

# Calcium Rescuing a Laryngospasm and Reverse the Wavy Triple an Electrocardiographic Sign of Hypocalcaemia or Yasser Sign: A Case Report

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Case Report

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## Abstract

**Rationale:** Laryngospasm is a serious condition in the emergency department. The electrolyte disorders is a remarkable entity in clinical medicine. Hypocalcemia is a well-known important electrolyte disorder. Wavy triple sign of hypocalcaemia (Yasser sign) is a novel an electrocardiographic sign linked to calcium deficiency.

**Patient concerns:** A young-aged female housewife patient presented to the emergency department with hyperventilation syndrome, tetany, and laryngospasm.

**Diagnosis:** Hypocalcemia causing a laryngospasm and wavy triple an electrocardiographic sign or Yasser sign.

**Interventions:** Electrocardiography, arterial blood gases, oxygenation, and echocardiography.

**Lessons:** The dramatic reversal of both laryngospasm and the wavy triple sign of hypocalcaemia (Yasser sign) after calcium gluconate injection interpret that these signs were due to hypocalcaemia.

**Outcomes:** There was a dramatic improvement of both clinical and electrocardiographic wavy triple sign of hypocalcaemia.

**Keywords:** Laryngospasm; Hypocalcaemia; Calcium; Wavy triple sign of hypocalcaemia; Yasser sign.

## Introduction

Laryngospasm is a potentially dangerous closure of the vocal cords producing partial or total airway obstruction [1]. Laryngospasm is an involuntary spasm of the vocal cords [2]. The condition unusually continues for less than 60 seconds, but it may last for 20–30 minutes. It may be triggered when the vocal cords or the area of the trachea below the vocal folds detects the entry of water, mucus, blood, or other substance. It is characterized by stridor and/or retractions [2]. The main symptom of laryngospasm is choking and difficulty or inability to breathe or speak, a feeling of suffocation, which may be followed by hypoxia-induced loss of consciousness [3]. When it happens, the vocal cords suddenly seize up or close when taking in a breath, blocking the flow of air into the lungs [3]. Laryngospasm may be preceded by high-pitched inspiratory stridor with a characteristic ‘crowing’ noise followed by total airway obstruction [1]. Various stimuli including asthma, allergies, aspiration, near drowning, gastroesophageal reflux disease (GERD), exercise, psychogenic pseudo-laryngospasm

(stress), anesthesia, after tracheal extubation, and irritants e.g. smoke, dust, fumes, liquids, and food can trigger laryngospasm [1-3]. Laryngospasms can result from hypocalcaemia, causing muscle spasms and/or tetany. Na<sup>+</sup> channels remain open even if there is very little increase in the membrane potential. This affects the small muscles of the vocal cords [1-3]. Laryngospasm may be complicated with hypoxia, bradycardia, negative pressure pulmonary edema, ischemic end-organ injury (e.g. stroke, hypoxic encephalopathy), and death [1].

Specific and multiple changes due to electrolyte disturbance may be seen on an electrocardiogram (ECG) [4]. The prolongation of the QTc-interval is an old non-specific ECG finding in hypocalcaemia [5]. Wavy triple an electrocardiographic sign (Yasser Sign) is a recently a novel diagnostic sign innovated in hypocalcaemia [6]. This sign interpretations are depending on the following:

1. Various subsequent three beats in the same lead are involved.
2. All ECG leads can be involved.
3. An accompanied elevated beat is seen with the first of the subsequent three beats, depressed beat with the second beat, and isoelectric ST segment in the third one.
4. The elevated beat is either associated with 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 depressed beat below the isoelectric line.
6. The arrangement for depressions, elevations, and isoelectricities of ST-segment for the subsequent three beats are variable from case to case. So, this arrangement non-conditional.
7. Mostly, there is no sharing part among the involved leads. The author intended that is not conditionally included in an especial coronary artery for the affected leads [6].

