Clinical Note

Pneumopericardium and aortic rupture

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ABSTRACT

Pneumopericardium is defined as the presence of air within the pericardial sac; it may be the cause of cardiac tamponnade. We here report the case of a 21-year-old male who, after suffering a motorcycle accident, was admitted to hospital conscious but anxious, with marked dyspnoea and tachypnoea and with a peripheral oxygen saturation level of 88%. The clinical examination disclosed marked thoracic subcutaneous emphysema mainly on the right haemithorax and extending to the side of the abdomen. On auscultation there was a marked diminution of the vesicular murmur in the right haemithorax. Orotracheal intubation was performed immediately and a central venous access catheter was inserted with crystalloid administration. An abdominal ultrasound scan and thoracocentesis were performed. The plain chest film (portable apparatus) disclosed haemothorax and multilobar lung contusion and an image highly suggestive of pneumopericardium. The patient died 15 minutes after admission. The Forensic Pathology examination (the report was received later) demonstrated rupture of the thoracic aorta and posed reasonable doubts as to the immediate cause of death: cardiac tamponnade secondary to the pneumopericardium or haemorrhagic hypovolaemic shock.

Key Words: *Pneumopericardium. Cardiac tamponade. Thoracic traumatism. Haemothorax.*

RESUMEN

Neumopericardio y rotura de aorta

El neumopericardio se define por la presencia de aire en la cavidad pericárdica. Puede provocar taponamiento cardíaco. Presentamos el caso de un varón de 21 años, que tras sufrir un accidente de moto, ingresa consciente, inquieto, con trabajo respiratorio marcado, taquipneico y saturación periférica de oxígeno del 88%. Presenta un gran enfisema subcutáneo torácico, especialmente en hemitórax derecho que se extiende al flanco abdominal. La auscultación respiratoria muestra una disminución marcada del murmullo vesicular en hemitórax derecho. Se procede a la intubación orotraqueal inmediata y canalización de una vía central y administración de cristaloides. Se realiza ecografía abdominal y toracocentesis. Se realiza una radiografía de tórax portátil que muestran hemotórax y contusión pulmonar multilobular, así como una imagen de Neumopericardio. El paciente fallece a los 15 minutos del ingreso. La necropsia demostró la presencia de rotura de aorta torácica, y se mantuvo una duda razonable respecto a la causa inmediata de la muerte, taponamiento cardíaco secundario al neumopericardio o *shock* hipovolémico hemorrágico.

Palabras clave: *Neumopericardio. Taponamiento cardíaco. Traumatismo torácico. Hemotórax.*

INTRODUCTION

Pneumopericardium is uncommon but potentially very serious given that it can lead to cardiac taponade and needs to be diagnosed and treated as soon as possible. Most cases have been described in newborn children who are on mechanical ventilators because of respiratory distress[1]. In adults it is most commonly caused by medical treatment, although it may also be associated with thoracic or oesophageal trauma, surgery in some cases, cocaine or cannabis abuse[2] and can also appear spontaneously in situations where thoracic pressure is significantly increased[3-5]. A chest x-ray is carried out to diagnose the condition and typically a radiotransparent layer of varying thickness appears around the cardiac silhouette. Chest CT scan can also help to diagnose the condition and allows us to distinguish it from pneumomediastinum.

CLINICAL CASE

A 22-year-old male patient was brought in by the advanced life support emergency medical team after a motorbike accident. He was admitted into hospital and from a neurological perspective, was conscious, oriented, and anxious and had

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a score of 15 on the Glasgow Coma Scale. Haemodynamically he had significant difficulty breathing, tachypnoea, with a breathing rate of 55 breaths/minute and peripheral oxygen saturation of 88%. He was pale and sweating with signs of poor perfusion. His blood pressure was 80/40 mm/Hg and his heart rate was 140.1 b.p.m.

During the examination large thoracic subcutaneous emphysema which had spread to the right hemithorax and the left side of the abdomen and neck was found which prevented a clear view of signs of increased jugular venous pressure and tracheal deviation. On auscultation there was a marked diminution of vesicular murmur in the right hemithorax. There were significant deformities affecting the right thigh and arm and his leg was twisted and shortened. There were no craniofacial injuries.

