

Acute aortic insufficiency after chest blunt trauma: two case reports

Carenini Gianmarco¹, Forlini Clarissa¹, Giovannini Ilaria¹, Laratta Matteo¹, Zago Elisabetta¹, Previtali Paola¹, Faraldi Loredana¹, Giudici Riccardo¹, Fumagalli Roberto¹

(1) University of Milan-Bicocca School of Medicine and Surgery - Anesthesia and Critical Care SAR 1, Niguarda Hospital, Milan (IT)

Ospedale Niguarda

Introduction

Approximately 30% of all trauma victims have some form of cardiothoracic lesion¹. The predominant types of cardiac injury following blunt chest trauma were rupture, contusion/laceration². Only one case of an aortic valve tear was noted in autopsy analysis². Hereafter, we present two cases of aortic insufficiency due to blunt chest trauma, admitted to the Intensive Care Unit (ICU) and Postoperative Care Unit in Niguarda Hospital.

Case reports

Case 1

The first case examines a 59-year-old man, who was admitted to our ICU in February 2023, due to a high energy motorcycle accident. Total body computed tomography (CT) scan, showed multiple fractures of posterior ribs and fracture of the sternal manubrium, a retrosternal hematoma without signs of active bleeding, left pneumothorax, extended bilateral lung contusion, no blushing spleen hematoma and stable pelvis fracture. After the CT scan, the patient was intubated due to low oxygen saturation, and left pneumothorax was drained. Considering chest trauma and unstable hemodynamics without active bleeding, a transthoracic echocardiogram (TTE) was performed, showing moderate-severe aortic insufficiency without ventricular dyskinesia. No bulb aortic aneurysm or dissection were seen in CT scan and ECG 12-lead was negative for ischemia. Coronary arteries CT scan was not performed due to coexistent beta blockers contraindications. An elective transesophageal echocardiogram (ETE) confirmed severe aortic insufficiency due to partial eversion of right coronary semilunar, without dilatation of aortic bulb and ascending aorta (**Figure 1**). No emergency surgical indication was given, because of high risk due to concurrent lesions (pelvis fracture, lung contusion). During ICU recovery a weekly TTE was performed, confirming aortic insufficiency grade (severe), without left ventricular dilatation. PiCCO was chosen for haemodynamic monitoring. After an acute peri-trauma phase and complications (septic shock), a pharmacological therapy (diuretics and angiotensin-converting enzyme inhibitor) was started, awaiting elective surgery not yet done.

