



A CHILD WITH LUDWIG'S ANGINA AND COVID-19 PNEUMONIA - A CHALLENGE TO ANESTHESIOLOGIST IN PERIOPERATIVE MANAGEMENT.

Anaesthesiology

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ABSTRACT

Ludwig's angina, a potentially life threatening, rapidly spreading cellulitis of floor of mouth and is rarely seen in children. In children with Ludwig's angina, difficult airway remains a challenge to even an experienced anesthesiologist. At any given period of time, a child with Ludwig's angina is at risk of airway obstruction due to narrower and edematous airways. Risk of airway obstruction may get complicated if there is associated sepsis and Covid pneumonia. Blind nasal and awake fiber optic techniques of airway management are otherwise difficult in an uncooperative child, hence a careful airway examination and choosing optimal method to secure airway is of prime importance. Here, we report airway management in a 4 year old boy having Ludwig's angina who was posted for emergency surgical drainage. Endotracheal intubation was done successfully using inhalational induction without skeletal muscle relaxants. In postoperative period, child was ventilated electively and treated for sepsis and covid-19 pneumonia.

KEYWORDS

Ludwig's Angina, Sepsis, Covid Pneumonia, Inhalational Induction.

INTRODUCTION:

Ludwig's angina is a gangrenous cellulitis of floor of the mouth and bilateral submandibular and sublingual regions that causes progressive and often fatal airway obstruction^[1]. Commonly seen in adult age group and rare in children^[2]. This condition often needs medical management, in severe stage requires surgical drainage^[3]. Covid-19 disease which is pandemic at present causes upper and lower respiratory tract infection, which affects adult age group more severely compared to pediatric age group. Children with Covid-19 disease have milder symptoms and are less likely to be hospitalized, when compared to adults^[4]. A subset of pediatric patients manifest with severe inflammation and multi-organ failure needs aggressive treatment^[5]. When Ludwig Angina combines with sepsis and covid-19 pneumonia ultimately it makes complex intraoperative and postoperative medical and airway management. Here we discuss about perioperative management in a child with Ludwig's angina scheduled for emergency sub mandibular abscess drainage under general anesthesia having compromised airway and factors contributing to early hypoxia like sepsis and Covid-19 pneumonia.

CASE REPORT:

A 4 year old male child weighing 12 kg presented with 3 days history of fever, swelling in the lower jaw and neck, and difficulty in swallowing. In past, he had history of multiple dental caries. On examination child was conscious, irritable, febrile, and pale and was having drooling of saliva. He was having stridor with SPO2 88% on room air and SPO2 98% with oxygen supplementation by face mask. He was having tachycardia (Pulse Rate 150/min) and tachypnea (Respiratory rate 48 breaths/min) with blood pressure of 100/60 mm Hg. Local examination revealed extra-oral swelling of size 8cmX4cmX3cm, soft to firm, non-fluctuate, extending from mandible to 3cm above sternal notch. Systemic examinations were unremarkable. Child was uncooperative for airway examination. His hemoglobin level was 8.5gm%, normal leucocyte and platelet count, and increased neutrophil ratio (P82L15E1M2). Blood was sent for culture and sensitivity. His chest X-ray showed haziness in bilateral upper zone and right middle zone and in ultrasonography of neck, diffuse subcutaneous edema and hypo echoic collection was found in the floor of mouth extending from angle of mandible involving sublingual, sub mandibular, and sub-mental region. From clinical picture, possibility of associated Covid-19 was suspected in Covid-19 pandemic period but Rapid Antigen Test for Covid-19 came to be negative. Emergency surgical drainage of sub mandibular abscess under general anesthesia was planned.



Figure 1: Preoperative picture showing extra-oral submandibular swelling and restricted mouth opening

Consent was obtained from parents for surgery, anesthesia, difficult airway management and post-operative ICU admission. Difficult airway cart was kept ready and standby ENT surgeon was available for emergency tracheostomy if at all needed. ECG monitor, pulse oximeter, non-invasive blood pressure monitor were attached. Intravenous line was secured with 20G intracath and intravenous fluid Ringer lactate with 5% dextrose (in 4:1 ratio) was started. Patient pre-medicated with Inj. Ondansetron (0.08mg/kg), Inj. Glycopyrrolate (4 mcg/kg) and Inj. Hydrocortisone (2mg/kg). Patient was preoxygenated with 100% O2 for 5 mins, inhalational induction was done with sevoflurane 6-8% followed by direct laryngoscopy (Macintosh blade size: 2) without skeletal muscle relaxant was done. Copious secretions were obstructing the vision, oral suction was done. Floor of mouth was swollen, vocal cords were edematous. It was decided to put small size 4mm (ID) uncuffed ETT (estimated ETT size based on age, 5mm ID). Intubation was uneventful and throat pack was kept to prevent aspiration of blood, pus and secretions. Anaesthesia was maintained with Sevoflurane 2%, Inj. Fentanyl (2mcg/kg), Inj. Atracurium 0.5mg/kg bolus followed by maintenance Inj. Atracurium 0.1mg/kg given. At the end of surgery analgesia was supplemented with intravenous Inj. Paracetamol (15mg/kg). After surgery he was not reversed, not extubated and shifted to post anaesthesia care unit. In the post anaesthesia care unit empirical antibiotics (Inj. Amoxiclav 200mg bd, Inj. Metronidazole 7mg/kg tid, Inj. Amikacin 15mg/kg/day) were started and later antibiotic was upgraded to Inj. linezoilid based on blood culture report. He was taken on volume control mode of ventilation and was sedated with Inj. Midazolam (0.02mg/kg) and was paralyzed with Inj. Atracurium (0.1mg/kg) intermittently overnight. Subsequent postoperative blood investigations were deranged and treated with appropriate fluids, blood products and antibiotics. Despite aggressive treatment his respiratory rate was remarkably high. Repeat chest X-ray was done on the 3rd postoperative day, it showed haziness in the bilateral upper zone. He was extubated on postoperative day 3. Before extubation child received Inj. Dexamethasone (0.1mg/kg). Mouth opening was improved from previous days, but he was continuously requiring oxygen support to maintain SPO2>94%. Due

