CASE REPORT

Contusio cordis, not an innocent diagnosis

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Accepted 13 March 2014

SUMMARY

This report demonstrates two cases of traumatic valvular lesions of the heart. The first is a patient with severe mitral regurgitation after a blunt chest trauma and the second a severe aortic regurgitation due to rupture of a coronary cusp after a motor cycle accident. Both patients underwent successful surgery and recovered. Valvular lesions are a rare complication after blunt chest trauma. Physicians should always consider a traumatic valvular lesion as a possible cause of pulmonary oedema or haemodynamic instability after a blunt chest trauma.

BACKGROUND

Contusio cordis after blunt chest trauma can be asymptomatic; however, severe complications can occur, immediately or with some delay. That is why patients after a blunt chest trauma should be clinically examined for cardiac involvement, allowing a timely recognition of serious complications and starting off adequate treatment.

CASE 1 PRESENTATION

A 75-year-old man, blind but otherwise healthy, presented with progressive dyspnoea at the emergency ward. For the past few months he had experienced mild fatigue on exertion. Five days before presentation he fell on a pole with his chest. Thereafter, he experienced a marked increase in dyspnoea on light exertion.

Investigations

On initial physical examination, he was haemodynamically stable. His jugular veins were distended, bilateral pulmonary rales and a systolic murmur grade III/VI, punctum maximum at the apex was heard. His ECG showed sinus rhythm, with minor repolarisation disturbances. His chest X-ray showed signs of pulmonary oedema and a normal heart configuration. Laboratory results showed a normal troponin level. Transthoracic echocardiography showed a hyperdynamic left ventricle with severe mitral valve regurgitation with flail leaflet of the posterior mitral valve leaflet (PMVL) due to chordal rupture. Additional images were acquired by transoesophageal echocardiography confirming the diagnosis of a P2 chordal rupture (figures 1–3 and videos 1–3).

Treatment

After admission, the clinical situation quickly deteriorated with acute heart failure. He required treatment with intravenous vasodilation, diuretics and oxygen, after which he stabilised. Coronary angiography revealed no significant coronary artery

Figure 1 Transoesophageal echocardiography showing severe mitral regurgitation with flail posterior mitral valve leaflet due to chordal rupture.

disease. One week later, successful mitral valve reconstruction was performed with a rectangular resection of the P2 scallop and an annuloplasty ring.

Outcome and follow-up

His recovery was without any problems. Six weeks after surgery medication could be discontinued.

CASE 2 PRESENTATION

A 25-year-old woman presented to the emergency department after a frontal collision on a motorcycle with another motorcyclist. The patient was otherwise healthy.

Investigations

On primary survey, she was haemodynamically stable, but had an O₂ saturation of 90% with an FiO₂ of 85% on a non-rebreather mask, a respiratory rate of 35/min and rhonchi on pulmonary

Figure 2 Transoesophageal echocardiography showing flail leaflet of the posterior mitral valve leaflet.

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To cite: Driessen R, Doodeman I, Bogaard K, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2014-204139

Figure 3 Transoesophageal echocardiography with Doppler mode showing severe eccentric mitral regurgitation.

auscultation. There were no signs of major bleeding, haematomas or rib fractures and the Glasgow Coma Scale score was maximal. On X-ray and CT scan examination, this patient turned out to have a pulmonary contusion on the left side, bilateral antebrachii fractures, fractures of the sternum, the left scapular body and fractures of the thoracic spine on levels 2–4. On secondary survey, the saturation was normalised and there were no specific abnormalities on the ECG.

During her stay in the intensive care unit, the troponins rose to a maximum of 0.88 µg/L and on auscultation, a grade IV/IV diastolic murmur was heard over the heart. A transthoracic and subsequently a transoesophageal echocardiogram were performed demonstrating a rupture of the left coronary cusp of the aortic valve leading to a severe aortic regurgitation (figures 4–7 and videos 4–7). No aortic dissection or pericardial effusion was found. The left ventricle was slightly dilated and hyperdynamic due to volume overload.

Treatment

The course in the intensive care unit was uncomplicated. A few weeks later, she had uncomplicated cardiac surgery with repair of the left coronary cusp with autologous pericardium.

Video 1 Transoesophageal echocardiography showing severe mitral regurgitation with flail posterior mitral valve leaflet due to chordal rupture.

