Moyamoya disease and systemic sclerosis (MoSys syndrome): a combination of two rare entities

Sirs,

Moyamoya disease (MMD), a rare chronic vasculopathy, usually affects the internal carotid and upstream arteries of the circle of Willis. As a result, a typical collateral circulation develops that can be seen on imaging studies as "something hazy" in Japanese termed *moyamoya*. An unknown cause leads to intimal hyperplasia and stenosis of the affected vessels predisposing patients to stroke (1).

Herein, we report a patient who presented with new onset systemic sclerosis (SSc) and history of MMD.

In 1997, a 44-year-old otherwise healthy woman presented to the emergency room with left-sided hemiparesis due to an ischaemic stroke. One year later, she complained about an episode of vision loss that was presumably a transient ischaemic attack, but no follow-up was initiated. An underlying cause was not found and neurological deficits did not persist after these initial events.

In 2008, when an episode of cognitive impairment as well as paraesthesia of the left hand occurred magnetic resonance angiography (MRA) of the cerebral arteries revealed a severe stenosis of the right distal internal carotid artery as well as the anterior and medial cerebral arteries (Fig. 1A). The diagnosis was confirmed by digital subtraction angiography (DSA), which depicted reticular collateral vessels, typical for MMD (Fig. 1B). The patient underwent neurosurgical right-sided encephaloarteriosynangiosis which provided sufficient perfusion.

At admission to our Rheumatology Ward because of unclear novel symptoms, we saw a 62-year-old patient in a poor general condition. This woman presented with skin thickening (modified Rodnan skin score: 31), arthritis, pulmonary fibrosis (computed tomography scan of the chest revealed initial fibrotic changes in both inferior lobes), a positive ANA titer of 1:2560 and anti-topoisomerase antibodies, but no thrombophilia. Duplex sonography of the carotid arteries did not show any vascular changes. Raynaud's phenomenon was not reported neither observed. In summary, diffuse SSc was diagnosed according to the ACR/EULAR criteria (score of 14) (2).

Immunosuppressive therapy with 15mg methotrexate was commenced and increased during follow-up. Etanercept 50mg per week s.c. was added to methotrexate because of ongoing arthritis 6 month later.

Case reports on occurrence of MMD and SSc (incidence of 0.086 case or 1 per 100,000 persons, respectively) are scarce. Two records describe the development of MMD in patients with limited SSc and hypothesise that presence of vasculopathy in SSc could trigger the transformations seen in MMD (3, 4). SSc as connective tissue disease comprises cutaneous and visceral involvement. Vasculopathy which seems to be caused by interaction of destructive and proliferative obliterating mechanisms is mainly observed in small vessels (5). In this respect, endothelial dysfunction is considered a major factor in SSc pathogenesis. For both disease entities, dysbalanced MMP/TIMP quotients have been reported (6, 7).

In addition to microangiopathy, macroangiopathic components have been described as well. Significant reduction of the arterial blood flow by duplex sonography and angiography of the radial and ulnar arteries was observed in SSc (8, 9). Early nailfold capillary changes are considered to precede clinical presentations of SSc (10). Hence, in our patient the vascular changes began prior to the clinical manifestations of SSc; MMD of the cerebral arteries could have been the first manifestation of SSc.

Although MMD has been linked with immunological diseases like systemic lupus erythematosus, systemic vasculitis or Sjögren's syndrome, this case report is the first description of MMD in a patient with diffuse SSc.

Micro- and macroangiopathic changes are present in SSc. Alterations of cerebral arteries that aetiologically reflect MMD could reflect the known pathophysiologic vasculopathy in this patient with SSc. MMD should be considered as a potential cause of cerebral ischaemic events in SSc (MoSys syndrome).

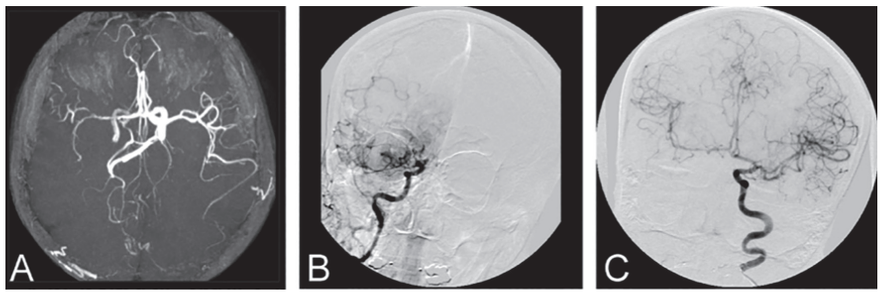

Fig.1. Magnetic resonance angiography (MRA) demonstrating a stenosis of the right distal internal carotid artery (**A**). Digital subtraction angiography (DSA) revealing severe stenosis of the right internal carotid artery at the terminal portion and abnormal vascular network (**B**) and normal left internal carotid artery and perfusion in the right middle cerebral artery via anterior communicating artery (**C**).

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