

# False Angina and Mimic Myocardial Infarction in Wavy Triple Sign (Yasser's Sign) of Hypocalcemia with later mild COVID-19 Pneumonia-Differentiation and Outcome

Yasser Mohammed Hassanain Elsayed\*

Critical Care Unit, Kafr El-Bateekh Central Hospital, Damietta Health Affairs, Egyptian Ministry of Health (MOH), Damietta, Egypt

\*Corresponding author: Yasser Mohammed Hassanain Elsayed, Critical Care Unit, Kafr El-Bateekh Central Hospital, Damietta Health Affairs, Egyptian Ministry of Health (MOH), Damietta, Egypt.

Submitted: 08 February 2023 Accepted: 22 February 2023 Published: 27 February 2023

doi <https://doi.org/10.63620/MKJCCREM.2023.1002>

**Citation:** Elsayed, Y. M. H. (2023). False angina and mimic myocardial infarction in wavy triple sign (Yasser's sign) of hypocalcemia with later mild COVID-19 pneumonia—Differentiation and outcome. *J of Cri Res & Eme Med*, 2(1), 1-4.

## Abstract

**Rationale:** Tetany is a metabolic disorder due to hypocalcemia that may be associated with musculoskeletal, chest, and cardiac manifestations such as chest pain, tachypnea, and laryngospasm. The wavy triple sign (Yasser's sign) is a new innovative diagnostic and prognostic sign of hypocalcemia. Despite the quickly swept of COVID-19 across the globe, there is clinical and pathophysiological evidence association between hypocalcemia and COVID-19 pneumonia.

**Patient Concerns:** A 43-year-old widow, housewife, and Egyptian, female patient was presented to the physician outpatient clinic (POC) with angina and tetany after psychogenic hyperventilation.

**Diagnosis:** False angina and mimic myocardial infarction in Wavy triple sign (Yasser's sign) of hypocalcemia with later mild COVID-19 Pneumonia.

**Interventions:** Electrocardiography, chest CT scan, abdominal ultrasound, oxygenation, and arterial blood gas.

**Outcomes:** Electrocardiographic and clinical stabilization was the result.

**Lessons:** The differential diagnosis of Wavy triple ECG sign (Yasser's sign) of hypocalcemia from acute ST-segment elevation myocardial infarction and ischemic ST-segment depression is critical and pivotal. A Wavy triple ECG sign (Yasser's sign) of hypocalcemia should be considered as one mimicking acute ST-segment elevation myocardial infarction and ischemic ST-segment depression. Sometimes some included considered clinical associations such as mild COVID-19 pneumonia may be neglected and insignificant in data interpretation.

**Keywords:** Coronary heart disease, False angina, COVID-19 Pandemic, Wavy triple sign (Yasser's sign), Hypocalcemia

## Abbreviations

- **COVID-19:** Coronavirus disease 2019
- **ECG:** Electrocardiogram
- **HVS:** Hyperventilation syndrome
- **MI:** Myocardial infarction
- **NSR:** Normal sinus rhythm
- **O2:** Oxygen
- **POC:** Physician outpatient clinic
- **SGOT:** Serum glutamic-oxaloacetic transaminase
- **SGPT:** Serum glutamic-pyruvic transaminase
- **STEMI:** ST-segment elevation myocardial infarction

- **VR:** Ventricular rate

## Introduction

Several conditions mimic a heart attack and acute coronary syndromes such as Brugada syndrome, hyperkalemia, Prinzmetal's angina, cardioversion, left bundle-branch block, left ventricular hypertrophy, early repolarization, pericarditis, cocaine, pneumo-mediastinum, pneumothorax, pulmonary embolism, and normal (so-called male pattern) [1-6]. Also, psychological disorders (e.g. panic disorders, anxiety, depression, emotional stress, or other psychological disorders) may be implicated in mimicking

myocardial infarction (MI). Wavy triple an electrocardiographic sign (Yasser's Sign) is a recently innovative diagnostic sign in hypocalcemia [7-8]. The analysis for this sign in the author's interpretations is based on the following;

1. Different successive three beats in the same lead are affected.
2. All ECG leads can be implicated.
3. An associated elevated beat is seen with the first of the successive three beats, a depressing beat with the second beat, and an isoelectric ST-segment in the third one.
4. The elevated beat is either accompanied by ST-segment elevation or just an elevated beat above the isoelectric line.
5. Also, the depressed beat is either associated with ST-segment depression or just a depressing beat below the isoelectric line.
6. The configuration for depressions, elevations, and isoelectricities of the ST segment for the subsequent three beats are variable from case to case. So, this arrangement is non-conditional.
7. Mostly, there is no participation among the involved leads. The author intended that is not conditionally included in the special coronary artery for the affected leads [7].

