Isolated tear in left atrial appendage due to blunt trauma chest: A rare case report

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Blunt traumatic cardiac rupture is associated with a high mortality rate. Motor vehicle accidents account for most cardiac ruptures, but crush injury is relatively rare. We describe a case of a 72-year-old man who had the left atrial appendage ruptured through blunt trauma due to a fall from scooter. Simple suture repair of the atrial appendage was achieved after clamping the base of the left atrium to control the bleeding. He recovered without complication. Traumatic injury to left atrial appendage is rarely seen and reported.

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Introduction

Cardiac rupture as a result of blunt trauma is seldom encountered because such cases are rarely diagnosed early and most of the patients die before surgical intervention [1–3]. About 10% of the patients who endure blunt injury to the chest have cardiac rupture, which is associated with a high mortality rate. Motor vehicle accidents account for the majority of non-penetrating cardiac ruptures [1]. The mortality from such ruptures ranges from 50% to 80% [3]. Anatomical injuries have included the atrium, appendage and ventricle but injury to the left appendage has been reported very rarely. Overall, rupture of the left side of the heart has a worse prognosis than right-sided rupture [1]. Here we describe the successful maleagement of an elderly patient who ruptured the left atrial appendage through blunt trauma due to a fall from scooter.

Case report

A 72-year-old male who was driving a scooter, fell from the scooter while preventing collision with a high-speed truck. He was brought to the emergency department in a critical condition within 30 min of the accident. He was conscious, in respiratory distress, and there were small bruises on his chest and abdomen. His respiratory rate was 30 breaths per minute, pulse rate was 98 beats per minute, and systolic blood pressure was 80 mmHg. His pupils were 2 mm in size and...
reacted normally. Auscultation showed normal air entry in both lungs and muffled cardiac sounds. There was no obvious injury to the chest wall except for 2–3 bruise marks. Abdominal palpation revealed mild muscle guarding and distension in the epigastrium and left hypochondrium. The patient developed an episode of profound bradycardia that responded to atropine. Then after 5 min, the patient became unconscious. Pulse became thready and blood pressure was 60 mmHg. After initial resuscitation, anesthesia was induced and an endotracheal tube was inserted and inotropes started. Chest radiography showed an enlarged cardiac silhouette with mediastinal widening. Transthoracic echocardiography revealed massive pericardial effusion but left ventricular systolic wall motion and valves function were normal. He was diagnosed with cardiac tamponade and cardiac shock, and pericardial centesis was immediately performed. We removed 600 ml of non-clotted pericardial blood via a subxiphoid approach. Hemodynamics improved, so the patient was shifted for a quick thoracic computed tomography (CT) scan which showed hemopericardium, minimal hemomediastinum and left hemothorax, without any recognizable site of intrathoracic organ injury, including the aorta. CT scan of the head revealed no intracranial injury. An abdominal CT scan and diagnostic peritoneal lavage were normal. Left intercostals drainage tube put which drained about 200 ml of blood. Pericardial collection again increased and hemodynamics was not improving.

Blunt traumatic cardiac rupture was suspected, and the patient was moved to the operating room. Midline sternotomy revealed hemopericardium with fibrin clot. A bleeding point was not immediately obvious, but a single left appendage laceration ran about 1 cm on the outer free wall. Base of left atrial appendage was healthy, so a vascular clamp was applied at the base of the left atrial appendage. Left atrial appendage was doubly tied with silk 1/0 and the clamp was removed. Left atrial appendage was tied with silk, not repaired by prolene to complete the procedure quickly in view of deranged hemodynamics and the base of appendage was healthy. All other cardiac and intrathoracic structures were found to be normal. The postoperative recovery was uneventful and he was discharged 12 days after the operation. Echocardiography was normal at the time of discharge.

Discussion

About 6–10% of patients who endure blunt injury to the chest have cardiac rupture. Isolated left atrial and pericardial ruptures are classified as two separate forms of cardiac trauma and such injuries without associated impairment, such as sternal or rib fractures or thoracic organ damage, are extremely rare. The causes of cardiac rupture range from a simple blow to a more severe directional force and the heart is susceptible to injury from sudden acceleration, deceleration, or compression because it hangs freely in the mediastinum between the sternum and the thoracic vertebrae, and it is suspended by the great vessels [5,6]. In adults, the mediastinum is less mobile and therefore, more susceptible to direct forces [5,6].
The mechanism of cardiac rupture by blunt trauma also includes compression of the heart between the sternum and the vertebral column, and direct contusion [4–6]. All chambers of the heart are susceptible to traumatic rupture but the atrial appendage is most vulnerable because of its relative thinness [1,7]. Right-sided (atrium and ventricle) cardiac ruptures have a better prognosis with 78% survival compared to 25% survival after left-sided rupture [1,7].

It is difficult to see why this patient survived long enough to come to surgery. Possibly because the pericardium was intact, the tapenades effect restricted bleeding and prevented fatal exsanguination. It is of interest that there was no evidence of major injury to the chest wall. This lack of injury is consistent with the injuries caused purely by deceleration force rather than direct impact. The position of the tear was consistent with the force of deceleration. If this scenario is correct, then patients who present with cardiovascular instability, a history of rapid deceleration without any external chest injury but with left hemothorax, may have a left atrial tear. Maleagement should be by mid sternotomy. Currently, there is no consensus on either the clinical definition or appropriate maleagement protocol, including diagnostic work-up, for such injuries. Therefore, only a high index of suspicion, rapid transport, evaluation, and expeditious maleagement may save such patients (Fig. 1).

In conclusion, we described rare blunt traumatic rupture of the left atrial appendage due to a fall from scooter in an elderly patient who had successful operative repair and recovered without complication.

References