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NEUROLOGICAL UPDATE

Stroke in supplementary motor area mimicking functional disorder: a case report

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Abstract

Supplementary motor area, the posterior third of the medial aspect of superior frontal gyrus, is known to be a heterogeneous area in function. It is involved in self-initiated motor movements, planning and sequencing the motor action, response inhibition, and bimanual movements. Blood supply for supplementary motor area is mostly by callosomarginal branch of anterior cerebral artery. Stroke in anterior cerebral artery territory is relatively uncommon, moreover, isolated supplementary motor area stroke is a rare entity. Supplementary motor area stroke, as a syndrome, has variable symptoms consisting of impairment of volitional movements, hemineglect, dyspraxia of contralateral limbs, impaired muscle tone, mutism and contralateral weakness. As symptoms are sometimes ambivalent, patients may be misdiagnosed as functional disorder and lose the chance for immediate adequate treatments such as thrombolysis. We report a 59-year-old man with previous history for myocardial infarction, referred to emergency room with an acute dense right-side hemiplegia, positive Hoover sign, asymmetrical Babinski responses and intermittent ability to move his arm in some specific reflex actions despite plegia. Since brain computed tomography scan was unremarkable we could not be sure whether his symptoms were organic or functional until a diffusion weighted imaging of magnetic resonance imaging elucidated the situation. To our knowledge, there is only one case report in the literature prior to ours, presenting a supplementary motor area stroke patient, mimicking functional disorder. Therefore, we may claim our report to be the second reported case.

Keywords Supplementary motor area · Anterior cerebral artery · Stroke · Malingering · Conversion disorder · Functional disorder

Introduction

Supplementary motor complex includes supplementary motor area (SMA), supplementary eye field and pre-supplementary motor area [1, 2]. SMA located in the posterior third of the medial aspect of superior frontal gyrus is a heterogeneous area in function [3–6]. We present a case of SMA stroke mimicking functional disorder.

Case report

A 59-year-old man, with previous history for myocardial infarction, was admitted to our emergency room, suffering a dense right-side hemiplegia and mild facial asymmetry since 2.5 h earlier. His leg was externally rotated while supine with motor force of utmost 2/5. Hoover sign was positive associated with an asymmetrical plantar response. However, he could bear his own weight when was helped to stand-up. His arm was quite plegic (motor force = 1–2/5) and flaccid but when his son offered him his glasses he could reach out his right hand to grab it. When asked, he could not explain and seemed unaware of this discrepancy. There was no language or sensory involvement. He was fully conscious and oriented. Brain computed tomography scan (CTS) was unremarkable and diffusion weighted imaging (DWI) of magnetic resonance imaging (MRI) showed a small acute infarction in left anterior cerebral artery (ACA) territory corresponding to SMA (Fig. 1). Meanwhile his plegia

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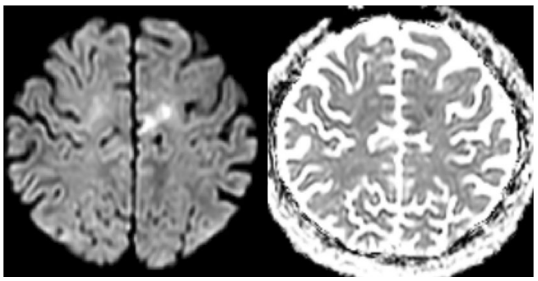

Fig. 1 Diffusion weighted imaging MRI showing a small acute infarction in left anterior cerebral artery territory corresponding to SMA

improved significantly and hence more than 3 h had passed, we decided not to do the thrombolysis and started aspirin and statins. Cardiac evaluation was normal and carotid artery ultrasound revealed a 50–70% stenosis. He was then transferred to a specialized center for carotid stenting.

Discussion

SMA is involved in self-initiated motor movements, planning and sequencing the motor action, response inhibition, and bimanual movements and recently found to have heterogeneous function in cognition [3–6].

Arterial supply for SMA is mostly by callosomarginal branch of ACA. Infarction in ACA territory consists only 3–5% of all strokes. Isolated infarction in SMA is even rarer with few case reports [3, 7, 8]. SMA syndrome, seen in infarction, neoplasm and following surgical resection, has variable symptoms such as impairment of volitional movements, hemineglect, dyspraxia of contralateral limbs, impaired muscle tone, mutism, and contralateral weakness [3–8].

Theoretically any type of stroke or neurological disease can trigger functional neurological disorder (FND), but SMA stroke to be specific may be regarded as a specific matter as its anatomic and functional role is unique, being connected strongly to emotional areas as shown in some functional imaging investigations [9, 10].

On the other hand, misdiagnosis of organic disorders as functional, has always been a dilemma to physicians. As reported in the literature, two patients with posterior circulation stroke had been misdiagnosed as functional [11]. Additionally, a case-series of 64 patients described organic pathologies misdiagnosed as functional, one of them was stroke [12].

Functional disorder, is a diagnosis of exclusion, based on the Diagnostic and Statistical Manual criteria and should be doubted when some explainable organic symptoms is found. But it is a useful clinical reminder that positive features of FND can be unreliable, especially in the context of acute neurological diseases such as stroke. Moreover, it should be noticed that FND is not a diagnosis of exclusion—it commonly co-exists with neurological disease and is diagnosed on the basis of these positive features—which sometimes may be misleading [13].

There is only one case report presenting SMA stroke mimicking a functional disorder [3], therefore, we may claim our case to be the second.

Conclusion

Differentiating functional disorders from stroke syndromes can be challenging especially when thrombolysis is considered in acute phase. On the other hand, it is a useful clinical reminder that positive features of functional neurological disorder specifically FND, can be misleading, especially in the context of stroke, and should not be regarded as diagnosis of exclusion.

Compliance with ethical standards

Conflicts of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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