ELECTROCARDIOGRAPHIC ARTIFACT MIMICKING VENTRICULAR TACHYCARDIA DURING HIGH-FREQUENCY OSCILLATORY VENTILATION: A CASE REPORT

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Artifacts on electrocardiograms (ECGs) can simulate serious arrhythmias and thus lead to unnecessary diagnostic or therapeutic interventions. One cause of ECG artifacts is simultaneous use of other equipment while the ECG is being monitored or recorded. ECG artifacts mimicking either atrial or ventricular arrhythmia have been reported with the use of a variety of equipment (see Table). Muscle contractions (eg, tremors, shivering, convulsions) and body motion (eg, changing body position, brushing the teeth, combing the hair, physiotherapy, coughing, hiccupping) can also cause ECG disturbances that simulate arrhythmias.

To my knowledge, the following is the first report of an ECG artifact due to high-frequency oscillatory ventilation.

A 54-year-old woman with no history of structural heart disease or arrhythmia was admitted to the intensive care unit (ICU) with a diagnosis of acute respiratory distress syndrome complicating acute pancreatitis. She was sedated, and mechanical ventilation was started. Her hypoxemia persisted despite maximal respiratory support with high positive end-expiratory pressure and a fraction of inspired oxygen of 1.00. She was given a paralytic agent, and high-frequency oscillatory ventilation was started at 5 Hz. After a few hours, ICU staff noted a change in heart rhythm from sinus tachycardia to apparent ventricular tachycardia. A defibrillator was placed near the patient’s bed, and the physician on duty was summoned. The patient had no marked changes in blood pressure, central venous pressure, or oxygen saturation as measured by pulse oximetry. Arterial blood gas analysis and measurements of serum levels of electrolytes also did not reveal any marked changes. Findings on direct monitoring of arterial pressure, central venous pressure waveforms, and plethysmographic results were not changed. An ECG artifact was suspected.

A 12-lead ECG showed artifactual ventricular tachycardia (see Figure). A “wandering” baseline and variations in the amplitude of apparent QRS complexes were noted. In addition, normal QRS complexes were detected in chest leads V3 to V6. To confirm the diagnosis of ECG artifact, the ventilator was switched off for a moment. When the ventilator was turned off, the bedside monitor once again showed sinus tachycardia, the patient’s original rhythm.

The most likely explanation for the apparent arrhythmia in this patient is oscillations of the chest wall associated with the use of high-frequency oscillatory ventilation. This type of ventilation might have caused motion (physiological) artifacts rather than any electrical noise (nonphysiological).

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REFERENCES
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