Erroneous Electrocardiographic Interpretations and its Clinical Implications

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Abstract

Introduction: The advancement of artificial intelligence (AI) has aided clinicians in the interpretation of electrocardiograms (ECGs) serving as an essential tool to provide rapid triage and care. However, in some cases, AI can misinterpret an ECG and may mislead the interpreting physician. Therefore, we aimed to describe the rate of ECG misinterpretation and its potential clinical impact in patient's management. **Methods:** We performed a retrospective descriptive analysis of misinterpreted ECGs and its clinical impact from May 28, 2020 to May 9, 2021. An electrophysiologist screened ECGs with confirmed diagnosis of atrial fibrillation (AF), sinus tachycardia (ST), sinus bradycardia (SB), intraventricular conduction delay (IVCD), and premature atrial contraction (PAC) that were performed in the emergency department. We then classified the misinterpreted ECGs as pseudo-AF, ST, SB, IVCD, or PAC into the correct diagnosis and reviewed the misinterpreted ECGs and medical records to evaluate inappropriate use of antiarrhythmic drugs (AAD), beta-blockers (BB), calcium channel blockers (CCB), anticoagulation, or resource utilization of cardiology and/or electrophysiology (EP) consultation. **Results:** A total of 4,969 ECGs were screened with diagnoses of AF (2,282), IVCD (296), PAC (972), SB (895), and ST (638). Among these, 101 ECGs (2.0%) were misinterpreted. Pseudo-AF (58.4%) was the most common followed by pseudo-PAC (14.9%), pseudo-ST (12.9%), pseudo-IVCD (7.9%) and pseudo-SB (6.0%). Patients with misinterpreted ECGs were aged 76.6±11.6yr with male (52.5%) predominance and hypertension being the most prevalent (83.2%) comorbid condition. The misinterpretation of ECGs led to the inappropriate use of BB (19.8%), CCB (5.0%), AAD therapy (7.9%), anticoagulation (6.9%) in patients with pseudo-AF, as well as inappropriate resource utilization including cardiology (41.6%) and EP (8.9%) consultations. **Conclusions:** Misinterpretation of ECGs may lead to inappropriate medical therapies and increased resource utilization. Therefore, it is essential to encourage physicians to carefully examine AI interpreted ECG's, especially those interpreted as having AF.

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