Common Carotid Dissection
A Sign of Emergency

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Patient 1 was a 58-year-old man who was brought to the emergency department after he collapsed in the kitchen. On arrival, the patient was comatose and did not react to pain stimuli. He was hypotensive (blood pressure 70/50 mm Hg), and ECG showed sinus tachycardia (120/min) with left bundle-branch block. Tests for troponin T were negative, and his D-dimer level was 3771 μg/L (normal range: 0 to 190 μg/L). Because of tachypnea and developing respiratory insufficiency, intubation became necessary. A massive pulmonary embolism was initially suspected.

Patient 2 was a 47-year-old man who suddenly collapsed with aphasia, right-sided hemiparesis, and progressive loss of consciousness. After intubation and during transportation to the emergency department, he was hypertensive, but on arrival he became hypotensive (blood pressure 80/60 mm Hg). An ECG showed sinus tachycardia (127/min) and marked ST depression in V5 and V6. Tests for troponin T were negative, and his D-dimer level was 212 μg/L. Cerebral bleeding with brain stem compression was on top of our list of differential diagnoses.

Patient 3 was a 57-year-old woman who came to our department because of dizziness and visual disturbance. After 1 day, she complained about persisting coldness and dysesthesia in her left arm. There was a blood pressure difference between her upper extremities (150/90 mm Hg on the right versus 100/90 mm Hg on the left). Her ECG and troponin T level were normal, and her D-dimer was 205 μg/L. Subclavian steal syndrome had to be excluded.

All patients had one symptom in common that led straight to the diagnosis. Extracranial sonography revealed dissection of the common carotid artery with double lumen (Figure 1), a moving dissection membrane (Movies I and II), and different Doppler flow velocities within the true and the false lumen (Figures 2 and 3 and Movie III) in the longitudinal plane. The dissection also could be visualized in the axial plane (Figure 4). These findings pointed toward aortic dissection (Stanford A) with side branch involvement and extension into the common carotid artery. An urgent chest computed tomography scan confirmed our diagnoses of type A aortic dissection (Figures 5 and 6).

The first patient died before surgery (Figures 7 and 8). The second patient underwent immediate surgery but developed paraparesis of the left arm because of cerebral hypoperfusion, which led to bilateral watershed infarction (Figure 9). The third patient developed pericardial effusion but survived immediate surgery without any clinical deficit.

Type A aortic dissection is a dramatic medical emergency with a high mortality rate (1% to 2% per hour for 24 hours). Primary neurological presentation is rare, and potentially harmful treatment (eg, thrombolysis) may be initiated, especially in patients presenting with stroke and aphasia. In addition to migrating chest pain (85% of patients) and/or back pain (46%), additional signs such as pulse deficit (30%), hypotension (21%), pericardial effusion (29%), aortic regurgitation (30%), abnormal ECG (69%), and elevated D-dimer may point toward aortic dissection. Side branch involvement of the supraaortic vessels with dissection of the common carotid or subclavian artery occurs in 15% to 41% of cases. Sonography of these vessels can be performed easily without time delay or transport of the patient, and we consider it a helpful complementary tool for the current diagnostic work-up. The sonographic images presented are intended to immediately influence short-term management of possible aortic dissection in any patient entering the emergency room.

Disclosures
None.

References

From the Department of Neurology, Innsbruck Medical University, Innsbruck, Austria. The online-only Data Supplement, consisting of Movies I through III, is available with this article at http://circ.ahajournals.org/cgi/content/full/115/6/e181/DC1.
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Figure 1. Duplex sonography of the common carotid artery and double lumen attributable to dissection (patient 3).
Figure 2. Doppler spectrum of the common carotid artery and different flow velocities within true and false lumens (patient 3).

Figure 3. Doppler spectrum of the common carotid artery and different flow velocities within true and false lumens. The irregular pulse reflects the unstable situation (patient 1).
Figure 4. Duplex sonography in the axial plane of the common carotid artery, with 2 lumina and dissection membrane (patient 2).

Figure 5. Chest computed tomography scan in type A aortic dissection, axial plane. Used with the permission of the Department of Radiology II, Medical University Innsbruck, Austria.

Figure 6. Chest computed tomography scan in type A aortic dissection with involvement of the truncus brachiocephalicus. Used with the permission of the Department of Radiology II, Medical University Innsbruck, Austria.

Figure 7. Preparation of the aorta ascendens and entry of the dissection (patient 1).
Figure 8. Preparation of the aortic arc and dissection from the entry into the truncus brachiocephalicus (tweezers inserted) (patient 1).

Figure 9. Cerebral computed tomography scan showing bilateral watershed infarction attributable to cerebral hypoperfusion (patient 2). Used with the permission of the Department of Radiology II, Medical University Innsbruck, Austria.
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