

# Pseudo ST-Elevation Myocardial Infarction (STEMI) Secondary to Giant Left Sided Diaphragmatic Herniation Simulating Acute Lateral STEMI

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January 14, 2024

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Any authors financial relationships or conflicts of interest regarding the content herein: None

Founding Source: None

All authors had access to the data and a role in writing the manuscript.

Key words: diaphragmatic herniation; STEMI, coronary artery disease; acute coronary syndrome; ST-elevation myocardial infarction; left anterior descending artery disease; acute anterior myocardial infarction

## Abstract:

ST-elevation myocardial infarction (STEMI) seen on electrocardiogram is not always related to coronary occlusion. Extra cardiac cause must be considered if symptoms and clinical conditions are not consistent with acute coronary occlusion. In this case, an elderly woman presented to the emergency department with nausea, vomiting, abdominal pain, and tenderness consistent with bowel obstruction. She has had no bowel movements for many days. ECG showed marked lateral ST-elevation with q waves but persistently low troponin. Chest X-ray and abdomen/chest CT scan confirmed the diagnosis of bowel obstruction leading to severe left-sided diaphragmatic herniation as the cause of Pseudo ST-elevation seen on her ECG.

**Presentation :** ST-elevation myocardial infarction (STEMI) seen on electrocardiogram is not always related to coronary occlusions. Extracardiac causes need to be considered if symptoms and clinical conditions are not consistent with acute coronary occlusion. A 98-year-old woman with a history of transient ischemic attack and hypothyroidism presented to the emergency department with severe abdominal pain nausea, vomiting,

and mild sharp chest pain. She had severe altered mental status and had a lack of bowel movements for many days. Her vitals revealed a BP of 181/96 and a heart rate of 91 beats per minutes (bpm). She was afebrile. She had respiratory distress with a respiratory rate of 23. Her O2 saturation was 94% on a 2-liter nasal cannula. Her physical exam was remarkable for abdominal tenderness and reduced bowel sounds with palpable stool in lower quadrants. The lung sound of her left side was diminished with a distant heart sound but no murmur. ECG showed marked lateral ST-elevation consistent STEMI ECG but had persistently low troponin levels of 0.04. She was also chest pain-free on arrival at the emergency department. Her labs were remarkable for normal creatinine, glucose of 182 mg/dl, mildly elevated liver enzymes, with an elevated white count of 16,000 increasing to 23,000 within a day with the left shift. Her hematocrit was normal. Her lactic acid level was elevated to 2.6 mmol/l. Her chest X-ray showed a severe left-sided hiatal hernia with a bowel gas pattern. (figure 1). CT abdomen revealed bowel obstruction with a large left-sided hiatal hernia with a loop of colon seen above the diaphragm, distended intrathoracic stomach, and large fecal impaction (Figures 3 and 4).

**Assessment:** The patient remained chest pain-free and decided to be "do not resuscitate" (DNR). Chest X-ray and abdomen CT scan confirmed the diagnosis of severe bowel obstruction due to fecal impaction leading to a giant left-sided diaphragmatic herniation covering a lateral aspect of cardiac chambers. Due to persistent low troponin levels, lack of chest pain, and marked left-sided diaphragmatic herniation, the diagnosis of pseudo-STEMI was made secondary due to severe diaphragmatic herniation.

**Diagnosis:** Patients presenting with giant left-sided diaphragmatic herniation that has displaced the lateral myocardial wall from the anterior chest that had led to pseudo STEMI ECG pattern. Clinical presentation with lack of chest pain, multiple imaging modalities, and laboratory findings were all speaking against the diagnosis of true STEMI. Furthermore, lack of ST elevation in other lateral leads such as AVL and I and the absence of reciprocal ST depressions suggested not a true STEMI. Raising white counts and lactic acidosis suggested a poor prognosis.

**Management :** She started on intravenous hydration and antibiotics. She needed urgent fecal disimpaction to resolve bowel obstruction and early sepsis. Resolution of bowel obstruction could also lead to improvement of colonic hernia. However, the patient and family declined further treatment and the patient was declared comfort care. She expired the next day.