After the initial evaluation, orotracheal intubation was performed immediately and a high- flow rate central venous access catheter was inserted by the left femoral vein with crystalloid administration (2000 ml). The chest tube was placed in the fifth intercostal space, midaxillary line and 1,300 ml of blood was evacuated.

In the abdominal ultrasound scan (ECOFAST) no free liquid or lesions in solid organs were detected. Pleural effusions could not be identified because of the obstructing air caused by the emphysema and as a result the ultrasound image was poor. The portable chest x-ray revealed large bilateral thoracic subcutaneous emphysema which dissected muscular planes (serratus, latissimus dorsi muscle, etc…) and spread towards the neck and mediastinum (pneumomediastinum). The right lung was obscured, which was compatible with haemothorax and multilobar lung contusion and the image was highly suggestive of pneumopericardium. The chest tube that had been inserted previously could also be seen (Figure 1).

Fifteen minutes after admission he went into cardiac arrest with electromechanical disassociation. Resuscitation was carried out for 30 minutes but it was unsuccessful.

Figure 1. The chest x-ray which showed the subcutaneous emphysema, collapsed lung, and right lung contusion and pneumopericardium.

DISCUSSION

The advanced life support emergency medical team dealt with the patient according to the scoop and run rather than the stay and play criteria. We believe that they acted correctly given the seriousness of the patient's injuries and the fact that the hospital was close to the scene of the accident.

Medical staff could have considered carrying out an emergency exploratory tracheotomy before the advanced life support but since there was no thoracic surgeon on duty in the hospital at that time and the patient's status changed quickly, the cardiac arrest occurred before any of this was possible. This supports the view that medical emergency services should be informed as soon as possible to make the necessary

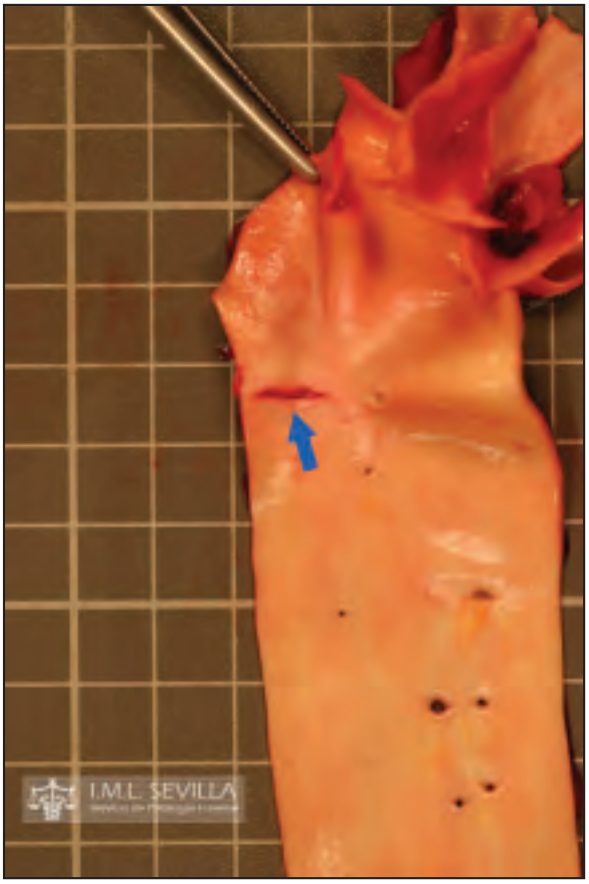

Figure 2. Cross section of the aorta where the aortic rupture can be observed (highlighted with the arrow).

resources for patients available immediately in cases of chest injury involving blood drainage (O-negative blood, plasma, thoracic surgeon, anaesthesia and an emergency theatre ready to use).

The forensic pathology report revealed a rupture of the thoracic aorta (Figure 2) which cast reasonable doubt on the immediate cause of death: cardiac tamponade secondary to the pneumopericardium or haemorrhagic hypovolaemic shock.

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