**Aim of this study:** In this manuscript, I reported a case of false angina and mimic myocardial infarction in the Wavy triple sign (Yasser's sign) of hypocalcemia with later mild COVID-19 in a young-aged female patient.

### Case Presentations

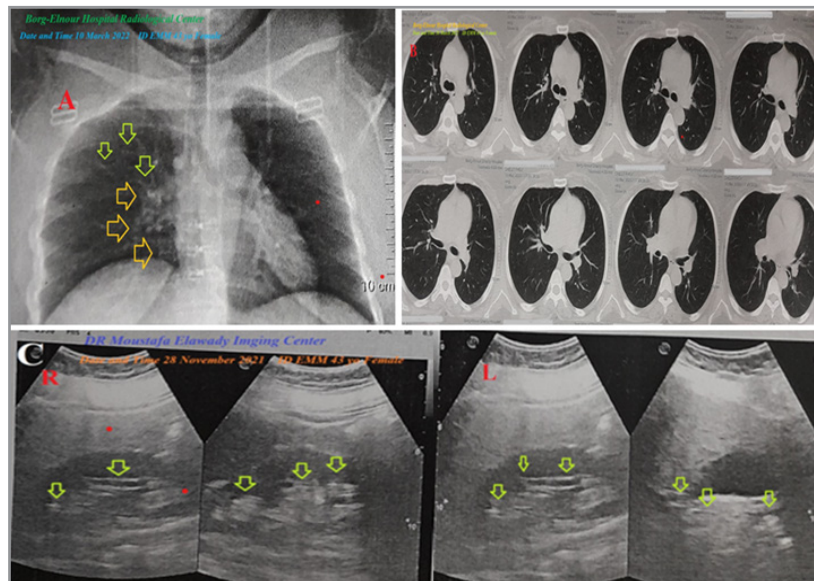
A 43-year-old widow, housewife, and Egyptian, female patient was presented to the physician outpatient clinic (POC) with angina, tetany, and psychogenic hyperventilation syndrome (HVS). Extremities numbness, circumoral paresthesia, carpopedal spasm, and palpitations were the associated symptoms. There is a recent history of psycho-familial troubles. Upon general physical examination; generally, the patient seems to be tetany, irritable, and distressed. GCS was 15. A regular rapid heart rate of 76 bpm, blood pressure of 100/80 mmHg, respiratory rate of 24 bpm, a temperature of 36.5 °C, and pulse oximeter of O<sub>2</sub>

