Rupture of a left internal mammary artery during cardiopulmonary resuscitation

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We present a rare case of a left internal mammary artery rupture during cardiopulmonary resuscitation (CPR). This case demonstrates that intrinsic cardiac/vascular injuries can occur even with manual CPR, and each patient should be monitored closely, considering the very subtle signs that can clue the physicians into the diagnosis.

Cardiopulmonary resuscitation (CPR) has the potential to cause a myriad of complications, the most common of which include rib fractures, lung injury such as pneumothorax or aspiration pneumonia, abdominal organ injury, and chest/abdominal pain (1). Injuries during CPR are more commonly seen when using mechanical rather than human compression-decompression devices (1). Our case discusses a complication involving rupture of the left internal mammary artery (LIMA) after manual CPR.

CASE PRESENTATION

An 80-year-old man with previous heart failure, atrial fibrillation, recent cardioversion, and venous thromboembolism on warfarin presented to the emergency department with complaints of syncope while at rest. He was bradycardic on telemetry, and his international normalized ratio was 3.4. On day 2, he began complaining of heartburn. Telemetry showed sinus rhythm with numerous atrial and ventricular premature complexes. A few minutes later he had cardiac arrest and was found to be in ventricular fibrillation. Advanced cardiac life support was started, and there was return of spontaneous circulation after one round of CPR and one defibrillation shock. A follow-up electrocardiogram showed atrial fibrillation with rapid ventricular response and a right bundle branch block. He was fully awake and alert after resuscitation. A transthoracic echocardiogram revealed a dilated ventricle with paradoxical septal motion, global left ventricular systolic dysfunction, and tachycardia with an ejection fraction of 30%.

The patient complained of chest pain after CPR, which persisted through the night despite pain medication. He slowly

became more hypotensive, eventually requiring vasopressor support. A scan showed a mediastinal hematoma and a large right-sided hemothorax with leftward mediastinal shift. The computed tomography scan was unable to localize the bleeding source. Selective angiography showed active extravasation of the LIMA. The LIMA was embolized and a right-sided chest tube was placed. He received a blood transfusion and was successfully liberated from vasopressors, but ultimately died 7 days after the resuscitation.

DISCUSSION

Many cardiac complications can occur after CPR, such as atrial and ventricular rupture, papillary muscle tear, cardiac hemorrhage, and vascular injuries. More common but often unrecognized complications include pulmonary fat embolus, occurring in 20% of nonsurvivors of CPR, as well as sternal fractures (2). Our case is unusual because it reveals a rare complication of CPR: rupture or avulsion of the internal mammary artery. In this case, it was fairly subtle and managed to go unnoticed until the patient became hemodynamically unstable. In the case of cardiac injuries, cardiac and pericardial injury may occur in the absence of associated thoracic injury, making the post-CPR diagnosis challenging (3).

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