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Case Report

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Respiratory Distress after a Liver Surgery, Think at Pneumopericardium

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Abstract

Introduction: Pneumopericardium is defined as a collection of air or gas in the pericardium, and considered a rare and innocuous condition. It may progress to tension and cardiac tamponade and may become life-threatening in many instances. In this publication, we will share the case of a pneumopericardium which occurred for middle-aged women treated for liver carcinoma after a laparotomic surgery.

Discussion: Pneumopericardium was once defined as a collection of air or gas in the pericardium, and considered a rare and innocuous condition. The most common etiology of pneumopericardium is blunt trauma. Also, air may dissect into the mediastinum from the retroperitoneal space following the perforation of a hollow viscous or infection with gas-producing organisms. Other causes of pneumopericardium include iatrogenic complications during chest or abdominal surgeries. Diagnosis of spontaneous pneumopericardium can often be made with a formal two-view Chest X-Ray or CT scan. The treatment of air in the pericardial space depends on the type of pneumopericardium present and whether or not there is associated cardiac tamponade. However, tension pneumopericardium can be effectively relieved by pericardiocentesis or tube decompression and the underlying cause subsequently determined.

Conclusion: In conclusion, surgeons should be aware of the possibility of pneumopericardium for patients with chest pain after a laparoscopic procedure and look for electrocardiographic abnormalities. It is important to outline the important role of the chest CT scan to search for pneumothorax or pneumomediastinum.

Keywords

Post-operative Respiratory Distress; Liver Surgery; Pneumopericardium

Introduction

Pneumopericardium is defined as a collection of air or gas in the pericardium and considered a rare and innocuous condition. It may progress to tension and cardiac tamponade and may become life-threatening in many instances [1].

The most common etiology of pneumopericardium is blunt trauma [1]. Other causes of pneumopericardium include iatrogenic complications [2].

In this publication, we will share the case of a

pneumopericardium which occurred for middle-aged women treated for liver carcinoma after a laparotomic surgery.

Case Report

The case of a 45 years old female has been treated for hepatocellular carcinoma of the right liver. We didn't notify any specific findings during preoperative evaluation. The surgical procedure consisted of a right hepatectomy. During the procedure, the patient had a hemorrhagic shock, she benefited with 2 units of blood cell transfusion and 3 units of fresh frozen plasma in addition to the noradrenaline at 0.7 gamma/ kilogram/ minute while waiting for a transfusion.

The patient was transferred to intensive care after the surgery, during her stay in intensive care, the patient maintained tachycardia at 140 beats per minute without any hemodynamic instability, management of hypovolemia and correction of hypokalemia.

We tried to perform a transthoracic ultrasound to evaluate volemia, but no windows access was possible, and because of the persistence of this tachycardia even after pain, kaliemia, volemia and anemia management, a thoracoabdominal CT scan was performed, which showed the presence of a pneumopericardium of 18 mm circumference and 16 mm at the apex (**Fig-1**).

