



Multiple Sclerosis with Stroke: Should it be anticipated?

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Background

Multiple sclerosis is an auto immune disorder of the central nervous system characterized by chronic inflammation, demyelination, gliosis and neuronal loss. The course of this disease can be relapsing-remitting or progressive. Prevalence of Multiple sclerosis as such is 0.2-0.3% and once diagnosed, patients can present with various vascular complications during the course of their illness. We report a rare case of a young middle-aged patient who was diagnosed to have multiple sclerosis (relapsing remitting variant) and within one year of diagnosis, he presented with two different complications of multiple sclerosis i.e ischaemic stroke and pulmonary thromboembolism.

Case description

A 38 year old male was admitted from our OPD with complaints of gradually progressive motor weakness of bilateral lower limbs and right upper limb in the form of slipping of footwear, difficulty in walking without one man support and difficulty in holding objects with the right hand since the past 4 month. He also experienced paroxysmal sensations of pins and needles over bilateral lower

limbs. Patient complained of a disturbance in gait due to muscle weakness in bilateral lower limbs since the past 3 months. According to him, his symptoms were aggravated with exercise or his daily activity. He also experienced urinary urgency with over flow in continence since last 2 months.

Patient recited that he had experienced similar symptoms 3 years back with complete recovery over a period of 6 months. Clinical examination revealed a UMN type of motor weakness in his affected limbs with clasp knife spasticity, reduced power, brisk deep tendon reflexes and Babinski sign positive bilaterally. Signs of in coordination were present over the right side of the body. The patient had a spastic paraplegic gait.

Investigations like MRI brain showed multiple active pericollous subcortical plaques with similar plaques at C₂₋₃ and C₄₋₅ level on MRI spine. CSF analysis showed presence of oligo-clonal bands and mild pleocytosis. Visual Evoked Potential studies suggested of bilateral optic neuritis.

Based on the revised McDonald's criteria, he was diagnosed as a case of Multiple Sclerosis (Relapsing Remitting variant) with lesions or episodes being disseminated in space as well as

time. His Kurtzke's Expanded Disability Status Score (EDSS) was calculated as 2.5. After a short course of injectable methyl prednisone (MSTT-94) administered at 1g/kg, patient was discharged on a tapering dose of oral prednisone as a part of treatment of the acute attack of multiple sclerosis. Patient was also started with DMARD's in the form of interferon B1A 30mcg once weekly intramuscular injections. Patient had started experiencing significant improvement during the course of his hospital stay.

Five days later, he again presented to the emergency with history of sudden onset weakness of the right side of the body with inability to speak. Physical examination revealed a UMN type dense right sided hemiplegia along with a Left Facial Nerve UMN type palsy and pure motor aphasia (Brocca's aphasia). An urgent MRI Brain was performed which confirmed an acute, left, Middle Cerebral Artery territory evolving infarct. Patient being in the window period, was thrombolysed with rTPA (recombinant tissue plasminogen activator) or alteplase and he showed near complete recovery over the next 4 weeks.

Two months later the patient was rushed to the emergency with complaints of sudden onset palpitation and shortness of breath since 2 hours. Examination in the emergency revealed tachycardia (heart rate 170/min), tachypnea (respiratory rate 40/min) and hypotension (blood pressure 90/60mm Hg). Respiratory system examination showed vesicular breath sounds with no adventitious sounds on auscultation in bilateral lung fields. An electrocardiogram performed in the emergency showed supraventricular tachycardia with regular RR interval. Patient was subsequently reverted to sinus rhythm with a single bolus of injection adenosine. However his breathlessness did not subside and he was intubated and put on mechanical ventilation in view of dropping oxygen saturation and tachypnea. Arterial blood gas analysis suggested of hypoxia. Patient was worked up for cause of his acute onset dyspnea and palpitation. D-dimer levels were markedly elevated (3825ng/ml). PT

INR was deranged (PT 19 sec, INR 1.64). CT pulmonary angiography done confirmed pulmonary thromboembolism involving the right and left pulmonary artery bifurcation extending into branches involving the bilateral upper and lower lobes. 2D Echocardiography showed mild right ventricular dilatation.

There was enough evidence to make a diagnosis of acute pulmonary thromboembolism. Patient was given injection low molecular weight heparin 40mg bid for 5 days and started on oral anticoagulant warfarin and dual antiplatelet clopidogrel plus aspirin. His condition improved over the next one week and was discharged subsequently and asked to monitor his prothrombin time on a weekly basis.



Fig 1a: MRI spine 3 years before current presentation showing active plaques in cervical spinal cord and at cervico-medullary junction.



