



# Wavy Triple Sign (Yasser's Sign) Accelerate the Hypocalcemic Convulsive Diagnosis in Generalized Convulsions with Chronic Renal Failure and Stones

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## Abstract

**Rationale:** There is a parallel relationship between hypocalcemia and chronic kidney disease. Generalized convulsion is a known multi-factorial disease. Wavy triple an electrocardiographic sign (Yasser's sign) is a new specific diagnostic, prognostic, and monitoring sign seen in the cases of hypocalcemia. Patient concerns: A 47-year-old, Housewife, married Egyptian female patient was presented to the intensive care unit with recurrent generalized fits in known diabetic and chronic renal failure on regular hemodialysis. Diagnosis: Wavy triple sign (Yasser's sign) with hypocalcemic convulsive diagnosis in generalized convulsions with diabetes, chronic renal failure, and stones. Interventions: Chest CT, brain CT, abdominal CT, calcium therapy bolus, and infusion. Outcomes: dramatic response with good outcomes post-calcium therapy was the result. Lessons: There is a strong link between chronic renal failure and the Wavy triple ECG sign (Yasser's sign). Mind orientation for Wavy triple ECG sign (Yasser's sign) in cases of recurrent generalized fits especially in chronic kidney disease will save time and hasten hypocalcemic convulsive diagnosis and management. Failure of traditional antiepileptic medications should direct intensivist to hypocalcemic fits.

**Keywords:** Hypocalcemia; epilepsy; fits; convulsion; chronic kidney disease; wavy triple ECG sign; yasser's sign of hypocalcemia

**Abbreviations:** CKD: Chronic Kidney Disease; ECG: Electrocardiogram; ICU: Intensive Care Unit

IHD: Ischemic Heart Disease; O<sub>2</sub>: Oxygen; PVC: Premature Ventricular Complex; VR: Ventricular Rate

## Introduction

Hypocalcaemia may represent asymptomatic laboratory findings and sometimes a life-threatening metabolic disorder. Generally, hypocalcemia is a common disorder in 10-18% of hospitalized patients [1] and 85% of intensive care unit (ICU) patients [2]. However, most advanced chronic kidney disease (CKD) has secondary hyperparathyroidism and unlike primary hyperparathyroidism has a low Ca<sup>2+</sup> due to calcitriol deficiency. One study has revealed hypocalcemia in 55% of ICU patients of a tertiary care center [3]. The Wavy triple ECG sign (Yasser's sign) is a recent diagnostic and prognostic sign innovated in hypocalcemia [4]. The sign analysis in the author's interpretations is based on the following:

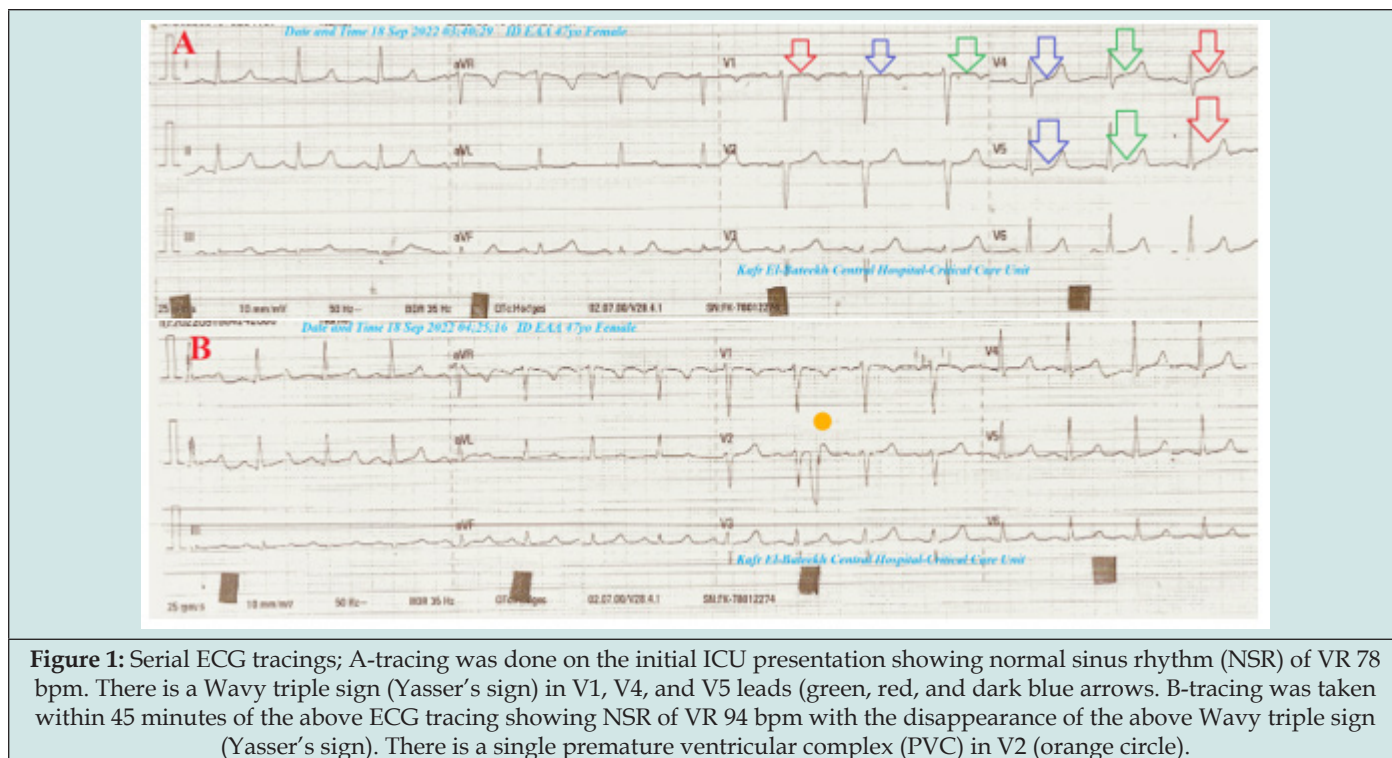
- Different successive three beats in the same lead are affected.
- All ECG leads can be implicated.
- An associated elevated beat is seen with the first of the successive three beats, a depressing beat with the second beat, and an isoelectric ST-segment in the third one.
- The elevated beat is either accompanied by ST-segment elevation or just an elevated beat above the isoelectric line.
- Also, the depressed beat is either associated with ST-segment depression or just a depressing beat below the isoelectric line.

