

Successful bystander cardiopulmonary resuscitation complicated by liver rupture

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A 40-year-old man, who had collapsed while running and was resuscitated successfully by bystanders, was referred. An automated external defibrillator had shown ventricular fibrillation before a single shock restored sinus rhythm. On arrival, the patient was alert and haemodynamically stable. He reported that he had recently suffered from chest pain during exercise but had not visited his general practitioner; before collapsing he had no complaints. Physical examination showed a moderately tender abdomen with normal peristalsis. Blood pressure and heart rate were 120/70 mmHg and 111 beats/min, respectively. Electrocardiogram and chest X-ray were normal. Laboratory tests showed normal cardiac markers and haemoglobin but all liver enzymes were elevated.

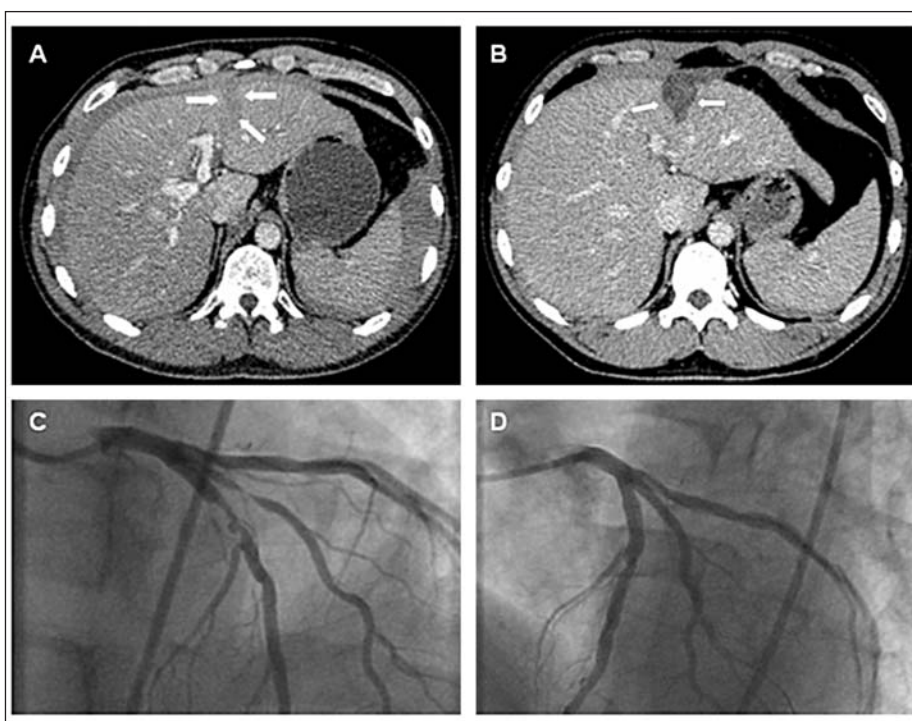


Figure 1. Computed tomography of upper abdomen and angiography of left coronary artery. Computed tomography (A) showed a subcapsular liver rupture and fluid around the liver. The control after nine days (B) demonstrated a haematoma at this site while there was no longer any fluid. The significant stenoses in the left anterior descending artery and its first diagonal branch (C) could then be treated by coronary stent implantation (D).

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Within one hour, the patient became haemodynamically unstable with progressive abdominal pain. At that time, the haemoglobin was still normal but computed tomography showed a liver rupture (figure 1A) in the absence of fractures, with fluid around the liver and in the pouch of Douglas. A surgeon was consulted and the decision was taken to follow a conservative therapeutic approach. The haemoglobin decreased but the patient did not require transfusions and had no cardiac symptoms.

After three days, coronary angiography was performed which revealed significant single-vessel disease (figure 1C). Percutaneous coronary intervention was postponed because of the recent liver rupture with temporary contraindication for aggressive antiplatelet therapy. Nine days later, computed tomography demonstrated stability of the haematoma in the liver (figure 1B). As a consequence, a percutaneous coronary intervention could successfully be performed with implantation of drug-eluting stents (figure 1D). The further in-hospital course was uneventful and the patient was discharged after four days. At six months follow-up, the patient was still free of symptoms.

Cardiopulmonary resuscitation is a life-saving procedure but can be associated with various complications.¹ The most frequently reported complications are fractures of ribs and sternum.¹⁻⁵ Damage to visceral structures inside the abdomen is much more rare.^{1,6} Among the abdominal complications, liver injury is the most frequent one, which can be explained by its anatomical position, structure, and volume.^{2,3} Recent data suggest that the incidence of liver injury is independent of whether patients receive resuscitation from lay bystanders or medical professionals.¹ Liver injury occurs more frequently if chest compression is performed with inappropriate techniques,^{1-3,6} but has also been found following correct chest compressions and in the absence of overlying rib fractures.^{1,3,6}

Liver rupture following cardiopulmonary resuscitation can have devastating consequences with haemodynamic instability as a result of massive bleeding.^{1,6} Medical awareness, measurements of haemoglobin, and abdominal ultrasound and/or computed tomography examinations may help to diagnose such complications at an early stage and promptly initiate adequate treatment.^{1,3,5} While urgent surgical therapy with patching of the lesion is required for the treatment of massive

bleeding, a conservative approach may be followed if the patient remains haemodynamically stable.^{1,6}

Care should be taken to perform cardiopulmonary resuscitation as correctly as possible.^{2,3,6} As cardiopulmonary resuscitation itself only rarely results in life-threatening complications, the risk of complications should be no reason to withhold such efforts from patients with cardiac arrest. ■

References

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