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Case Report and Literature Review

Psoriasis as the single risk factor for "Locked-in syndrome" after ischemic stroke in a young patient: case report and literature review

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ABSTRACT

Background: Locked-in syndrome (LIS), also known as cerebromedullospinal disconnection or pseudocoma, is a rare neurological disorder. LIS is most commonly caused by ischemic or hemorrhagic pontine stroke. Autoimmune diseases have been shown to increase risk of cardiovascular disease and cerebrovascular disease. Psoriasis as an isolated risk factor for LIS has not been described in literature

Case Description: A 50-year-old male patient with psoriasis and no other obvious risk factors presented to the ER after being found in his home with loss of consciousness. He was diagnosed with basilar artery thrombosis and pontine stroke which lead to post-stroke LIS.

Conclusion: Most patients seek treatment for psoriasis from a cosmetic perspective. It is important to stress the cardiovascular and cerebrovascular risks associated with untreated psoriasis to patients who refuse treatment. Our patient with locked-in syndrome makes this teaching point emphatically.

Introduction

Locked-in syndrome (LIS), also called cerebromedullospinal disconnection or pseudocoma, is a rare neurological disorder. The symptoms and signs of LIS include complete paralysis of all voluntary muscles except for the ones that control the movements of the eyes. It is most commonly caused by ischemic or hemorrhagic pontine stroke. Other causes such as trauma, infection, tumours, demyelinating disease and amyotrophic lateral sclerosis may also cause LIS. LIS is divided into three groups according to the degree of impairment. The first subgroup is the classical type in which quadriplegia and aphonia are present but cognitive functions, vertical eye movements, and blinking are preserved. The second group is incomplete impairment type which some other voluntary movements can be made except eye movement. The third group is the total impairment type in which only cognitive functions are preserved. Most locked-in syndrome patients do not recover, however, in some rare instances, significant improvement may occur.

Autoimmune diseases are shown to significantly increase risk of cardiovascular disease and cerebral vascular disease. We are presenting the case of a 50-year-old male patient with psoriasis and no other obvious risk factors who had a basilar artery thrombosis and pontine stroke which lead to post-stroke LIS.

Case Description

A 50-year-old male patient with psoriasis (for which he was on no treatment) presented to the ER after being found in his home with loss of consciousness. He had no other medical problems. Admission blood tests and drug screen were negative. Initial CT angiogram of head and neck showed acute complete occlusion with thrombus of the middle and

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distal basilar artery truck. He was intubated and admitted to the intensive care unit. Patient had mechanical thrombectomy of basilar artery truck and right superior cerebellar artery with radiological restoration of normal brain perfusion from TICI (Thrombolysis in Cerebral Infarction) Score 0 to TICI 3. However, he did not clinically improve and continues to have respiratory failure, dysarthria, dysphagia, and quadriplegia. Patient is able to communicate only via a rudimentary system by blinking his eyes for yes or no answers. He had tracheostomy and was transferred to a long-term acute care hospital.

Discussion

Autoimmune diseases such as rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), psoriasis and inflammatory bowel disease are known to have higher risk for CAD and stroke over general population. Some of these diseases, like RA, are even considered as independent risk factor for CAD and stroke by clinicians and researchers.

Previous studies have showed strong evidences that autoimmune disease is associated with stroke. In a meta-analysis, Wiseman et al. reported that the pooled odds of ischemic stroke and hemorrhagic stroke were 1.64 (95% CI, 1.32–2.05) and 1.68 (1.11–2.53) respectively in RA patient compared with the general population [1]. Another meta-analysis included 10 studies showed that in patients with SLE compared to the general population, the pooled risk ratio (RR) for overall stroke was 2.53 (95% CI 1.96-3.26), ischaemic stroke 2.10 (95% CI 1.68-2.62), intracerebral haemorrhage 2.72 (95% CI 2.15-3.44) and subarachnoid haemorrhage 3.85 (95% CI 3.20-4.64) [2]. For psoriasis patient, Armstrong et al. reported in their meta-analysis which included 165908 patients with mild psoriasis, the RR for stroke was 1.12 (95% CI, 1.08-1.16) [3]. Among 6396 patients with severe psoriasis, the RR for stroke was 1.56 (95% CI, 1.32-1.84). In a meta-analysis included 8 studies and totally 126,493 IBD patients, both Crohn's disease and ulcerative colitis showed an increased risk of stroke incidence (HR = 1.32; 95% CI, 1.13-1.56 and HR = 1.18; 95% CI, 1.06-1.31) respectively [4].