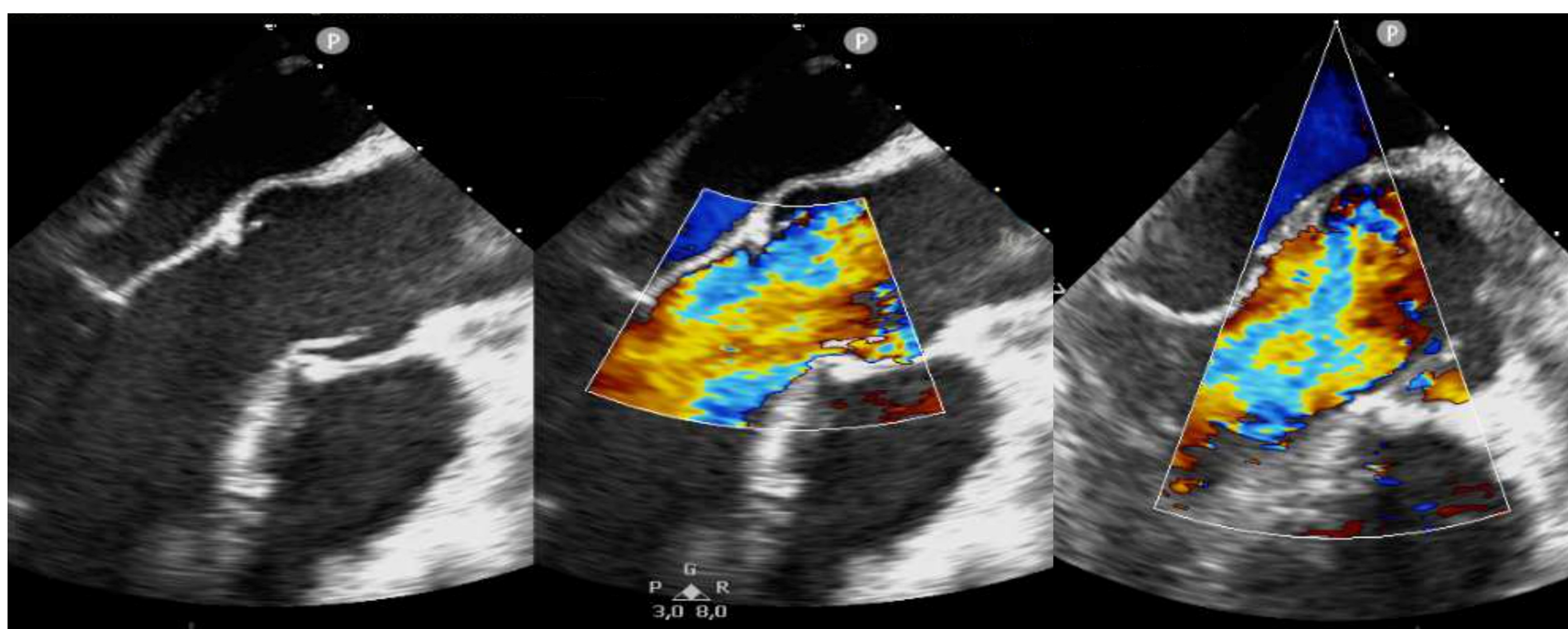


Figure 1: ETE images showing severe aortic insufficiency without aortic bulb and ascending aorta dilatation.

Case 2

The second case involves a 22-year-old male admitted to our ICU in November 2022 after a free-fall injury. The patient was intubated on scene because of hypotension and compromised neurological status. The injury pattern at admission revealed a traumatic brain injury (TBI) with traumatic subarachnoid hemorrhage (without neurosurgical indications) and indirect signs of diffuse axonal injury; chest trauma with fracture of two right ribs, homolateral pneumothorax (treated with thoracic drainage in the emergency room) and bilateral lung contusions with pneumatoceles; multiple spinal fractures (without spinal cord lesions - as documented by a subsequent magnetic resonance imaging); abdominal trauma with left kidney laceration and active arterial bleeding. The patient therefore underwent an emergency endovascular embolization of multiple bleeding branches of the left kidney artery with hemodynamic stabilization and was then admitted to the ICU. The patient was extubated within the first 24 hours of ICU stay. On day 2 supraventricular arrhythmias and clinically relevant systolic hypertension were reported: tension pneumothorax, pericardial irritation and myocardial infarction were excluded and the TTE and ETE performed showed massive aortic valve insufficiency due to a traumatic lesion of the non-coronary cuspid (**Figure 2**). No left ventricular functional or anatomical alterations were found and only a minor mitral insufficiency was reported. Pericardial integrity and absence of aortic dissection were confirmed with a cardiac CT scan. Urgent cardiac surgery was excluded because of recent intracranial hemorrhage and given the cardio-respiratory stability of the patient. During the ICU stay, weekly TTE assessments were performed, confirming severe aortic valve insufficiency, and invasive hemodynamic monitoring was maintained.

