CASE REPORT

Cardiac compression due to gastric volvulus: an unusual cause of chest pain

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SUMMARY

A 42-year-old man was admitted to coronary care for assessment with severe retrosternal chest pain. Echocardiography showed significant external compression of the left atrium. A subsequent CT scan revealed him to have a large hiatus hernia, with most of his stomach herniating into his thorax causing left atrial compression and gastric volvulus. He subsequently underwent successful emergency decompression of the gastric volvulus and repair of his hiatus hernia.

BACKGROUND

Gastric volvulus is a rare and thus easily missed cause of chest pain, but diagnostic delay can lead to gastric perforation, sepsis and even death. Gastric volvulus causing cardiac compression is even rarer. We present a case of a patient who presented with chest pain and was found to have left atrial compression due to gastric volvulus.

CASE PRESENTATION

A 42-year-old man presented with acute severe retrosternal chest pain and severe nausea and retching. An ECG performed by the paramedics showed suspicious, but non-specific ST changes anteriorly (figure 1). A probable cardiac cause was suspected and he was transferred directly to the coronary care unit for assessment and possible emergency coronary angiography. Medical history included hypertension, hiatus hernia and recurrent gastrointestinal bleeding secondary to angiodysplasia. On assessment he was grey, diaphoretic, tachycardic (110 bpm) and hypertensive at 153/74 with no discrepancy in each arm. Chest auscultation revealed slight reduction in breath sounds at his left base with normal heart sounds. Abdominal examination revealed mild left upper quadrant tenderness but no masses.

DIFFERENTIAL DIAGNOSIS

In view of ongoing severe central chest pain, the differential diagnosis included acute coronary syndrome (ACS), pulmonary embolism and acute aortic syndrome.

INVESTIGATIONS

An emergency bedside transthoracic echocardiogram was performed. Echocardiography showed normal left ventricular (LV) systolic function with no regional wall motion abnormalities, normal right heart, pulmonary artery pressure, aortic root

Figure 1 ECG on arrival.

and no pericardial effusion. However, there was an unusual finding of extrinsic compression of the left atrium due to an echo-dense mass (figures 2 and 3). This finding was evident on the parasternal long axis (figure 2) and apical four-chamber views (figure 3). Despite the significant compression of the left atrium, there was no haemodynamic impact on LV filling on mitral valve Doppler assessment.

This finding prompted an urgent chest X-ray and CT thorax/abdomen. Chest X-ray showed a large intrathoracic hiatus hernia that appeared as

Figure 2 Extrinsic left atrial compression seen on the parasternal long axis view on echocardiography.

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Figure 3 Extrinsic left atrial compression seen on the apical four-chamber view.

a cyst-like retrocardiac mass giving the impression of cardiomegaly (figure 4).

CT confirmed the patient to have a large hiatus hernia, with most of the stomach herniated into the thorax with the gastric body compressing the left atrium (figure 5, yellow arrows). This had led to most of the greater curve of the stomach lying above the inferior curve, resulting in an organoaxial gastric volvulus affecting the long axis of the stomach causing gastric outlet obstruction.

TREATMENT

His case was discussed urgently with surgical colleagues. He underwent emergency endoscopy that evening to decompress the stomach and a nasogastric tube was placed under direct vision. This was followed by laparoscopic reduction of the gastric volvulus the following day. The hiatus hernia was repaired by cruroplasty, which was reinforced with a biological mesh and 360° Nissen fundoplication was performed. In addition to a gastropexy, a percutaneous endoscopic gastrostomy (PEG) tube

Figure 4 Chest X-ray showing a large hiatus hernia and cyst-like retrocardiac mass.

Figure 5 CT scan showing a large hiatus hernia and gastric volvulus. The stomach is upside down, with the visualised infradiaphragmatic part of the stomach being the gastric fundus. Most of the stomach had herniated into the posterior mediastinum, with the antrum located anterosuperiorly and the fundus posteroinferiorly. The stomach is seen to be compressing the left atrium and abutting the descending aorta (yellow arrows).

was inserted to prevent further gastric volvulus and recurrent herniation of the stomach into the chest.

Postoperatively a chest X-ray showed marked improvements in comparison with his initial chest X-ray now that his whole stomach was intra-abdominal (figure 6).

A barium swallow prior to discharge showed free flow of barium through the hypopharynx to the stomach and duodenum (figure 7).

OUTCOME AND FOLLOW-UP

Following an expectant postoperative recovery, he was discharged home on the fourth day.

He has since completed 18 months of follow-up and was asymptomatic of acid reflux and gastric volvulus.

DISCUSSION

Chest pain is one of the the most common reasons for patients presenting to the emergency department, but rare causes can easily be missed. Gastric volvulus is an uncommon disorder that ensues when the stomach rotates more than 180°. The result is compromise of the gastric blood supply. Classically

Figure 6 Postoperative chest X-ray .

Figure 7 Barium swallow showing free flow of contrast into the oesophagus, stomach and duodenum.

presenting with Borchardt's triad of epigastric pain, severe retching and an inability to pass a nasogastric tube, gastric volvulus is a rare and thus easily missed cause of chest pain.^{1 2}

There have been a number of case reports of gastric volvulus presenting with chest pain and even mimicking ACS.³

A variety of ECG changes typical of ACS have been reported, including T wave inversion.³ Farr *et al*⁴ have reported a case of gastric volvulus causing inferior ST elevation.

While gastric volvulus causing chest pain is rare, it causing cardiac compression as in this case is even rarer. There are sporadic case reports that have specified gastric volvulus as a cause of cardiac chamber compression. Left atrial compression appears to be the most common described in the literature.^{5–7} Some cases have reported significant haemodynamic compromise. Kalra *et al*⁸ reported a case of gastric volvulus causing compression of both atria leading to tamponade. This resulted in electrical mechanical dissociation necessitating cardiopulmonary resuscitation. Another case has been reported of gastric volvulus causing both cardiac chamber compression and compression of mediastinal structures, such as the superior vena cava, causing cardiovascular collapse.⁹

Gastric volvulus should be considered where external cardiac chamber compression is present in the context of severe chest pain. This case demonstrates the power of bedside echocardiography in the rapid triaging and definitive management of undifferentiated chest pain.

Contributors AB was the cardiology registrar on call responsible for the initial assessment and work-up of this patient on arrival in CCU. DA was the supervising

Learning points

- ▶ Around 70% of patients with gastric volvulus present with the classical Borchardt's triad.
- ▶ However, this case demonstrates that it can present in a number of other ways, including chest pain with ECG changes and cardiac chamber compression.
- ▶ A history of Gastro-oesophageal reflux disease (GORD), paraoesophageal hernia or hiatal hernia repair should make one consider a diagnosis of gastric volvulus in a patient presenting with chest pain.
- ▶ Cardiac compression, although rare, can also occur, and if left atrial compression is noted in a patient presenting with chest pain this should once again prompt consideration of gastric volvulus.

consultant and involved in his care following this initial assessment and work-up. VK was the consultant general surgeon who performed the operation. AB wrote up the case with the assistance of DA and VK.

Competing interests None declared.

Patient consent Obtained.

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