For CAD and MI, Fransen et al. reported in their meta-analysis which included 13 studies that relative risk for CAD are 1.65 (95% CI, 1.54–1.76) in woman and 1.55 (95% CI, 1.41–1.69) in men in RA patient compared to general population [5]. Erre et al also reported that coronary flow reserve (CFR), a measure of both obstructive coronary artery disease and microvascular dysfunction, were significantly lower in patients with RA than in healthy controls [6]. In a prospective study done by Goldberg et al, patients with SLE developed significantly more CAD events than matched controls followed over a median of 8 years [8]. For psoriasis patient, Armstrong et al. also suggested that in mild psoriasis, patient had a significantly increased risk of myocardial infarction (RR, 1.29; 95% CI, 1.02-1.63) and severe psoriasis was associated with a significantly increased risk of cardiovascular mortality (RR, 1.39; 95% CI, 1.11-1.74) and myocardial infarction (RR, 1.70; 95% CI, 1.32-2.18) [3]. Both Crohn's disease and ulcerative colitis were found to have increased risk of ischemic heart disease in multiple studies [9].

The mechanism for association between autoimmune diseases and cardiovascular and cerebral vascular disease is not very clear. Systemic inflammation is the most possible mechanism. Clinical study showed that risk of CAD and stroke in autoimmune diseases usually higher at younger age. Wiseman et al. reported that stroke risk across rheumatic diseases is highest in those aged <50 years [OR, 1.79 (1.46–2.20)] and reduces relatively with ageing [>65 years: OR, 1.14 (0.94–1.38)] [1]. Similar trend was also observed in other autoimmune disease like SLE and psoriasis. This phenomenon is an indirectly evidence that systemic inflammation contributes more than traditional atherosclerotic risk factor in the development of CAD and stroke in autoimmune disease patient. Endothelial dysfunction has been shown in autoimmune disease patients like rheumatoid arthritis. Reduced number and impaired function of endothelial progenitor cells, impaired responsiveness to nitric oxide (NO), elevated level of monocyte chemotactic protein-1 (MCP-1)-induced protein and elevated level of asymmetric dimethylarginine are among the most important contributors to endothelial dysfunction in autoimmune disease [10-13]. Early arterial stiffness and calcification are also involved in the development of CAD and stroke in autoimmune diseases patient [14, 15]. Factors such like cytotoxicity, pro-inflammatory cytokine and matrix metalloproteases may attribute to increased atherosclerosis of vasculature in autoimmune disease patient. For example, Warrington et al showed that CD4+CD28null T cells were significantly higher in patients with CAD and co-existent RA and expansion of CD4+CD28null T cells in these patients may contribute to the progression of atherosclerosis [7]. Basic researches have also showed that autoimmune disease and cardiovascular, cerebral vascular disease share common pro-inflammatory cytokine such as Interleukin-32 and Interleukin 17 [16, 17].

Disease-modifying anti-rheumatic drug (DMARD), corticosteroid and biologic agents' treatment for autoimmune disease showed controversial results on its impact on CAD and stroke. Methotrexate use has been shown to be associated with a lower risk for cardiovascular events in RA patient [18, 19]. On the contrary, other study showed methotrexate significantly increased mortality in patients with rheumatoid arthritis and cardiovascular comorbidity [20]. Ajeganova et al showed that incidence of ischemic coronary artery events was similar in RA patients treated with low-dose prednisolone versus placebo, whereas the risk of ischemic cerebrovascular events was higher in the prednisolone group [21]. On the contrary, corticosteroid therapy was shown to be associated with a reduced risk of CV death in RA patient with pre-existing CAD [22]. Biologic agents, such as TNFα-inhibitors, also showed controversial results on its impact on CAD and stroke in psoriasis patient [23, 24]. For RA patient, results are consistent which suggesting that TNFα-inhibitors are likely useful in the prevention of cardiovascular complications of RA [25]. Other biologic agents, like Abatacept, rituximab or tocilizumab require more studies to get information about their effect on CAD and stroke in autoimmune disease patient.

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