

## Management of difficult airway in a pregnant patient with severely reduced mouth opening

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### Abstract

Pregnancy is associated with a wide variety of oral and dental changes ranging from gingivitis to odontogenic infections. If left untreated, severe dental abscess can progress to Ludwig's angina, which is a potentially lethal cellulitis that rapidly extends to the neck region and may lead to life-threatening upper airway obstruction. We report the case of a pregnant woman who presented with intense throbbing pain, trismus and severely reduced mouth opening due to dental abscess for the last one week. She required incision and drainage of abscess with extraction of third molar under general anaesthesia. There are some significant challenges to an anaesthesiologist like the risk of aspiration and failed intubation in patients with pregnancy and anticipated difficult airway. With counselling and proper preparation, we were able to manage this case with awake intubation. The potential merits of securing airway in conscious state with necessary steps in preparation are particularly discussed with emphasis of creating awareness among local healthcare practitioners.

**Keywords:** Dental Abscess, Ludwig's Angina, Pregnancy, Awake Fibre optic Intubation, Incision and Drainage.

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### Introduction

There are marked oral changes during pregnancy with 70% of women having gingivitis and an increase in periodontal disease including gingival bleeding, hyperplasia and pregnancy epulis.<sup>1</sup> The mandibular third molar is one of the most common sources of odontogenic infections that can spread into submandibular, sublingual and submental spaces.<sup>1</sup> Severe dental abscess is usually manifested by an intense, throbbing pain that may start suddenly and spread to ear, jaw and neck on the same side. It is also accompanied by redness and swelling on the face along with trismus, resulting in limited mouth opening. If left untreated, it can progress to Ludwig's angina, which is a rapidly spreading cellulitis and can produce life-

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threatening upper airway obstruction with septicaemia often leading to death.<sup>2</sup> In severe forms of odontogenic infections, it requires surgical drainage under general anaesthesia. Associated pregnancy makes airway management and choice of anaesthesia further difficult.

### Case Report

A 40-year-old lady who was 26 weeks pregnant, weighing 78 kg, presented to dental and maxillofacial clinic at Aga Khan University Hospital, Karachi on 04th May 2018 with one-week history of toothache on the left lower side along with moderate facial swelling, fever and reduced mouth opening. On examination, there was diffuse tender swelling involving the left mid face, angle of mandible and submandibular region with mild skin redness (Figure 1a). The maxillofacial surgeon diagnosed it as severe dental abscess with impending Ludwig's angina and planned incision and drainage procedure under general anaesthesia for which the patient was referred to the anaesthesiologist.

On the day of surgery (05th May 2018), the preoperative assessment revealed that she had restricted mouth opening with inter-incisor distance of 1cm, modified Mallampati class IV and unable to protrude her tongue (Figure 1b). The consultant anaesthesiologist had a detailed conversation with the patient and the surgeon regarding the choice of anaesthesia, benefits of intubation in conscious state, complications in the event of failed airway and anaesthetic and procedural risk on preterm delivery. The patient was explained all the steps in preparation and procedure for nasal fibre optic intubation (FOI). An



**Figure-1:** (a) Extent of abscess involving midface and submandibular region.  
(b) Severely reduced mouth opening with 1 cm inter-incisor distance.

informed consent was obtained and she also kindly agreed to photographs being taken for the purpose of scientific publication. The obstetrician also saw her before the procedure and an ultrasound was advised. It showed single alive intrauterine pregnancy corresponding to 25 weeks and five days with foetal heart rate of 140/min and there were no uterine contractions.

She was given premedication with intravenous Ranitidine 50 mg, intravenous Metoclopramide 10 mg and Sodium citrate. Standard monitoring was applied in preoperative holding area and injection Glycopyrrolate 0.2 mg IV was given. Fifteen minutes later, Xylometazoline 1:1000 nasal vasoconstrictor two sprays were instilled in both nostrils. A safe dose of Lignocaine for topical anaesthesia of airway was calculated with 5 mg/kg. Nebulisation with 3ml Lignocaine 4% was done in the operating room. Further topicalization was achieved with 2ml Lignocaine 4% via mucosal atomisation device. During all these steps, the patient was continuously observed through standard ASA monitoring (NIBP, ECG, Pulse oximetry).

