

Case Reports

Acute Non-Cardiogenic Pulmonary Edema Following Acute Upper Airway Obstruction with A Piece of Meat

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Abstract

A 14- year-old boy developed acute pulmonary edema post upper airway obstruction. This complication of acute upper airway obstruction is not very rare. The cause of obstruction in this case is suffocation by a piece of meat during a barbeque party. The piece of meat was removed from the upper airway; however, he continued to be in respiratory distress, which was relieved only after intubation with mechanical ventilation. In this type of acute pulmonary edema, the leading mechanism is increased negative intrapleural pressure due to the forceful inspiration against the obstructed airways. Treatment modalities include relieving the obstruction, mechanical ventilation with Positive End Expiratory Pressure (PEEP) and diuretic. Knowledge of this complication increases the vigilance of the emergency physicians and helps to identify patients at risk and then start helpful treatment for these patients.

Keywords: Acute pulmonary oedema, Upper airway obstruction, Aspiration, Piece of meat.

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Case Report

A 14- year-old male patient was brought to the emergency room in severe respiratory distress after aspiration of a piece of meat during a barbeque party. On arrival to the emergency department, the patient had stridor, cyanosis, and severe restlessness. Indirect laryngoscopy was performed and a piece of meat was removed from his upper airway. However, the patient continued to suffer from difficulty in breathing and needed oxygen therapy. Ten minutes later, he developed severe respiratory distress and severe oxygen desaturation despite oxygen therapy, therefore, the patient was intubated and mechanical ventilation was started. Bronchoscopy was performed through the endotracheal tube and

showed patent airways with no residual food particles. Post intubation chest x-ray showed diffuse bilateral lung infiltrate with normal heart size (Figure 1). This condition was considered a case of negative pressure acute pulmonary edema due to upper airway obstruction. The patient was put on Positive End Expiratory Pressure (PEEP) of 5 cm H₂O and he was given 40 mg of furosemide. After half an hour, his status started to improve and the required FiO₂ to maintain an adequate oxygenation was gradually decreased. On the second day, the chest x-ray improved significantly, and cleared completely after 48 hrs (Figure 2). The patient was discharged four days after admission without any further complications.

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Figure (1).

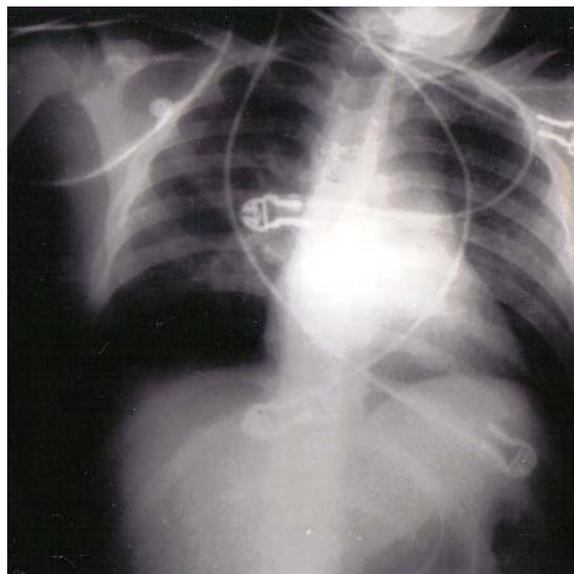


Figure (2).

Discussion

Negative pressure edema is a rare but serious complication after episodes of acute airway obstruction, or the relief of chronic upper airway obstruction in patients otherwise not at risk of pulmonary edema.¹ Most of the reported cases are due to post extubation laryngospasm,² other cases are due to obstruction after foreign body aspiration.¹ Our case is one of the rare cases of post upper airway obstruction pulmonary edema occurring after relief of the upper airway obstruction due to aspiration of a piece of meat. The patient developed symptoms of complete upper airway obstruction, which was managed by removal of the foreign body in the emergency room. However, he continued to be in respiratory distress, with severe hypoxia, and required intubation because of acute respiratory failure caused by negative pressure acute pulmonary edema.

There are two recognized types of Post Obstructive Pulmonary Oedema (POPE).³ POPE type 1 is uncommon but life threatening condition, and such patients develop sudden, unexpected and often severe pulmonary edema following an episode of acute airway obstruction in patients otherwise not at risk for pulmonary edema.

It also follows a sudden, severe episode of upper airway obstruction such as post-extubation laryngospasm,⁴ epiglottitis, croup,⁵ and choking⁶ and is seen in strangulation and hanging.⁷ POPE type 1 may be associated with any cause of acute airway obstruction. The pathogenesis of POPE type 1 is multifactorial.^{8,9} Forceful attempts to inhale against an obstruction create high negative intrathoracic pressure, which causes increased venous return, decreased cardiac output and fluid transudation into the alveolar space. The importance of vigorous inspiratory effort in POPE type 1 is supported by the apparent increase in susceptibility to this condition in young athletics who, because of their chest wall musculature, are able to generate extremely high negative inspiratory pressure.³

Other factors may also contribute, including direct suctioning of endotracheal tube adaptors during thoracotomy;¹⁰ narcotic use; short neck; obesity;¹¹ obstructive apnea,⁶ nasal, oral or pharyngeal surgery,¹² or vocal cord paralysis,¹³ conditions leading to increased capillary-alveolar pressure gradients;¹⁴ endotracheal tube obstruction;¹⁵ and premature extubation.^{16,17}

POPE type 2 occurs following surgical relief of chronic upper airway obstruction.¹⁸ Treatment for both types is supportive, and full rapid recovery is expected if the appropriate management is provided.¹²

This case is a rare case of POPE caused by upper airway obstruction with a piece of meat. In the literature, only few cases of acute pulmonary edema following upper airway obstruction by food particles are reported. Knowledge of this complication increases the vigilance of the emergency physicians and helps to identify patients at risk and to start treatment for these patients.

In conclusion, non-cardiogenic acute pulmonary edema can complicate acute upper airway obstruction caused by food particles and after removal of foreign body from the upper airways. Such patients should be evaluated and observed for the development of non-cardiogenic (post-obstructive) acute pulmonary edema.

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الْوَدَمَةُ الرِّئَوِيَّةُ الحَادَةُ النَاشِئَةُ قَلْبِيًّا بَعْدَ انْسِدَادِ فِي المَسَالِكِ التَّنَفْسِيَّةِ العَلِيَا بِسَبَبِ شَفْطِ قِطْعَةِ لَحْمٍ

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الملخص

مريض يبلغ من العمر 14 عاماً أصيب بْوَدَمَةٍ رِئَوِيَّةٍ حَادَةٍ بَعْدَ انْسِدَادِ المَسَالِكِ التَّنَفْسِيَّةِ العَلِيَا. هذه المضاعفة ليست نادرة الحدوث، وفي هذه الحالة كان سبب الانسداد تناول قطعة لحم أثناء حفل مشاوي. هذا النوع من الودمة الرئوية الحادة ينتج عن زيادة الضغط السلي داخل الجنبية بسبب الشهيق الشديد ضد مسلك تنفسي فيه انسداد. العلاج يتضمن إزالة الانسداد، التهوئة الميكانيكية مع الضغط الرفيري النهائي الإيجابي، و مدرات البول. والمعرفة بهذه الحالة تزيد تيقظ اطباء الطوارئ لتقديم العلاج الأنسب.

الكلمات الدالة: وَدَمَةُ رِئَوِيَّةٍ حَادَةٍ، انْسِدَادِ فِي المَسَالِكِ التَّنَفْسِيَّةِ العَلِيَا، شَفْطِ، قِطْعَةِ لَحْمٍ.