Low DBP Linked to Mortality in the Elderly

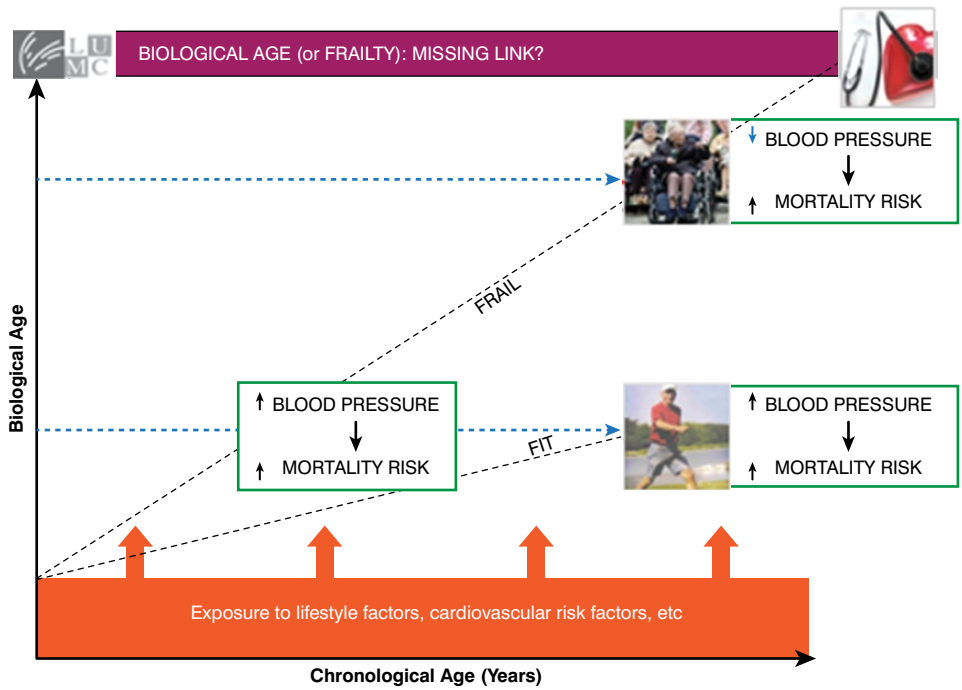
Written by Emma Hitt Nichols, PhD

Low diastolic blood pressure (DBP) is associated with increased mortality in biologically older, frail elderly, whereas high DBP is associated with mortality in biologically younger, fit elderly. Majon Muller, Leiden University Medical Center, Leiden, The Netherlands, presented data from a population-based prospective study evaluating the effect of biological age on blood pressure (BP) control.

It is well known that high BP has been associated with an increased mortality risk [Lewington S et al. *Lancet* 2002]. However, this does not appear to hold true for patients who are very old or frail; in this population, lower BP has been associated with a greater risk of mortality (Figure 1) [Poortvliet RK et al. *J Hyperten* 2012; van Bemmel T et al. *J Hypertens* 2006; Hakala SM et al. *Eur Heart J* 1997]. It has been suggested that it is biological age, rather than chronologic age, that should be used to determine the effect of BP on mortality risk [Muller M et al. *Hypertension* 2014; Odden MC et al. *Arch Int Med* 2012]. The purpose of this study was to determine if physical and cognitive function can be used as indicators of biological age, which could elucidate the apparent complicated relation between BP and mortality in older populations.

In the population-based Longitudinal Aging Study Amsterdam, systolic BP (SBP) and DBP were related to mortality risk in 1466 older patients (mean age, 76 years) over 15 years of follow-up (mean follow-up, 11 years). The primary outcome was all-cause mortality, which was assessed with Cox regression analysis that adjusted for age, sex, cardiovascular risk factors, and cardiovascular disease. Biological age was measured by gait speed with the 6-meter walking test, and

