LIDOCAINE-ASSOCIATED SEvere DYSpNEA AND PULMONARY INFILTRATES AFTER BRONCHOSCOPY: A CASE REPORT

Kuan-Chun Lin, Chi-Wen Lo, Chia-An Chou

Abstract

Flexible fiberoptic bronchoscopy is generally a well-tolerated procedure with few adverse effects. We report a patient with catastrophic asthma attack after bronchoscopy. Chest radiography showed peri-hilar pulmonary infiltrates. An electrocardiogram demonstrated sinus rhythm. Negative pressure pulmonary edema (NPPE) was highly suspected. Unexpected lidocaine-associated bronchospasm and pulmonary infiltrates are unusual clinical manifestations.

Key words: Lidocaine, Asthma, Bronchoscopy

Introduction

Topical lidocaine is frequently for anesthesia of the upper and lower respiratory tract prior to bronchoscopy. Nebulized lidocaine has also been suggested as an effective treatment for intractable cough,1 and several research groups have reported the use of nebulized local anesthetics in the study of airway reflexes.2-6 In contrast, other reports have shown that inhalation of nebulized lidocaine can occasionally cause bronchoconstriction in patients with asthma.5-9 This report describes a 64-year-old female with a history of asthma who presented with intractable itching cough and foreign body sensation over upper airway for months. An electrocardiogram demonstrated sinus rhythm. Spirometry revealed a normal ratio of FEV1/FVC with marked bronchodilator response. Despite of premedication with nebulized lidocaine, refractory cough and chest tightness happened after bronchoscopy. She was sent to emergency room 2 hours later because of sudden onset of wheezy dyspnea and cyanosis. There was no evidence of aspiration of gastrointestinal contents. Chest radiography showed right hilum infiltrates. Bronchospasm and negative pressure pulmonary edema were impressed. Caution must be exercised when clinicians anesthetize the airways of asthmatic patients with topical lidocaine, even when the asthma is clinically inactive.

Case Presentation

A 64-year-old woman with a history of asthma presented with intractable itching throat and foreign body sensation over upper airway for months. Chest radiography was normal. An electrocardiogram demonstrated sinus rhythm. Spirometry revealed a normal ratio of FEV1/FVC with marked bronchodilator response (Table 1). A normal MAST test and level of IgE were also...
Lidocaine-associated respiratory distress

In the case presented, the patient noted no clinical sign or symptom indicating poor-controlled asthma. Pulse oximetry showed 98% under room air. Under the tentative diagnosis of suspected endobronchial lesion such as pulmonary tuberculosis or malignancy, bronchoscopy was arranged. She was scheduled fasting and given 5 ml nebulized lidocaine (2%) 10 minutes before bronchoscopy. She developed mild chest tightness and shortness of breath just before the procedure. The physicians did not pay much attention to these symptoms. Later, she developed severe cough and more discomfort feeling during the examination. No endobronchial lesion was found. Despite of premedication of nebulized lidocaine, refractory cough and dyspnea got worse after the bronchoscopy. She was sent to emergency room 2 hours later because of sudden onset of wheezy dyspnea. Lip cyanosis, diffuse wheezing and rales, use of accessory muscles and paradoxical abdominal movements were noted on examination. The conscious level and blood pressure were well, but arterial blood gas revealed respiratory alkalosis and mild hypoxemia. There was no leukocytosis, abnormal liver or renal function. Initial CXR (Fig. 1) showed homogenous opacities over right middle and lower lung. There was no evidence of aspiration of gastrointestinal contents. Asthma attack and negative pressure pulmonary edema were impressed. Nebulized bronchodilators and intravenous methylprednisolone were administered simultaneously. The sputum cultures yielded mixed flora. The results of blood cultures were negative. After 10 days of admission, the chest radiography (Fig. 2) improved. Finally, the patient was discharged and followed up at the chest outpatient department periodically.

Discussion

Flexible fiberoptic bronchoscopy is generally a well-tolerated procedure with few adverse effects. The commonly recognized complications include hypoxemia, bleeding, fever, cardiac arrhythmia, bronchospasm, pneumonia and pneumothorax. The mortality rate is in the range of 0.01% and the rate of major complication is 0.08%.

Laryngospasm and bronchospasm are common airway complications, and patients with asthma have higher risks. There are several factors that may contribute to these accidents. Hypoxemia is always a potential complication of bronchoscopic examination and tends to cause an increase in bronchial tone. A number of studies have documented a significant fall in PaO₂ during the bronchoscopic procedure. Hypoxemia is a result of a combination of several factors: compromised airway by the bronchoscope, underlying respiratory disease, respiratory depression secondary to premedication, adverse effects of topical anesthesia and suctioning, and possibly subepithelial receptor-mediated reflexes causing bronchoconstriction and ventilation-perfusion mismatching.

