

Unexpected and severe postintubation croup after a very short day surgery in a pediatric patient -a case report-

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An 18 month-old boy underwent endoscopic foreign body removal under anesthesia on an outpatient basis and the operation took approximately 5 minutes. Stridor developed in both lung fields 6 hours after emergence from anesthesia, and severe croup developed, with cyanosis of the lips and aggravated stridor 20 hours after the end of the procedure. The croup resolved with oxygen therapy, intravenous dexamethasone, and epinephrine nebulization therapy. In this report, we suggest that thorough investigations of the patient's past history, including history of any airway problems, and careful monitoring after emergence from anesthesia be done in order to decide the proper discharge time of the patient. Further, proper prophylaxis following risk stratification is important, especially in patients at high risk of postoperative airway obstruction. (Korean J Anesthesiol 2014; 67: 287-289)

Key Words: Ambulatory surgical procedures, Croup.

A very brief time of surgery may make clinicians tend to overlook prophylaxis of anesthetic complications. Prophylaxis of postextubation airway obstruction in high-risk patients is always important, especially in pediatric patients. The incidence of postintubation croup is known to be 0.1–1% [1]. Postintubation croup shows characteristic symptoms and signs such as inspiratory wheezing, barking cough, hoarseness, and inspiratory dyspnea, and is likely to develop from immediately after extubation to 3 hours after. Symptoms that require treatment usually become clear within the first hour after extubation [2]. The au-

thors report a case of a pediatric patient who experienced severe croup 20 hours after simple endoscopic foreign body removal under short-term general anesthesia.

Case Report

An 18-month-old male patient, weighing 12 kg, was scheduled for removal of foreign body of the upper gastrointestinal tract using endoscopy under anesthesia on an outpatient basis. The patient was delivered vaginally at 39 weeks gestational age,

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weighing 3,180 g. He was diagnosed with a tracheoesophageal fistula and went through tracheoesophageal fistula ligation and end-to-end anastomosis 2 days after birth. On his 25th day, he was diagnosed with infantile hypertrophic pyloric stenosis and underwent pyloromyotomy. 40 days after birth, esophageal stricture was found and tracheal dilation with ballooning was done by endoscopy.

Preoperative evaluation showed no abnormality in the physical examination, electrocardiography, and chest X-ray. A general anesthesia was planned with endotracheal intubation, given the patient's past medical history and age. For premedication, glycopyrrolate 0.05 mg was injected intramuscularly 30 minutes before the operation. Anesthesia was induced with intravenous thiopental 60 mg, and then manual ventilation via a face mask with sevoflurane 8% and O₂ 100% was applied. While trying to intubate the patient with a tracheal tube of internal diameter 4.0 mm, resistance was felt right after the tube was passed through the vocal cords, so we replaced the tracheal tube with one with an internal diameter of 3.5 mm, and then intubation was completed successfully. The cuff on the tracheal tube was not inflated. Sevoflurane 2.0–2.5 vol%, and N₂O 1.5 L/min, O₂ 1.5 L/min were used for maintenance and N₂O was stopped as soon as the foreign body was pulled out. During the endoscopic procedure, the heart rate was maintained at 110–130 beats/min, SpO₂ 100%, systolic blood pressure 70–85 mmHg, end-tidal CO₂ (ETCO₂) 32–38 mmHg, and body temperature 37.0°C. Endoscopic removal of the foreign body, which seemed to be some kind of food material, took approximately 5 minutes. During the procedure, the patient recovered spontaneous breathing, and extubation was done right after the procedure was completed. Supportive ventilation via a face mask was given until the patient recovered consciousness. The patient was transferred to the ward after observation for 20 minutes in the recovery room. The heart rate was 110 beats/min, respiratory rate was 28 /min, and body temperature was 37.3°C when the patient arrived in the ward.