Figure 1. Blood Pressure and the Risk of Mortality in the Fit Versus the Frail



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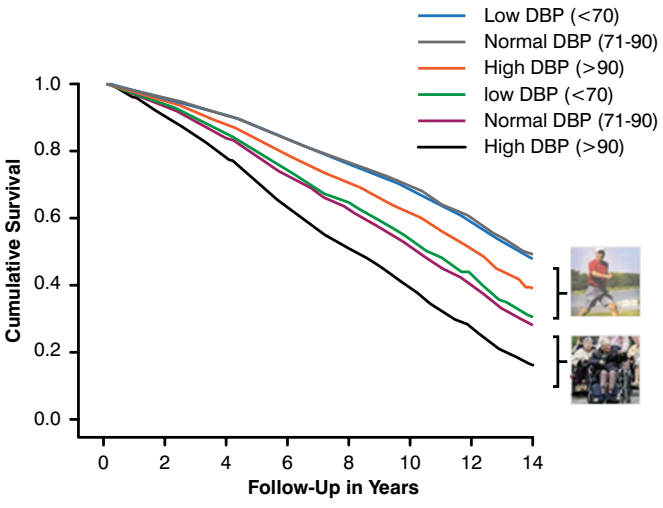
cognitive function was measured by the Mini–Mental State Examination (MMSE). Patients could achieve a biological age combination score of up to 4 points: 0 points for a gate speed of ≥0.8 m/s, 1 for <0.8 m/s, and 2 if the test could not be completed, as well as 0 points for achieving an MMSE score of >28, 1 for 27 to 28, and 2 for ≤26.

In the study, 49% of patients were men; 8% had diabetes; and 37% had cardiovascular disease. Mean (interquartile range) SBP and DBP were 151 mm Hg (134 to 170) and 82 mm Hg (74 to 91), respectively. In addition, 41% of patients were classified as "fit" (combination score of 0 or 1) and 59% as "frail" (combination score of 2 to 4).

Compared with normal DBP (71 to 90 mm Hg), low DBP (≤70 mm Hg) was significantly associated with an increased mortality risk in frail, or biologically old, patients (HR, 1.5; 95% CI, 1.2 to 1.8) (Figure 2). In contrast, high DBP was associated with increased mortality risk in fit, or biologically younger, patients (HR, 1.5; 95% CI, 1.1 to 1.9; trend p=0.01). SBP was not associated with mortality.

Figure 2. Effect of Biological Age on Mortality Risk Stratified by Diastolic Blood Pressure



DBP=diastolic blood pressure.

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Dr. Muller concluded that we need to refine our approach to thinking about optimal BP levels and that data from this study support the use of using markers of biological age to improve our understanding of the association between BP in late life and clinical outcomes.

Simple, Noninvasive Hemodynamic Monitoring Improves Uncontrolled Hypertension

Written by Brian Hoyle

The findings of the multicenter Better Control of Blood Pressure in Hypertensive Patients Monitored Using the HOTMAN System trial [BEAUTY; NCT01482364] of 153 patients has shown the value of the simple and noninvasive monitoring of hemodynamic parameters in improving uncontrolled hypertension. The findings were reported by Tommaso Comotti, MD, Istituto Auxologico Italiano, Milan, Italy.

High blood pressure (BP) remains uncontrolled in up to 20% of those treated for hypertension [de la Sierra A et al. *Hypertension* 2011; Egan BM et al. *Circulation* 2011]. The ultimate control of drug-treated but still uncontrolled hypertension may require more or better-acting drugs [Redón J et al. *J Hypertens* 2010]. Poor adherence due to side effects is also a problem [Ceral J et al. *Hypertens Res* 2011; Gifford RW. *Hypertension* 1988; Klein LE. *Hypertension* 1988].

Another option for BP control is the use of an approach termed *integrated hemodynamic management*. The approach relies on the technique of thoracic electrical bioimpedance, which, by means of externally placed probes, measures the electrical resistance of the thorax to a high-frequency, very-low-magnitude current. The method permits real-time hemodynamic measurements, and the low current used reduces artifacts. The technology is commercially available as the HOTMAN system (Hemo Sapiens, San Ramon, CA, USA).

BEAUTY was a prospective randomized trial designed to explore whether drug selection based on integrated hemodynamic management would improve the hemodynamic status of patients with uncontrolled hypertension during a 6-month follow-up (n=76; patients also received usual hypertensive care; IHM Group), compared with drugs selected conventionally according to the 2007 European Society for Hypertension guidelines (n=77; control group). The primary end point of the study was the absolute change in daytime ambulatory systolic BP. Whether the drug-related changes in hemodynamic parameters are related to BP alterations and whether the improvements in hemodynamic and BP control reduced adverse effects were also assessed.

Hemodynamic status was assessed as worsened, stable, or improved based on comparison of values obtained at baseline and the final clinic visit. The 2 investigators were blind to patient randomization. Inclusion criteria were age 18 to 75 years, essential hypertension,