

Spontaneous termination of unstable ventricular tachycardia in emergency department: A case report

Bekele Getenet^{1*}, Guadie Tewabe², Mengistu Abebe¹, Temesgen Ayenew¹, Dejen Tsegaye¹, Kefale Mitiku³

ABSTRACT

Introduction: Ventricular tachycardia is a type of tachycardia that originates solely from ventricular tissues or Purkinje fibers. Based on its duration, it can be classified as sustained or non-sustained. The standard management of sustained ventricular tachycardia was pharmacologic agents, electrical cardioversion, or ablation therapy. However, in this specific case, sustained ventricular tachycardia was spontaneously converted.

Case report: A 26-year-old male presented with palpitation of one hour and was diagnosed with sustained monomorphic ventricular tachycardia with unstable signs (heart rate of 220 beats per minute). After some while, the symptoms and the abnormal findings were spontaneously terminated.

Conclusion: it is known that sustained monomorphic ventricular tachycardia with unstable signs needs immediate termination with synchronized electrical cardioversion. However, unstable sustained monomorphic ventricular tachycardia in this patient was terminated spontaneously.

Keywords: Ventricular tachycardia, arrhythmia, emergency department, Ethiopia.

1. Debre Markos University, Debre Markos, Ethiopia
2. Debre Markos Comprehensive Specialized Hospital, Debre Markos, Ethiopia
3. Injibara University, Injibara, Ethiopia

Correspondence: Bekele Getenet
Email: bekeleget12@gmail.com

Received: December 7, 2023;

Accepted: June 23, 2024;

Published: October 10, 2024

Copyright: ©2024 Bekele Getenet. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Bekele Getenet, Guadie Tewabe, Mengistu Abebe et.al. Spontaneous termination of unstable ventricular tachycardia in emergency department: A case report. PAJEC.2024;2(2): page 14 – 19.

1. Introduction

Ventricular tachycardia is a type of tachycardia (heart rate faster than 100 beats per minute) in which the origin of the driving focus is solely in ventricular tissue or purkinje fibers. Based on the electrocardiographic morphology, it can be categorized as monomorphic ventricular tachycardia & polymorphic ventricular tachycardia⁽¹⁾. Ventricular tachycardia can be diagnosed based on Brugada's algorithm of wide QRS complex tachycardia⁽²⁾. Ventricular tachycardia can also be classified as sustained, which persists for longer than 30 seconds, or hemodynamic instability within the initial 30 seconds, and non-sustained, which lasts for a maximum of 30 seconds^(3,4). For management purpose, ventricular tachycardia is unstable if one of the following features is present: systolic blood pressure below 90 mmHg, altered mentation, ischemic chest pain, shortness of breath, heart rate faster than 200 beats per minute⁽³⁾.

The diagnosis of ventricular tachycardia was associated with structural cardiac disease and prior documented myocardial infarction. However, ventricular tachycardia might be the cause of wide complex tachycardia in 31% of cases without structural heart disease⁽⁵⁾. Sustained ventricular tachycardia was found in 39% of spontaneous ventricular tachycardia in structurally & functionally normal heart⁽⁶⁾. Idiopathic ventricular tachycardia is characterized as monomorphic ventricular tachycardia without structural cardiac disease or coronary artery disease.

In Indonesia, there was a case report on a 32-year-old male presenting with hemodynamic instability and idiopathic left ventricular tachycardia. It was successfully terminated with electrical cardioversion, and radiofrequency ablation was planned with follow-up⁽⁷⁾. The treatment of sustained ventricular tachycardia in the emergency department can be pharmacological and electrical cardioversion. Generally, idiopathic ventricular tachycardia

has a good prognosis with pharmacological treatment or ablation therapy^(1,8).