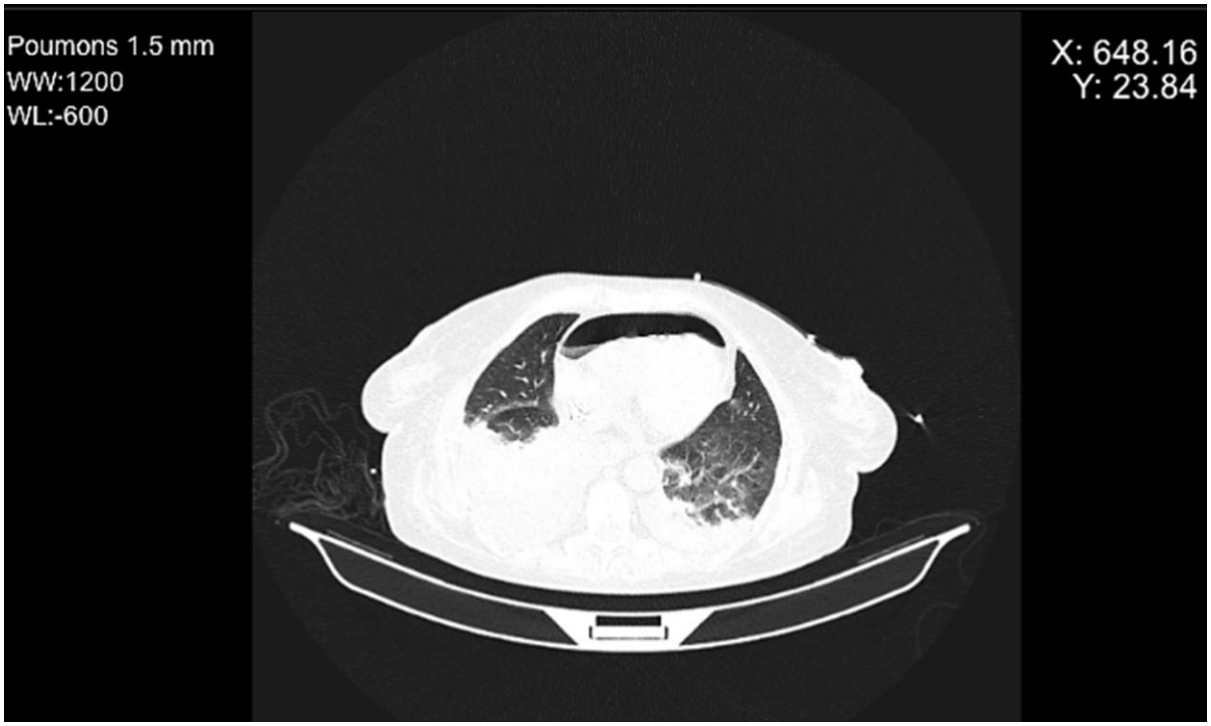

Fig-1: Chest CT Scan showing a pneumopericardium with bilateral atelectasia

The vascular surgeons were informed the decision was to wait and re-evaluate the evolution of the effusion for the next hours.

Cardio selective beta-blocker was started, of course with the management of pain and volemia. The evolution was favorable, returning to a normal heart rhythm without hemodynamic instability after 6 hours, and then she was transferred to the surgery unit the day after.

Discussion

Pneumopericardium was once defined as a collection of air or gas in the pericardium and considered a rare and innocuous condition. However, a growing body of clinical evidence indicates that pneumopericardium may progress to tension and cardiac tamponade, and may become life-threatening in many instances [1].

The most common etiology of pneumopericardium

is blunt trauma [1]. In addition, air may dissect into the mediastinum from the retroperitoneal space following the perforation of a hollow viscus or an infection with gas-producing organisms. Other causes of pneumopericardium include iatrogenic complications such as after pacemaker insertion, esophagogastroduodenoscopy, or closure of an atrial septal defect [2].

Pneumopericardium has been described after laparoscopic urologic and gastrointestinal procedures; it has rarely been reported after a gynecologic laparoscopy procedure. Most cases were asymptomatic and were diagnosed incidentally at radiography. Some patients reported abdominal pain as the initial symptom, which led to the diagnosis [3].

The etiology of pneumopericardium as a result of the laparoscopic procedure is unclear. According to Nicholson and Berman, gas can reach the pericardial cavity and the mediastinum via a path along the inferior vena cava through the diaphragm. Thus, with increased insufflating pressure, CO2 could track through an existing congenital defect of the pericardial sac. The surgeon may be able to demonstrate the abnormal motion of a hemidiaphragm [4]. On another hand, we found that the main causes of diaphragmatic injuries are blunt trauma and iatrogenic during chest or abdominal surgeries [5]. This is what happened in our case.

The classically described signs and symptoms of tension pneumopericardium include pulsus paradoxus, tachycardia, reduced cardiac output with increased central venous pressure, muffled heart sounds and low voltage ECG traces although many of these may also be produced by coexisting injuries. A number of mechanisms can lead to injury in blunt chest trauma including increased thoracic pressures and shearing forces secondary to thoracic compression, rapid deceleration, and direct impact. These forces lead to a number of potential different pathways for a pneumopericardium to develop [6].

Diagnosis of spontaneous pneumopericardium can often be made with a formal two-view CXR. Chest radiographs typically show the heart surrounded partially or completely by air with a sharply delineated pericardium outlined by lucency on either side. In patients with tension pneumopericardium, a substantial decrease in the size of the cardiac silhouette may be observed [7].

CT is more sensitive and specific for the detection of pneumopericardium, and when compression and flattening of the heart occur, especially the right ventricle anteriorly, tension pneumopericardium should be diagnosed [8].

The treatment of air in the pericardial space depends on the type of pneumopericardium present and whether or not there is associated cardiac tamponade. In adults who have simple pneumopericardium without tension, no active intervention is required.

However, tension pneumopericardium can be effectively relieved by pericardiocentesis or tube decompression and the underlying cause subsequently determined [1].

Conclusion

In conclusion, surgeons should be aware of the possibility of pneumopericardium for patients with chest pain after a laparoscopic procedure and look for electrocardiographic abnormalities. It is important to outline the important role of the chest radiographs not only to make the diagnosis but also to search for pneumothorax or pneumomediastinum. A timely treatment of tension pneumopericardium by pericardiocentesis can often reduce morbidity in intensive care patients.

Ethics Approval

Not applicable

Consent for Publication

Not applicable

Availability of Data and Materials

Not applicable

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The authors declare that they have no competing interests.

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Authors' Contributions

All authors read and approved the final manuscript.

Yassine Smiti, Chakib Oussama, Avouch Othman, Lamyae Kallouch, Omor Youssef, Latib Rachida, Brahim El Ahmadi, Ghannam Abdelilah, Zakaria Belkhadir - Acquisition of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Guarantor of Submission

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