f) 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.

g) Mostly, there is no participation among the involved leads.

The author intended that is not conditionally included in a special coronary artery for the affected leads. However, chronic kidney disease is a predisposing condition to hypocalcemia [5]. Clinically, frequently documented hypocalcemia has a role in the induction of seizures and general excitability such as tetany, and Chvostek's sign [6].

## Case Presentation



**Figure 1:** Serial ECG tracings; A-tracing was done on the initial ICU presentation showing normal sinus rhythm (NSR) of VR 78 bpm. There is a Wavy triple sign (Yasser's sign) in V1, V4, and V5 leads (green, red, and dark blue arrows. B-tracing was taken within 45 minutes of the above ECG tracing showing NSR of VR 94 bpm with the disappearance of the above Wavy triple sign (Yasser's sign). There is a single premature ventricular complex (PVC) in V2 (orange circle).

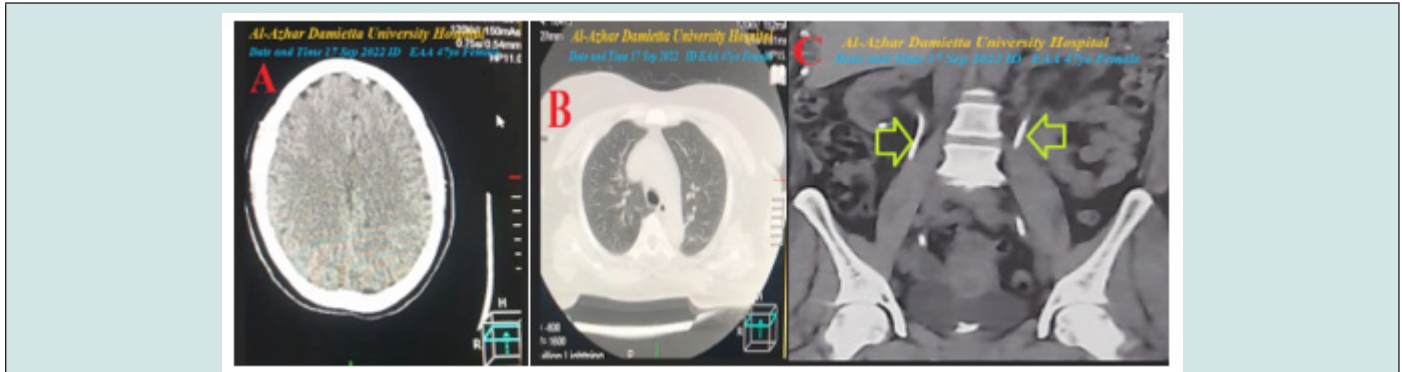
A 47-year-old, Housewife, married Egyptian female patient was referred to the intensive care unit (ICU) with recurrent generalized fits. She has a history of chronic renal failure on regular hemodialysis and multiple ureteric stones. There are recent bilateral ureteric stents. The patient denied a history of similar relevant neurological diseases, drugs, or other special habits. Upon general physical examination, generally, the patient appeared in generalized tonic-clonic fit with, a biting tongue, with GCS of 14/15, regular pulse rate (HR) of 95 bpm, blood pressure (BP) of 100/70 mmHg, respiratory rate (RR) of 25 bpm, a temperature of 37°C, and pulse oximeter of oxygen (O<sub>2</sub>) saturation of 97%. Currently, the patient was admitted to ICU for recurrent generalized fits and chronic renal failure. Initially, the patient was treated with O<sub>2</sub> inhalation by O<sub>2</sub> system line (100%, by nasal cannula, 5L/min), one midazolam IV amp (5 mg over 5 minutes), and continued ICU monitoring. There is no response with still fits. Levetiracetam IVI (1000 mg was added in 1000 ml of normal saline). There is still no response with still fits. The initial ECG tracing was done on the initial ICU presentation showing normal sinus rhythm (NSR) of VR 78 bpm. There is a Wavy triple sign (Yasser's sign) of hypocalcemia in V1, V4, and V5 leads (Figure 1A). The initial workup lab was Immediate ABG was (PH;