In Cameroon, a 66-year-old male presented with unstable sustained monomorphic ventricular tachycardia. He passed away after 30 minutes despite being given six tablets of amiodarone, intranasal oxygen, and intravenous fluids. A defibrillator was not available & he was not electrically cardioverted⁽⁹⁾. Electrical cardioversion and stabilization are the prioritized management options for unstable sustained monomorphic ventricular tachycardia. Unstable polymorphic sustained ventricular tachycardia should be terminated with defibrillation (unsynchronized form)⁽¹⁰⁻¹²⁾.

Acute management of patients with ventricular arrhythmia and unstable hemodynamic status aims at immediate termination of ventricular arrhythmia, and early termination of stable ventricular arrhythmia should be warranted as it may lead to decompensation⁽¹³⁾.

In a study done in 30 patients without myocardial disease and with morphologic left bundle branch block & inferior axis, palpitation was felt in 12 patients, dizziness was the main complaint in 13 patients, and syncope was experienced in 7 patients. In this study, two patients had spontaneous resolution of sustained ventricular tachycardia, though it did not mention whether any feature of instability was present or absent⁽¹⁴⁾. Despite the main complaint of our patient being palpitation, spontaneous conversion of sustained ventricular tachycardia with unstable sign was unexpected.

2. Case report

This is a case report of a 26-year-old male who presented on April 06, 2023, at Debre Markos Comprehensive Specialized Hospital emergency room with a complaint of palpitation of one hour duration.

He also had two similar attacks with around 6-month intervals; each episode was identical but shorter than the current one. Both episodes were

relieved without treatment. He had no family history of sudden death, and he did not have any noticed precipitant factor. He did not take any medication and did not undergo any specific maneuvers.

At the time of presentation, his vital signs were in the normal range, except his heart rate was 220, and 12 lead electrocardiography showed ventricular tachycardia (see Fig.1). As he was conscious, he had to be counseled and sedated for synchronized

electrical cardioversion. While he was counseled for the procedure, he said that he just got relieved, and the spontaneous conversion of the rate and the rhythm were visible with the defibrillator and printed electrocardiographic tracing (see Fig 2). He had normal serum electrolyte & renal function tests. Abnormalities were not detected on echocardiography and chest radiography.