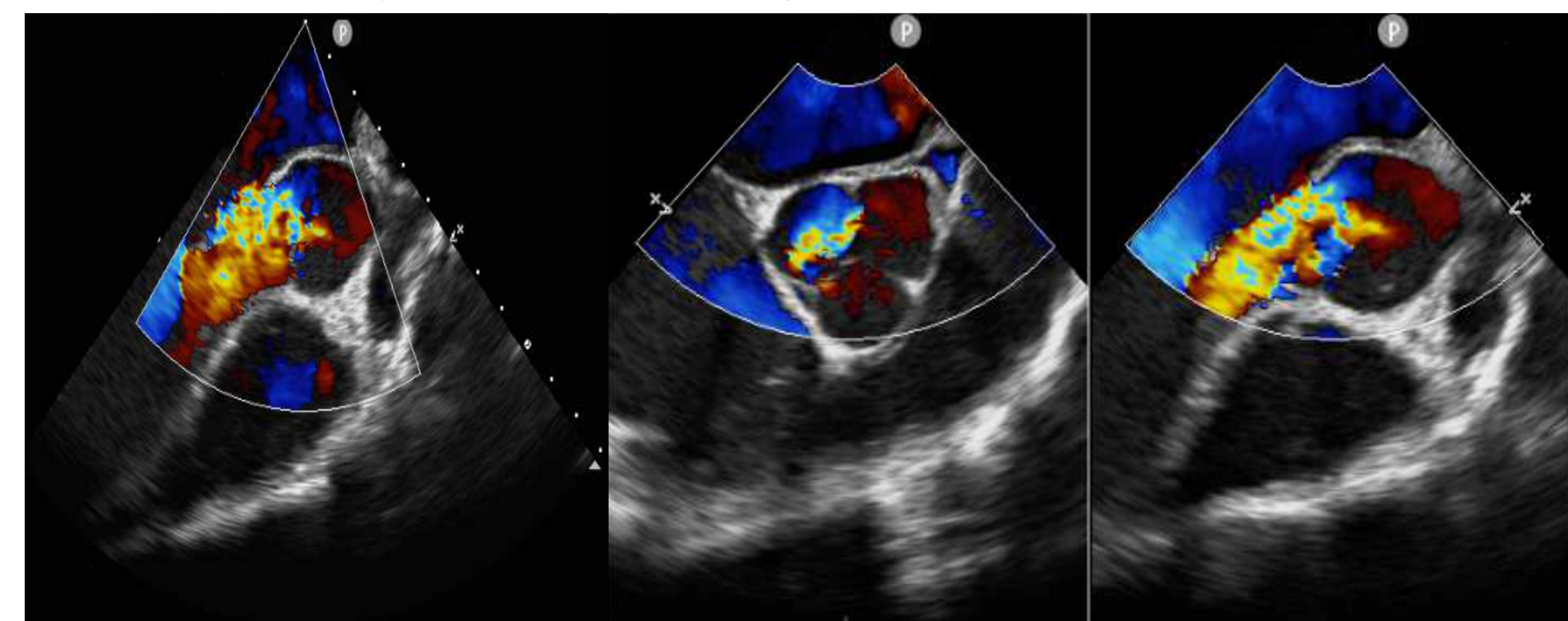


Figure 2: ETE images showing massive aortic valve insufficiency due to the lesion of the non-coronary cuspid.

Discussion and conclusions

Blind chest trauma often occurs after a high-energy accident or after falls. If the most common injury is myocardial contusion, aortic valve tear after blunt chest trauma is very rare. The initial misdiagnosis of severe aortic insufficiency could prolong the intensive care stay with failure of weaning from mechanical ventilation. Weaning-induced pulmonary edema secondary to cardiac dysfunction has been demonstrated to be the most common cause of weaning failure³. Early detection of the aortic valve traumatic injuries permitted the optimization of the medical therapy and a successful weaning from mechanical ventilation. In conclusion, it is essential in the patient with blunt chest trauma to carefully evaluate the arterial waveform (sharp systolic upstroke followed by a steep decline, with "descendent" diastolic notch) and to add an echocardiographic evaluation to the standard trauma imaging.

References

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Declaration of interest: None