6.92 mmHg, PCO<sub>2</sub>; 18 mmHg, HCO<sub>3</sub>; 3.7 mmHg, SO<sub>2</sub>; 95%, lactate; 6.1 mmol/L, and PaO<sub>2</sub>; 119 mmHg).

The random blood sugar was 119 mg/dl. CBC showed; Hb was 8.7 g/dl, RBCs; 3.39\*10<sup>3</sup>/mm<sup>3</sup>, WBCs; 9.5\*10<sup>3</sup>/mm<sup>3</sup> (Neutrophils; 80.4 %, Lymphocytes: 9.6%, and Mix 10.0%), Platelets; 268\*10<sup>3</sup>/mm<sup>3</sup>. Serum creatinine (4.2mg/dl), serum ionized calcium (6.5mg/dl), serum magnesium (1.7mg/dl), serum potassium (5.3mmol/L), serum phosphate (7.3mg/dl), and plasma sodium (148 mmol/L). Plasma TSH (3.43mU/L). HA1C (5.9%). Two calcium gluconate ampoules (10 ml 10% over IV over 20 minutes) were given as an emergency dose and repeated every 12 hours. The second ECG tracing was taken within 45 minutes of the above ECG tracing showing NSR of VR 94 bpm with the disappearance of the above Wavy triple sign (Yasser's sign). There is a single premature ventricular complex (PVC) in V2 (Figure 1B). The brain CT scan was done within 1 day before ICU admission showing no abnormalities (Figure 2A). The chest CT was done 1 day before ICU admission also showing no abnormalities (Figure 2B). The abdominal CT scan was done 1 day before ICU admission showing evidence of bilateral ureteric stents (Figure 2C). Within 48 days of the above

management, the patient finally showed nearly dramatic clinical and electrocardiographic improvement. Wavy triple sign (Yasser's sign) with hypocalcemic convulsive diagnosis in generalized convulsions with diabetes, chronic renal failure, and stone was the most probable diagnosis. The patient was discharged after clinical

stabilizations and continued twice daily Oral calcium and vitamin D preparation were prescribed for life-long. Further recommended cardiac urological, neurological, and endocrinal follow-up was advised.



**Figure 2:** A-section of the brain CT scan was done 1 day before ICU admission showing no abnormalities. B-section of chest CT scan was done 1 day before ICU admission showing no abnormalities. C-section of abdominal CT scan was done 1 day before ICU admission showing evidence of bilateral ureteric stents (lime arrows).

## Discussion

### Overview

- A 47-year-old, Housewife, married Egyptian female patient was presented to the ICU with recurrent generalized fits in diabetes and known chronic renal failure on regular hemodialysis.
- The primary objective for my case study was the presence of recurrent generalized fits in known chronic renal failure on regular hemodialysis in a middle-aged female patient admitted to the ICU.
- The secondary objective for my case study was the question, how would you manage this case in the ICU?
- Interestingly, the presence of the Wavy triple ECG sign (Yasser's sign) will strengthen the diagnosis of hypocalcemia in chronic renal failure.
- Abdominal CT showed bilateral ureteric stents supporting the diagnosis of stented ureteric stones (Figure 2C).
- Ischemic heart disease was the most probable ECG 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.
- The only limitation of the current study was the unavailability of EEG.

### Conclusion and Recommendations

- There is a strong link between chronic renal failure and the Wavy triple ECG sign (Yasser's sign).

- Mind orientation for Wavy triple ECG sign (Yasser's sign) in cases of recurrent generalized fits especially in chronic kidney disease will save time and hasten hypocalcemic convulsive diagnosis and management.
- Failure of traditional antiepileptic medications should direct be intensivist to hypocalcemic fits.

### Conflicts of Interest

There are no conflicts of interest.

### Acknowledgment

I wish to thank the team nurses of the critical care unit in Kafr El-Bateekh Central Hospital who made extra-ECG copies for helping me. I want to thank my wife for saving time and improving the conditions for supporting me.

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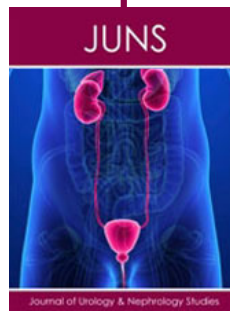
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