BP <135/85 mm Hg at 6 months was 42% in the renal denervation arm compared with 28% in the standardized treatment only arm; however, this was not significant. In both arms of the study at 6 months, >85% of patients required ≥4 antihypertensive agents, with about 30% requiring 7 antihypertensives.

Dr. Azizi concluded by stating that data from the DENER-HTN trial show that renal denervation with the Symplicity catheter results in a significant reduction in systolic daytime ambulatory BP in patients with resistant hypertension.

Perioperative Beta-Blockade Improves CEA Outcomes

Written by Emma Hitt Nichols, PhD

Perioperative beta-blockade for patients with coronary artery disease (CAD) who are undergoing carotid endarterectomy (CEA) appeared to prevent cardiac damage, resulting in a low mortality rate and no stroke events. George Galyfos, MD, Hippocration Hospital, Athens, Greece, presented data from a study evaluating the role of beta-blockage in asymptomatic cardiac damage in patients with CAD undergoing CEA.

The death rate after undergoing CEA is up to 50%, with most deaths occurring within the first 48 hours. Therefore, CEA is considered to be a procedure of intermediate cardiac risk according to guidelines of the American College of Cardiology and American Heart Association. In 2009, those guidelines and those of the European Society of Cardiology recommended preoperative beta-blockade with dose titration as Class IIa evidence [Bouri S et al. *Heart* 2013]. In addition, a review revealed that in most studies, beta-blockade in patients undergoing vascular surgery resulted in a decrease in cardiovascular events, mortality, heart rate, and blood pressure compared with control; however, there was also an increased risk of bradycardia and mortality [Brooke BS, *J Vasc Surg* 2010]. The purpose of this study was to further evaluate the effect of beta-blockade on the outcomes of patients undergoing CEA.

In the present study, 162 patients with CAD who were expected to undergo CEA were randomly assigned to receive a beta-blocker (n=70) or not (n=92). In addition, patients were categorized into 3 groups (low, medium, or high cardiac risk) according to their Vascular Study Group of New England Cardiac Risk Index score [Bertges et al. *J Vasc Surg* 2010]. On the basis of this index, most patients with low cardiac risk were asymptomatic (64%), whereas a majority of patients at high cardiac risk had a history of transient ischemic attack or amaurosis (83%).

Patients who received beta-blockade before CEA had less cardiac damage compared with patients who did not undergo beta-blockade (odds ratio, 0.25; 95% CI, 0.08 to 0.77; p=0.01). Following the CEA procedure, there were no strokes overall, and no events were observed in patients at high cardiac risk. In addition, 14% of patients experienced asymptomatic cardiac damage within the first 72 hours, but there were no cases of symptomatic cardiac damage. The mortality rate in the study was 0.6%.

Interestingly, troponin levels increased by the first day after CEA for patients at low and intermediate cardiac risk but not for patients at high cardiac risk (Table 1). At Days 3 and 7, the troponin levels decreased in patients at low and intermediate risk but remained the same for patients at high risk. This suggests that patients at high risk receive the greatest benefit from beta-blockade.

Table 1. Troponin Levels After Carotid Endarterectomya

	Cardiac Risk (n=162)		
	Low (n=70)	Intermediate (n=80)	High (n=12)
Preoperatively	0.007	0.008	0.004
Day 1	0.297 (0.018)	0.624 (0.015)	0.026
Day 3	0.102 (<0.05)	0.204 (0.028)	0.023
Day 7	0.016	0.025	0.003

According to Vascular Study Group of New England Cardiac Risk Index score. Parentheses indicate significant p values.

In conclusion, Dr. Galyfos stated that data from this study indicate that perioperative administration of beta-blockers appears to provide a protective effect from cardiac damage in patients with CAD who are undergoing CEA. In addition, he called for more trials with less bias to examine the benefit of beta-blockade in this population.

24-Hour ceABP Is a Better Measurement in Young Patients

Written by Emma Hitt Nichols, PhD

Twenty-four-hour central ambulatory blood pressure (ceABP) was shown to be significantly lower than peripheral ambulatory blood pressure (pABP) in adolescents and young adults. Higher blood pressure (BP) was found to be correlated with left ventricular mass index (LVMI) and common carotid intima-media thickness (cIMT). Angeliki Ntineri, MD, University of Athens, Athens, Greece, presented data from a study of 24-hour ceABP in adolescents and young adults.

pABP is known to be higher than ceABP in young patients (up to 30 mm Hg) because of amplification of the

ejection wave by reflected waves in the peripheral arterial tree. The central hemodynamic load is thus more accurately measured by ceABP and is superior to pABP in predicting organ damage and outcomes. The 2013 European Society of Hypertension and European Society of Cardiology guidelines for the management of arterial hypertension indicate uncertainty regarding the significance of isolated systolic hypertension in young persons when measured peripherally [Protogerou AD et al. *J Hypertens* 2013], especially since ceABP is frequently normal or low in the same patients [O'Rourke MF, Adji A. *J Hypertens* 2013]. No current data show unfavorable outcomes in young patients with isolated systolic hypertension, so there is no evidence to suggest that treatment is necessary. The purpose of this study was to describe the potential relationships between 24-hour ceABP and pABP with preclinical target organ damage in young patients.

