Stiff Person Syndrome

Renu Saigal¹, Laxmikant Goyal², RN Yadav³, Abhishek Agrawal¹, Pradeep Mital⁴, Bhavesh Patel⁵

Abstract
Stiff-person syndrome or Moersch-Woltmann is a very rare and disabling neurologic disorder characterized by muscle rigidity and episodic spasms involving axial and limb musculature. It is an autoimmune disorder resulting in a malfunction of aminobutyric acid mediated inhibitory networks in the central nervous system. We describe a patient of stiff person syndrome.

Introduction
Stiff person syndrome (SPS) or Moersch-Woltmann syndrome is characterized by axial muscle rigidity, progressive stiffness, and spontaneous, reflex or action-induced painful spasms of the paraspinal, abdominal and occasionally proximal leg muscles associated with exaggerated lumbar lordosis.¹ Electrophysiological studies show continuous motor unit activity with abnormal exteroceptive reflexes with a normal interference pattern during spasms.¹

Antiglutamic acid decarboxylase (GAD) antibodies in both serum and cerebral spinal fluid (CSF) with additional evidence of autoimmune disease are features of this syndrome.²

Case History
A 38-year-old man of North Indian origin presented with a 3-year history of progressive stiffness and painful spasms of his trunk muscles, lower part of back and proximal part of both lower limbs, with recent worsening of his condition over the last few weeks resulting in a considerable difficulty in standing up and walking. There was history of diabetes for 5 years which was controlled on insulin. There is no history of any autoimmune diseases. The family history was unremarkable.

On admission, the lower limbs were rigid with a flexion of the hips and knees, movements were severely limited and painful, and strength could not be assessed because of rigidity and spasms. There was restriction of lateral and forward flexion at lumbar spine (Figure 1). Increased tone was noted in limbs. Sensory examination was normal. Deep tendon reflexes were normal in upper limbs and brisk in lower limbs. Plantar response was flexor bilaterally. His gait was robotic due to stiffness of limb muscles. There was exaggerated lumbar lordosis. Results of routine laboratory tests including complete blood count (CBC), serum electrolytes, blood urea nitrogen, serum creatinine, serum glucose and liver enzymes were normal. The erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) values were normal. Free T4, TSH were normal. Chest x-rays and abdominal ultrasonography revealed no abnormalities. MRI of lumbo-sacral spine showed exaggerated lumbar lordosis.

Earlier he was diagnosed as a case of ankylosing spondylitis and was given infliximab but he did not respond. In view of exaggerated lumbar lordosis with stiffness of limb muscles and muscle spasms which were aggravated by noise, light, movement and pin prick and relieved by sleep, calm environment along with robotic posture and type 1 diabetes; diagnosis of Moersch-Woltmann syndrome or stiff person syndrome was kept and he was further evaluated.

Antibody against glutamic acid decarboxylase was positive (>2000 nmol/L) (normal ≤0.02 nmol/L). EMG (electromyogram) showed continuous involuntary firing of motor units in lower limb muscles with normal insertional activity and no spontaneous activity in the upper limb muscles. Treatment with oral clonazepam was started after which there was a dramatic improvement of the clinical features with marked reduction of the hypertonus and the patient could walk with little aid. Daily baclofen (10 mg thrice daily) provided complete relief of symptoms.

Discussion
Stiff person (or stiff man) syndrome is also known as Moersch-Woltmann syndrome.¹ It has no genetic predisposition. There is insidious onset and it affects middle-age persons. It is characterized by persistent and intense spasms, particularly of the proximal lower limbs and lumbar paraspinal muscles with exaggerated lumbar lordosis.² Table 1 lists differential diagnosis. Stiffness is aggravated by noise, sensory stimulus and any movement. Stiffness disappears during sleep, with proximal nerve block, general anaesthesia and use of benzodiazepine.³ Antibodies against glutamic acid decarboxylase (GAD) are found in 65-70% cases.³ GAD is synthesizing enzyme for GABA (γ-aminobutyric acid) so antibodies against it results in decreased synthesis of GABA. The imbalance between the spinal inhibitory (GABAergic) input and the excitatory input to alpha motor neurons results in continuous stimulation of motor neurons and stiffness of muscles. Moersch-Woltmann syndrome is usually associated with other autoimmune disorders i.e. type 1 diabetes mellitus (60% of cases), autoimmune thyroiditis, myasthenia gravis, pernicious anemia and immune-mediated vitiligo.¹ It may be a paraneoplastic manifestation in breast cancer, small cell lung cancer and Hodgkin’s lymphoma.⁴

In patients negative for GAD antibody, other possible pathophysiologic etiologies includes postsynaptic elements such as synaptophysin, amphiphysin (associated with paraneoplastic form),⁵ gephyrin,¹ and GABA-transaminase.

Electromyography characteristically

¹Former Professor and Head, ²Assistant Professor, ³Associate Professor, ⁴Professor, ⁵Resident, Department of Medicine, SMS Medical College, Jaipur, Rajasthan

Received: 06.06.2014; Revised: 22.07.2014; Accepted: 28.07.2014
shows continuous involuntary firing of motor units with normal insertional activity with preserved silent period. Benzodiazepines (diazepam, clonazepam) are effective initial therapy for SPS. Baclofen can be used in unresponsive cases. Corticosteroids are used when patients are refractory or intolerant to benzodiazepines and or baclofen.  

References


Table 1: Causes of stiffness with exaggerated lumbar lordosis

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<th>Syndrome</th>
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<tr>
<td>Stiff person syndrome</td>
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<tr>
<td>Neuromyotonia or Issacs syndrome</td>
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<td>Tetanus</td>
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<td>Strychnine poisoning</td>
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Fig. 1: Exaggerated lumbar lordosis