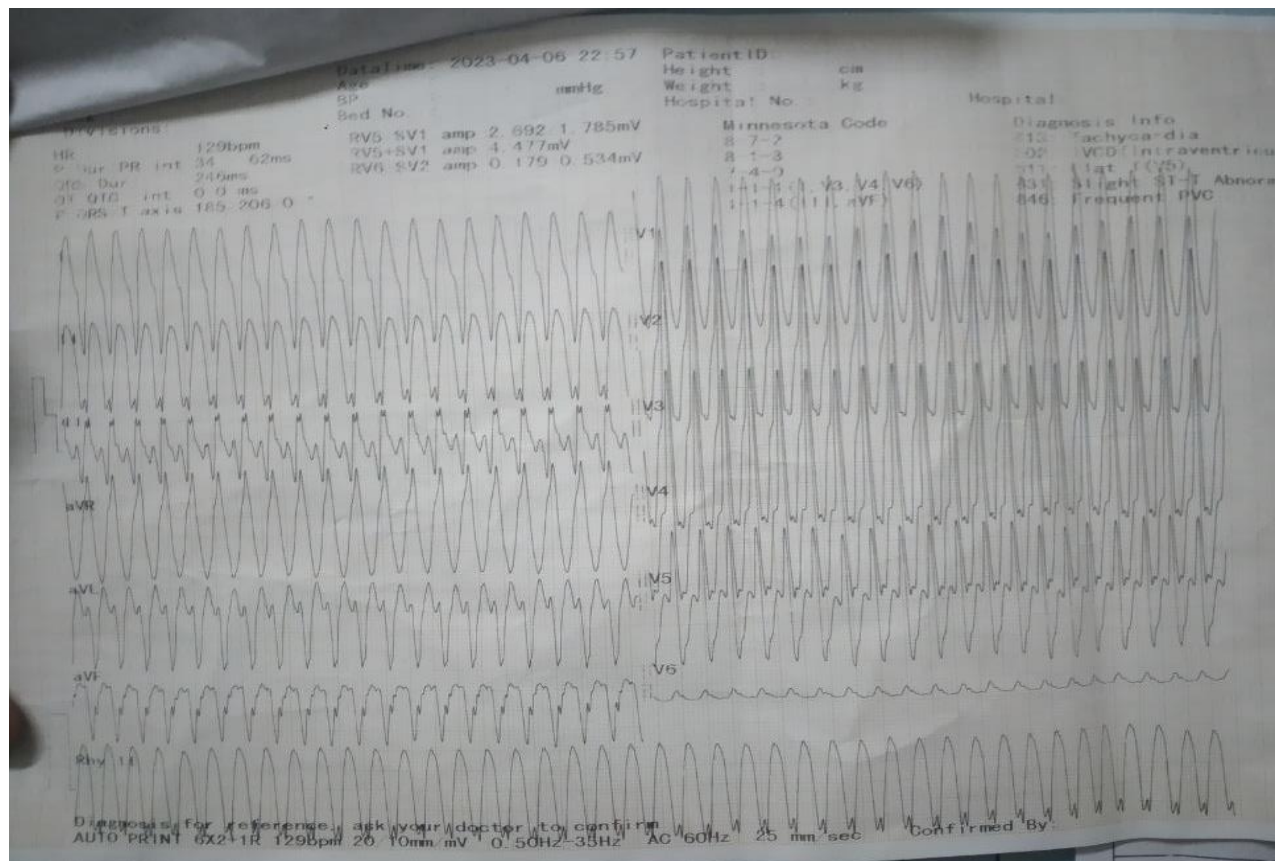


Figure 1: Ventricular tachycardia in 26 years old male with intermittent episodes of palpitation

This is an electrocardiographic tracing with a regular rhythm, a heart rate of 220, and a QRS duration of 140ms with similar morphology, which suggests monomorphic ventricular tachycardia.

