Gavin Publishers
Emergency Medicine Investigations
Volume 2016; Pages 3
Gokdag E et al.

Case Report

Air in the Pulmonary Trunk Caused by Contrast Media Injection

Eren Gokdag, Ersin Tunca, Fatma Sari Dogan and Ozlem Guneysel*

Department of Emergency Medicine, Dr. Lutfi Kirdar Kartal Education and Research Hospital, Istanbul, Turkey

***Corresponding author:** Ozlem Guneysel, Department of Emergency Medicine, Dr. Lutfi Kirdar Kartal Education and Research Hospital,Emergency Medicine Clinic, Istanbul, Turkey, E-mail: guneysel@gmail.com

Citation: Gokdag E, Tunca E, Dogan FS, Guneysel O (2016) Air in the Pulmonary Trunk Caused by Contrast Media Injection. Emerg Med Inves 2016: 1-3.

Received: 3 May, 2016; **Accepted:** 25 May; 2016; **Published:** 8 June, 2016

Abstract

Venous Air Embolism (VAE) is a rare diagnosed complication of contrast-enhanced imaging technique but could have serious outcomes. VAE related to Contrast Enhanced Computerized Tomography (CECT) examination have been reported between 7% - 23% in different studies. Thirty-one years old male patient was admitted to Emergency Department (ED) after a head on car collision. CT scan showed fractures on the left sixth and eleventh ribs, heterogeneous splenic enhancement with perisplenic fluid and air embolism in the pulmonary artery. The patient had no symptoms during observation and discharged from ED after 24 hours without any complications related VAE or trauma.

Introduction

Venous Air Embolism (VAE) is a rare diagnosed complication of contrast-enhanced imaging technique but could have serious outcomes. Injection of large amounts of air into the venous system may result in air hunger, dyspnea, cough, chest pain, pulmonary edema, tachycardia, hypotension, or expiratory wheezing. Neurologic deficits may result from stroke due to decreased cardiac output or paradoxical air embolism. Patients with right-to-left intracardiac shunts or pulmonary arteriovenous malformations are at a higher risk of having a neurological deficit develop from small volumes of air embolism [1]. VAE is usually seen when contrast media injection performed manually, but usage of power injection minimizes the risk. Power injectors are routinely used medical devices which can be programmed to deliver specific amounts of contrast agent at specific flow rates.

On Computerized Tomography (CT), VAE is generally recognised as air bubbles or air-fluid levels in the vascular spaces or in right ventricle and can be seen in intracranial venous system [1].

The purpose of this case is to raise awareness of considering this rare situation in patients performed Contrast Enhanced Computerized Tomography (CECT).

Case Presentation

Thirty-one years old male patient was admitted to Emergency Department (ED) after a head on car collision. The patient got stuck in the car for approximately one hour. The patient was confused under the influence of alcohol and his vital signs were as follows: Glasgow Coma Scale 14 (E4V4M6), blood pressure: 132/68 mmHg, pulse rate: 75 beats/minute, respiratory rate 16 breaths/minute, temperature 36.7°C, oxygen saturation %94 on room air and blood sugar 110 mg/dl checked by glucose test strip.

The patient complained of pain localised on posterior of left hemithorax and left mid-axillary region. First physical examination and Focused Assessment with Sonography for Trauma (FAST) had no specific findings except rib tenderness on the left hemithorax and abdominal tenderness. CECT scan of chest, abdomen and brain was performed. CT scan showed fractures on the left sixth and eleventh ribs, heterogeneous splenic enhancement with perisplenic fluid and air embolism in the pulmonary artery (Figure 1). Measured volume of the air was approximately 3 cc.

After air embolism was identified, patient was placed on left lateral decubitus and Trandelenburg position and given 100%

Figure 1: The presence of air emboli in the pulmonary artery and right ventricle.

oxygen. Patient was consulted with cardiovascular surgeon. No surgical approach was considered. Therefore, patient was admitted to the ED for close observation and follow-up. Laboratory results including complete blood count, serum electrolytes, coagulation parameters, and cardiac markers were not revealed any serious acute pathology (Table 1).