In this cross-sectional study, 44 apparently healthy people aged 12 to 25 years who were healthy volunteers or referred for elevated BP (but untreated) were assessed by somatometrics, BP, echocardiogram for LVMI, and cIMT. Measurements of ceABP and pABP were evaluated during routine work or school days at 20-minute intervals for 24 hours via a Mobil-O-Graph 24-hour pulse wave velocity (PWV) monitor.

At baseline, half the participants were less than 19 years of age. The mean age of the study group was 18.8 years; 73% were male; and the mean body mass index was 24.1 kg/m^2. High ambulatory BP—defined as the 24-hour BP >95th percentile or >130/80 mm Hg—was present in 18% of participants. High-normal ambulatory BP—defined as a 24-hour BP >90th percentile or >125/75 mm Hg—was present in 21%.

Mean 24-hour ceABP was ~13 mm Hg lower than pABP ($p<0.01$). In addition, there was a high correlation between systolic pABP and systolic ceABP ($r=0.94$; $p<0.01$). Systolic BP amplification was higher in males than in females, with a difference of 4.3 mm Hg ($p<0.01$). There was no difference in systolic BP (SBP) amplification among normotensives, high-normal, and hypertensives. Increasing age was associated with a decrease in SBP amplification ($r=-0.44$; $p<0.01$). Both 24-hour ceABP ($r=0.51$; $p<0.01$) and pABP ($r=0.43$; $p<0.01$) were associated with LVMI; 24-hour ceABP ($r=0.42$; $p=0.005$) and pABP ($r=0.38$; $p=0.01$) were also associated with common cIMT. Similarly, there was a strong correlation between 24-hour PWV and ceABP and pABP ($r=0.94$ and $r=0.92$, respectively; $p<0.01$ for both).

Dr. Ntineri concluded that data from this study confirmed that the difference in ceABP and pABP can be quite large. Prospective studies are needed to investigate the role of ceABP in young patients.

High Morning SBP Linked to Cerebrovascular Events

Written by Emma Hitt Nichols, PhD

Morning systolic blood pressure (SBP) is associated with increased risk of cerebrovascular events, even if clinic SBP is low. Kazuomi Kario, MD, PhD, Jichi Medical University School of Medicine, Shimotsuke, Japan, presented data from the Home Blood Pressure Measurement With Olmesartan Naive Patients to Establish Standard Target Blood Pressure study [HONEST; UMIN000002567; Saito I et al. *Hypertens Res* 2013].

Home blood pressure (BP) monitoring is the first step in achieving 24-hour BP control [Shimamoto K et al. *Hypertens Res* 2014]. Morning hypertension—defined as BP ≥135/85 mm Hg in the morning—is a recommended target in clinical practice, by having patients take their antihypertensive medication in the morning [Kario K. *Am J Hypertens* 2005]. The purpose of the HONEST study was to determine the effect of home BP, clinic BP, and the occurrence of cardiovascular events.

In the large prospective observational HONEST study, 21,591 olmesartan-naïve patients with essential hypertension who had data for 2 days of morning home and clinic BP were followed for 2 years. At baseline, the mean age was 65 years, the body mass index was 24 kg/m^2, and 50% of participants had previously used antihypertensive therapy. All patients received olmesartan at baseline (mean dose, 18.2 mg), and 83% continued its use by the end of the study (mean dose, 20 mg). The primary end points included cerebrovascular event, cardiac event, and sudden death.

Morning home SBP and clinic SBP were significantly associated with reaching the primary end point at 18 months ($p=0.015$ and $p=0.0005$, respectively) and 24 months ($p\leq0.0001$ for both). According to a spline regression analysis, the minimum risk for morning home SBP and clinic SBP was 124 mm Hg and 131 mm Hg, respectively. Patients with morning home SBP ≥145 mm Hg and clinic SBP ≥150 mm Hg had the greatest risk of reaching the primary end point (HR, 3.92; $p<0.0001$), with patients having morning home SBP ≥145 mm Hg and clinic SBP <130 mm Hg also having significant risk for reaching the primary end point (HR, 2.47; $p=0.014$).

There were no significant differences between morning home SBP and clinic SBP and between morning home diastolic BP (DBP) and clinic DBP, over the 2 years of follow-up. In addition, morning home and clinic BPs decreased by 20 and 10 mm Hg, respectively, at 2 years. The incidence of the primary end point was