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CASE REPORT

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Hyperdense artery sign on computed tomography is extremely valuable marker of middle cerebral artery occlusion in early hemiparesis

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ABSTRACT

Hyperdense artery sign (HAS) is the earliest sign of cerebral infarction on nonenhanced computed tomography (NECT). HAS can be visible before irreversible cerebral damage. A 70-year-old woman presented to the emergency room with left-sided weakness and facial drooping for 5 hours. Head NECT showed HAS in the proximal part (M1) of the right middle cerebral artery (MCA). After 65-hours follow-up, NECT revealed large hypodense area in the territory of the right MCA with mass effect in the form of compression of the ipsilateral lateral ventricle. This was a case of right MCA infarction. On follow-up, the patient was not improved and discharged with right-sided hemiplegia. HAS is a highly valuable marker for the diagnosis of early cerebral infarction in patients with acute hemiparesis. The patients of hemiparesis with HAS should be dealing rapidly as acute ischemic stroke.

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KEYWORDS

Cerebral artery occlusion, computed tomography, hemiparesis, hyperdense artery sign, valuable marker

Literature review

Hyperdense artery sign (HAS) is the earliest sign of cerebral infarction on nonenhanced computed tomography (NECT) that can be visible before irreversible parenchymal damage [1]. It is a direct image of the thromboembolic material within the artery that can be seen within 90 minutes after the event [2].

HAS occurs in 68.8% of patients with the middle cerebral artery (MCA) occlusion within the first 24 hours [3]. It has 76% of sensitivity for identifying occlusion of M1 branch of the MCA [4]. The high specificity of HAS (95%) made it as a confident marker to confirm acute arterial occlusion, and it is more commonly identified in the proximal arteries than in distal [5]. In the first 4.5 hours, the time is critical, and the potential value of advanced imaging must be balanced against the determined impact of delaying treatment [6]. HAS appears in the first 6 hours in 56.6% of the patients of MCA infarction as well as the subtle hypodense area, whereas HAS usually appears more obvious than subtle hypodense area. Other more specific signs of early MCA infarction such as insular ribbon sign are less likely to occur in the first 6 hours [7].

This case is reported to highlight the importance of HAS associated with positive clinical features such as hemiplegia as an indication for the rapid treatment of early ischemic stroke by thrombolytic drugs and/or endovascular thrombectomy to avoid the worse irreversible outcomes of delay.

Case report

A 70-year-old woman with a past history of diabetes mellitus presented to the emergency room after sudden left-sided weakness and facial drooping for 5 hours. On clinical examination, the patient had left side neglect and grade 0 power movement on the left upper and lower extremities. Head NECT showed HAS in the proximal part (M1) of the right MCA but no other cerebral changes (Fig. 1). The patient was admitted to the intensive care unit for treatment. After 65 hours of medication, the patient was sent to CT for follow-up. Head NECT revealed a large hypodense area in the territory of the right MCA with mass effect in the form of compression of the ipsilateral lateral ventricle (Fig. 2). This was

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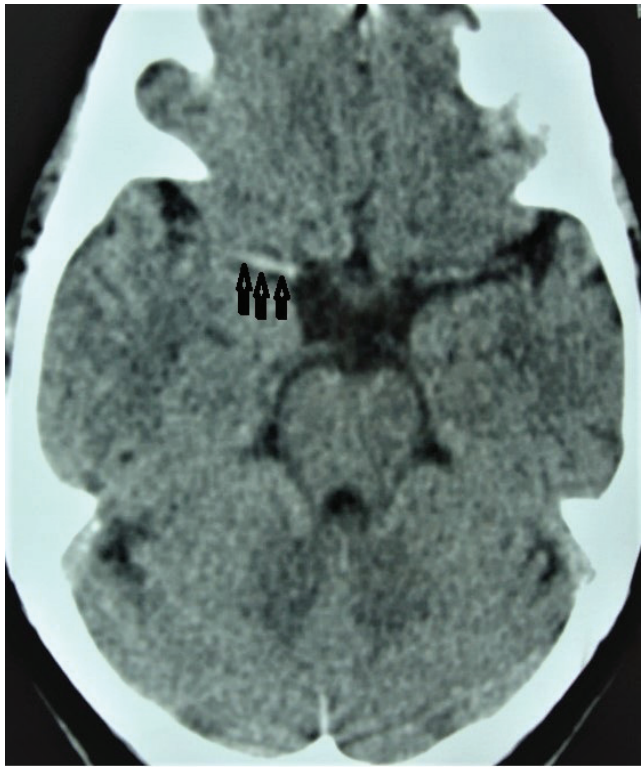


Figure 1. Non-contrast CT of 70 years old woman done on presentation shows increased density of the right middle cerebral artery (MCA, arrows).

