

AUTONOMIC DISORDERS PROGRAM



Stanford Autonomic Disorders Program Research

In the field of autonomic disorders, the group I lead at our institution optimized certain techniques of autonomic assessment which have become now among the standards of testing. For instance, we have demonstrated the importance of changing time measurements and paying close attention to the configuration of sweat responses as a tool to differentiate various types of small fiber neuropathies.

In the field of GI dysfunction, our group was the first to show the role that autonomic dysfunction plays in the etiology of gastroesophageal reflux. We also showed that, contrary to a widely held belief, patients with dysautonomia and gastric fullness exhibit rapid gastric emptying more often than slow emptying. This altered the way we manage these patients, and the differences could have clues to the underlying etiology of their disorder.

Our group found that autonomic impairment accounts for a significant amount of the GI manifestations in patients with inflammatory bowel disease. We were also the leaders in studying the pattern of autonomic nervous system function in adult patients with cyclic vomiting syndrome, and our findings currently have significant implications pertaining to the management.

Another condition we studied is that of rhinitis. It is estimated that chronic rhinitis affects 33 million U.S. residents and results in 22 to 25 million physician outpatient visits at an annual cost of \$6 billion. Approximately one half of those affected have what is termed non-allergic rhinitis. The diagnosis of non-allergic rhinitis includes both vasomotor rhinitis and non-allergic rhinitis with eosinophilia syndrome (NARES). Symptoms of vasomotor rhinitis include intermittent nasal obstruction, rhinorrhea, and headaches that often occur in response to physical stimuli such as cold air, tobacco smoke, sudden temperature changes, wet extremities, and emotional stimuli. The pathophysiology of vasomotor rhinitis is unknown, and our group found evidence that the autonomic nervous system is involved. The autonomic nervous system regulates the vascular tone, secretory function, and inflammatory status of the sinonasal

cavity. Optimal function of the autonomic nervous system depends on a delicate balance between the parasympathetic nervous system composed of cholinergic fibers and the sympathetic nervous system composed of adrenergic fibers. Our study showed that an imbalance in parasympathetic and sympathetic input to the sinuses, nasal cavity and the upper or lower respiratory tract is associated with vasomotor nasal symptoms and chronic respiratory tract inflammation.

Our group evaluated the association between sleep disorders and autonomic dysfunction. We found a strong association between sympathetic dysfunction and obstructive sleep apnea. The association became even stronger when we considered those with obstructive sleep apnea and hypertension, leading to increased cardiovascular morbidity. We also found that patients with parasympathetic dysfunction had primarily insomnia. The mechanisms of such associations are not known, but we believe that the association could be due in part to the close anatomical proximity of the control centers for both sleep and autonomic nervous system in the hypothalamus. Therefore, any disease process that involves the autonomic nervous centers may have impact on the sleep centers.

Finally, our group is one of the most active in using skin biopsies to evaluate small fiber and autonomic neuropathies. This technique has revolutionized the approach to autonomic and small fiber neuropathies. We were among the earlier investigators who developed normative data. Our group was also one of the earliest to study its value in patients with idiopathic autonomic and painful neuropathy. We conclude that combining neurophysiological and morphological changes is very useful in the diagnostic approach to these difficult neuropathies. Given the vast extent of the autonomic nervous network within the body, I believe that my work has broad implications for further understanding of various neurologic and systemic conditions where body homeostasis is impaired.

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