

## ■ BP recovery from Valsalva maneuver in autonomic failure

Vogel et al. studied blood pressure (BP) changes in response to Valsalva maneuver to assess the integrity of baroreflexes. BP recovery time following termination of Valsalva maneuver provides an index that quantitates the full range of severity of systemic adrenergic failure in patients with autonomic failure.

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## ■ Is time of the essence? The continuing search for a noninvasive measure of sympathetic adrenergic function

Commentary by Roy Freeman, MD, and Christopher Gibbons, MD

Vogel et al. propose that the BP recovery time following phase III of the Valsalva maneuver is a useful index of sympathetic function, particularly in patients with severe sympathetic adrenergic dysfunction. Clinical evaluation of the sympathetic nervous system usually entails the use of tests that indirectly measure autonomic function. The assessment of muscle sympathetic nerve activity with microneurography is a direct measure of sympathetic adrenergic function. A tungsten microelectrode, several microns in size, is inserted into a fascicle of a distal sympathetic nerve to the skin or muscles. Using this technique sympathetic outflow to skin and muscle can be measured at rest and in response to physiologic perturbations. While this technique provides direct information on sympathetic outflow, it is invasive, technically difficult, labor intensive, and currently used only in research studies.<sup>1</sup>

The assessment of venous plasma catecholamine levels provides a more direct measure of sympathetic function but this too has limitations. Plasma norepinephrine levels are determined by both the spillover (the appearance rate of norepinephrine in the plasma) and the clearance (the volume of plasma that

is emptied of norepinephrine per unit time). Static measurements of plasma norepinephrine concentration therefore may not provide an accurate index of sympathetic function. The amount of norepinephrine released into the plasma (norepinephrine spillover) can be measured by determining the dilution of radiolabeled norepinephrine—the isotope dilution method—but this too is not suitable for clinical use.<sup>2,3</sup>

The widely used clinical tests of sympathetic adrenergic function are the BP response to an orthostatic stress (head up tilt or stand) and the BP response to a Valsalva maneuver. The response to orthostatic stress is a specific test, provided volume depletion and dehydration are excluded, but, due to system redundancy, the test lacks sensitivity.<sup>4</sup>

The fall in BP during phase II of a Valsalva maneuver and the overshoot in phase IV of the maneuver may be more sensitive measures of sympathetic function but this test also has deficiencies. Vogel et al. draw attention to one of these—the inability to quantify the late phase II BP response, perhaps the most sensitive measure derived from the maneuver, in severe or even moderate autonomic failure. Their article

shows that the BP recovery time from phase III (a largely mechanical fall in BP) correlates with other measures of sympathetic function. They propose that this measure will provide a quantitative index of adrenergic function when the late phase II of the Valsalva maneuver is absent or unrecordable.

This suggestion provides additional data without additional testing.

The current study was retrospective, but clearly shows a difference among groups with differing degrees of sympathetic adrenergic failure. A prospective evaluation is needed before this can be adapted to clinical practice, but this measure may be an important complement to the evaluation of patients with autonomic disorders.

### References

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