

A Rare Case of Transient Inferior ST Segment Elevation

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ABSTRACT

The investigators review the electrocardiographic manifestations of hiatal hernia and describe the case of an 86-year-old male who presented with a large distended hiatal hernia causing electrocardiographic findings of new onset ST segment elevation of the inferior leads without reciprocal changes. After decompression, the patient's electrocardiogram demonstrated resolution of the ST segment elevation.

Key words: Electrocardiogram, hiatal hernia, ST elevation

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INTRODUCTION

Hiatal hernias are a common anomaly the incidence of which increases with age.^[1] Hiatal hernias are considered one of the fundamental etiologies for gastroesophageal reflux disease (GERD). GERD is one of the most common differential diagnoses in a patient with typical angina-like chest pain.

Patients with large hiatal hernias have been reported to have cardio-pulmonary symptoms as well as electrocardiographic and echocardiographic manifestations in several case reports.^[4-20] Hiatal hernias should be considered in the differential diagnosis of patients with angina-like chest pain. Given the symptoms of GERD, the cardiopulmonary findings, and the high prevalence. To the best of our knowledge, we are reporting the first case of focal inferior segment ST segment elevation secondary to a large hiatal hernia.

CASE

The patient is an 86-year-old white male with a past medical history of hypertension and a 12-year history of a hiatal hernia. He does not have a history of diabetes, hyperlipidemia, or coronary artery disease. He is a non-smoker, active for his age, and has no recent history of chest pain. The patient takes 25 mg of metoprolol twice a day for his hypertension and 40 mg of omeprazole daily for GERD.

The patient presented to the emergency department with a chief complaint of persistent nausea. He received an abdominal film during his work-up which revealed a large hiatal hernia, which along with his persistent nausea, the possibility of gastric volvulus was entertained [Figure 1]. The patient subsequently underwent an abdominal CT scan that ruled out gastric volvulus and demonstrated a large hiatal hernia in which the stomach was almost entirely in the thorax [Figure 2]. An electrocardiogram while patient was in Emergency Department revealed new ST segment elevation in the inferior leads without reciprocal changes [Figure 3a]. The patient continued to have persistent nausea and started to develop pleuritic left sided chest pain. His vital signs remained stable with a temperature of 98.4, 16 respirations a minute, heart rate of 70, blood pressure of 156/63, and an oxygen saturation of 98% on room air. He was admitted for 24-h observation. His cardiac markers remained within normal limits. An echocardiogram revealed no wall motion abnormalities and a preserved ejection fraction.

During the hospitalization, the patient had a number of episodes of large volume emesis, resulting in dramatic improvement of his symptoms. Repeat

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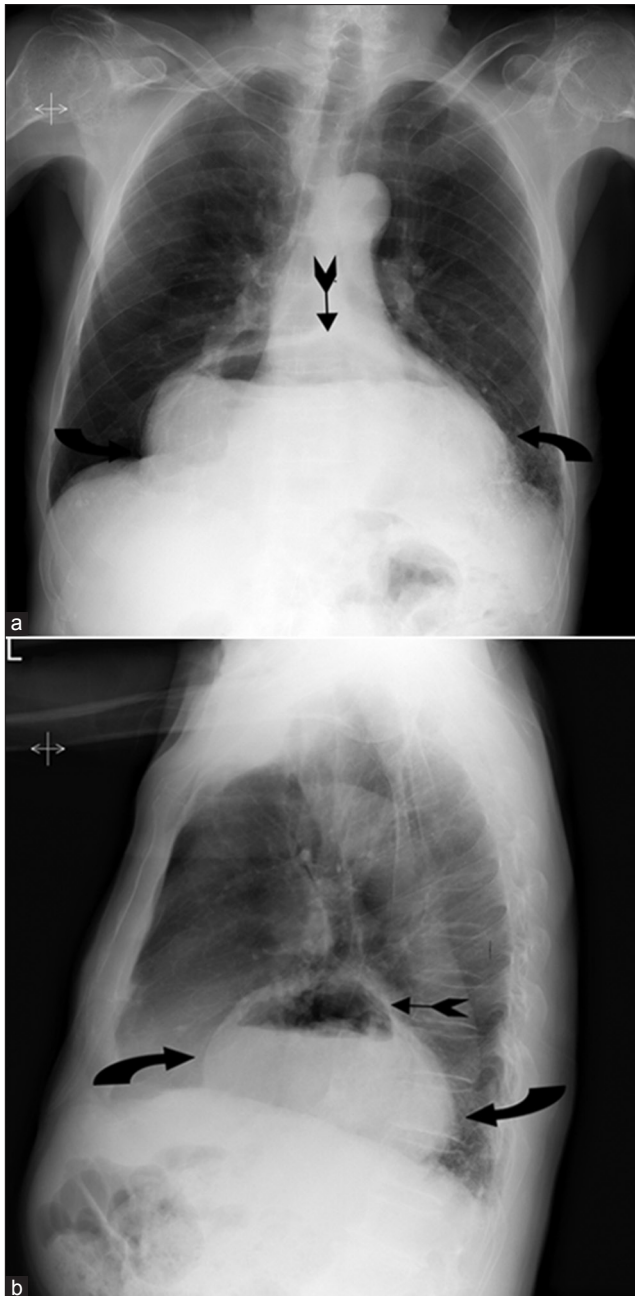