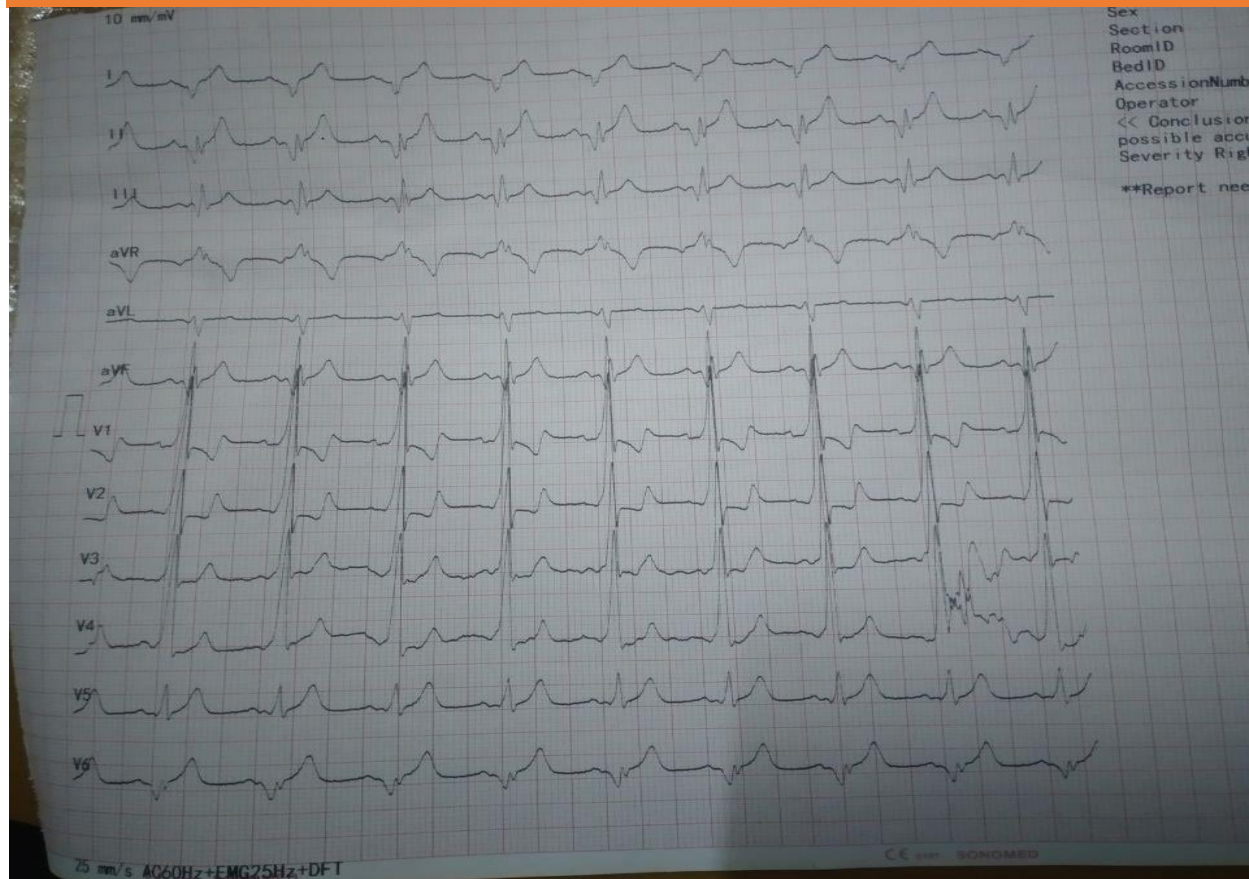


Fig.2: ECG tracing after spontaneous conversion of sustained unstable ventricular tachycardia

This is an electrocardiographic tracing with regular sinus rhythm, heart rate of 100, right axis deviation, QRS duration of 120ms, peaked T wave at leads I, II, V5, V6, Q waves at II, III, avf, V6, ST segment depression at V1-V4.

3. Discussion

The diagnosis of ventricular tachycardia was made based on Brugada's algorithm of wide QRS complex tachycardia⁽²⁾. In our case report, paroxysmal sustained ventricular tachycardia was spontaneously converted. It is against a study done on patients with sustained induced ventricular tachycardia that continued unabated unless terminated with pharmacologic intervention, or programmed stimulation was applied⁽¹⁵⁾. The finding was supported by a study done on 30 patients with sustained ventricular tachycardia, from which two patients experienced spontaneous resolution⁽¹⁴⁾. The disparity was also found in one study that explained the spontaneous resolution of non-sustained ventricular tachycardia reported in four of seven patients

who did not receive antiarrhythmic drugs⁽¹⁶⁾. This may be because the type of ventricular tachycardia is non-sustained and commonly self-resolved.

Our finding is also different from a similar case report in which a 32-year-old male experienced monomorphic ventricular tachycardia with hemodynamic instability, successfully converted with electrical cardioversion⁽⁷⁾. A similar case report of a 66-year-old male who was not saved with amiodarone, intranasal oxygen, and intravenous fluids, but he did not get electrical cardioversion⁽⁹⁾. The reason behind this may be old age and the presence of chronic hypertension. We found that a 26-year-old male patient presented with monomorphic ventricular tachycardia and a heart rate of

220/minute. The symptoms, heart rate, and cardiac rhythm were spontaneously converted, which deviated from many guidelines and published reports⁽¹⁰⁻¹³⁾.

4. Conclusions

It is known that the standard management of sustained ventricular tachycardia is pharmacologic, electrical cardioversion, or ablation therapy. First-line emergency management of sustained monomorphic ventricular tachycardia with one of the unstable signs is synchronized electrical cardioversion. Nevertheless, spontaneous termination of sustained monomorphic ventricular tachycardia with unstable sign was found in this case.

Competing interests

The authors declare that they have no competing interest.

Acknowledgments

We would like to thank the patient for giving us written consent.

