

# Arterial Air Embolism Due to Blunt Chest Trauma: A Case Report

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**Abstract:** Trauma is the third leading cause of death in Brazil and has a huge impact on the potential years of life lost. Most of the lesions identified are mild and, when treated in time have an excellent prognosis. Air embolism (AE) is a rare but potentially fatal condition, especially after blunt chest trauma, when diagnosis is challenging. A 39-year-old male victim of a motorcycle fall at 60 km/h with moderate traumatic brain injury and chest trauma. There was no change in the primary assessment. In the secondary evaluation, he presented pain on palpation of the anterior chest, and pain in the epigastrium, without peritonitis. The computed tomography (CT) demonstrated the presence of a gaseous focus in the left ventricle (LV); small bilateral pneumothorax foci; areas of lung contusion bilaterally; left kidney and pancreas with signs of ischemia and gaseous foci inside. He was followed in the Intensive Care Unit (ICU) with acute renal failure and pancreatitis, treated conservatively. Then, he was undergone to a cardiac catheterization: absence of significant obstructive coronary artery disease and mild LV systolic dysfunction. He was maintained on 100% O<sub>2</sub> until discharge from the ICU and discharged from hospital after 12 days of hospitalization. When the lung parenchyma is injured by a blunt trauma of high kinetics, the pulmonary vessels (PV) and the bronchial tree come into contact and air, under high pressure, enters the PV causing AE. AE is difficult to diagnose in the acute phase as the embolus disappears in about 0.5-30h. [1] Diagnosis is usually made with imaging tests. The treatment of air embolism is eminently supportive. 100% O<sub>2</sub> therapy decreases bubble size by forcing nitrogen out of the plunger. The use of a hyperbaric chamber is described and, in more severe cases, it is possible to perform aspiration of the ventricle.

## Background

Trauma is the third leading cause of death in Brazil and has a huge impact on the potential years of life lost. Chest trauma is the second leading cause of death from external causes, whether penetrating or blunt. Most of the lesions identified are mild and, when treated in time have an excellent prognosis. The involvement of the pulmonary hilum, especially of the vascular elements, is difficult to diagnose and control.

Air embolism (AE) is a rare but potentially fatal condition, especially after blunt chest trauma, when diagnosis is challenging. We report a case of AE after blunt chest trauma with renal and pancreatic repercussions, which treatment was conservative.

## Case Report

A 39-year-old male victim of a motorcycle fall at 60 km/h with moderate traumatic brain injury and chest trauma. There was no change in the primary assessment. In the secondary evaluation, he presented pain on palpation of the anterior chest, and pain in the epigastrium, without peritonitis.

The computed tomography (CT) demonstrated the presence of a gaseous focus in the LV; small bilateral pneumothorax foci; areas of contusion and alveolar hemorrhage bilaterally; left kidney and pancreas with signs of ischemia and gaseous foci inside.

An electrocardiogram was requested: extensive anterior and lateral wall infarction area and troponin: 4819 pg/ml. The echocardiogram (ECO) was

performed: apical akinesia of the LV; anterior, anteroseptal and anterolateral LV wall hypokinesia; mild LV contractile dysfunction.

He was followed in the Intensive Care Unit (ICU) with acute renal failure and pancreatitis, treated conservatively. Then, he was undergone to a cardiac catheterization: absence of significant obstructive coronary artery disease and mild LV systolic dysfunction. He was maintained on 100% O<sub>2</sub> until discharge from the ICU.

The patient evolved with resolution of pancreatitis and improvement in renal function. He was discharged from hospital after 12 days of hospitalization. During outpatient follow-up, there were no changes in a new ECHO. He showed improvement in renal function and renal scintigraphy with DMSA with relative renal function of the right kidney 69%; and from the left kidney 31%. It is still under follow-up.



## Images

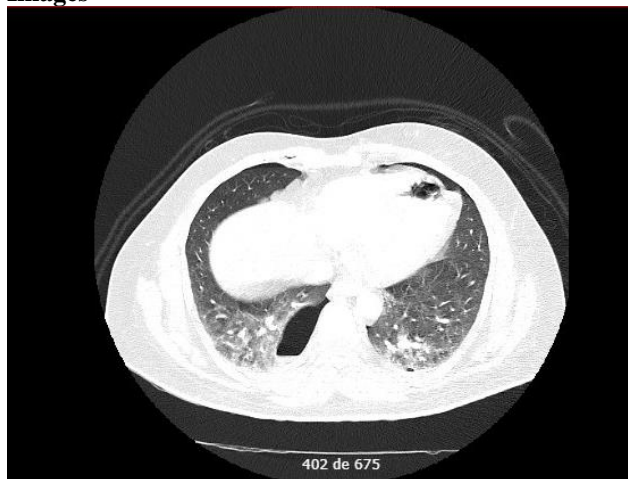


Figure 1: Lung contusions; gaseous focus inside the LV; small bilateral pneumothorax foci.



Figure 2: left kidney with signs of ischemia and gaseous foci inside.



Figure 3: Pancreas with signs of ischemia and gaseous foci inside.

## Discussion

AE is usually caused by interventions that expose the venous circulation and the external environment (central venous catheter, chest trauma, cardiovascular surgery, for example). When the lung parenchyma is injured by a blunt trauma of high kinetics, the pulmonary vessels (PV) and the bronchial tree come into contact and air, under high pressure, enters the PV causing AE.

Gravity is related to the patient's position: the lateral decubitus increases the chance of embolism to the central nervous system, while the supine position does not exclude, but decreases this chance. In the case reported, the patient had gas emboli to the pancreas and left kidney; and did not develop neurological symptoms during hospitalization. During the entire initial care, the patient was in the supine position, which may have contributed to the patient not having a stroke due to AE.

AE is difficult to diagnose in the acute phase as the embolus disappears in about 0.5-30h. [1] Diagnosis is usually made with imaging tests (CT or MRI).

The treatment of air embolism is eminently supportive. 100% O<sub>2</sub> therapy decreases bubble size by forcing nitrogen out of the plunger. The use of a hyperbaric chamber is described and, in more severe cases, it is possible to perform aspiration of the ventricle.

## References

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