Lambert-Eaton Syndrome

Lambert-Eaton syndrome, or Lambert-Eaton Myasthenic Syndrome (LEMS), is a neuromuscular disorder that typically occurs as a paraneoplastic syndrome from malignancies, such as small cell lung cancer. This is caused by antibodies against the presynaptic calcium channels, inhibiting release of acetylcholine. Patients display morning weakness, which is overcome with repeated muscle use. This is distinguished from myasthenia gravis by the weakness gradually being overcome, not worsened with use. Furthermore, in Lambert-Eaton, extraocular muscle sparing is typically seen. This disorder can be diagnosed with increased muscle strength with repeated EMG stimulation, as well as a negative tensilon test.



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Mechanism

Autoantibody to the Presynaptic Calcium Channel on Motor Neurons

Ant-tie-bodies at Presynaptic Calcium-cow Channel

In Lambert-Eaton syndrome, autoantibodies against voltage-gated presynaptic calcium channels decrease the amount of calcium that can enter the nerve terminal. This decreases the amount of acetylcholine released into the neuromuscular junction.

Inhibits Acetylcholine (ACh) Release at Neuromuscular Junction

Inhibiting-chains on A-seagull-cola at Neuromuscular Junction

Antibodies against presynaptic calcium channels inhibit the release of acetylcholine-containing synaptic vesicles. Normally, these vesicles are released into the synaptic cleft and stimulate the acetylcholine receptors on the muscle. The muscle then contracts.

Paraneoplastic Syndrome

Parachuting-neoplasms

Lambert-Eaton syndrome is associated with lung malignancies, thus making it a paraneoplastic syndrome, which is defined as a condition that arises as a result of cancer elsewhere in the body. It most often is linked with small cell carcinoma, but can also occur with autoimmune disorders like diabetes mellitus type I and hypothyroidism.

Small Cell Lung Cancer

Small Lung Tumor-guys

This syndrome is most highly associated with small cell lung cancer. Of small cell lung cancer patients, 1–3% have Lambert-Eaton syndrome. In most of these cases, Lambert-Eaton associated weakness is the first symptom of the lung cancer, and the cancer is otherwise asymptomatic.

Symptoms

Proximal Muscle Weakness

P-proximal Drooping Muscles

Patients with this syndrome display proximal muscle weakness, usually of the arms and legs. Proximal muscles (those closest to the trunk) are predominantly affected; this leads to difficulties climbing stairs and rising from a sitting position.

Improves with Muscle Use

Muscles Improving with Use

Clinically, with Lambert-Eaton syndrome, we see that the muscle weakness is worst in the mornings, and improves with muscle use throughout the day.

Autonomic Symptoms

Atomic-auto

Apart from skeletal muscle, the autonomic nervous system also requires acetylcholine neurotransmission; this explains the occurrence of autonomic symptoms in Lambert-Eaton syndrome. Most often, the autonomic symptoms include dry mouth, impotence, blurred vision, impaired sweating and constipation.

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Extraocular Muscle Sparing

Eye Muscles Okay

Patients typically have extraocular muscle sparing. Weakness of the eye muscles is uncommon, though some may have double vision and drooping of the eyelids. This distinguishes Lambert-Eaton from myasthenia gravis, in which eye signs are much more prominent.

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