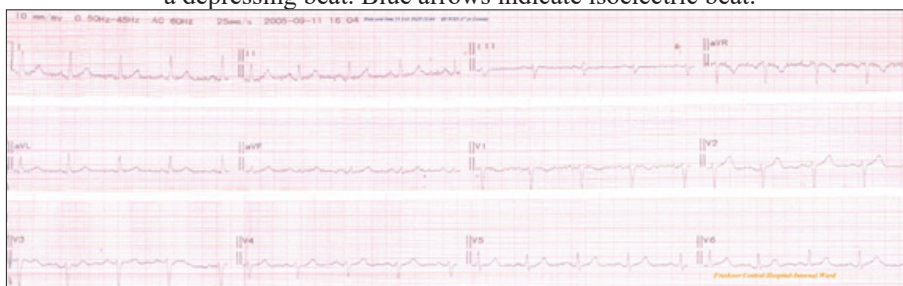
### Case Presentation

A 37-year-old married, female, housewife, Egyptian patient presented to the emergency department with choking, rapid difficult breathing, inability speaking, and a sense of suffocation. She was recently exposed to socio-familial stress. The patient denied a history of cardiac or other relevant diseases. Upon examination, the patient appeared tachypneic, stridor, marked stretched neck to back, and choking. His vital signs were as follows: blood pressure of 100/80 mmHg, the pulse rate of 82/bpm and regular, the respiratory rate of 34/min and irregular, the temperature of 36.9°C, and the pulse oximeter of oxygen (O<sub>2</sub>) saturation of 94%. No more relevant clinical data were noted during the clinical examination. The patient was admitted to the internal ward as tetany, laryngospasm, and severe

hypocalcaemia. An Urgent initial ECG tracing on emergency arrival showing normal sinus rhythm with widespread Wavy triple sign of hypocalcaemia (Yasser sign) in ten leads of ECG with VR: 82 bpm (Figure 1). A 100% O<sub>2</sub> inhalation using nasal cannula at the rate of 5 L/min was administered. The patient was advised to be calm and try to rest his breath. The immediate ABG showed respiratory alkalosis (PH: 7.41 mmHg, PCO<sub>2</sub>: 31.16 mmHg, HCO<sub>3</sub>: 19.5 mmHg, and PaO<sub>2</sub>: 93 mmHg). Measured random blood sugar was 117 mg/dl Full blood count (FBC); Hb was 11.3 g/dl, RBCs: 5.11\*10<sup>3</sup>/mm<sup>3</sup>, WBCs: 6.7\*10<sup>3</sup>/mm<sup>3</sup> (Neutrophils: 62.1 %, Lymphocytes: 34.6%, Monocytes: 3.3%), Platelets: 194\*10<sup>3</sup>/mm<sup>3</sup>. SGPT: 24 U/L, SGOT: 36 U/L, serum creatinine: 1.1 mg/dl, blood urea: 23 mg/dl. Plasma sodium was (137 mmol/L). Serum potassium was (4.3 mmol/L). Serum calcium showing hypocalcaemia with ionized calcium: 0.51 mmol/L. The troponin test was negative (less than 2 ng/ L). Later echocardiography was normal with EF 59%. No more workup was done. Two calcium gluconate ampoules (10 ml 10% over IV over 20 minutes) were given as an emergency dose. Maintenance therapy with IVI calcium gluconate ampoules (10% with the rate; 0.5 mg/kg/hour over IV over 6 hours) was the infused. The patient as discharged within 24 hours of clinical, electrocardiographic, and near laboratory improvement. ECG tracing was taken within 1.30 hours after 2 amp of IV calcium therapy showing nearly normalization of all above ECG findings but with still the same VR: 82 bpm (Figure 2). Serum ionized calcium after the correction was 0.81 mmol/L). The patient was discharged within 12 hours after relieving, and electrocardiographic normalization. Oral calcium and vitamin-D preparation were prescribed on discharge. Future serial ionized calcium was advised.



**Figure 1:** An initial ECG tracing on emergency arrival showing normal sinus rhythm with widespread Wavy triple sign of hypocalcaemia (Yasser sign) in ten leads of ECG with VR: 82 bpm. Red arrows indicate an elevated beat. Green arrows indicate a depressing beat. Blue arrows indicate isoelectric beat.



