Cardiology in the Young

cambridge.org/cty

Images in Congenital Cardiac Disease

Cite this article: Mahendran AK, Chang PM, and Gupta D (2021) Electrocardiographic interference: know your patient well. *Cardiology in the Young* **31**: 462–463. doi: 10.1017/S1047951121000330

Received: 24 November 2020
Revised: 15 January 2021
Accepted: 16 January 2021
First published online: 5 February 2021

Keywords:
ECG; artefact; gastric stimulator

Author for correspondence: Arjun K. Mahendran, MD, FAAP, Congenital Heart Center, Department of Pediatrics, University of Florida, Gainesville, FL, USA.
Tel: +1 352 273-7770; Fax: +1 352 392-0547.
E-mail: amahendran@ufl.edu

© The Author(s), 2021. Published by Cambridge University Press.

CAMBRIDGE UNIVERSITY PRESS

Electrocardiographic interference: know your patient well

Arjun K. Mahendran, Philip M. Chang and Dipankar Gupta

Congenital Heart Center, Department of Pediatrics, University of Florida, Gainesville, FL, USA

Abstract

Two cases of paediatric patients with gastric pacemakers causing distinct electrocardiographic artefact. Recognition of extracardiac artefact is essential for proper ECG interpretation in patients.

Case

Two paediatric patients with gastroparesis secondary to mitochondrial disease, treated with gastric stimulator implantation (Medtronic® Enterra II Neurostimulator implanted subcutaneously in the lower left abdomen), were screened for cardiomyopathy. Screening electrocardiogram showed sinus rhythm and distinct artefact (Fig 1a and b), with an automated machine interpretation of atrial fibrillation.

Discussion

These cases present unique examples of ECG artefact for educational purposes. Tracing artefact can arise from non-cardiac devices, with the quality of artefact dependent on device type, settings, and location in or outside of the body.[1,2] One such example is a gastric stimulator,

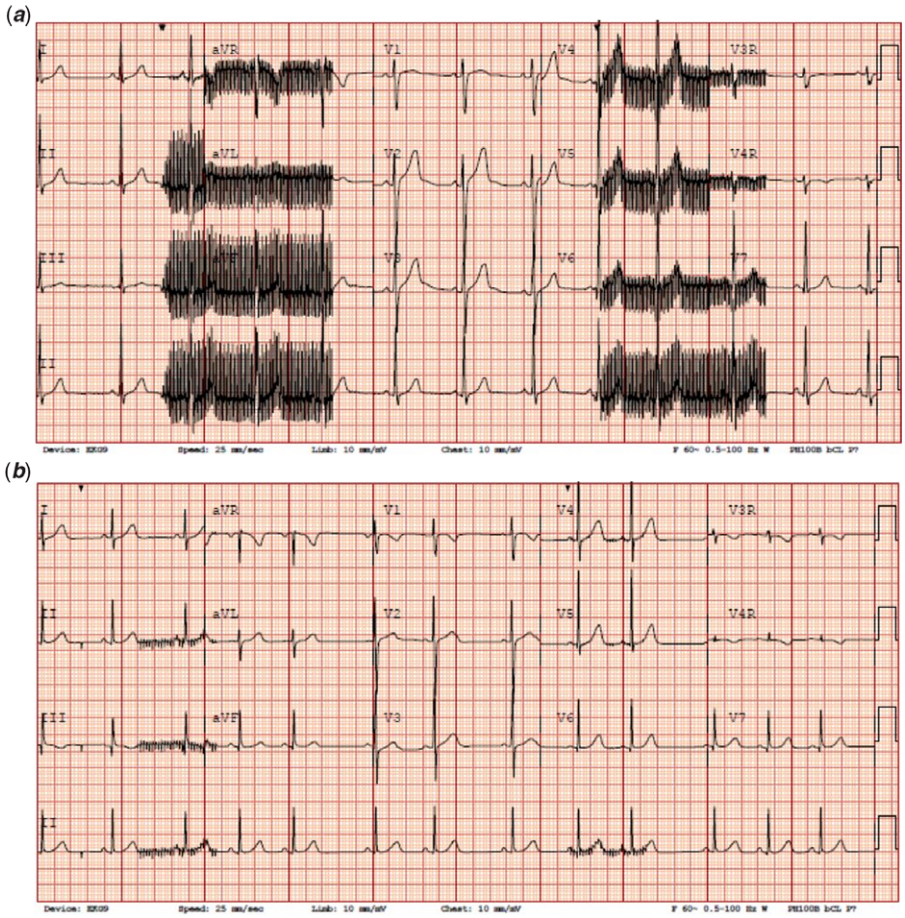


Figure 1. (***a***) Electrocardiogram from a 12-year-old boy with mitochondrial disorder, gastroparesis, and permanent gastric stimulator. Device settings were 8 milliamp, 420 μs pulse width, rate of 40 Hz, and machine cycle of 2 s on and 3 s off. Artefact correlates with the impulse frequency and is noted only when the stimulator is on. (***b***) Electrocardiogram from a 6-year-old girl with a permanent gastric stimulator. The rate was set at 28 Hz with a cycle of 1 s on and 4 s off.

which is used for drug-resistant gastroparesis commonly seen in mitochondrial diseases. Electrical impulses from gastric stimulators are typically low amplitude and high frequency in quality with cyclical on/off periods, thereby mimicking physiologic gastric function. These impulses can be recorded on ECG despite signal filtering. Recognition of this and other types of extracardiac artefact is essential for proper ECG interpretation in complex paediatric patients.

Acknowledgments. None.

Financial support. This research received no specific grant from any funding agency, commercial, or not-for-profit sectors.

Conflict of interest. None.

Ethical statement. The authors assert that all procedures contributing to this work comply with the ethical standards.

References

1. Guinand A, Noble S, Frei A, Renard J, Tramer MR, Burri H. Extra-cardiac stimulators: what do cardiologists need to know? Europace 2016; 18: 1299–1307.
2. Gupta D, Saidi A, Bryant RM. Artefactual atrial flutter due to interference from a portable media device. Cardiol Young 2015; 25: 1375–1376.

https://doi.org/10.1017/S1047951121000330 Published online by Cambridge University Press