Parameter	Value	Laboratory Reference Ranges
White blood cells	16600/uL	4800-10800
Red blood cells	5.56 x10^6/uL	4.7x10^6-10.1x10^6
Hemoglobin	16 g/dl	14-18
Hematocrit	47.3%	42-52
Platelet	268000/uL	130000-400000
aPTT (Activated Partial Thrombo-plastin Time)	23.1 seconds	24.8-35
PT (Theprothrombin time)	13.7 seconds	11.5-15.5
INR (International Normalized Ratio)	1.03	0.8-1.2
TNI (Cardiac-specific Troponin I)	0 ng/mL	0-0.04
Glucose	110 mg/dl	74-106
AST (Aspartate aminotransferase)	57 U/L	0-50
ALT (Alanine aminotransferase)	94 U/L	0-50
Total Bilirubin	0.72 mg/dl	0.2-1.2
Amylase	45 U/L	29-103
Sodium	134 mmol/L	136-146
Potassium	3.7 mmol/L	3.5-5.1
Chloride	102 mmol/L	95-115
Creatinine	0.76 mg/dl	0.67-1.17
Urea	23 mg/dl	17-43
Creatine Kinase	222 U/L	0-17
Calcium	8.98 mg/dl	8.4-10.5

Table 1: Routine Emergency Tests of the Patient.

Control CT scans had performed at first and eighth hours. Air embolism was totally resolved at the eighth hour control scan (Figures 2 and 3). The patient had no symptoms during observation and discharged from ED after 24 hours without any complications related VAE or trauma.

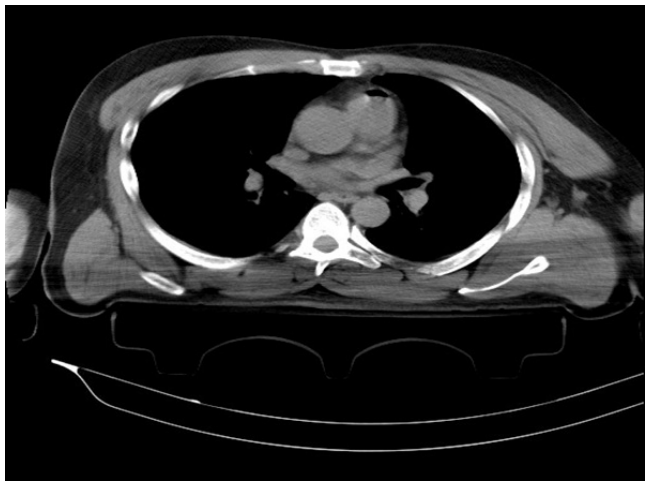

Figure 2: One hour later, the air emboli nearly dissipated.

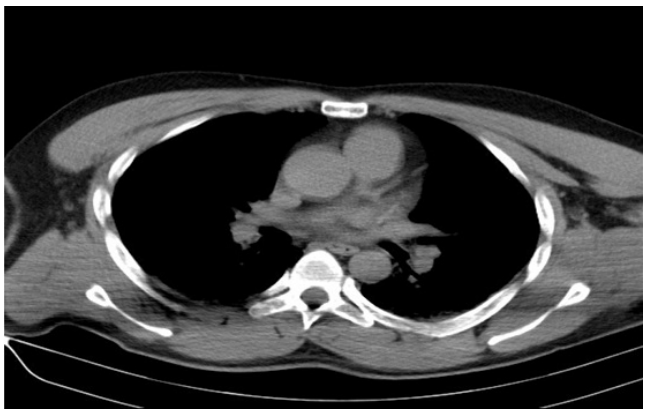

Figure 3: Eight hours later, the air emboli totally dissipated.

Discussion

The clinical manifestations of VAE include acute dyspnea, continuous cough, chest pain, seizures or stroke. Hypoxia, tachycardia, tachypnea, hypotension are major findings. Unintentionally injection of 200-300 cc of air to the vascular system has been reported as fatal [2]. Treatment includes 100% oxygen and placing the patient in the left lateral decubitus and Trandelenburg position. Hyperbaric oxygen could be used to reduce the size of air bubbles. Cardiopulmonary resuscitation should be started immediately if cardiopulmonary arrest occurs [1]. VAE related to CECT examination have been reported between 7% - 23% in different studies [3-5].

Although those studies show significant ratio of iatrogenic VAE, limited cases reported in the literature shows VAE after CECT scan [6]. Probably; most of the patients are clinically asymptomatic and often undiagnosed. In this case the patient did not have any symptoms or life threatening findings related to VAE during the treatment as usual.

Conclusion

Physicians and also CT technicians should be aware of VAE in patients whom performed CECT and be ready to manage its complications.

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