CASE STUDY

Gerstmann's syndrome associated with diagnostic cerebral angiography

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Abstract

Objective: Gerstmann's syndrome is a rare neurological disorder characterized by right–left disorientation, finger agnosia, agraphia and acalculia. Several causes for the manifestation of this rare syndrome have been reported in previous publications; however, thus far, an association between secondary diagnostic cerebral angiography and Gerstmann's syndrome has not been reported.

Case report: A 48-year-old woman diagnosed with subarachnoid haemorrhage underwent a secondary diagnostic cerebral angiography 7 months after the episode. The patient showed memory impairment, agraphia, acalculia, right–left disorientation, occasional errors in speech and finger agnosia accompanied by an acute infarction in the left middle cerebral artery territory. However, she showed excellent recovery after intensive rehabilitation and conservative treatment.

Conclusion: The previously reported rate of permanent neurological complications associated with diagnostic cerebral angiography was very low (0-0.5%). To the best of the authors' knowledge, this is the first case report of Gerstmann's syndrome as a complication of cerebral angiography. This report discusses the complications associated with the neurological condition and emphasizes the need for early rehabilitation in cases of Gerstmann's syndrome.

Keywords: Gerstmann's syndrome, angiography, complication

Introduction

Gerstmann's syndrome is a neurological disorder characterized by right–left disorientation, finger agnosia, agraphia and acalculia [1]. Previous studies have shown that cerebrovascular diseases (CVD) [2], traumatic brain injuries [3] and neurodegenerative diseases [4] are some of the causes of Gerstmann's syndrome.

Diagnostic cerebral angiography is associated with temporary and reversible neurological complications such as transient ischemic attack (TIA), headache and transient global amnesia and the complication rates have been found to be as low as 0-2%. The rate of permanent neurological complications such as cerebrovascular accident (CVA) varies from 0–0.5% [5–7]. To the best of the authors' knowledge, this is the first case report of Gerstmann's syndrome associated with diagnostic cerebral angiography.

Case history

The patient was a 48-year-old woman with hypertension who had not received regular medication for years. Her family history was unremarkable. She presented with a sudden onset of consciousness disturbance on 26 February 2011 and recovered soon thereafter. Subsequently, she experienced severe headache with nausea and brain computed tomography (CT) scans obtained in the emergency

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Figure 1. (a) Computed tomography (CT) image of the brain taken on 26 February 2011, shows subarachnoid haemorrhage in the basal cistern, both sylvian fissures and the intraventricular region. (b) Diffusion-weighted magnetic resonance imaging (MRI) of the brain shows acute cerebral infarction in the left middle cerebral artery territory, including the parietal lobe and the insular ribbon.

department revealed diffused subarachnoid haemorrhage (SAH) (Figure 1(a)). The patient underwent an emergency surgery that involved extraventricular drainage. Diagnostic cerebral angiography performed through the right femoral artery on 11 March 2011, showed no evidence of aneurysm formation or vascular malformation and normal appearance of both the internal carotid arteries and the left vertebral artery. The patient was discharged on 28 March 2011 with a mild neurological deficit (mild weakness of bilateral lower limbs and minimal dysarthria); however, she could independently perform activities of daily living (ADL).

After her discharge, she received regular rehabilitation therapy and no new onsets of neurological deficits were observed. Her regular prescription included medications to control hypertension. To ensure that there were no undetected brain aneurysms, she was readmitted on 28 September 2011. At 08:30 on the next day, a second diagnostic cerebral angiography was performed using the same procedure as the last examination. The procedure lasted for \sim 35 minutes and was uneventful without any immediate complications. However, the patient complained of nausea, vomiting and urine retention at 14:00 and developed intermittent agitation symptoms from 18:00 onward. Her Glasgow Coma Scale score was E4M5V3 and her blood pressure was 130/ 72 mmHg. Physical examination revealed memory impairment, agraphia, acalculia, right-left disorientation, occasional errors in speech and finger agnosia. The muscle strength in her right limbs was 4/5. The results of laboratory examination were normal, including those of hepatic and renal function tests and for levels of electrolytes and levels of cardiac enzymes. Magnetic resonance imaging (MRI) of the brain performed 2 days later showed an acute infarction in the left middle cerebral artery territory,

including the parietal lobe and the insular ribbon (Figure 1(b)). On the basis of the physical examination and MRI findings, a diagnosis of Gerstmann's syndrome was made.

The patient received conservative treatment, followed by intensive rehabilitation therapy.

Thereafter, the patient's neurological deficits gradually improved. The patient showed no obvious residual neurological deficits a month after the SAH episode and only showed mild agraphia (phonetic paragraphia) and acalculia (difficulty in subtraction and multiplication). Moreover, the patient could independently perform ADL tasks.

Discussion

The rate of neurological complications resulting from diagnostic cerebral angiography, particularly permanent deficit, is low. Neurological complications can occur because of various reasons. The most commonly agreed upon explanation seems to be thromboembolism caused by the disruption of an atherosclerotic plaque by catheters or guide wires, which might result in a CVA. Other proposed mechanisms for development of complications include arterial dissection, platelet activation, changes in clotting factor levels and neurotoxicity of the injected contrast agents [8, 9].

The complication rates associated with diagnostic angiography have been attributed to many risk factors, e.g. patient age is one of the factors associated with an increase in the complication rate. Heiserman et al. [10] reviewed 363 patients and found no neurological complications in patients younger than 50 years. Willinsky et al. [5] reported that the rates of neurological complications in patients who were older than 55 years were significantly higher than those in patients younger than 55 years. Presence of hypertension, diabetes [11] or CVD [12] increased the complication rate. Complication rates were also high if the duration of fluoroscopic exposure was more than 10 minutes [5] or if the injected volume of contrast material was high [11]. Referral indications for neurological complications differ. For example, Cloft et al. [12] reported that patients with SAH, an aneurysm or an arteriovenous malformation have lower rates of neurological complications than those with an ischemic stroke. The above-mentioned risk factors were reviewed and it was found that hypertension might be the only causative factor for neurological deficit in the patient. However, one cannot completely exclude the risk associated with increased duration (more than 10 minutes) of fluoroscopic exposure, because the total duration of the imaging procedure for the threearteries was \sim 35 minutes.

Patients with Gerstmann's syndrome typically have a lesion localized to the dominant side (usually left) of the parietal cortex, including the angular and second occipital gyrus, the supramarginal gyrus and the superior parietal lobule [1]. Although there is no specific therapeutic guideline for the diagnosis of Gerstmann's syndrome, the prognosis of this syndrome in adults is favourable and for the symptoms to improve over time. Furthermore, rehabilitation of the patient with speech therapies and occupational therapies might help improve agraphia and acalculia. The lesion site in this patient was similar to those in previously reported cases. The patient showed excellent outcome after intensive rehabilitation, although mild residual agraphia and acalculia persisted. These findings were consistent with those observed in previously reported cases.

Conclusion

Herein, this study reported the first case of Gerstmann's syndrome associated with diagnostic cerebral angiography and discussed the complications associated with the syndrome. It is suggested that patients should be prescribed intensive rehabilitation therapies because these therapies typically result in favourable outcomes.

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