Original Investigation

Treatment With Multiple Blood Pressure Medications, Achieved Blood Pressure, and Mortality in Older Nursing Home Residents
The PARTAGE Study

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IMPORTANCE Clinical evidence supports the beneficial effects of lowering blood pressure (BP) levels in community-living, robust, hypertensive individuals older than 80 years. However, observational studies in frail elderly patients have shown no or even an inverse relationship between BP and morbidity and mortality.

OBJECTIVE To assess all-cause mortality in institutionalized individuals older than 80 years according to systolic BP (SBP) levels and number of antihypertensive drugs.

DESIGN, SETTING, AND PARTICIPANTS This longitudinal study included elderly residents of nursing homes. The interaction between low (<130 mm Hg) SBP and the presence of combination antihypertensive treatment on 2-year all-cause mortality was analyzed. A total of 1127 women and men older than 80 years (mean, 87.6 years; 78.1% women) living in nursing homes in France and Italy were recruited, examined, and monitored for 2 years. Blood pressure was measured with assisted self-measurements in the nursing home during 3 consecutive days (mean, 18 measurements). Patients with an SBP less than 130 mm Hg who were receiving combination antihypertensive treatment were compared with all other participants.

MAIN OUTCOMES AND MEASURES All-cause mortality over a 2-year follow-up period.

RESULTS A significant interaction was found between low SBP and treatment with 2 or more BP-lowering agents, resulting in a higher risk of mortality (unadjusted hazard ratio [HR], 1.81; 95% CI, 1.36-2.41); adjusted HR, 1.78; 95% CI, 1.34-2.37; both $P < .001$) in patients with low SBP who were receiving multiple BP medicines compared with the other participants. Three sensitivity analyses confirmed the significant excess of risk: propensity score–matched subsets (unadjusted HR, 1.97; 95% CI, 1.32-2.93; $P < .001$; adjusted HR, 2.05; 95% CI, 1.37-3.06; $P < .001$), adjustment for cardiovascular comorbidities (HR, 1.73; 95% CI, 1.29-2.32; $P < .001$), and exclusion of patients without a history of hypertension who were receiving BP-lowering agents (unadjusted HR, 1.82; 95% CI, 1.33-2.48; $P < .001$; adjusted HR, 1.76; 95% CI, 1.28- 2.41; $P < .001$).

CONCLUSIONS AND RELEVANCE The findings of this study raise a cautionary note regarding the safety of using combination antihypertensive therapy in frail elderly patients with low SBP (<130 mm Hg). Dedicated, controlled interventional studies are warranted to assess the corresponding benefit to risk ratio in this growing population.

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Treatment of hypertension in frail elderly persons is controversial. Based primarily on the results of the Hypertension in the Very Elderly Trial (HYVET),[1] a randomized clinical study of blood pressure (BP) treatment in persons older than 80 years without major comorbidities, the 2013 European Society of Cardiology-European Society of Hypertension guidelines for the management of arterial hypertension stated that, after the age of 80, "evidence is limited to individuals with initial systolic blood pressure (SBP) of greater than 160 mm Hg, whose SBP was reduced to values less than 150 but not less than 140 mm Hg. Therefore, the recommendation of lowering SBP to less than 150 mm Hg in elderly individuals with SBP greater than 160 mm Hg is strongly evidence-based."[2(p1317)]

In addition, the American College of Cardiology Foundation/American Heart Association 2011 expert consensus document on hypertension in the elderly mentioned that, for individuals older than 80 years, an SBP goal "between 140 to 145 mm Hg, if tolerated, can be acceptable."[3(p2045)] However, the HYVET[1] had several exclusion criteria, such as hemorrhagic stroke in the previous 6 months, heart failure requiring treatment with antihypertensive medication, high serum creatinine level, hyperkalemia or hypokalemia, gout, diagnosis of clinical dementia, and a requirement of nursing care. Thus, exclusion in the HYVET study of patients with major comorbidities, dementia, and loss of autonomy raises questions as to the generalizability of these recommendations in very old, frail individuals receiving polypharmacy.[4] Observational studies[5-8] in frail older individuals have shown no or even an inverse relationship between BP and morbidity and mortality. In 2012, Odden et al[9] reported that, in persons older than 65 years, the relationship between BP and mortality was modified by walking speed. The investigators observed that higher SBP was associated with an increased risk of mortality in adults with medium to fast walking speed, whereas this association was less clear in the presence of slow walking speed, which is a major indicator of frailty in elderly individuals.[10] The authors[9] concluded that future research should aim to better characterize this relationship in frail older adults and the institutionalized population.