**Figure 2:** The second ECG tracing was taken within 1.30 hours after 2 amp of IV calcium therapy showing nearly normalization of all above ECG findings with still the same VR: 82 bpm.

## Discussion

- **Overview:** A young-aged female housewife patient presented to the emergency department with hyperventilation syndrome, tetany, and laryngospasm.
- **The primary objective** for my case study was the presence of hyperventilation syndrome, tetany, laryngospasm, and severe hypocalcaemia.
- **The secondary objective** for my case study was the priority in the management of hyperventilation syndrome, tetany, laryngospasm, and severe hypocalcaemia.
- The choking, inability speaking, marked stretched neck to back, and a sense of suffocation due to hypocalcaemia may be named as “Laryngeal tetany”.
- The dramatic reversal of Wavy triple sign of hypocalcaemia (Yasser sign) after calcium gluconate injection interpret that these signs were due to hypocalcaemia.
- Laryngospasm is mostly psychogenic pseudo-laryngospasm due to psychogenic hyperventilation syndrome by the stress.
- The negative troponin test with non-conclusive ECG changes for ischemic heart disease (IHD), and normal echocardiography will quietly exclude the presence of IHD.
- The etiology of the hypocalcaemia in the current case is unknown. Hyperventilation syndrome which causing respiratory alkalosis was the possible cause.
- Ischemic heart disease (IHD) was the main differential diagnosis.
- I can't compare the current case with similar conditions. There are no similar or known cases with the same management for near comparison.
- **Study questions here:** How did you manage the current case? What are the possible causes of a laryngospasm and the ECG changes?.
- **Limitations of the study:** There are no known limitations in the study.
- **Recommendations:** It is recommended to widening the research in clearing the simultaneous presence of both laryngospasm and Wavy triple sign (Yasser sign) in hypocalcaemia.
- Conclusion
- The dramatic disappearance of both laryngospasm and Wavy triple sign (Yasser sign) is meaning that this sign was lonely due to severe hypocalcaemia.

## Abbreviations

ABG	: Arterial blood gases
ECG	: Electrocardiogram
IHD	: Ischemic heart disease
O <sub>2</sub>	: Oxygen
VR	: Ventricular rate

## Conflicts of interest

There are no conflicts of interest.

## Acknowledgment

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## References

1. Nickson C (2019). Laryngospasm. Retrieved URL: <https://litfl.com/laryngospasm/> (Accessed Feb 10, 2019)
2. Gil G and Robert WM Walker (2013). Laryngospasm in anesthesia. *Continuing Education in Anaesthesia Critical Care & Pain*, 14(2), 47-51. doi: <https://doi.org/10.1093/bjaceaccp/mkt031>
3. Robinson J (2020). Laryngospasm. Heartburn/GERD Guide. WebMD. Retrieved URL:<https://www.webmd.com/heartburn-gerd/guide/laryngospasm-causes-symptoms-and-treatments#1> (Accessed June 19, 2020)
4. Soar J, Perkins GD, Abbas G et al., (2010). European Resuscitation Council Guidelines for Resuscitation 2010 Section 8. Cardiac arrest in special circumstances: Electrolyte abnormalities, poisoning, drowning, accidental hypothermia, hyperthermia, asthma, anaphylaxis, cardiac surgery, trauma, pregnancy, electrocution. *Resuscitation*, 81(10), 1400-1433. doi: <https://doi.org/10.1016/j.resuscitation.2010.08.015>
5. Dusky BMR (2001). ECG Abnormalities Associated With Hypocalcemia. *Chest*, 119( 2), 668-669. doi: <https://doi.org/10.1378/chest.119.2.668-a>
6. Elsayd YMH (2019). Wavy Triple an Electrocardiographic Sign (Yasser Sign) in Hypocalcemia. A Novel Diagnostic Sign; Retrospective Observational Study. *EC Emergency Medicine and Critical Care (ECEC)*, 3(2), 1-2. Retrieved URL: <https://www.econicon.com/ecec/pdf/ECEC-03-00193.pdf>

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