Fig 1b: MRI spine at current presentation showing active plaques at C₂₋₃ and C₄₋₅ level

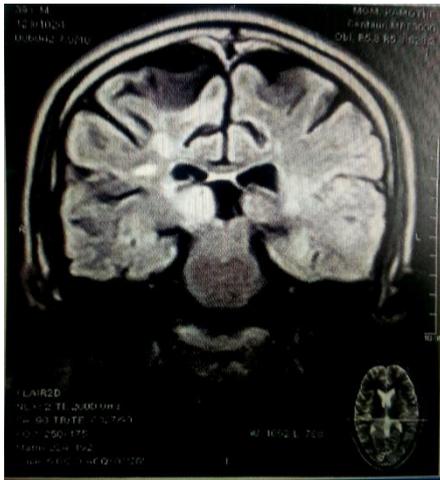


Fig 1c: MRI brain coronal section (T2 weighted image) showing multiple active pericortical, subcortical plaques.

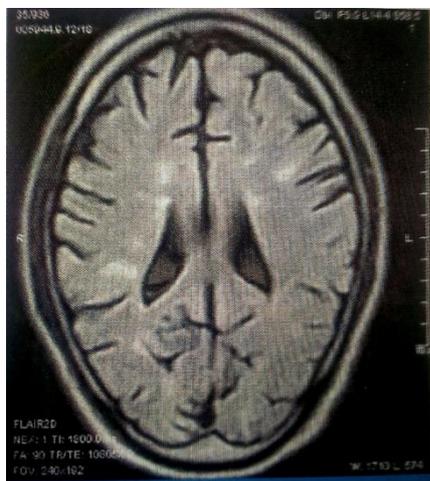


Fig 1d: MRI brain axial section (T2 weighted image) showing multiple active pericortical, subcortical plaques

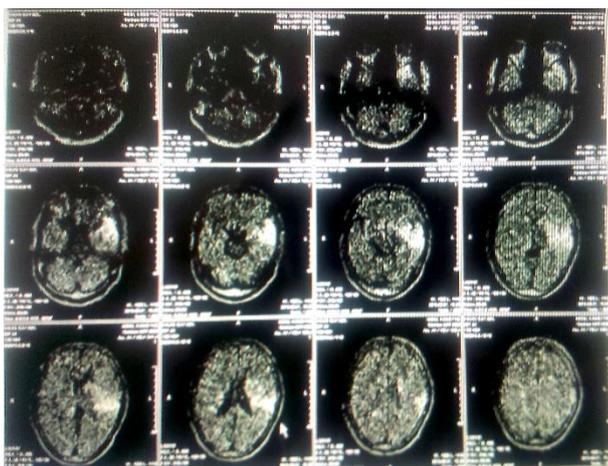


Fig 1e: MRI brain (diffusion image) revealing a large, evolving left ganglio-capsular infarct in the middle cerebral artery territory.

Discussion

Multiple Sclerosis is a chronic inflammatory disease that breaks down the central nervous system, and is the most common neurological cause of disability amongst young people. Multiple Sclerosis is associated with an increased risk of vascular events such as stroke, myocardial infarction, congestive cardiac failure and venous thrombosis and pulmonary thromboembolism within the first few years of diagnosis compared with the general population. This is of particular significance in young and middle aged patients especially females diagnosed to have multiple sclerosis. The risk declines thereafter, but remains elevated for stroke and venous thromboembolism. Shared risk factors, linked pathogenesis, and bias may contribute to the association. Inflammatory processes including autoimmune diseases which ignite vascular endothelial dysfunction and atherosclerosis and the presence of certain shared risk factors may promote development of arterial and venous vascular diseases in such patients.

Multiple sclerosis (MS) and stroke pathology are characterized by blood–brain barrier breakdown, leucocyte emigration, and tissue destruction. Each process is thought to involve the matrix metalloproteinases (MMP). MMPs are expressed in inflammatory lesions in the central nervous system, but their individual expression is dependent on the nature and chronicity of the lesion. However, the general pattern of expression, in perivascular cuffs and in active lesions, supports a role for these enzymes as mediators of blood–brain barrier breakdown and tissue destruction, both in MS and in cerebral ischaemia.

References

1. Marrie RA, Reider N, Cohen J, Stuve O, Trojano M, Cutter G, et al. A systematic review of the incidence and prevalence of cardiac, cerebrovascular, and peripheral vascular disease in multiple sclerosis. *Mult Scler* (2015) 21:318–31. [10.1177/135245851524585-](https://doi.org/10.1177/135245851524585-)

- 14564485 [PMC free article] [PubMed]
[Cross Ref]
2. Roshanisefat H, Bahmanyar S, Hillert J, Olsson T, Montgomery S. Multiple sclerosis clinical course and cardiovascular disease risk – Swedish cohort study. *Eur J Neurol* (2014) 21:1353– e88. 10.1111/ene.12518 [PubMed] [Cross Ref]
 3. Christiansen CF, Christensen S, Farkas DK, Miret M, Sørensen HT, Pedersen L. Risk of arterial cardiovascular diseases in patients with multiple sclerosis: a population-based cohort study. *Neuroepidemiology* (2010) 35:267–74.10.1159/000320245 [PubMed] [Cross Ref]
 4. Tseng CH, Huang WS, Lin CL, Chang YJ. Increased risk of ischaemic stroke among patients with multiple sclerosis. *Eur J Neurol* (2015) 22:500–6.10.1111/ene.12598 [PubMed] [Cross Ref].