Outcome and follow-up

During follow-up, there was only a mild residual aortic regurgitation. The patient is now working on rehabilitation of the other injuries.

DISCUSSION

Contusio cordis appears to be an innocent diagnosis after a blunt chest trauma, occurring in 16–76% of the cases.^{1–4}

Video 2 Transoesophageal echocardiography showing flail leaflet of the posterior mitral valve leaflet.

Video 3 Transoesophageal echocardiography with Doppler mode showing severe eccentric mitral regurgitation.

Figure 4 Combined long-axis and short-axis view, showing severe aortic regurgitation due to rupture of the left coronary cusp of the aortic valve, with a double contour of the cusp on the short axis.

However, serious complications can occur, including myocardial rupture, pericardial lesions, valvular lesions and coronary artery dissection.⁵ Data on prevalence of these complications are lacking.

Traumatic cardiac valvular injuries are rare. Only a few cases of traumatic mitral valve regurgitation due to chordal rupture have been published. Traumatic aortic valve regurgitation is also rare. Up to 2002, there were only 100 cases reported.⁶ Valvular lesions usually result from a high-energy trauma such as a car or motorcycle accident, but a fall from a great height or sport

accident is also reported. Probable mechanisms of valvular lesions are sudden deceleration or sudden compression of the cardiac blood column during a vulnerable phase. Atrioventricular valves are most susceptible.⁷ Their vulnerable phase is during isovolumetric contraction, late diastole or early systole. This can cause rupture of the papillary muscle, chordae tendineae or valve leaflets. The vulnerable phase for aortic valve lesions is during early diastole, when the transaortic gradient is the highest.⁸ Usually only one cusp is damaged, the non-coronary cusp is most commonly involved.⁶

Figure 5 Transoesophageal echocardiography long axis, rupture of the left coronary cusp of the aortic valve.

Figure 6 Transoesophageal echocardiography long axis with Doppler flow, showing severe eccentric aortic regurgitation.

Figure 7 Three-dimensional echocardiogram showing rupture of the left coronary cusp.

Video 4 Combined long-axis and short-axis view, showing severe aortic regurgitation due to rupture of the left coronary cusp of the aortic valve, with a double contour of the cusp on the short axis.

Video 5 Transoesophageal echocardiography long axis, rupture of the left coronary cusp of the aortic valve.

Video 6 Transoesophageal echocardiography long axis with Doppler flow, showing severe eccentric aortic regurgitation.

The diagnosis of a traumatic valve lesion in the acute phase is difficult, because it is often accompanied by multiple other traumatic lesions and clinical presentation mimics a primary pulmonary problem or left ventricular dysfunction. Symptoms can vary widely. Patients can be asymptomatic for years after the trauma or present immediately after the trauma with haemodynamic instability and acute congestive heart failure. Symptoms of papillary muscle rupture are known to be more dramatic than chordal rupture. Physical examination can be misleading as 50% of the patients with important mitral regurgitation have no audible murmur.⁹ Echocardiography is required to diagnose the aetiology of the problem. In the case of aortic valve rupture, the main sign on primary survey can be cardiogenic shock. On auscultation, S3 and an early and short diastolic murmur can be heard.¹⁰ It is remarkable, however, that most patients develop symptoms after 1 week.⁶ In the second case, there were no profound signs of cardiogenic shock, although the aortic valve insufficiency was severe. Therefore, this case is

Video 7 Three-dimensional echocardiogram showing rupture of the left coronary cusp.

an illustration of the difficulty in diagnosing traumatic (aortic) valve rupture in the acute phase and the need for observation and dedicated physical examination.

Physicians at the emergency department should always consider a traumatic valvular lesion, especially in the presence of pulmonary oedema or haemodynamic instability after a blunt chest trauma.

Learning points

- ▶ Although rare, valvular lesions are the possible complications after a blunt chest trauma.
- ▶ Symptoms due to traumatic valve disease are non-specific and can be misleading.
- ▶ Patients with a blunt chest trauma, mild or severe, presenting with dyspnoea or haemodynamic problems are entitled to cardiologist consultation, a dedicated physical examination and an echocardiogram in order to search for valvular problems.

Contributors RD and ID researched data and wrote the manuscript. KB and SR contributed to the discussion and reviewed/edited the manuscript.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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