to corona pandemic situation and less sensitivity and high specificity of rapid antigen test^[6] which was done preoperatively, Covid-19 RTPCR was done on postoperative day-9 and it came positive. Covid infection contact was not traceable. Therefore patient shifted to covid-19 isolation ward, where covid-19 protocol treatment (Covid-19 Maharashtra guidelines^[7]) was given. Child was improved clinically after initiation of Covid pneumonia treatment protocol. On postoperative day 20, RTPCR for covid-19 became negative, therefore he shifted to non-covid ward.



Figure 2: Day 3 Postoperative picture showing improvement in mouth opening

DISCUSSION:

Ludwig's angina and deep neck infections are dangerous because of their normal tendency to cause edema, distortion, and obstruction of airway. Observation and intravenous antibiotics may be used to treat patients in the early stages of the disease. The airway must be protected with surgical drainage in the case of advanced infections.^[8] The most common presentation of Ludwig's angina is pain and trismus along with fever and dysphagia. Indicators of imminent airway obstruction include difficulty breathing, stridor, and cyanosis. Asphyxia produced by increasing edema of the neck soft tissues is the most significant complication of an untreated severe illness.^[9]

Ludwig's angina infection originates in the floor of the mouth and rapidly spreads throughout the sub mandibular space. Common bacteria causing Ludwig's angina include *Streptococcus viridans*, *Staphylococcus aureus*, *B-hemolytic streptococcus*, *Staphylococcus epidermidis*, *Bacteroid* genus, *Fusobacterium nucleatum*. *Klebsiella pneumonia* is found in more than half of diabetic patients with Ludwig's angina^[10]. Treatment includes intravenous antibiotic therapy covering gram positive, gram negative and anaerobic infection. Patients those associated with airway compromise require surgical manipulation incision and drainage is often indicated^[11].

The many strategies for anesthesia management that have been outlined are: elective tracheostomy under local anesthesia, fiber optic awake or blind nasal intubation, direct laryngoscopy and intubation under intravenous or inhalational anesthesia with or without muscle relaxant. Although tracheostomy is a well-established procedure of stabilizing the airway under local anesthetic, is not without risk^[12]. Others have suggested that tracheostomy should be avoided wherever possible because of a connection between the facial spaces that could cause infection to spread more inferiorly into the chest. In adults with deep neck infections, an awake fiber optic method using topical anesthetic is the first choice for airway management^[13].

In pediatric patients suffering from Ludwig's angina, the greatest challenge is intubating them without losing their airway. Intravenous induction would be exceedingly risky because neither intubation nor ventilation could be guaranteed. As a result, an inhalational induction with sevoflurane / halothane is favored, as it preserves spontaneous respiration until laryngoscopy is performed^[14]. Intubation without muscle relaxant may precipitate laryngospasm^[15]. Judicious use of muscle relaxant is warranted in such situations, and suxamethonium provides the best intubating conditions. Alternatively, laryngoscopy may be performed under deep inhalational anesthesia, and muscle relaxant should only be administered once vocal cords are visualized. Therefore, such decisions should be taken very carefully in each patient by an experienced anesthesiologist^[12].

COVID-19:

SARS-CoV-2, a novel corona virus that causes covid-19 disease has a wide clinical spectrum, ranging from asymptomatic to severe respiratory distress necessitating hospitalization.^[16] Children have equal chances of becoming infected with SARS CoV-2 as adults, although they have milder symptoms or completely asymptomatic.^[17] Children with moderate to severe Covid-19 disease may present with interstitial pneumonia, hypoxia and respiratory distress.

Asymptomatic and mild Covid-19 cases only require supportive home therapy while moderate to severe cases require hospitalization with general support, oxygen therapy in case of hypoxia, ventilator support in case of respiratory distress and appropriate pharmacological therapy^[16]. COVID-19 disease is diagnosed using Point of Care Test i.e. Rapid Antigen Test (RAT) or by a real-time polymerase chain reaction (RT-PCR)^[18]. Even though Ludwig's angina with sepsis presents with hypoxia and respiratory distress, one has to keep high suspicion of Covid-19 disease in Covid-19 pandemic period. Early diagnosis of Covid-19 disease and starting Covid-19 pneumonia treatment will help in managing hypoxia and respiratory distress early in Ludwig's angina child.

CONCLUSION:

Success of airway management in Ludwig's angina child needs thorough assessment of disease condition, aggressive treatment of the underlying infection and maintenance of a patent airway with appropriate difficult airway equipment. Even though clinical picture of COVID-19 in children is much less severe than in adults, high suspicion of Covid -19 infection in pandemic situation is important as this may help for initiating appropriate therapy for better clinical outcome.

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