

Vasodilator Therapy in Hot Weather: A Warning



Hot, dry weather experienced every summer in the Desert Southwest is associated with an increase in the occurrence of syncope.^{1,2} Almost invariably, these syncopal episodes occur in older individuals who are taking anti-anginal, anti-heart failure, or anti-hypertensive pharmacological therapy. During my many years of practice in Massachusetts, I did not observe that summer months were associated with an increase in the number of patients who fainted.

However, shortly after arriving in Tucson, one of my patients made me aware of the medical implications of the hot and dry summer weather conditions here in Arizona. This patient was a retired US Army nurse with a long history of hypertension and coronary artery disease. One of the medications she was taking was enalapril 20 mg twice a day. On one occasion when I saw her in clinic during the month of July and was reviewing her list of medications, she informed me that she was taking enalapril 10 mg twice a day. When I told her that the medical record stated she was taking 20 mg twice a day, she replied “Doctor, if I took 20 mg in the summer, I would not be able to get out of bed in the morning because I would be so dizzy.” That moment represented an “A-ha” event for me. Of course, one could not take the same dose of a blood pressure depressing medication during the hot and dry Arizona summer months that one could tolerate during cool winters. In fact, all of us living in the Desert Southwest are slightly dehydrated and vasodilated during the summer because of the meteorological conditions.

Subsequently, I noticed that patient values for blood urea nitrogen tend to be modestly higher during the summer than during the winter. This supports the idea that we are all moderately dry during the hot Arizona summers. One time during inpatient attending rounds, I related the story detailed above while we were discussing a patient who had fainted in a local restaurant. At that time, one of our cardiology fellows, Jennifer Huang, volunteered to investigate the

incidence and predisposing factors related to syncope in Tucson during the summer months and compare those numbers with what occurred during the winter. This discussion led to the 2 studies cited above.^{1,2} The two investigations demonstrated that the incidence of syncope in Tucson was higher during the summer than during the winter. Moreover, blood pressure lowering medications were invariably involved.

During the last 2.5 months (June, July, and half of August 2022) when I was the attending on the inpatient cardiology consultation service, I saw 6 elderly geriatric patients with syncope resulting in a variety of traumatic injuries that included an extensive subdural hemorrhage, a comminuted fracture of the nasal bone, and several hip and humeral fractures all requiring surgical intervention. These patients had been previously diagnosed with difficult to control hypertension or heart failure with reduced left ventricular ejection fraction. Each of these individuals was receiving substantial doses of blood pressure depressing medications including vasodilating agents. The heart failure patients were all taking Entresto (sacubitril/valsartan), a double vasodilator. Moreover, all of them on admission to the hospital had systolic blood pressures less than 115 mm Hg. Once their vasodepressors were discontinued, their systolic blood pressures rose to the 130-140 mm Hg range. These patients had all suffered orthostatic symptoms for several days before fainting. A recent phase IV post-marketing study involving more than 68,000 patients on Entresto therapy found that 792 or 1.16% had suffered aggravated syncope (ie, syncope with total loss of consciousness).³ The overwhelming majority were in the geriatric age group.

The lesson for daily clinical practice from our studies and from the patient anecdotes just described is clear: Weather conditions must be considered when treating patients with blood pressure lowering medications in areas with very high ambient temperatures. Patients should often lower the dosage of their anti-hypertensive, anti-anginal, and anti-heart failure medications when the local temperatures are high. This is particularly relevant if humidity is low. I expect this clinical problem to increase in the future as our planet continues to warm.

I strongly encourage all my elderly patients to invest in an automatic blood pressure measuring device. These

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machines are relatively accurate and reasonably priced at pharmacies and large warehouse shopping entities such as Walmart and Target. I advise patients to sit quietly for a few minutes in the morning and then record a blood pressure. If the systolic number obtained is lower than 120 mm Hg, I suggest that they cut in half the dosage of one of their blood pressure lowering medications, usually a vasodilator such as losartan, amlodipine, or lisinopril. Furthermore, I encourage them to keep a diary of the recorded blood pressure readings so that later we can define an individualized dosage regimen for summer and winter months. Patients are also encouraged to contact me if they are experiencing recurrent orthostatic symptoms. Bearing this in mind, I am particularly careful when treating patients who are receiving Entresto therapy. It has been my repeated observation that elderly patients, particularly those with a widened pulse pressure, do not tolerate aggressive blood pressure lowering as shown by the examples described above. The old dictum still applies in the 21st century: *Primum non nocere*.

As always, I am happy to hear from readers at jalpert@email.arizona.edu or jalpert@arizona.edu.

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