Figure 1: PA and lateral chest X-ray. (a) PA chest X-ray shows abnormal widening of the mediastinal contours (curved black arrows) with air-fluid level (straight black arrow) compatible with a large gastric hernia. (b) Lateral chest X-ray shows abnormal opacity in the middle mediastinum (curved black arrows) with air-fluid level (straight black arrow) consistent with a large gastric hernia

electrocardiogram revealed resolution of the ST segment elevation [Figure 3b]. The patient received supportive care during his hospitalization and was referred to cardiothoracic surgery at discharge. Two months later, the patient received a laparoscopic Nissen fundoplication. The procedure and post-operative course were without complications and the patient has been in good health since the surgery.

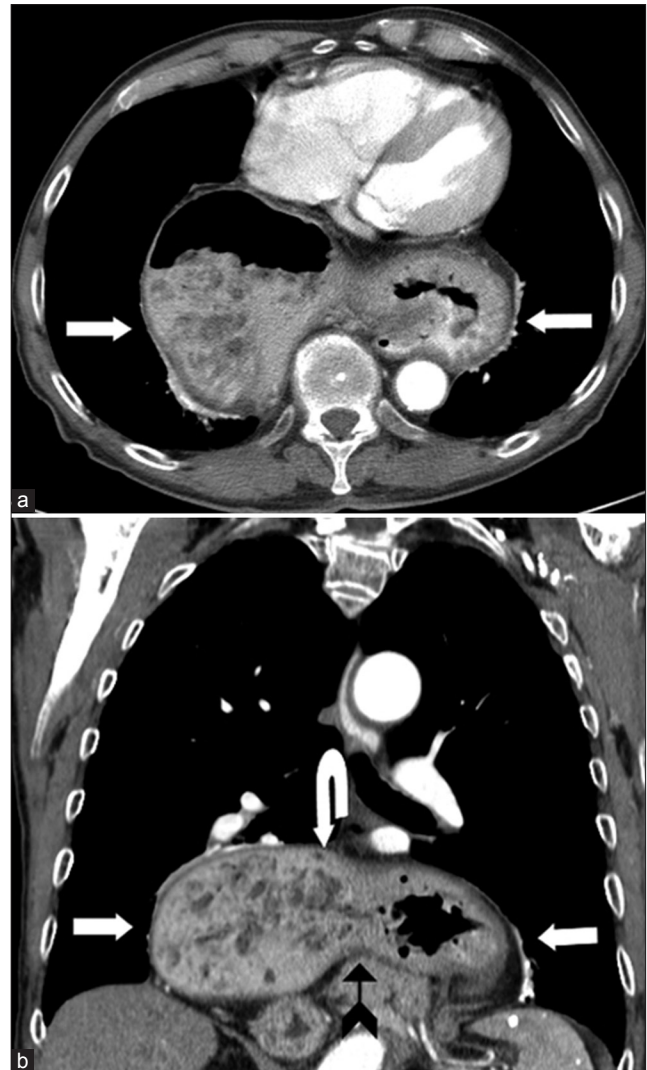


Figure 2: Axial and coronal chest CT. (a) Axial CT image shows the stomach (straight white arrows) within the thorax, posterior to the heart, consistent with a large gastric hernia. (b) Coronal CT image shows the stomach (straight white arrows) above the diaphragm, within the chest, compatible with a large gastric hernia. Additionally, the greater curvature (curved white arrow) of the stomach is positioned superior to the lesser curvature (straight black arrow) indicative of an organoaxial volvulus

Comments

Arrhythmias such as atrial tachycardia, atrial fibrillation, supraventricular tachycardia, paroxysmal atrial flutter as well as electrocardiographic changes such as T wave inversion have been reported with large hiatal hernias in previous case reports. The exact mechanism of these electrocardiographic changes is not well understood. Kounis and colleagues hypothesized that an increase in direct or indirect pressure to the global surface of the heart caused electrical alternation seen on electrocardiography.^[13] Schilling and colleagues hypothesized two theories in their case of paroxysmal atrial flutter. First, that compression of the heart caused either ischemic changes or an anatomic conduction

