Pneumomediastinum following ecstacy use: Case report

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Abstract: Ecstasy (3,4 methylenedioxymethamphetamine, MDMA), is an amphetamine derivative. It is a very popular, widely misused substance which is especially used in recreational places. Emergency visits have increased because of its effect causing addiction, misuse and toxicity. Pneumomediastinum is a rare and usually benign condition that affects young adult men. Patients rarely show symptoms and detected by coincidence.
A 22-year-old male patient was admitted to the emergency department with complaints of waking anxiety, neck pain, palpitations and shortness of breath. In his PA chest x-ray, subcutaneous emphysema was observed. His computed tomography image was compatible with pneumomediastinum.
The use of Ecstasy in the world and in our country increases and the complications associated with its use increase in line with it. Therefore, caution should be exercised against its complications.
Keywords: : Ecstasy, Pneumomediastinum, Emergency

1. Introduction

Ecstasy (3,4 methylenedioxymethamphetamine, MDMA), is an amphetamine derivative and it has been widely used by young adult population in recent years. It is of interest because of increasing visits to emergency services, addictive properties of the substance as well as its widespread misuse. If neck emphysema and difficulty in swallowing are observed in patient using this substance, pneumomediastinum should be considered. Due to misuse potential of this substance, it must be recognized by emergency service physicians.

2. Case Report

A 22-year-old male patient was admitted to the emergency department with complaints of waking anxiety, neck pain, palpitations and shortness of breath. In his history, he said that he used ecstasy 36 hrs ago and used this type of drug for the first time, he had palpitations and nausea 30 minutes after taking the drug, but did not vomit or have loss of consciousness, and his complaints resolved spontaneously for about 10 minutes later. The patient had no family history and during his physical examination, he had neck swelling, redness, subcutaneous crepitation and coarsening of voice. His pulse was : 145/min, BP 130/70 mmHg, respiratory rate: 22/min, SpO2: %88. In cardiac auscultation, S1 (+), S2 (+), rhythmic, and tachycardic. His electrocardiogram (EKG) was compatible with normal sinus rhythm and tachycardic. His laboratory parameters were normal. methamphetamine / amphetamine levels in urine were not studied. In his PA chest x-ray, subcutaneous emphysema was observed. His computed tomography image was compatible with pneumomediastinum (Figure 1).

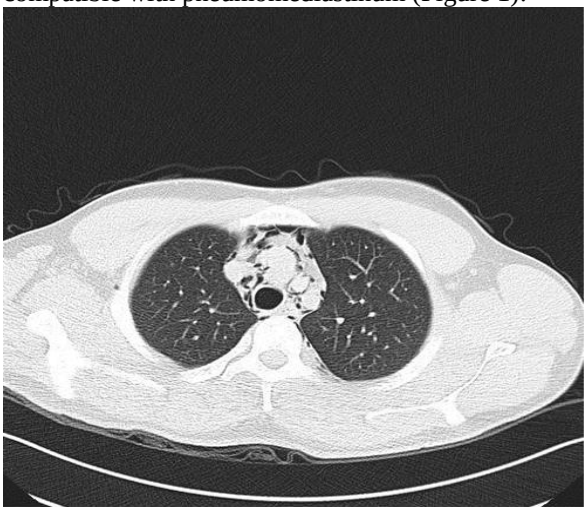

Figure 1: The patient's computed tomography image was compatible with pneumomediastinum.

His computed cervical tomography displayed presence of subcutaneous emphysema (Figure 2).

