

"You may have recently reviewed the article in Western New York Physician provided by Matthew Funderburk, MD, FACC. In the article, Dr. Funderburk provides the reader with tips to appropriately diagnose and manage resistant hypertension. UCVA will continue to provide, on a quarterly basis, articles such as this which will assist you in the management of some of the more common cardiovascular conditions experienced by your patients."



*~ Christine Miller, RN, RHIT, MPA,
Chief Administrative Officer*

Resistant Hypertension at the Office

By Matthew Funderburk, MD, FACC

When assessing cardiovascular risk in patients, hypertension is one of the most common risk factors we encounter, and often one of the most frustrating to manage. Defined as failure to achieve goal BP using full doses of a three-drug regimen including a diuretic, resistant hypertension often can seem an all too common occurrence. The increase in patients meeting this definition is also related to a drop in "goal BP" for patients

with diabetes and renal disease in hypertension guidelines, for whom JNC VII guidelines recommend BP controlled to less than 130/80.

So, how do we approach these patients? As we all know, there is no great "cookie cutter" approach we can apply broadly. Rather, focusing on the most common reversible causes will usually identify likely reasons for resistant hypertension in the individual patient.

First and foremost, ensure the BP readings are as accurate as possible with appropriate cuff size. Consider "white-coat" hypertension, and give strong consideration to some type of ambulatory blood pressure monitoring. This can be accomplished via ambulatory automated BP cuffs that patients use at home and keep a log of BP's for review. Alterna-

tively, a formal automated ABP (ambulatory blood pressure) monitor can be worn by the patient for 24 hours, and is nice because you can easily see average blood pressures outside the office and assess for circadian variability as BP's are monitored at night while the patient is sleeping as well. The more BP data you have, the more confident you can be in identifying the true resistant hypertension patient. If end organ effects of BP are noted such as renal insufficiency, left ventricular hypertrophy identified by echocardiogram, or proteinuria this will also raise the likelihood that you are dealing with true resistant hypertension.

Noncompliance with medications and dietary factors are common reasons for "resistance" to BP control. Open communication with patients to



Resistant Hypertension at the Office

allow them to feel comfortable being honest enough to “confess” not taking their medications is important. Often this leads to deeper issues of problems with cost, or side effects that can be the real issue that has to be addressed to allow for successful treatment. Careful questioning is important. When I ask “Have you been taking your medications every day?”, the answer is usually “Yes”. However, when I ask “Have you taken your medications yet today?”, we often discover the reason that the blood pressure is elevated in the office but has been normal at home.

High salt diet and excessive alcohol intake are common contributors as well, as most patients are often not aware of the high sodium levels in their diet, or that excessive alcohol use contributes to elevations in blood pressure. Often brief questioning in the office can identify specific dietary items leading to difficulty in managing hypertension. Common offenders: simply adding salt with the salt shaker to food, canned vegetables or canned soups, packaged noodles with seasoning packets, packaged deli meats, frozen dinners, vegetable juices (they’re supposed to be healthy...right?), chips/pretzels/nuts, marinade (watch out for regular soy sauce!!). Black licorice can contribute due to mineralocorticoid activity, but I seem to rarely find patients that eat this.

Investigate for illicit and over-the-counter drugs. Regular NSAID use or pressor agents

in cold remedies (e.g. phenylephrine, pseudoephedrine) can counter the therapeutic effect of the patient’s antihypertensive medications. Consider a urine tox screen as well, as the surprise positive screen for cocaine can be priceless when considering a more expensive work-up.

If pursuing these common remediable causes fails to lead to an identified reason for resistant hypertension, consider volume overload as the next most likely cause.



Matthew Funderburk, MD, FACC

Whether this is from salt intake, or volume retention due to kidney disease or liver disease, inadequate diuretic therapy is a common reason for inadequate hypertension control. Consider thiazide diuretics such as chlorthalidone, as the longer half-life of this generic medication versus HCTZ may lead to better diuretic efficacy. In patients with significantly reduced GFR, changing a thiazide to a loop diuretic, or combining the two classes may be needed.

If all easily reversible causes are identified and corrected, and hypertension persists, further evaluation for a

cause of secondary hypertension is indicated. This should consist of considering polysomnography for obstructive sleep apnea, screening for hyperaldosteronism with an aldosterone: plasma renin activity ratio, screening for pheochromocytoma with urine metanephrines and/or plasma metanephrines, and imaging with CTA or MRA for renal artery stenosis. Consider echocardiography to screen for aortic coarctation, or even CT angiogram of the aorta if there is strong clinical suspicion for this based on brachial-femoral pulse delay on exam. If abnormalities in these screening tests are found, or if they are normal and resistant hypertension persists, referral to a hypertension specialist (often a cardiologist or nephrologist) is indicated.

