

ECG Diagnosis: Deep T Wave Inversions Associated with Intracranial Hemorrhage

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The 12-lead electrocardiogram (ECG) in patients with acute intracranial hemorrhage (ICH) can demonstrate several findings associated with ICH and increased intracranial pressure, including deep, inverted “cerebral” T waves, prolonged QT interval, Osborn (J) waves, and U waves.¹⁻³ In addition to the ECG changes described above, cardiac dysrhythmias have been reported in patients with ICH (particularly with subarachnoid hemorrhage), including: sinus bradycardia; sinus tachycardia; atrial pacemaker and atrial fibrillation; premature atrial, junctional, and ventricular complexes; ventricular tachycardia; and atrioventricular blocks.⁴ ST-T wave changes associated with myocardial ischemia (ST-depression) and infarction (ST-elevation) can also be found on the ECG in association with ICH. The mechanism(s) responsible for ECG changes associated with ICH are not well understood, although hypothalamic stimulation and autonomic dysregulation have been implicated as causative for these ECG findings.⁴

The differential diagnosis of inverted T waves on the 12-lead ECG includes myocardial ischemia and infarction, bundle branch block, ventricular hypertrophy, pulmonary embolism, hypertrophic cardiomyopathy, and increased intracranial pressure.⁵ It is important to note that the findings of deep, inverted T waves on the 12-lead ECG are not diagnostic of ICH but can occur in the appropriate clinical setting, and that further diagnostic imaging (ie, noncontrast computed tomography scan of the brain) is required for the diagnosis of ICH. ❖

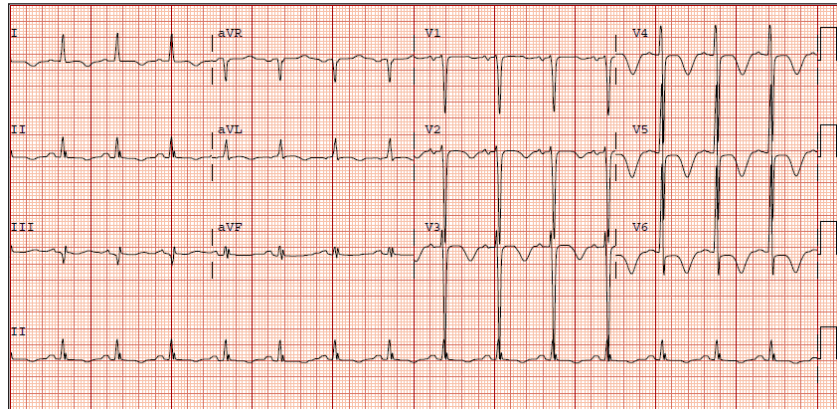


Figure 1. 12-lead electrocardiogram from a 47-year-old man with sudden onset of headache, syncope, and left-sided weakness, demonstrating normal sinus rhythm with deep, inverted T waves in leads V3-V6 and prolonged QT interval (610 msec).

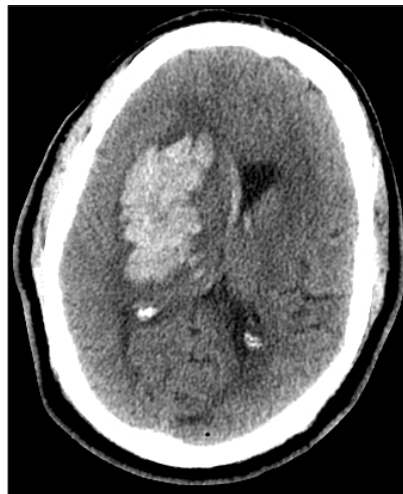


Figure 2. Noncontrast computed tomography scan of the brain from the same patient as in Figure 1, demonstrating a large intraparenchymal hemorrhage in the right periventricular white matter with mass effect and a 6-mm midline shift from right to left.

Disclosure Statement

The author(s) have no conflicts of interest to disclose.

How to Cite this Article

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