Flat-detector CT angiography in the evaluation of neuro-Behçet disease

**Keywords**  
Behçet disease; Neuro-Behçet disease; Flat detector computed tomography; Neuroradiology

**Dear editor,**

In patients with unknown Behçet disease (BD), the diagnosis of neuro-Behçet disease (NBD) is challenging, since various diseases may mimic NBD [1]. Flat detector-computed tomography (FDCT) allows obtaining rotational datasets and images with ultra-high spatial resolution [2]. The combination of FDCT with digital subtraction angiography (DSA) allows tracking the entire course of iodinated contrast material bolus from its initial injection through the arterial or venous vasculature [2]. We report two patients with NBD without a prior history of BD, who were diagnosed as having NBD based on clinical investigations and FDCT angiography.

The first patient was a 34-year-old man who was referred to our neurology department with a 1-month history of headache, blurred speech and difficulty in walking. Magnetic resonance (MR) imaging revealed multiple spontaneously hyperintense lesions of the periventricular deep white matter, thalamus, and mesencephalon on T2-weighted images (Fig. 1). Deep venous structures and venous sinuses were normal on MR angiography. DSA examination revealed normal findings. FDCT angiography was performed from both internal carotid artery of the patient at the end of the angiography session. FDCT angiography of the patient revealed multiple stenosis, reduced lumen calibration and beading appearance in veins that drains deep white matter area. The second patient was a 51-year-old man who was referred to our neurology clinic with a 2-week history of severe headache and nausea. MR imaging showed multiple spontaneously hyperintense lesions on T2-weighted images in the pons and the medulla oblongata, which were more prominent in the right side (Fig. 2). MR angiography showed normal findings. Similar to the first patient, DSA examination was normal. FDCT angiography was performed from both vertebral arteries of the patient at the end of the angiography session. FDCT angiography demonstrated irregularities in the right pontine perforator veins consistent with NBS.

Recent histopathological reports revealed that parenchymal lesions in NBD represent inflammatory cellular infiltration around peripheral small venules and arterioles,

---

**Figure 1.** 34-year-old man with neuro-Behçet disease. a: T2-weighted MR image in the transverse plane shows multiple hyper-intense lesions (arrows) in the deep white matter. Prominent cerebral sulcus and enlarged ventricular system secondary to cerebral atrophy were also noted; b: magnified flat detector computed tomography angiography image using maximum intensity projection reconstruction at the same level than MR image in A demonstrates stenosis, reduced lumen calibration and beading appearance in veins that drains deep white matter (arrow). Also note the normal appearance of the veins at the same level for comparison.
indicating demyelination and edema [3]. MR imaging is the gold-standard diagnostic modality for NBD [4]. MR imaging has great contrast resolution that allows detecting parenchymal lesions, as well as dural sinus thrombosis with the help of MR angiography [4]. However, MR imaging and MR angiography are not able to show inflammation of venous structures due to low spatial resolution [4]. Despite DSA has been shown to be an efficient tool to demonstrate involvement of small and medium-sized intracranial arteries, which is characterized by aneurysms and occlusions in NBD, visualization of the small venous structures remains difficult [5]. Furthermore, DSA is no longer recommended in NBD since arterial or venous catheterization dramatically increases the risk of thrombosis or aneurysm formation at the puncture site. FDCT angiography has superior spatial resolution than DSA, which have allowed us to track small venous structures [2]. However, FDCT angiography with iodinated contrast material administration from the carotid or vertebral arteries also requires catheterization of the femoral artery. On the other hand, FDCT angiography can also be performed with intravenous contrast material injection. Recent studies showed that FDCT angiography obtained with intravenous contrast material have similar diagnostic capabilities than DSA for evaluation of flow-diverting stents [6]. Other than interventional procedures, utilization of FDCT angiography for the diagnostic purposes has been very limited up to date. Recently, Kocak et al. conducted a study that showed potential role of FDCT angiography besides neuro-interventional procedures [2]. They reported that FDCT angiography was able to reveal higher association rates between cavernous malformations and developmental venous anomalies because of its ability to demonstrate smaller venous structures. In conclusion, we believe that FDCT angiography is a promising radiological modality to identify cerebral venulitis in NBD. Apart from the diagnosis of NBD, with advancing technology and increased image quality and resolution, FDCT angiography might offer very important contributions in understanding pathophysiological mechanisms of NBD.

1. Disclosure of interest

The authors declare that they have no competing interest.

References


D. Alis b,c, C. Civcik a, B.C. Erol a,
O. Kizilkilic c, N. Kocer b, C. Islak b

a Department of Radiology, Cerrahpasa Faculty of medicine, Istanbul University, KMPasa, 34098 Istanbul, Turkey
Department of Neurology, Cerrahpasa faculty of medicine, Istanbul university, KMPasa, 34098 Istanbul, Turkey

Corresponding author.

E-mail addresses: drdenizalis@gmail.com (D. Alis), cerencivcik@gmail.com (C. Civcik), b.caglarerol@hotmail.com (B.C. Erol), osmank@istanbul.edu.tr (O. Kizilkilic), nkocer@istanbul.edu.tr (N. Kocer), cislak@istanbul.edu.tr (C. Islak)

http://dx.doi.org/10.1016/j.diii.2017.05.008
2211-5684/© 2017 Editions françaises de radiologie. Published by Elsevier Masson SAS. All rights reserved.