Identification of carotid artery dissection by contrast enhanced ultrasonography. A case report.

Zhao-jun Li, Xiang-hong Luo, Lian-fang Du

Department of Ultrasound, First People’s Hospital Affiliated to Shanghai Jiaotong University, Shanghai, China

Abstract

Carotid arterial dissection is an important cause of stroke in young and middle-aged patients. Ultrasound (and particularly contrast enhanced ultrasonography) is an important approach in patients with sudden onset of stroke combined with renal failure who are not suitable for angiography. In this report we describe the ultrasound features of carotid arterial dissection and discuss its utility.

Keywords: carotid artery dissection, renal failure, contrast-enhanced ultrasonography

Introduction

Spontaneous dissection of the carotid artery (CA) is an important cause of ischemic stroke [1]. Although the diagnosis is generally established by digital subtraction angiography (DSA) and contrast computed tomography (CTA) [2], CA ultrasonography represents the first-line and important approach in patients with sudden onset of stroke combined with renal failure who are not suitable for angiography.

Case report

An 81-year-old man with renal failure (creatinine: 295 umol/L to 400 umol/L) for more than 8 years was admitted to the intensive care unit for acute stroke. Physical examination showed respiratory rate of 27/min, pulse of 80/min, and blood pressure of 200/105 mm Hg.

An ultrasound examination of CA was performed. B-mode imaging showed multiple plaques and at about 1 cm proximate to left bifurcation, a suspected intimal flap or “hypoechoic plaque” narrowed the left CA (fig 1 a). Color Doppler imaging revealed that there was a double lumen with different flow directions in the left CA: one presented red and blue turbulence signals and the other showed the narrowed and raised focal flow (fig 1 b,c,d). The lesion ruled out the possibility of a hypoechoic plaque and it was suspected to be a dissection of the left CA. But we still were not able to explicitly distinguish: 1. Which was the true and the false lumen? 2. Was there a thrombus in the false lumen? 3. What percentage of the degree of stenosis was caused by the dissecting aneurysm?

The specific imaging SonoVue (sulphur hexafluoride) 3 ml bolus was injected into a peripheral vein. The contrast-enhanced ultrasonography indicated: the true lumen was narrow, the flow velocity was increased, and the bolus disappeared very quickly. The false lumen presented little forward blood flow, the flow volume increased gradually, and the bolus gathered (fig 2). The leaking of dissection was easily discovered. The patient had renal failure and was not suitable for angiography, so the DSA and CTA were not performed.

Discussions

CA dissection is one of the important causes of stroke in young and middle-aged patients and its clinical symptoms can be misleading [3]. CA dissection sometimes
causes brain ischemia and subarachnoid hemorrhage so immediate and explicit evaluation and treatment is necessary. The diagnostic tools for identifying dissections are DSA, CTA, magnetic resonance imaging (MRI), magnetic resonance angiography (MRA), and transsurface carotid ultrasonography (TSCU) [2]. TSCU is most readily available for vascular disorders, and can help to detect vascular dissections, particularly in a patient with renal failure not suitable for angiography.

Contrast medium can markedly enhance the diagnostic information and is safe with a very low incidence of side effects. Contrast-enhanced ultrasonography is a relatively accurate and minimally invasive tool in the detection of vascular lesions and correlates well with CTA. The dissection of the CA demonstrated the contrast medium gathered in the false lumen and flow void in the true lumen. The definite findings specific to dissection are easier for the diagnosis and assessment of the degree of stenosis.

In conclusion contrast-enhanced ultrasonography combined with B-mode and Doppler imaging is a good approach to identify the dissection of the carotid artery.

Acknowledgement: The project was supported by the Shanghai Health and Family Planning Commission Fund, China (Grant No. 201440290)

References