Case Report

# Stiff Leg Syndrome : A Case Report

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**ABSTRACT**

Stiff person syndrome (SPS) is a rare disorder characterized by progressive fluctuating muscular rigidity and spasms. Glutamic acid decarboxylase (GAD) antibody is primarily involved in the pathogenesis of SPS. Stiff leg syndrome (SLS) is a newly emerging entity considered as focal form of SPS in which symptoms are confined to distal limb usually the leg although sometimes this progresses to involve the axial musculature as well. Here we report a case of stiff leg syndrome confirmed by electromyography with high serum level of GAD antibodies.

## INTRODUCTION

Stiff person syndrome (SPS) is characterized by axial rigidity, progressive stiffness, and spontaneous, reflex or action induced painful spasms of the paraspinal, abdominal and occasionally proximal leg muscles associated with a lumbar hyperlordosis. The symptoms are progressive and may fluctuate.[1] Most patients with classical SPS have antibodies against glutamic acid decarboxylase (GAD), but there are also paraneoplastic variants, commonly secondary to breast cancer or small cell lung cancer. Both classical and paraneoplastic SPS have an autoimmune basis and are strongly associated with other autoimmune diseases.[2] During the last few years, several cases with SPS were reported whose symptoms were confined to one lower limb. The condition was named as the "stiff leg" or "stiff limb" syndrome (SLS).[3] We describe a patient with signs and symptoms closely resembling those seen in cases of SLS.

## CASE REPORT

A 38 year female known case of epilepsy presented with tightness and painful spasms in left lower limb with difficulty in walking since 8 months which was progressive in nature. Symptoms persisted throughout the day and relieved in sleep. There was worsening of her condition over the last few months resulting in a considerable difficulty of standing up and walking and she developed fixed posturing of her left lower limb. There was no past history of diabetes, or other auto-immune diseases. The family history was unremarkable. On examination the left lower limb were rigid and had genu recurvatum, movements were severely limited and painful, and strength could not be assessed because of rigidity and spasms. Power in other limbs was normal. No paraspinal or axial contractions were palpated. Sensory examination was normal. Deep tendon reflexes were normal . She had an intact intellect and there were no other neurologic abnormalities.

Results of routine investigations including complete blood count, renal and liver function test, viral markers, ESR and CRP were normal. Glycosylated hemoglobin and thyroid function test was normal. Cerebrospinal fluid examination was unremarkable .MRI brain with whole spine screening was also done which was normal. Electromyography revealed spontaneous continuous MUAP discharges (figure 1) in biceps, triceps, paraspinals, Vastus Medialis, Tibialis Anterior, Gastrocnemius. Her paraneoplastic profile, anti amphiphysin was negative and antiGad antibody was positive. Female tumor markers were negative and CT thorax plus abdomen was done which was normal. We again did her EMG after giving IV diazepam which abolished continuous MUAP discharges in biceps and triceps. She showed gradual improvement and diminished pain by treatment with diazepam, baclofen, steroids and plasmapharesis.

**FIGURE 1 EMG showing spontaneous continuous MUAP discharges**

**Vastus Medialis** **Triceps** **Paraspinals**

## DISCUSSION

Stiff-person syndrome is an autoimmune disease, and the anti-GAD antibody is primarily involved in the pathogenesis of SPS. Glutamic acid decarboxylase is the

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rate-limiting enzyme for gamma amino butyric acid (GABA) synthesis. Because GABA is the major inhibitory neurotransmitter in the central nervous system, it has been believed that the dysfunction of GABAergic pathways is involved in the pathogenesis of SPS.[2] A proposed mechanism for the development of stiffness is that the loss of GABAergic input into motor neurons produces tonic firing at rest and leads to excessive excitation in response to sensory stimulation.[4] This theory was supported by the presence of high-titer anti-GAD antibodies in more than 85% of patients and the reduction in brain GABA.2 SPS affects twice as many women as it does men.[5] In patients positive for anti- GAD antibodies, there was a strong association with other organ-specific autoimmune diseases, such as insulin-dependent DM, hypothyroidism, Grave's disease and pernicious anemia.[2] It is also known that approximately ten percent of GAD antibody-positive SPS patients have epilepsy[4] and, conversely, that the presence of anti-GAD antibodies in epilepsy, especially TLE, is not a rare condition.[6] In GAD antibody-positive patients with epilepsy, there is a significant increase in the frequency of inhibitory postsynaptic potentials in hippocampal neurons, which may suggest that anti-GAD antibodies specifically interfere with the GABAergic synapses of the hippocampus, a critical site in the pathogenesis of TLE.[2,6]

| Diagnostic criteria of SPS by Dalakas[7] |
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| 1. Episodic stiffness of the muscles mostly involving axial muscles leading to fixed deformity. |
| 2. Episodic muscle spasms, triggered by sounds, stress or touch. |
| 3. Continuous co-contraction of agonist and antagonist muscles, confirmed by electromyography. (subsides with diazepam)* |
| 4. An absence of other neurologic disorders which cause stiffness and rigidity. |
| 5. Presence of serum anti-GAD antibodies or amphiphysin autoantibodies . |

*Not a part of Dalakas criteria but commonly included in diagnostic criteria.

"SLS" is a variant of "stiff person syndrome" (SPS) which is a rare auto-immune neurological condition first described in 1956 by Moersch and Woltman.[8] It is usually GAD autoantibody-negative and only partially respond to GABAergic treatment. Other variants include progressive encephalitis with rigidity and myoclonus (PERM), paraneoplastic variants associated with anti-amphiphysin or - gephyrin antibodies.[9] Current therapeutic strategies for SPS are divided into two categories: the first category includes GABA- enhancing drugs known to interact with pharmacologic mechanisms underlying the production of muscular rigidity, and the second category includes immunomodulatory agents.[2]

| Antibodies | Better treatment response[10] |
|---|---|
| Anti- GAD positive | IV immuoglobulins |
| Anti amphiphysin antibody | Steroids, plasmapheresis |
| GABARAP antibody | IV immuoglobulins |
| Glycine R alpha 1 antibody | Better response to immunotherapy than GAD positive |

## CONCLUSION

In conclusion, we present a case of stiff leg syndrome confirmed by electromyography with positive anti-GAD antibody. Stiff leg syndrome is a newly emerging entity confined to distal limb usually the leg may progress to involve the axial musculature. Though stiff leg syndrome is usually GAD autoantibody - negative but clinical suspicion and the measurement of anti - GAD antibody are essential for the diagnosis. Early diagnosis and appropriate treatment are important to improve the prognosis.

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