Massive Pulmonary Embolism With Liver Injury Associated With Chest Compressions During Cardiac Resuscitation

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A 34-year-old man was admitted to our hospital because of sudden respiratory failure caused by massive pulmonary embolism. After arrival in the hospital, the patient experienced cardiopulmonary arrest, and we promptly initiated percutaneous cardiopulmonary support, in addition to sternal compressions for cardiopulmonary resuscitation. Computed tomography revealed massive pulmonary embolisms and intraperitoneal bleeding due to liver injury. After interventional hemostasis of the hepatic arteries, we performed emergent pulmonary embolectomy and hemostasis of the liver with gauze packing. Absence of further intraperitoneal bleeding was confirmed 2 days later on a second look. The patient was discharged 2 month later without neurologic sequelae.

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Accepted for publication Sept 5, 2013.
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Comment

Liver injury in the setting of cardiac massage with sternal compression is rare, occurring at a rate of 0.6% to 2% [2, 3]. Given that we found no evidence of iatrogenic injury or technical complications in this case, we hypothesize that two factors placed this patient at additional risk. First, cardiac resuscitation by sternal compression was performed under the condition of extreme right heart strain caused by massive PE [4, 5]. This common feature of large PE is consistent with the patient’s symptoms of progressive tachypnea and tachycardia, and was also confirmed on cardiac ultrasonography. Second, the patient was given heparin, required for introduction of the PCPS system. Literature reports have described addition to immediate resuscitation with sternal compression, percutaneous cardiopulmonary support (PCPS) was performed within 30 minutes. Computed tomography of the chest and abdomen revealed bilateral massive PE (Fig 1) and intraperitoneal bleeding caused by liver injury (Fig 2). We performed angiography of the hepatic artery, confirming multiple hemorrhages of the peripheral branch (Fig 3). No injury to the inferior vena cava or hepatic vein, a potential complication of PCPS cannulation, was identified. We subsequently performed emergent surgical intervention for massive PEs, as well as control of intraperitoneal bleeding by interventional embolization of one peripheral branch of the hepatic artery. Pulmonary embolectomy was performed with the patient under normothermic standard cardiopulmonary bypass, and massive pulmonary thrombi were successfully removed from the bilateral pulmonary arteries. We then performed midline laparotomy and gauze packing for liver injury. We were subsequently able to stop both cardiopulmonary bypass and PCPS, although oxygenation remained tenuous. Two days later, we performed a second look for intraperitoneal bleeding, which confirmed hepatic hemostasis. An inferior vena cava filter was placed for prevention of PE recurrence. The patient was weaned from mechanical ventilation 1 week postoperatively. He was discharged home 1 month after the operation without major complications or neurologic sequelae.

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http://dx.doi.org/10.1016/j.athoracsur.2013.09.044
anticoagulant-induced liver injury after cardiac massage by sternal compression [6, 7].

The mortality rate of acute PE has been reported to be 65% in cases requiring emergent embolectomy [8]. In this case, we were able to successfully resuscitate and treat the patient despite the complication of massive intraperitoneal bleeding. Performing a minimally invasive interventional embolization of a bleeding peripheral hepatic artery allowed us to perform the pulmonary embolectomy promptly. Emergent pulmonary embolectomy was performed to wean the patient from extracorporeal membrane oxygenation and to discontinue the anticoagulation as quickly as possible, in consideration of the intraperitoneal bleeding. We performed the interventional embolization before the pulmonary embolectomy, given that interventional embolization could be performed more quickly than direct repair for multiple bleeding hepatic arteries. Suspecting that the bleeding was due to cardiopulmonary resuscitation, we performed hepatic hemostasis with only gauze packing, confirming hemostasis 2 days later. Despite life-threatening complications compounding critical illness, appropriate decision making regarding intervention and sequence enabled us to treat and discharge this patient without major neurologic sequelae.

References

Upgrading Redo Coronary Artery Bypass Graft by Recycling In Situ Arterial Graft

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We present a case of redo coronary artery bypass grafting (CABG) in which a single internal thoracic artery (ITA) graft was upgraded to a bilateral ITA graft by recycling a...