In the vast majority of patients thorough evaluation for the contributing factors as reviewed above usually leads to successful treatment. In truly refractory cases there has been some promising blood pressure reduction in feasibility trial data using an implanted carotid baroreflex stimulator, known as the Rheos Baroflex Hypertension Therapy System. This is a battery-powered generator inserted under the skin near the clavicle, with two electrical leads that run under the skin to the left and right carotid sinus. There are ongoing clinical trials with this device in progress, and this may become an effective option to consider in the near future for truly refractory patients.

UCVA: The Journey from Solo Practice to Rochester's Largest Private Cardiology Group

It is hard for some to imagine that UCVA really began as a solo practice. Dr. Maurice Varon came to Rochester for his internship in Internal Medicine in 1987. This came as a surprise to him since residing in Upstate New York wasn't more than a passing thought. Strong Memorial Hospital was the only program outside of NYC he had ranked as a possible option. When he found out that was where he was going he was quoted as saying "What have I done". Now he would tell anyone, he thinks it was the best thing that ever happened to him; it is a great community.

In 1993, UCVA was born in a little office on Westfall Road with zero patients and a skeleton part-time staff. In just 5 years, UCVA made the move to Clinton Crossings and began adding physicians, one per year for the next three years. Dr. Marc Odorisi, Dr. George Pancio, II and Dr. Daniel Williford all joined UCVA. Each of these physicians had trained at Strong Memorial and they had all worked together for many years.

In 2001, UCVA expanded to the Southern Tier, determined to provide convenient care to their patients and outstanding service to their referring primary care offices. By 2002 Dr. Peter Kringstein joined the practice, followed soon after by Dr. David Fries and Dr. Matt Funderburk, and UCVA set out to find a larger facility. With that new facility came the addition of state-of-the-art technology, numerous friendly and professional staff, and a renewed commitment to availability and quality cardiac care. In 2004, UCVA moved into the new office in Brighton at Clinton Woods. This 20,000 square foot facility provides 26 exam rooms, 4 echo rooms, 4 stress echo rooms and 2 nuclear cameras. In addition, this facility serves as home to the region's largest and most comprehensive cardiac monitoring departments, providing remote device follow up, Holter and event monitoring as well as one of the regions only ambulatory blood pressure monitoring services. A full service noninvasive vascular lab operates in this new facility along with enhanced external coun-

terpulsation (EECP) for refractory angina patients.

In 2005, UCVA continued with their goal of making things as convenient as possible for their patients and expanded into new full-service space in Geneseo which included the addition of a nuclear camera, so that their Southern Tier patients would not have to drive into Rochester for that service. The practice recently completed an addition to that location to provide their patients with even greater comfort and convenience. As UCVA's presence in the Southern tier grew, the demand for services grew as well, and in keeping with their commitment to accessible care, UCVA opened an office in Dansville. This site now offers consultation as well as cardiac monitoring, device management, cardiac and vascular ultrasound, and stress testing.

Most recently, UCVA further expanded into Greece and successfully completed a merger with Unity Cardiology. UCVA now has a comprehensive cardiology services agreement with Unity Health system and is proud to be serving this growing part of our community. This merger has also allowed UCVA to offer comprehensive cardiac services, with the addition of Dr. Tejan Patel performing diagnostic and interventional cardiac procedures at Unity and RGH, as well as Dr. Sarah Taylor and Dr. Abrar Shah providing electrophysiology services at Unity and Strong Memorial. In addition, UCVA takes great pride in their commitment to Unity Health Systems' academic and clinical missions and has welcomed Dr. P.K. Mathews, Dr. Robert Vannozzi, Dr. David Hsi, Dr. Nate Ritter, and Dr. Joan Thomas, who also serves as Chief of Cardiology at Unity Health System.

Ultimately, UCVA is where it is today thanks to providers like you. We remain committed to excellence in patient care and outstanding service and access. UCVA continues to raise the bar in the treatment of cardiovascular disease and strives each day to exceed your expectations.

~ Keep an eye out for our next newsletter and feel free to submit suggestions to our Practice Liaison, Nicolé Fogarty.