saturation of 98% were reported. No more relevant clinical data were noted during the clinical examination. Past ECG tracing was done 45 days ago on routine follow-up and showed normal sinus rhythm (NSR) with no detected abnormalities (Figure 1A). Urgent ECG tracing was done on the presentation in the POC showing NSR (VR; 77) a Wavy triple sign (Yasser's sign) of hypocalcemia in II, III, aVL, aVF, and V4-6 leads. (Figure 1B). The patient was treated at POC with O<sub>2</sub> inhalation (100%, by nasal cannula, 5L/min) by an oxygen generator. Two calcium gluconate ampoules (10 ml 10% over IV over 20 minutes) were given as an emergency dose. Oral calcium and vitamin D preparation were prescribed for two weeks. ECG tracing was repeated within a few weeks after oral calcium and vitamin-D preparation showed NSR with no detected abnormalities (Figure 1C). The initial complete blood count (CBC), d-dimer, troponin test, SGPT, SGOT, serum creatinine, blood urea, and RBS were within normal. Ionized calcium was low (0.6mmol/L). ABG showed respiratory alkalosis. Within 35 days the patient presented with mild COVID-19 pneumonia. There is a history of direct contact with confirmed COVID-19 cases. Plain CXR film was done within 5 days of treatment by standard anti-COVID-19 medications and showed right perihilar ground-glass opacities and a hazy halo sign (Figure 2A). Chest CT without contrast showed no abnormalities (Figure 2B). The echocardiography was within normal with an ejection fraction of 60%. Abdominal ultrasound showed gravels on both kidneys (Figure 2C). he post-COVID-19; CBC showed; Hb was 12.1 g/dl, RBCs; 4.48\*10<sup>3</sup>/mm<sup>3</sup>, WBCs; 10.47\*10<sup>3</sup>/mm<sup>3</sup> (Neutrophils; 64.2 %, Lymphocytes: 31.6%, Monocytes; 4.2%, Eosinophils; 0% and Basophils 0%), Platelets; 207\*10<sup>3</sup>/mm<sup>3</sup>. S. ferritin was normal (59 ng/ml). D-dimer was high (880 ng/ml). CRP was high (18 g/dl. SGPT was normal (33 U/L). SGOT was slightly high (50 U/L). Serum creatinine was normal (0.61 mg/dl) and blood urea was high (25 mg/dl). Serial workups were done till nearly complete normalization. False angina and mimic myocardial infarction in Wavy triple sign (Yasser's sign) of hypocalcemia with later mild COVID-19 Pneumonia was the most probable current diagnosis. The patient was advised to have future outpatient cardiovascular, pulmonary, and infectious follow-ups.





**Figure 1:** A- Past ECG tracing was done 45 days ago on routine follow-up and showed NSR (VR;70) with no detected abnormalities. B- Urgent ECG tracing was done on the presentation in the POC showing NSR (VR; 77) a Wavy triple sign (Yasser's sign) of hypocalcemia in II, III, aVL, aVF, and V4-6 leads ( green, red, and light blue arrows). C- ECG tracing was repeated within a few weeks after oral calcium and vitamin D preparation showed NSR (VR; 81) with no detected abnormalities



**Figure 2:** A-Plain CXR film was done within 5 days of treatment by standard anti-COVID-19 medications and showed right perihilar ground-glass opacities (orange arrow) and a hazy halo sign (lime arrow). B- Chest CT scan film without contrast showed no abnormalities. C. Abdominal ultrasound showed gravels on both kidneys sign (lime arrow).

## Discussion

### Overview

- A young-aged, widow, housewife female patient presented to the POC with angina and tetany, and a Wavy triple ECG sign (Yasser's sign) of hypocalcemia after psychogenic hyperventilation syndrome.
- The primary objective for my case study was the presence of a patient with angina and tetany, and Wavy triple ECG sign (Yasser's sign) of hypocalcemia after psychogenic hyperventilation in POC.
- The secondary objective for my case study was the question of; how did you manage the case at POC?
- Acute hyperventilation syndrome (HVS) is mostly associated with the following ECG changes prolonged QT interval, ST depression or elevation, and T-wave inversion [9]. Tachypnea in HVS is implicated in the pathogenesis of respiratory alkalosis and subsequent hypocalcemia [7].
- Regarding aWavy triple ECG sign (Yasser's sign) of hypocalcemia, differential diagnosis from acute ST-segment elevation myocardial infarction (STEMI) and ischemic ST-segment depression is the most important in the current case study.
- In a Wavy triple ECG sign (Yasser's sign) of hypocalcemia, an associated elevated beat is seen with the first of the successive three beats, a depressing beat with the second beat, and an isoelectric ST-segment in the third one [7,8]. But in the new ST elevation at the J-point in two contiguous leads with the cut-off points:  $\geq 0.2$  mV in men or  $\geq 0.15$  mV in women in leads V2–V3 and/or  $\geq 0.1$  mV in other leads. New horizontal or down-sloping ST depression  $>0.05$  mV in two contiguous leads; and or T inversion  $\geq 0.1$  mV in two contiguous leads with prominent R-wave or R/S ratio  $\geq 1$  [10]. The diagnosis of acute myocardial infarction is based on: Elevated blood levels of cardiac enzymes (CK-MB or troponin T) and one of the following criteria are met: 1 [11]. The patient has typical complaints, 2. The ECG shows ST-elevation or depression. 3. Pathological Q-waves develop on the ECG. 4. A coronary intervention had been performed (such as stent placement).
- The dramatic reversal of clinical and electrocardiographic happened after calcium therapy.
- The presence of direct contact with confirmed COVID-19 cases and unilateral ground-glass consolidation with elevated CRP and d-dimer will strengthen the COVID-19 diagnosis.

sis. But it is a mild infection.

