
CLINICAL NOTE

Liver laceration caused by cardiopulmonary resuscitation manoeuvres

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None

Laceration of the liver is a rare complication of cardiopulmonary resuscitation, which can damage nearby abdominal organs. Complications of external cardiac massage, particularly those affecting the liver, are rarely reported, however. It is important to apply the correct techniques in order to avoid damaging nearby organs; although liver laceration is a rare complication, emergency physicians should be aware that it might occur. We describe a case of liver laceration discovered during autopsy. [Emergencias 2009;21:148-150]

Key words: Liver laceration. Thoracic complications. Cardiopulmonary resuscitation (CPR). Forensic pathology.

Introduction

Chest compression is a vital manoeuvre involved in cardiopulmonary resuscitation (CPR). With the hands paced on the middle of the chest, compression is performed at the appropriate frequency and to the required depth, with minimal interruptions.

However, a series of complications secondary to the manoeuvre are well documented, such as rib fracture and damage to the liver and spleen, as well as gastric and cardiac lesions. Despite being frequently cited as associated with CPR manoeuvres, laceration of the liver is rare. Correct positioning of the hands may reduce the incidence of these complications, but does not ensure they do not occur¹.

We describe a case of liver laceration with haemoperitoneum secondary to complications induced by CPR manoeuvres in a case of sudden death due to acute coronary syndrome.

pressure, ex-smoker of 1 pack/day, suffered a sudden loss of consciousness. A lay bystander called the emergency services and initiated chest compression, with the victim lying on a soft surface. On arrival, the emergency service team observed the bystander performing chest compression with his hands placed to the right of the sternum at the level of the xyphoid apophysis. The patient was found with cardio-respiratory arrest and initial ventricular fibrillation. Advanced life support procedures were initiated immediately, but to no avail.

Autopsy diagnosis was death due to acute coronary thrombosis. The autopsy revealed intra-peritoneal haemorrhage of approximately 450 ml, secondary to double laceration of the liver: one being 8cm long at the point of insertion of the falciform ligament, and the other 5 cm long in the left lobule (Figure 1). Liver cross section showed parenchymal lacerations extending 2.5 cm into the liver (Figure 2). No rib or sternal fractures were observed.

Case report

A 52-year-old man with a history of high blood

Discussion

Trauma secondary to CPR manoeuvres is a well

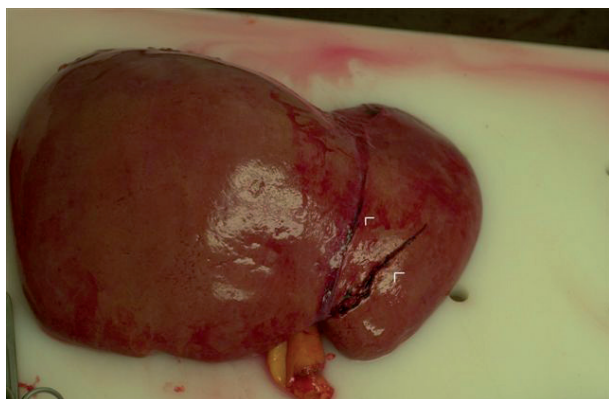


Figure 1. Double laceration of the left hepatic lobe.

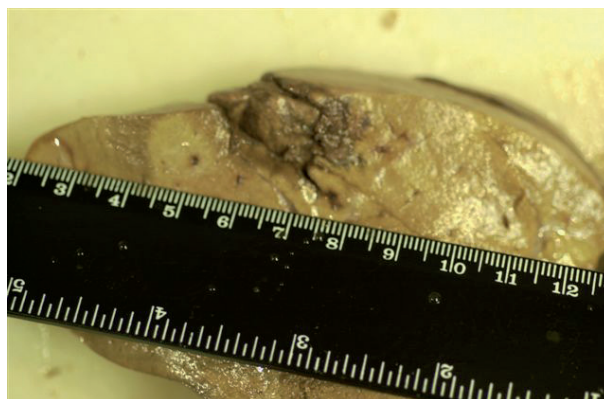


Figure 2. Liver section showing the depth of the lacerations.

known problem. The most frequent are: rib fracture (with an incidence of 25-50% in post mortem autopsies)², sternal fracture, chest wall haematoma, pneumothorax and cardiac contusion. The least frequent lesions are: rupture of the thoracic aorta³, diaphragm rupture⁴, pneumoperitoneum due to gastric perforation⁴, and the combination of pneumothorax and pneumomediastinum⁵. Laceration or rupture of the liver has been described by some authors^{1,4,6-8}.

In a number of autopsies^{1,2,8}, the incidence of liver and/or spleen trauma secondary to CPR varied between 0% to 31%. The incidence of post-CPR liver trauma in the form of haematoma or laceration is 2.9% in post mortem autopsies⁸. Krischer et al¹ found rib fractures associated with rupture of the liver in 73% of cases. In our case, no rib or sternal fracture was observed.

The liver is damaged more often than the gall bladder, probably because of its larger size and more medial position in the abdominal cavity. Children are especially susceptible to liver damage after CPR manoeuvres. Gillies et al¹⁴, in a review of post-CPR liver damage, found 4 cases; 2 with rupture related to the administration of thrombolytics and 2 with laceration, one of whom was a pregnant woman who later died.

Adler et al⁸ highlighted the importance of a high index of suspicion for bleeding due to intra-abdominal lesions in patients receiving anticoagulants who suffer post-CPR hypovolemic shock with increased abdominal diameter.

Typically, post-CPR liver lesions are observed to the left of the falciform ligament, as in our case^{7,11,12}. The main causes of liver laceration is excessive pressure applied to sternum and incorrect hand placement with compressions above the xyphoid apophysis^{1,7}. In the present case, incorrect performance of the CPR manoeuvres by a lay bystander could have caused the lacerations, but

such lesions have also been described after correct execution of CPR¹³.

It is hoped that the new recommendations on chest compressions¹⁵ will result in correct technique, which should mean fewer lesions secondary to CPR manoeuvres.

In conclusion, correct CPR technique is important to avoid such complications and basic CPR training programs must be developed for the general population. The possibility of CPR-induced visceral lesions must be considered in cases of hypovolemic shock of unknown aetiology or prolonged electrical activity without a palpable pulse.

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Laceración hepática secundaria a maniobras de reanimación cardiopulmonar

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La laceración hepática es una complicación poco frecuente de la resucitación cardiopulmonar. La reanimación cardiopulmonar puede originar lesiones de vísceras abdominales. Las complicaciones del masaje cardiaco externo, en especial referencia a las lesiones hepáticas, son escasamente descritas. Es importante usar una técnica correcta con el fin de evitar lesiones en órganos próximos. A pesar de que la laceración hepática es rara los servicios médicos deben estar alerta de dicha complicación. Describimos un caso de laceración hepática descubierta en el estudio post mortem. [Emergencias 2009;21:148-150]

Palabras clave: Laceración hepática. Compresiones torácicas. Reanimación cardiopulmonar (RCP). Patología forense.