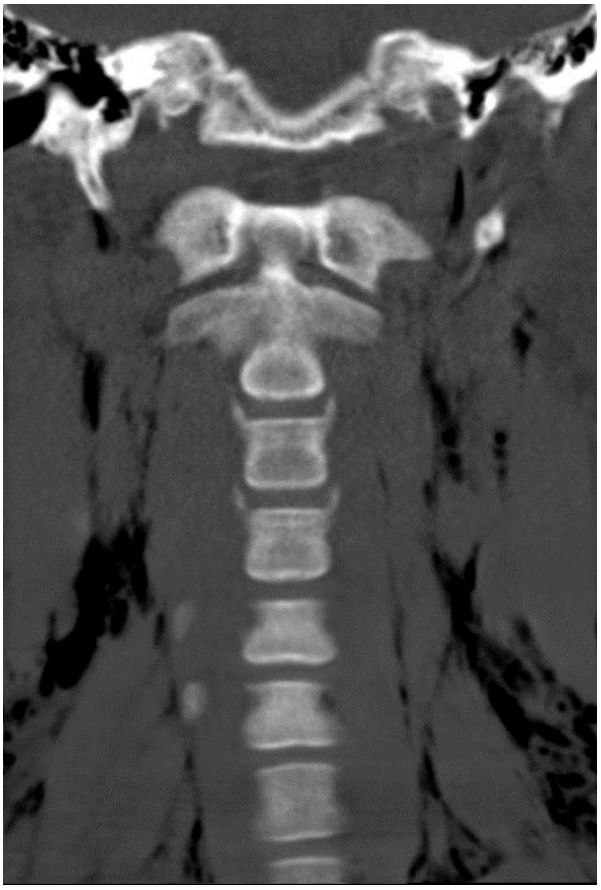

Figure 2: The patient's computed cervical tomography image was compatible with pneumomediastinum.

In his contrasted esophagography, there was no leak of contrast agent. Second-generation IV cephalosporin 1gr 2x1 was started. Since the patient's complaints declined and he was stable during a 72-hour follow-up, he was discharged with a recommendation of having daily series PA chest x-ray taken and psychiatric consultation. In his PA chest x-ray taken at the end of first week, it was established that subcutaneous emphysema completely resolved.

3. Discussions

Today, about 80-90% of MDMA produced worldwide is produced by Belgium and the Netherlands and distributed from there to all over the world. The legal literature has over twenty formulas related to synthesis of MDMA, only 7-8 of which match with each other(1). Ecstasy (3,4-methylenedioxymethamphetamine, MDMA) is a sympathomimetic amphetamine derivative agent. It causes release of endogenous catecholamines, especially norepinephrine and dopamine and prevents their presynaptic reabsorption (2,3). Ecstasy is chemically a street name for MDMA. It is often presented as MDMA in clinical and research studies. It was derived from methamphetamine, as included in its name. Its street names also include Ex, XTC, white doves, soda, flight, wings, speed, crystal, meth, Adam, clarity, Stacy, lover's speed and essence and its main active ingredient is amphetamine. Like amphetamine, MDA and MDMA are synthetic substances in every aspect and not found in nature (4-5). These drugs are defined as substances, called entactogens, that cause physical closeness, empathy, and euphoria. Although they are used in psychotherapy and psychiatry, they are recognized as illicit in most countries. It is frequently used by particularly young people in parties, and causes euphoria, alertness, intimacy, sexual recovery and disinhibition (loss of conditioned reflex) in people who use it. It increases energy, stamina, and initiative. The popularity of these drugs arises from their low price and availability in various forms such as small pills, powder, liquid. These drugs are very common in young populations which have been informed about the dangers of drug injections, including heroin, cocaine, methamphetamine. However, many users are not aware that MDMA is a type of methamphetamine and not reliable. It has been claimed to be safer than amphetamine, but unlike amphetamine, it has acute and toxic effects.

Overdose causes cardiovascular symptoms such as agitation, anxiety, hallucinations, coma, seizures, chest pain, palpitations, and dyspnea (6). Expected effects begin one hour after oral administration. In our patient, complaints of palpitations and nausea started approximately 30 minutes after ingestion of the drug.

Minor side effects such as agitation, teeth grinding, ataxia, sweating, blurred vision, tachycardia, hypertension fade away in about an hour. Unpleasant side effects of MDMA are trismus and teeth grinding (4). Also in our case, 10 minutes after medication, there has been decline in complaints.

Generally, after one hour, inability to keep one's legs still starts. Increase in muscle activity and body temperature starts by direct effect of the substance on thermoregulatory system in the brain. After 2-3 days of first administration, pain and stiffness occur in arm and leg muscles as well as muscles below the back. Headache, nausea, loss of appetite, blurred vision, dry mouth and insomnia are frequently seen after the first testing of the substance. Increase in heart rate and blood pressure decline with persisting use or in time with fluctuations (4). It causes hypertension, tachycardia, and hyperthermia. Hypertensive seizures

can be seen. It may cause intracranial hemorrhage, myocardial infarction, aortic dissection, and dysrhythmias (3). There are fewer cases reported about cardiotoxic effects of ecstasy, including MI, pulmonary artery and aortic dissection. In our patient, of these findings only tachycardia emerged. Idiopathic pneumothorax and myocarditis have been reported in a 16-year-old patient who has occasionally used ecstasy (7).