This case elaborates on the importance of considering clinical presentation and other diagnostic tools when evaluating patients with an ECG showing STEMI-like changes in order not to rush to the cardiac catheterization laboratory for non-cardiac causes of ECG changes. Dr Kings mentioned a case of pulmonary embolism simulating inferior myocardial infarction rushed to the cardiac catheterization laboratory leading to unnecessary percutaneous coronary intervention jeopardizing the patient by missing the right diagnosis. (1) Diaphragmatic herniation as a cause of pseudo-ST-elevation myocardial infarction has been well documented. Sing et al. describe a similar case of ST-elevation seen on ECG related to extreme abdominal distension and hemidiaphragm elevation leading to extrinsic cardiac compression resolution after hernia treatment. (2) in another case, a pseudo infarction ECG was recorded secondary to a large diaphragmatic hernia seen during transthoracic echocardiographic study below the inferior wall simulating a pericardial effusion. (3) Diaphragmatic herniation depending on the location can simulate various types of ST elevation. Basir et al. report a case of large diaphragmatic herniation simulation inferior ST-elevation myocardial infarction with the resolution of ST changes after treatment. (4) Other cases have documented normal coronary angiograms performed due to misdiagnosis of ST-elevation myocardial infarction seen on ECG related to diaphragmatic herniation. (5,6) It is important that Pseudo ST-elevation myocardial infarction related to diaphragmatic herniation should be recognized as a not uncommon cause of misleading diagnosis of ST elevation.

## References:

1. King SB 3rd. Tyranny of Door-to-Balloon Time. JACC Cardiovasc Interv. 2016;9(9):987-8
2. Singh M, Sood A, Rehman MU, Othman M, Afonso L. Elevated Hemi-diaphragms as a Cause of ST-segment Elevation: A case report and literature review. J Electrocardiol. 2017;50(5):681-685.

3. Buonavolonta JJ, O'Connor WH, Weiss RL. Pseudoinfarction ECG pattern caused by diaphragmatic hernia uniquely resolved by transthoracic echocardiography. *J Am Soc Echocardiogr.* 1994;7(4):425-8
4. Basir B, Safadi B, Kovacs RJ, Tahir B. A Rare Case of Transient Inferior ST-Segment Elevation. *Heart Views.* 2013 Jul;14(3):117-20.
5. Rubini Gimenez M, Gonzalez Jurka L, Zellweger MJ, Haaf P. A case report of a giant hiatal hernia mimicking an ST-elevation myocardial infarction. *Eur Heart J Case Rep.* 2019 Sep 1;3(3):ytz138.
6. Narala K, Banga S, Hsu M, Mungie S. Hiatal hernia mimicking ST-elevation myocardial infarction. *Cardiology.* 2014;129(4):258-61

Figure 1: EKG Showing Lateral STE elevation suggesting lateral wall ST-elevation myocardial infarction.

Figure 1: This is a caption

Figure 2: Chest X-ray and CT abdomen showing giant left-sided diaphragmatic herniation.

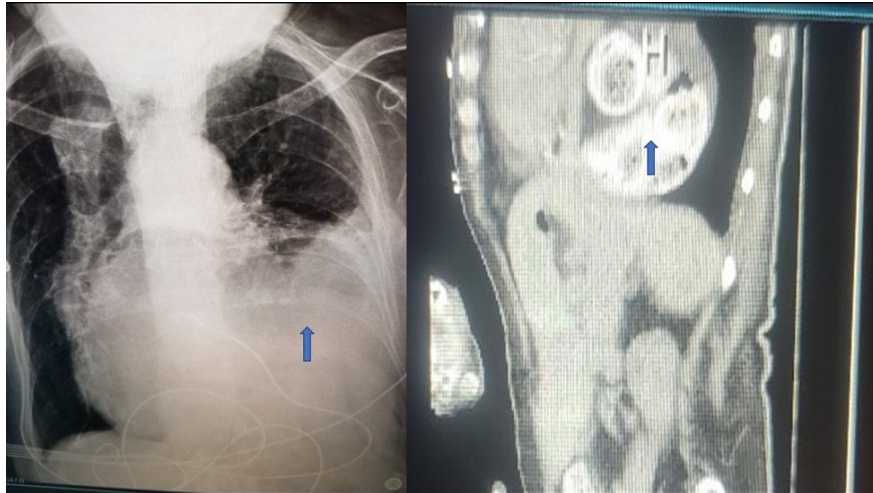


Figure 2: This is a caption