

A New Sign for Internal Carotid Artery Dissection Diagnosis by Ultrasound: An Unusual Curve of Bloodstream

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To the Editor: Internal carotid artery dissection (ICAD) is one of the main causes of stroke in young- and middle-aged adults with a current mortality rate of 40%. Delayed diagnosis and treatment can result in permanent neurological impairment and/or death.^[1] Currently, digital subtraction angiography (DSA) is considered the gold standard for diagnosis while conventional ultrasound (US) is utilized as a screening tool. The sonographic features of ICAD include a luminal flap, stenosis, or occlusion secondary to the presence of hematoma and/or thrombus. These characteristics may be subtle, which diminishes US sensitivity for detecting ICAD. The following case report exemplifies US ability to diagnose ICAD through the demonstration of an unusual curve and the detection of an intraluminal hematoma.

A 31-year-old female patient, who presented with recurring headaches after swimming exercise, was referred to our department for a duplex carotid US examination. The patient was scanned utilizing a Philips IU22 affixed with 1–5 MHz and 3–9 MHz probes. Bilateral normal appearing common carotid arteries were visualized. However, unusual hemodynamic flow including unusual curve, color aliasing [Figure 1b], and high-velocity flow (right 210 cm/s and left 208 cm/s) within both mid internal carotid arteries were acquired with the lower frequency probe. The higher frequency probe was then activated, and multiple intramural hematomas (right 4.7 mm and left 5.2 mm) [Figure 1a] and intraluminal narrowing were detected, resulting in a diagnosis of ICAD with an estimated 50–69% stenosis. Subsequent computerized tomography angiography and DSA examinations confirmed the diagnosis of ICAD [Figure 1c and 1d]. While further DSA imaging of the renal arteries determined the patient had fibromuscular dysplasia (FMD).

Following thrombolytic therapy, a follow-up US was performed 11 months after initial imaging. Resolution of the hematomas and normal flow velocities were obtained from both extracranial arteries.

ICADs often present the following characteristics on US: (1) the double cavity structure (the true and false cavities), (2) stenosis, (3) aneurysm, (4) intramural hematomas, and (5) abnormal flow signals.^[2,3] Conventional US methods have a limited ability to visualize the distal internal carotid arterial segments, frequently resulting in inconclusive diagnoses. This unique case represents how, the unusual hemodynamic flow, especially the unusual curve raised suspicion of an underlying problem. The presence

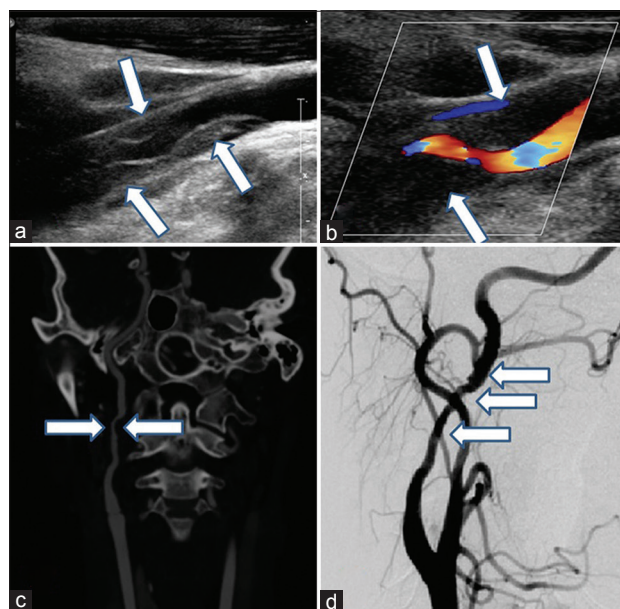


Figure 1: The manifestation of internal carotid artery dissection of a 31-year-old female patient. (a) Multiple intramural hematomas (arrows) were showed clearly in the right internal carotid artery by ultrasound. (b) Intramural hematomas (arrows) and the unusual curved bloodstream between them were showed in the left internal carotid artery by ultrasound. (c) The stenosis of the right internal carotid artery (arrows) was showed by computed tomography angiography. (d) Diffused, long-distance corrugated sign (arrows) at the right internal carotid artery was showed by digital subtraction angiography.

of hematomas, stenosis, and raised velocities assisted in this diagnosis of ICAD.

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After further imaging with DSA, bilateral renal arterial dissections were discovered, thus leading to a diagnosis of FMD. FMD accounts for 15% of all cervical artery dissections.^[4,5] Renal and carotid arteries are most commonly affected, yet dissections can be seen in any vascular extension.^[5]

The presence of unusual curve with intraluminal hematomas may be a key component in determining ICAD. Moreover, as outlined in this case report, may be a supportive characteristic for the diagnosis of FMD.

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Conflicts of interest

There are no conflicts of interest.

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