It may also cause hyperthermia, disseminated intravascular coagulation, and rhabdomyolysis (3). Hyperthermia is one of the major symptoms of acute toxicity by MDMA. Cases in which body temperature was above 43 °C were reported (8). Use of MDMA increases secretion of antidiuretic hormone, leading to hyponatremia and hypoosmolarity (3). Laboratory parameters of our patient were normal.

Pneumomediastinum is presence of extra alveolar air in mediastinum(8). Events that lead to increase in the alveolar and intrabronchial pressure can cause pneumomediastinum and subcutaneous emphysema(9). There have been cases of pneumomediastinum caused by amphetamine in the literature (1). A case of spontaneous pneumomediastinum accompanied by ecstasy-induced myocarditis was also reported (10). Pneumomediastinum is a condition generated by high intrathoracic pressure usually during conditions such as epileptic seizures, asthma, and positive pressure ventilation. Although there are known cases of pneumomediastinum after administration of inhalation drugs, it is rarely seen after use of ecstasy. Possible cause of this phenomenon is prolonged extreme dance in party drug culture. Also in our case, there was excessive physical activity upon administration of the drug.

After ingestion of inhalation drugs, alveolar tearing causing primary pulmonary interstitial emphysema occurs. This tearing can develop by a variety of mechanisms leading to transmural pressure difference between alveolar and interstitial spaces (11). On the other hand, alveolar pressure is also temporarily increased by drug-induced vomiting caused by the Valsalva maneuver applied to increase the euphoric feeling and high physical activity.(12). As a result, air entering the pulmonary interstitium passes to the mediastinum by leaking through bronchovascular layers. Mediastinum is involved in various anatomical structures such as submandibular region, retropharyngeal area as well as vascular bed in the neck. It is also linked directly to retroperitoneal region via periaortic and periesophagial areas. Tissue plan extending from the mediastinum via sternocostal area of diaphragm extends to the pelvis through side regions of the abdomen. Although Mediastinum is only a limited area inside the chest, it is involved in a very large area described above(2). Therefore, in patients with pneumomediastinum, free air in mediastinum may spread to all of these areas which contact mediastinum. Subcutaneous emphysema is the most common symptom reported in children and adults with pneumomediastinum (10). Subcutaneous emphysema was also present in our patient.

Studies in adults reported that spontaneous pneumomediastinum was observed more in men (75%), asthma patients (28%) and smokers (28%) and the most common symptom was chest pain (78.1%) (8). other symptoms associated with pneumomediastinuma are shortness of breath, chest pressure sensation, dysphagia, and sore throat (9). Our patient was also admitted with complaints of sudden onset of sore throat, shortness of breath. In posteroanterior chest x-rays, radiolucency showing replacement of mediastinal pleura along the left heart is observed. In addition, radiolucency appearance showing subcutaneous emphysema can be detected in soft tissues of the chest. In the case of lateral chest x-rays, radiolucency of the air extends around hilar pulmonary vessels, esophagus, and trachea (9). In our case, a chest X-ray image compatible with subcutaneous emphysema was observed. Upon detection of this image, a thorax CT scan was performed. Spontaneous pneumomediastinum is usually a benign condition that does not require medical intervention and is treated conservatively (13). Clinical significance and risk level of pneumomediastinum is dependent on underlying etiology and the presence of complications (9). In general, in the treatment of pnomomedistinum, the underlying disease is treated, bed rest, oxygen therapy, analgesics are administered (14). In patients who have developed pneumomediastinum, antibiotics may be given to prevent the development of mediastinitis, depending on the etiology. Antibiotic therapy was started in our patient as a prophylactic measure.

Pneumomediastinum usually disappears within a week's time. Microdrainage is required in treatment of serious subcutaneous emphysema (in the rate of 1.1%). Subcutaneous emphysema usually resolves within 1-3 days (15). In our case, within one-week follow-up, the subcutaneous emphysema completely resolved.

4.Conclusion

The use of Ecstasy in the world and in our country increases and the complications associated with its use increase in line with it. Therefore, caution should be exercised against its complications. Possible development of ecstasy-induced

pneumomediastinum should be considered. Chest radiography and chest CT in the diagnosis of these cases is usually sufficient.

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