Table 1. Spirometry revealed a normal ration of FEV1/FVC with marked bronchodilator response

<table>
<thead>
<tr>
<th>Index</th>
<th>NORM</th>
<th>PRE</th>
<th>POST</th>
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<th>%PRE</th>
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<td>BEST</td>
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<tr>
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<td>81</td>
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<tr>
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<td>1.48</td>
<td>1.23</td>
<td>43</td>
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</tbody>
</table>
Karetzky et al. have shown that significant hypoxemia occurred when the bronchoscopic tip was at the level of the carina, an area known to have a high concentration of subepithelial receptor sites. In this patient, the SpO2 was well throughout the procedure. Additional oxygen supplement was also given during the examination. No hypoxemia was found.

Laryngospasm may result from vagally mediated or other reflexes when the bronchoscope passes through inadequately anesthetized vocal cords. The incidence of bronchospasm may also be diminished by adequate topical anesthesia and possibly aerosol administration of atropine. This patient was a little bit nervous and anxious about this procedure. Due to her poor technique, the premedication of inhaled lidocaine might not be enough. The procedure could impose substantial suffering to her. Under this circumstance, asthma might occur.

Rarely, a hypersensitivity reaction to local anesthetics may manifest itself as bronchospasm and laryngospasm. Nebulised lidocaine may cause narrowing of the airways in patients with asthma, but this is rarely of clinical importance especially as nebulized bronchodilators are given before fiberoptic bronchoscopy. Hypersensitivity to lidocaine is uncommon. Urticarial reactions may occur, and deaths due to anaphylaxis after small doses of injected local anesthetic have been reported. We highly suspect that the asthma attack in this patient was related to a hypersensitivity reaction to topical lidocaine due to the short interval between inhalation of nebulized lidocaine and bronchoconstriction. Other factors have to be considered, such as aspiration of gastric acid, choking episode after bronchoscopy leading to bronchospasm or arrhythmia. No strong evidence supports this suspicion.

In our patient, no history of drug allergy was found before. The spirometry demonstrated a normal ratio of FEV1/FVC, but marked bronchodilator response. Airway hyper-responsiveness was impressed. The result of asthma control test (ACT) showed a well control status. No clinical signs or symptoms indicated poor-con-
trolled asthma. Unexpectedly, bronchoconstriction attacked after bronchoscopy.

NPPE is relatively uncommon intra-operative and post-operative complication and is still a diagnosis by exclusion of other factors. Generally, NPPE occurs when inspiratory effort against an obstruction creates a large intrapulmonary negative pressure which can increase venous return with subsequent increase in the pulmonary capillary hydrostatic pressure. The transudation of fluid from the pulmonary vasculature causes edema formation into the alveolar space. Typically, these patients have well-developed musculature, capable of creating a large negative pressure. NPPE has also been described in patients with upper airway obstruction in cases of epiglottitis and croup, foreign body obstruction, airway secretions, following re-expansion of an atelectatic region of the lung or rapid drainage of a pleural effusion. Specially, after vigorous suction during bronchoscopy, obstructive sleep apnea and biting on the laryngeal mask tube were also reported. Treatment of NPPE is usually supportive and includes maintenance of a patent airway and adequate oxygenation. In severe cases, endotracheal intubation and mechanical ventilation with PEEP is usually necessary. The prognosis is benign, but 11% to 40% of the described cases develop life threatening complications, including mortality.

Clinical experience suggests that bronchospasm and negative pressure pulmonary edema are uncommon problems during bronchoscopy. In conclusion, caution must be exercised when clinicians anesthetize the airways of asthmatic patients with topical lidocaine, even when the asthma is clinically mild. Careful and patient explanation of risk of bronchoscopy to the patients and family is also of importance in face of this unexpected but potentially catastrophic accident.

References
利多卡因導致嚴重呼吸困難及肺浸潤於支氣管鏡
檢查後：病例報告

林冠群，羅啓文，周嘉安

摘要

目前施行纖維支氣管鏡是一個相當安全之檢查。本文描述一位因施行支氣
管鏡檢查而引起氣喘發作之患者，在檢查前胸部 X 光是正常，心電圖也無異
常，但卻在檢查後突然產生呼吸困難與喘鳴。住院時因胸部 X 光呈現右中葉及
下葉均質性泛白而判斷合併肺壓性肺水腫。我們高度懷疑此氣喘發作，肺浸潤
與利多卡因過敏有關。利多卡因致哮喘發作以及肺壓性肺水腫於支
氣管鏡檢查後在臨床上是一種少見的型態。

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