6 hours after the procedure, the general condition of the patient was unremarkable except that his body temperature was slightly high and there was mild stridor in both upper lung fields. Dexamethasone 5 mg was injected intramuscularly owing to the absence of an IV line and the discharge plan was canceled. Tepid massage was performed and the body temperature fell from 37.4 to 37.0°C. While sleeping, the patient had dyspnea and cyanosis of the lips and the stridor in both upper lung fields became worse 20 hours after the procedure. The SpO₂ at that time was 70%. A mask of O₂ 7 L/min, dexamethasone 2.5 mg intravenous, and epinephrine 1 : 1,000 2.5 ml nebulization for 10 minutes were used for treatment. SpO₂ rose to 100% 20 minutes after treatment and the patient was transferred to the intensive care unit (ICU). Heart rate was 170 beats/min, respiratory rate

was 46 /min, and temperature was 36.9°C right after arriving in the ICU. After 6 hours of oxygen therapy, he was transferred to the general ward, with stable vital signs, and he was discharged without any symptoms the next day.

Discussion

Risk factors for postintubation croup are age between 1 and 4 years, anesthetic time longer than 1 hour, coughing on the endotracheal tube, traumatic intubation, tight-fitting endotracheal tube, changes in position during surgery, patient position other than supine, and repeated attempts to intubate [1]. In this case, the patient's past history of a tracheoesophageal fistula operation could have caused tracheal narrowing. Further, leakage was not found until the airway pressure was 25 cmH₂O. Consequently, the risk factors of postoperative airway obstruction in this case are the age of 2, repeated intubation attempts, and a tight-fitting endotracheal tube. Recently, cuffed tracheal tubes are thought to be acceptable for use in pediatric patients except for premature babies and newborns [1,3]. We used a cuffed tracheal tube but the cuff was not inflated as adequate airway pressure and tidal volume were achieved without inflation. In adult patients, the risk factors of laryngeal injury or edema are longer duration of intubation, lack of use of neuromuscular blocking agents, smaller patient's height/tracheal tube size ratio, absence of tube leak, and female gender [4,5]. But the sensitivity of the air-leak test in predicting post-extubation laryngeal edema in pediatric patients is low [6].

To prevent coughing while intubated, asleep extubation or a painkiller given before extubation is used. Other than that, lidocaine 1.5 mg/kg with close monitoring can be used for smooth extubation. In this case, extubation was done smoothly without coughing while the patient was still asleep. Administration of multiple doses of dexamethasone prior to extubation can be helpful for children with multiple airway manipulations who have been intubated for more than 24 hours [7]. Although we did not expect postoperative airway complications in this patient owing to the brief duration of the procedure, if dexamethasone had been administered prophylactically, postoperative croup may not have developed or may not have been as severe. That is to say, early identification of patients with an increased risk of developing laryngeal edema that can evolve into respiratory failure can facilitate prevention or early treatment of this condition.

The croup scoring system most commonly used is the Westley clinical score [8]. In this patient, a score of mild severity was applicable at 6 hours after the surgery, and a score of high severity was relevant at 20 hours. The treatment modalities are dexamethasone and nebulized epinephrine. The most commonly studied dexamethasone dose is 0.6 mg/kg; however, a dose as low as 0.15 mg/kg may be just as effective, and oral dosing of

dexamethasone has a similar effect as intramuscular administration [9]. As dexamethasone's half-life is 36–54 hours, serum dexamethasone levels which were at therapeutic levels and epinephrine nebulization must have resolved the upper airway obstruction when severe croup developed in this case. Other than dexamethasone, the inhalant form of budesonide is helpful in acute exacerbation of croup because it causes strong vasoconstriction with fast action, and furthermore, its systemic effects are minimal [1,10].

Short and simple procedures are appropriate for ambulatory surgery setting. Because airway problems in pediatric patients are an important and emergent problem, thorough investigation

of a past history of airway problems and careful observation after emergence from general anesthesia should be done in order to decide when the patient should be discharged. Moreover, proper prophylaxis such as dexamethasone administration is important in pediatric patients who have risk factors for postoperative airway obstruction even if they have very brief surgery.

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