Case Report

Cocaine-Induced Cervical Emphysema and Pneumomediastinum

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Abstract Cervical emphysema and pneumomediastinum are rare conditions, especially outside the setting of blunt trauma. Here we describe a case of a 31-year-old male with a history of cocaine use presenting with cough, odynophagia, neck pain, and neck swelling after forcefully blowing his nose to relieve cocaine-associated congestion and obstruction. Physical exam demonstrates crepitus along the neck and clavicular regions. Imaging shows cervical emphysema, pneumomediastinum, and a nasopharyngeal fistula. We discuss presentation, causes, diagnosis, and management of cervical emphysema and pneumomediastinum.

Keywords pneumomediastinum; cervical emphysema; subcutaneous emphysema; nasopharyngeal fistula; retropharyngeal emphysema; Valsalva; cocaine

1. Introduction

Cervical emphysema and pneumomediastinum refer to the presence of gas in the tissues of the neck and the mediastinum, respectively. The most common causes include injury to the tracheobronchial tree, alveoli, and the upper GI tract [4, 6]. More distant injuries, such as to the face or hollow organs of the abdomen, can potentially lead to air tracking into the tissues of the neck and mediastinum [9, 11]. Previously reported activities that drive air into the tissue include air-driven dental tools, positive pressure ventilation, and Valsalva maneuvers related to actions such as weight lifting, childbirth, coughing, and singing [6, 10, 11].

Here we describe a case of cervical emphysema and pneumomediastinum induced by nose-blowing related to cocaine in the presence of a nasopharyngeal fistula, the combination of which has never been previously reported to the best of our knowledge.

2. Case presentation

A 31-year-old male presented to the local emergency room with complaints of cough, odynophagia, progressive neck pain, and swelling. This had started the previous night when he had been nasally inhaling cocaine and experienced a protracted episode of sneezing and severe nasal congestion with obstruction, which led to violent nose blowing for hours to clear his nasal passages. It was at that time that he began to feel some neck swelling and discomfort. The swelling and discomfort, along with odynophagia and an increasing cough, continued to worsen into the next day and evening, which led the patient to seek medical attention. He denied any hemoptysis, nausea or vomiting, or hematemesis. He denied any physical trauma. The patient added that a similar episode occurred four months prior to this incident with similar inciting circumstances.

The patient’s physical examination was significant for gross crepitus along the left neck and clavicular region. The chest was clear with distant breath sounds on auscultation and absent Hamman’s sign. A CT scan of the neck and chest was completed upon initial evaluation by an emergency room physician and confirmed the presence of emphysema along the neck planes extending into the chest creating pneumomediastinum without pneumothorax (Figures 1 and 2). There was also a perforation identified in the left nasopharynx on the CT of the neck indicative of a nasopharyngeal fistula (Figure 3). A flexible nasopharyngoscopy was completed at the bedside following his radiologic studies. This did not identify a perforation in the nasopharynx or any other disruptions of the upper respiratory tract mucosa.

Figure 1: Contrast-enhanced CT of the neck in coronal view (a) shows diffuse cervical emphysema, and axial view (b) shows extension into the retropharyngeal space.
Due to the possibility of a ruptured esophagus as a cause of this process, a gastrografin esophagram was completed. This was found to be negative for any ruptures or tears. The patient was subsequently admitted to the intensive care unit for close monitoring and treated with antibiotics and oxygen via a non-rebreather mask. The patient was instructed to not sneeze through his nose or blow his nose. Within three days, the patient showed a significant improvement. There was a complete resolution of the crepitus in the neck and clavicular area. The patient was discharged home. Unfortunately, the patient was lost to follow up.

3. Discussion

Cervical emphysema commonly presents with crepitus, swelling, dysphagia, dysphonia, wheezing, neck discomfort or a combination of these [2,4]. The most common symptoms of pneumomediastinum include dyspnea (75% of patients), chest pain (50% of patients), and dysphagia [1]. By far, the most common cause of pneumomediastinum is blunt trauma leading to direct injury at various levels of the airway [6]. The condition may also arise as a spontaneous pneumomediastinum, as detailed by Macklin. The mechanism of action consists of a repeated and sustained increase in the intra-bronchial and intra-alveolar pressure, causing rupture of the marginal alveoli; the air then dissects along the perivascular interstitial space to the mediastinum. This leads to pneumomediastinum, and from there air tracts into the neck spaces [5]. Other causes include perforation of hollow abdominal organs or injury to the esophagus, larynx, or tracheobronchial tree. Injury to the neck or face can also lead to air tracking down the fascial planes [2,6,8,9].

In our case, we see the presence of both cervical emphysema and pneumomediastinum, with presenting symptoms that are consistent with cervical emphysema. The likely scenario is a single origin of air tracking through fascial planes into the neck and mediastinum. Based on the finding of a nasopharyngeal fistula on imaging, we suspect this to be the entrance point for the air. Ko et al. (2010) describe the pathway of air in a case associated with repeated vomiting, where increased pressure forces air into a nasopharyngeal fistula and then travels to the mediastinum via the retropharyngeal space [3].

The patient’s history of repetitive vigorous nose-blowing is likely the driving force for the development of cervical emphysema and pneumomediastinum. Terzic et al. (2011) previously described a case of cervical emphysema without pneumomediastinum related to nose-blowing; a mucosal lesion was assumed but never discovered [11]. Our case adds severity to the situation with the extension of air into the mediastinum, and offers a clear pathway by identifying a nasopharyngeal fistula. Sneezing, coughing, and nose-blowing associated with cocaine use all lead to repeated Valsalva maneuvers that may have generated enough force in the upper airway to cause nasopharynx perforation and subsequent fistula formation. It is difficult to say definitively whether the fistula was a congenital process or acquired, but the patient’s use of cocaine can lead one to speculate on the possibility of drug-induced mucosal damage as either an inciting or contributing factor. Furthermore, cocaine is known for its vasoconstrictive properties leading to mucosal injury and necrosis with chronic use, and cases of oronasal fistulas of the palate have been reported [7]. However, to the best of our knowledge, there have not been any reports of nasopharyngeal fistulas associated with cocaine use. Future literature may eventually provide a clearer answer for cases such as these.
A thorough history and physical examination will allow the clinician to identify and diagnose cervical emphysema and pneumomediastinum, but imaging should be done to confirm the diagnosis and evaluate the extent. Though simple X-rays may demonstrate air in the tissue and along fascial planes, a CT with contrast is preferred due to the ability of the latter to definitively differentiate between emphysema and necrotizing fasciitis or mediastinitis [11]. Furthermore, CT scan is more likely to reveal any ruptures, perforations, or fistulas. Even when CT scans show a potential source of air, investigation of serious causes of pneumomediastinum and cervical emphysema should be done, such as a gastrografin esophagram study to rule out esophageal perforation.

Cervical emphysema and pneumomediastinum are usually self-limiting and will resolve on their own without treatment [8]. However, serious complications may arise, and hospitalization is recommended to observe the patient. High concentration oxygen may be used to speed up resorption of air, and antibiotics are recommended to prevent a secondary infection [6]. Patients should be advised to avoid Valsalva maneuvers such as forceful nose-blowing, weightlifting, and holding in a sneeze. This is even more imperative in a patient with an identifiable anatomic defect. Serial imaging can be done to ensure the patient is fully recovered at discharge.

References