References

- 1) Zipes DP. Braunwald's heart disease: a textbook of cardiovascular medicine. BMJ Medical Journal-ISSN 2348-392X. 2018;5(2):63-.
- 2) Brugada P, Brugada J, Mont L, Smeets J, Andries EW. A new approach to the differential diagnosis of a regular tachycardia with a wide QRS complex. *Circulation*. 1991;83(5):1649-59.
- 3) Tintinalli JE, Stapczynski JS, Ma O, Yealy D, Meckler G, Cline D. Tintinalli's Emergency Medicine: A Comprehensive Study Guide, 8e: McGraw Hill Education; 2016.
- 4) Pedersen CT, Kay GN, Kalman J, Borggrefe M, Della-Bella P, Dickfeld T, et al. EHRA/HRS/APHRS expert consensus on ventricular arrhythmias. *Europace*. 2014;16(9):1257-83.
- 5) Masood A, Mohammad S, Mohammad J, Caceres J, Patrick J T. Wide QRS complex tachycardia: reappraisal of a common clinical problem. *Annals of internal medicine*. 1988;109(11):905-12.
- 6) Mehta D, McKenna WJ, Ward DE, Davies MJ, Camm AJ. Significance of signal-averaged electrocardiography in relation to endomyocardial biopsy and ventricular stimulation studies in patients with ventricular tachycardia without clinically apparent heart disease. *Journal of the American College of Cardiology*. 1989;14(2):372-9.
- 7) Ratnasari DAS, Kusuma IA. IDIOPATHIC LEFT VENTRICULAR TACHYCARDIA: A CASE REPORT. *Herb-Medicine Journal: Terbitan Berkala Ilmiah Herbal, Kedokteran dan Kesehatan*. 2018;1(1).
- 8) Strain JE, Grose RM, Factor S, Fisher JD. Results of endomyocardial biopsy in patients with spontaneous ventricular tachycardia but without apparent structural heart disease. *Circulation*. 1983;68(6):1171-81.
- 9) Nkoke C, Luchuo EB, Dikoume L. Fatal monomorphic ventricular tachycardia in a semi-urban setting in Cameroon: a case report. *BMC Research Notes*. 2017;10(1):1-3.
- 10) Al-Khatib SM. 2017 AHA/ACC/HRS guideline for management of patients with ventricular arrhythmias and the prevention of sudden cardiac death: executive summary. *Circulation*. 2018;138:e210.
- 11) Link MS, Berkow LC, Kudenchuk PJ, Halperin HR, Hess EP, Moitra VK, et al. Part 7: adult advanced cardiovascular life support: 2015 American Heart Association guidelines update for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation*. 2015;132(18_suppl_2):S444-S64.
- 12) Al-Khatib SM, Stevenson WG, Ackerman MJ, Bryant WJ, Callans DJ, Curtis AB, et al. 2017 AHA/ACC/HRS guideline for management of patients with ventricular arrhythmias and the prevention of sudden cardiac death: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society. *Journal of the American College of Cardiology*. 2018;72(14):e91-e220.

- 13) Deneke T, Nentwich K, Ene E, Berkovitz A, Sonne K, Halbfäß P. Acute management of ventricular tachycardia. *Herzschrittmachertherapie+ Elektrophysiologie*. 2020;31(1):26-32.
- 14) Buxton AE, Waxman HL, Marchlinski FE, Simson MB, Cassidy D, Josephson ME. Right ventricular tachycardia: clinical and electrophysiologic characteristics. *Circulation*. 1983;68(5):917-27.
- 15) Lerman BB, Stein K, Engelstein ED, Battleman DS, Lippman N, Bei D, et al. Mechanism of repetitive monomorphic ventricular tachycardia. *Circulation*. 1995;92(3):421-9.
- 16) Rahilly GT, Prystowsky EN, Zipes DP, Naccarelli GV, Jackman WM, Heger JJ. Clinical and electrophysiologic findings in patients with repetitive monomorphic ventricular tachycardia and otherwise normal electrocardiogram. *The American journal of cardiology*. 1982;50(3):459-68.