For prevention of hypoxaemia during FOI, nasal prongs were applied with oxygen 4-5 litres/min. The operating table was kept in head-up (30°) position and the patient was approached from the front. The Karl Storz fibre optic bronchoscope (FOB) with C-Mac system (Karl Storz, Tuttlingen, Germany) was introduced from the right nostril, into the lower nasal meatus, identifying nasal septum and floor of the mouth and passed through the nasopharynx. It was further advanced into the laryngeal opening and 1ml Lignocaine 4% was sprayed through the working channel of FOB. As the scope passed into the glottic opening and subglottic space, another 1ml Lignocaine 4% was sprayed. After carina was visualised, size 7.0 mm cuffed reinforced endotracheal tube was railroaded over the scope. Then, the FOB was slowly brought out while ETT tip was seen and ensured its position 3-4 cm above the carina. After securing the airway and observing the end tidal CO<sub>2</sub>, anaesthesia was induced via injection Propofol and Atracurium was given for muscle paralysis. Morphine and Paracetamol were used for analgesia. The patient remained haemodynamically stable. Even after general anaesthesia, the mouth opening did not improve and the surgical team struggled in accessing the involved tooth (Figure 2). Incision and drainage of abscess, along with the infected lower left third molar, was removed and purulent material was extracted and sent for culture and sensitivity. Corrugate drain was placed at the site of abscess. The procedure lasted for about 30-45 minutes. At the end of the procedure, combination of Neostigmine 2.5mg and Glycopyrrolate 0.5mg was used and the patient was extubated and shifted to the post anaesthesia care unit



**Figure-2:** Reduced mouth opening persisted after giving general anaesthesia with muscle relaxation following awake intubation.

(PACU). Cardiotocography (CTG) was performed in PACU, which confirmed the foetal cardiac activity and absence of uterine activity.

## Discussion

Pregnancy has been associated with compromised oral health, and there is an overall increase in the incidence of orofacial infections in this state.<sup>1</sup> Severe infections during pregnancy can be life-threatening for both the mother and the foetus. Health practitioners may be reluctant to treat odontogenic infections aggressively in pregnancy due to the potential risks of imaging modalities and medications such as antibiotics.<sup>3</sup> Without adequate treatment, infection can spread along fascial planes caudally to cranial base and in a rostral direction to the mediastinum. The definitive management of odontogenic abscesses is surgical exploration and drainage. This does not change during pregnancy, and early and aggressive surgical management is likely to be less harmful than prolonged intravenous antibiotics, which is more commonly associated with progression of disease to sepsis and multi-organ dysfunction syndrome, compromising both the patient and her baby.

Pregnancy, with its anatomic and physiological changes, is expected to make the airway management further difficult in these cases.<sup>4</sup> Because of this difficulty, similar cases have been reported where incision and drainage procedure in pregnant woman have been performed under local anaesthesia. They reported that local anaesthetic drugs relieved the pain, trismus and permitted a thorough incision and drainage.<sup>5</sup> But in clinical setting, element of discomfort, anxiety and mild pain always persists, complicating the procedure, while sometimes it is almost impossible for the surgeons to proceed with such procedures under local anaesthesia mostly due to the extent and location of the abscess and limited mouth opening. Furthermore, laryngospasm leading to asphyxia and death have been reported following incision and

drainage under local anaesthesia.<sup>6</sup> But in our case, the incision drainage of dental abscess could not be performed under local anaesthesia because of difficult surgical access and restricted mouth opening.

In such circumstances where this procedure under LA is not an option, general anaesthesia would be required. However, in pregnant patients with anticipated difficult airway, intubation after putting the patient to sleep with anaesthetics poses a threat not only for aspiration but also for hypoxia due to failed intubation.<sup>7</sup> Our patient also posed difficulty in supraglottic airway placement. Therefore, the safer option would be to secure airway while the patient is still awake. Our decision to perform awake intubation has been validated by the fact that even after giving general anaesthesia and muscle relaxant, the restricted mouth opening could not improve and a lot of effort was required by the maxillofacial surgeon to access the third molar that was causing the problem. One of the pivotal findings in the UK-based national audit project (NAP) 4 was failure to consider awake fibre optic intubation as the primary airway technique and led to direct harm in a number of patients.<sup>8</sup> When the patient is conscious, airway is better preserved due to adequate muscle tone in upper airway structures. Awake nasotracheal fibre optic intubation has been safely performed in pregnant women keeping the following considerations in mind: 1) Possibility of nasal engorgement and bleeding may occur more in pregnant woman; 2) they may be more sensitive due to reduced dose requirements of LA drugs.<sup>9</sup>

## Conclusion

Success and management in these cases require close communication and collaboration between physicians and the patient.

**Disclaimer:** This is to certify that the manuscript has been read and approved by all the authors, the requirements for authorship have been met, and each author believes that the manuscript represents honest work.

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