Traumatic septal coronary perforation after a motor vehicle collision

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DESCRIPTION

A 21-year-old man presented to our institution after a motor vehicle collision. His vitals were normal. He had normal heart sounds with no murmurs.

Electrocardiogram (EKG) showed ST-segment elevations in leads I, AVL, V1 to V3. Troponin was elevated at 1810 ng/L (<15 ng/L). Chest CT revealed multiple rib fractures and a haematoma in the antero-septum of the left ventricle (LV). An echocardiogram revealed mild LV systolic dysfunction with a severely hypokinetic septum and moderate right ventricular (RV) systolic dysfunction. Coronary angiogram showed no evidence of atherosclerosis. There was a traumatic dissection of the second diagonal artery and septal coronary perforation with shunting into the RV (figure 1, videos 1 and 2).

A ventriculogram showed mild global LV systolic dysfunction (video 3). Right heart catheterisation revealed no significant step-up on a shunt run. Cardiac MRI showed a non-significant shunt with QP:QS ratio of 1.04. After discussion with cardiac team and given the lack of a significant shunt as well as clinical stability, a conservative monitoring approach was followed.

On follow-up 10 months later, a CT angiography (CTA) revealed complete resolution of the

previously seen haematoma (figure 1C) and no evidence of shunt. His echocardiogram was normal.

Blunt chest trauma can cause coronary intimal tear due to shear forces, resulting in dissection

Video 1 Right anterior oblique and cranial shot showing the septal perforation and traumatic dissection of the diagonal branches.

Figure 1 (A) 3D CT reformat demonstrating haematoma adjacent to LAD. (B) Axial CT demonstrating haematoma adjacent to right ventricle (arrowhead). (C) Resolution of haematoma at 3-month (asterisk). (D) Septal haematoma (red arrow) and dissection of second diagonal (yellow arrow). (E) Short-axis view showing continuous flow to the RV (yellow arrow). (F) Resolution of shunt at 10 months (white arrow).

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Video 2 Right anterior oblique and cranial shot showing the septal perforation and traumatic dissection of the diagonal branches.

Video 3 A left anterior oblique ventriculogram showing mildly decreased global LV systolic function. LV, left ventricle.

and acute myocardial infarction.¹ The left anterior descending coronary artery (LAD) is mostly affected due to its proximity to the chest wall.² Apart from cardiac contusion, this case highlights traumatic coronary perforation and dissection as a rare complication of motor vehicle accidents.

Learning points

- ▶ Apart from cardiac contusion and spasm, traumatic coronary perforation and dissection should be on the differential diagnosis of blunt chest trauma especially in the context of ECG changes and troponin rise.
- ▶ Conservative approach with follow-up CT angiography is reasonable in patients with no chest pain and with preserved TIMI 3 flow in the affected vessel with dissection.
- ▶ Septal coronary perforation can lead to VSD that can be monitored with cardiac MRI. Ventricular septal defect (VSD) with a significant shunt usually requires intervention either percutaneously or surgically.

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