- Acute STEMI and ischemic ST-segment depression were the possible differential diagnosis for the current case study.
- I can't compare the current case with similar conditions. There are no similar or known cases with the same management for near comparison.
- There are no limitations of the current study.

### Conclusion and Recommendations

- The differential diagnosis of Wavy triple ECG sign (Yasser's sign) of hypocalcemia from acute ST-segment elevation myocardial infarction and ischemic ST-segment depression is critical and pivotal.
- A Wavy triple ECG sign (Yasser's sign) of hypocalcemia should be considered as one mimicking acute ST-segment elevation myocardial infarction and ischemic ST-segment depression.
- Sometimes some included considered clinical associations such as mild COVID-19 pneumonia may be neglected and insignificant in data interpretation.

### Conflicts of interest

There are no conflicts of interest.

### Acknowledgment

I wish to thank my wife to save time and improving the conditions for supporting me.

### References

1. Wang, K., Asinger, R. W., & Marriott, H. J. (2003). ST-segment elevation in conditions other than acute myocardial infarction. *The New England Journal of Medicine*, 349(22), 2128–2135. <https://doi.org/10.1056/NEJMra022580>
2. Spodick, D. H. (2003). Acute pericarditis: Current concepts and practice. *JAMA*, 289(9), 1150–1153. <https://doi.org/10.1001/jama.289.9.1150>
3. Finkel, J. B., & Marhefka, G. D. (2011). Rethinking cocaine-associated chest pain and acute coronary syndromes. *Mayo Clinic Proceedings*, 86(12), 1198–1207. <https://doi.org/10.4065/mcp.2011.0332>
4. Brearley, W. D., Jr., Taylor, L., 3rd, Haley, M. W., & Littmann, L. (2007). Pneumomediastinum mimicking acute ST-segment elevation myocardial infarction. *International Journal of Cardiology*, 117(1), e73–e75. <https://doi.org/10.1016/j.ijcard.2006.05.040>
5. Krenke, R., Nasilowski, J., Przybylowski, T., & Chazan, R. (2008). Electrocardiographic changes in patients with spontaneous pneumothorax. *Journal of Physiology and Pharmacology*, 59(6), 361–373.
6. Johnson, N. N., Toledo, A., & Endom, E. E. (2010). Pneumothorax, pneumomediastinum, and pulmonary embolism. *Pediatric Clinics of North America*, 57(6), 1357–1383. <https://doi.org/10.1016/j.pcl.2010.07.010>
7. Elsayed, Y. M. H. (2019). Wavy triple an electrocardiographic sign (Yasser sign) in hypocalcemia: A novel diagnostic sign; Retrospective observational study. *EC Emergency Medicine and Critical Care*, 3(5), 1–2.
8. Elsayed, Y. M. H. (2020). Hypocalcemia-induced camel-hump T-wave, tee-pee sign, and bradycardia in a car-painter of a complexed dilemma: A case report. *Cardiac*, 2(1), 7.
9. Kern, B. (n.d.). Hyperventilation syndrome clinical presentation. Medscape. Retrieved February 22, 2021, from <https://emedicine.medscape.com/article/807277-clinical>
10. Martin, T. N., Groenning, B. A., Murray, H. M., Steedman, T., Foster, J. E., Elliot, A. T., ... & Wagner, G. S. (2007). ST-segment deviation analysis of the admission 12-lead electrocardiogram as an aid to early diagnosis of acute myocardial infarction with a cardiac magnetic resonance imaging gold standard. *Journal of the American College of Cardiology*, 50(11), 1021–1028.
11. Alpert, J. S., Thygesen, K., Antman, E., & Bassand, J. P. (2000). Myocardial infarction redefined: A consensus document of The Joint European Society of Cardiology/American College of Cardiology Committee for the redefinition of myocardial infarction. *Journal of the American College of Cardiology*, 36(3), 959–969. [https://doi.org/10.1016/S0735-1097\(00\)00804-4](https://doi.org/10.1016/S0735-1097(00)00804-4) add references