusion used to be used up to 2.0 mcg/kg/hr provided the haemodynamic of the patient was stable (4).

In Ludwig angina, the area of submandibular inflammation can extend to the surrounding structures such as oropharynx, base of tongue and epiglottis. This inflammation can interfere with local anaesthetic absorption. The percentage of unionized local anaesthetic may reduce in our case. Therefore the higher dosage of local anaesthetic is required to anaesthetize the epiglottis and the base of tongue. In our centre, it is a common practice when the patient with awake fibre optic ventilation goes for the airway procedure, that they are admitted to the ICU post-operatively for overnight ventilation (5). The patient was given IV dexamethasone for 3 doses to allow the oedema to subside. The leak test was performed prior to extubating the patient. Therefore, it is imperative to consider managing Ludwig angina with a difficult airway, early broad parenteral antibiotics, and early surgical incision and drainage.

CONCLUSION

Ludwig angina is known to cause trismus which can result in difficult intubation. Awake fibre optic with dexmedetomidine still found to be an appropriate approach for induction in the drainage of submandibular collection. A higher dosage of local anaesthetic is required during the 'spray as you go' technique in our case.

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