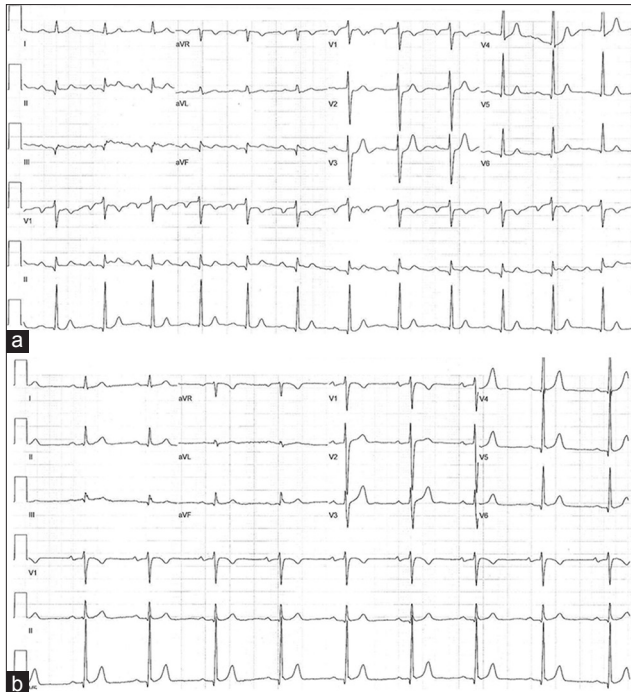


Figure 3: Electrocardiogram. (a) 1 mm ST segment elevation in the inferior leads without reciprocal changes. (b) Complete resolution of ST segment elevation in the inferior leads

block causing the reentry. Second, that the hiatal hernia may cause compression of the vagal innervation to the heart causing electrocardiographic changes.^[7]

Patients with large hiatal hernias have been reported to have cardio-pulmonary symptoms as well as electrocardiographic and echocardiographic manifestations in several case reports. These findings are reviewed in [Table 1]. Hokamaki and colleagues described an interesting case of a 79-year-old woman who developed diffuse ST segment elevation after decompression of a large hiatal hernia.^[8] In their report, they hypothesize that rapid decompression of the hiatal hernia may have caused pericardial inflammation resulting in pericarditis. Tursi and colleagues also hypothesized that their finding of a supraventricular arrhythmia may have been caused by pericardial irritation.^[6]

Our case represents a patient with focal ST segment elevation of the inferior leads, a new electrocardiographic finding associated with large hiatal hernias. The exact mechanism of these electrocardiographic changes is not known. We hypothesize that the focal ST segment elevation in the inferior leads could be related to torsion or compression of the epicardial artery from direct pressure from the hiatal hernia. These electrocardiographic changes could also be related to rotational changes of the heart associated with compression from the hiatal hernia. This may also explain the changing depth and duration of the inferior Q-waves. Regardless of the exact cause of these electrocardiographic changes, once the

Table 1: Cardiac manifestations associated with Hiatal Hernia

Author	Year published	Cardiac finding
Delmonico ^[17]	1968	Angina pectoris
Landmark ^[4]	1979	Ectopic atrial tachycardia
Kounis ^[13]	1988	Electrocardiographic alternation
Baerman ^[20]	1988	Recurrent syncope, Left atrial compression
Gleadle ^[16]	1989	Left parasternal heave, systolic murmur associated with a thrill
Buonavolonta ^[10]	1994	Pseudo-infarction electrocardiographic pattern
Hunt ^[15]	1996	Left atrial compression
Schilling ^[7]	1998	Paroxysmal atrial flutter
Akdemir ^[12]	2001	Stable angina pectoris, syncope
Tursi ^[6]	2001	Recurrent supraventricular extrasystole
Gurgun ^[14]	2002	Dyspnea on exertion
Ito ^[19]	2003	Dyspnea on exertion, cardiac compression
Hokamaki ^[8]	2005	T wave inversions, diffuse transient ST elevation
Siu ^[18]	2005	Recurrent acute heart failure
Duygu ^[5]	2008	Persistent atrial fibrillation
Zanini ^[9]	2009	T wave inversion of the anterior leads
Gard ^[21]	2011	ST elevation in V1-V3

patient's had repeated episodes of large volume emesis, his hiatal hernia decompressed leading to resolution of his electrocardiographic findings.

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