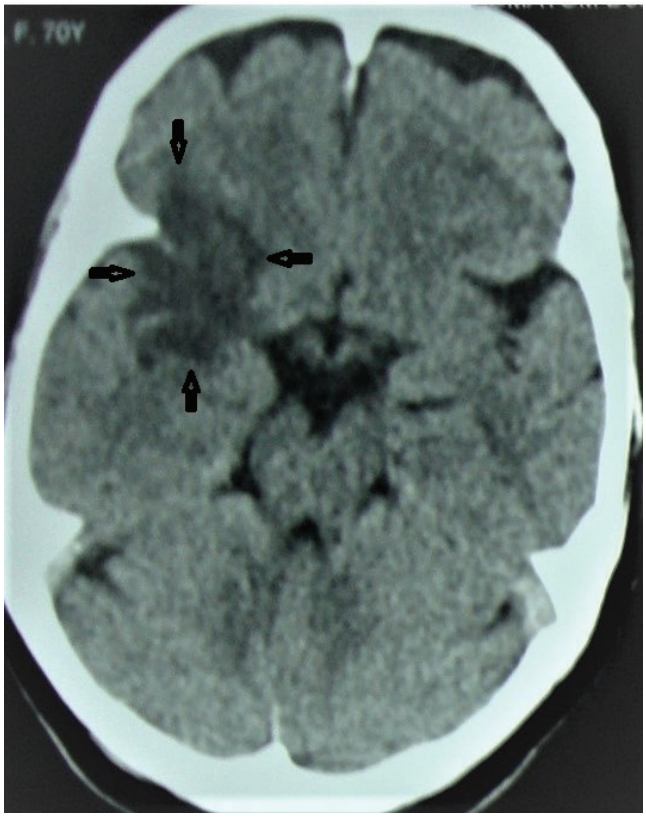


Figure 2. Non-contrast CT of 70 years old woman done after 65 hours shows hypodense area in the territory of the right middle cerebral artery (MCA, arrows).

a case of right MCA infarction. On follow-up, the patient was not improved and discharged with left-sided hemiplegia.

Discussion

Early detection of cerebral infarction is a critical point for treatment to avoid the worse outcomes. HAS is the earliest sign of cerebral infarction on NECT that occurs before irreversible damage of cerebral tissue.

In this case, the patient presented with left-sided hemiparesis for 5 hours and NECT revealed HAS in the right MCA. As reported by Jensen-Kondering et al. [8], HAS becomes visible with the onset of arterial occlusion before any cerebral damage with a specificity of 90%–100% and sensitivity of 80%–100% in thin-slice multidetector computed tomography, especially in the MCA, which is the most common affected site by ischemic stroke.

Goyal et al. [9] reported that rapid intravenous thrombolytic delivery is associated with less disability in patients with large vessel occlusion. Emberson et al. [10] reported that for eligible patients, intravenous medical therapy by Alteplase improves the outcomes when delivered within the first 4.5 hours of stroke onset. Unfortunately, this case was arrived to the emergency room after 4.5 hours of the onset of symptoms. This case was discharged with hemiplegia. This was consistent with the study of Li et al. [11] who reported that patients with HAS on admission CT are less likely to have rapid recovery.

Khripun et al. [12] reported no fatal outcomes from endovascular approach in patients with tandem internal carotid artery and the ipsilateral MCA within the first 6 hours after the stroke onset. Unfortunately, endovascular approach was not available in the center.

Puhr-Westerheide et al. [13] reported that the growth of hyperacute infarction strongly depends on the collateral arteries, but their study was about anterior cerebral artery infarction; however, this case was in the MCA territory which is a poor area of collaterals as reported by Li et al. [14].

Conclusion

HAS is a highly valuable marker for the diagnosis of early cerebral infarction in patients with acute hemiparesis. The patients of hemiparesis with HAS on CT should be dealing rapidly as acute ischemic stroke. Balance between confirmation of arterial occlusion either by diffusion-weighted

Magnetic resonance imaging (MRI) or angiography and the risk of delaying effective treatment should be done to avoid catastrophic results.

Conflicts of interest

None

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