Occlusion of the internal carotid artery (ICA) can cause ischemia through various mechanisms, primarily through artery-to-artery embolisms from the stump, but also due to a hemodynamic mechanism. When the patient is in a hypotensive condition, the collateral supply may be insufficient. Susceptibility-weighted imaging (SWI) is sensitive for detecting dilated vessels, which can be observed in the area of hypoperfusion (prominent vessel sign, PVS). Here, we report a patient who initially showed the PVS that dynamically decreased a few hours after induced hypertension with associated neurological recovery.

CASE REPORT

An 87-year old man with hypertension, diabetes, and renal failure was admitted with aphasia and right-sided weakness. Susceptibility-weighted imaging (SWI) revealed prominent vessel sign (PVS) without an acute lesion, with left carotid artery occlusion and decreased perfusion of the left hemisphere. The blood pressure increased from 90/60 mmHg to 160/80 mmHg after hypertensive treatment and the neurological deficits recovered completely. Five hours later, the PVS decreased on follow-up SWI. The PVS dynamically changes according to the perfusion status; therefore, it may be potentially beneficial to evaluate the perfusion status after treatment, especially in patients in whom contrast agent use is contraindicated.
DISCUSSION

The PVS was developed due to the increased concentration of deoxyhemoglobin inside the vein where the oxygen extraction ratio was increased. Therefore, the PVS was thought to represent the ischemic penumbra. The PVS predicted infarct growth, early neurological deterioration, and poor outcome.\(^1\),\(^2\) However, there is a lack of data showing how the PVS present on SWI may change dynamically.

Induced hypertension increases perfusion. The treatment is effective and feasible for those who may not receive reperfusion treatment. Several studies have reported promising results of the treatment.\(^3\),\(^4\) In our patient with ICA occlusion, induced hypertension was effective. The treatment effect was not only reflected in the neurological improvement, but also objectively in the dynamic change in the PVS in the short-term follow-up analysis performed within a few hours.

The perfusion status is usually determined using computed tomography or magnetic resonance perfusion imaging.\(^5\) However, a considerable amount of the contrast agent is required in both studies. Using contrast repeatedly within a day may have a potential adverse effect on the renal function and should be avoided for patients with poor renal function.\(^6\) However, a contrast agent is not required in SWI; the scan time is relatively short, and the PVS changes dynamically according to the perfusion status after a few hours. Therefore, our case findings suggest that the PVS may be potentially beneficial for evaluating the perfusion status, especially after treatment inducing increased perfusion to the cerebral hemisphere, especially in patients with poor renal function.

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Conflicts of Interest

No potential conflicts of interest relevant to this article was reported.

REFERENCES