The Predictive Values of Blood Pressure and Arterial Stiffness in Institutionalized Very Aged Population (PARTAGE) multicenter, longitudinal study was performed in 1130 frail individuals aged 80 years or older who were living in nursing homes (clinicaltrials.gov identifier: NCT00901355).[11] Almost 80% of the participants were receiving treatment for hypertension, and 63% of the men and 53% of the women receiving that treatment had an SBP of less than 140 mm Hg.[11] This finding contrasts with the much lower frequency (38% of men, 23% of women) of an SBP of less than 140 mm Hg reported for individuals 80 years or older who were receiving treatment for hypertension in a community-living setting.[12] In the PARTAGE study[13] after 2 years of follow-up, there was an inverse relationship between baseline SBP levels and all-cause mortality. These results remained unchanged even after adjusting for several confounders, such as age, sex, history of previous cardiovascular (CV) disease, Charlson Comorbidity Index score, cognitive function (Mini-Mental State Examination), and autonomy status (activities of daily living). Classification in SBP tertiles showed a 30% increase in all-cause mortality in patients ranked in the lowest tertile of SBP (approximately <130 mm Hg) compared with those in the 2 upper tertiles.

The reasons for these results remain unclear. Rather than being a sign of good arterial health, a low SBP in very old, frail individuals could be the expression of malnutrition, heart failure, and other comorbidities associated with poor prognosis. Another important issue in this population is polymedication and drug-induced problems. In this context, the PARTAGE participants were receiving a mean of 7.1 different drugs, including 2.2 antihypertensive drugs.

The objective of the present PARTAGE analysis was to assess whether the increased all-cause mortality in frail elderly patients with a low SBP was associated with the number of antihypertensive drugs these individuals were receiving. To this end, we examined the effect of the interaction between SBP and antihypertensive treatment on all-cause mortality. All-cause mortality was used as an end point because death in the elderly is often the outcome of a cascade of events comprising both CV and non-CV factors.

Methods

Patients and BP Measurements

The participants in the PARTAGE Study[11] were recruited, examined, and monitored in nursing homes. Patients were included from January 2007 to June 2008 and were monitored for 2 years. The last patient finished the follow-up period through June 10, 2010. The details of the PARTAGE populations have been published.[11,13] The exact protocol of SBP data collection has been detailed in the initial PARTAGE publication.[11] This study was approved by the respective regional ethics committees in France (Comité de Protection des Personnes of Nancy) and in Italy (Comitato Etico Area Vasta Romagna). All participants gave written informed consent prior to the study. A total of 18 measurements (3 in the morning and evening during 3 consecutive days) were performed in the room in which the patients usually resided. Morning BP measurements were carried out from 8 AM to noon and evening BP measurements from 3 PM to 6 PM. The mean of these 18 measurements was used for the present analyses. Focus was placed on SBP rather than on diastolic BP since all recent recommendations and expert opinions on hypertension management[2,3] indicate that, in older individuals, elevated diastolic BP is much less relevant than is elevated SBP.

Statistical Analysis

Continuous variables are presented as mean (SD), and discrete variables are presented as frequency and percentage. The 2-tailed significance level was set at $P < .05$. Pairwise comparisons were carried out using the Mann-Whitney and χ^2 tests, as appropriate. Univariate and multivariate time-to-event analyses were performed using Cox proportional hazards regression with all-cause mortality as the outcome. Results are presented as hazard ratio (HR) and 95% CI. Cumulated mortality curves for the various subgroups were determined ac-

Table 1. Demographic and Clinical Data

Characteristic	≥2 BP Drugs/SBP <130 mm Hg, Mean (SD)				
	Yes/Yes	All Others[a]	No/Yes	No/No	Yes/No
Patients, No. (%)	227 (20.1)	900 (79.9)	149 (13.2)	328 (29.1)	423 (37.5)
Age, y	88.2 (4.7)	87.6 (4.8)	87.4 (4.9)	87.4 (4.7)	87.9 (4.8)
Women, %	172 (75.8)	793 (78.1)	110 (73.8)	243 (74.1)	350 (82.7)
BMI	25.8 (4.4)	25.7 (4.8)	24.2 (4.3)	25.3 (4.8)	26.5 (4.8)
ADL[b]	4.85 (1.05)	4.99 (1.05)[c]	4.79 (1.11)	5.03 (1.07)	5.03 (1.02)
MMSE score	23.4 (5.4)	23.3 (5.0)	23.2 (5.3)	23.1 (4.9)	23.4 (5.0)
History of cancer, %	29 (12.8)	143 (15.9)	29 (19.5)	60 (18.3)	54 (12.8)
Heart failure, %	79 (34.8)	128 (14.2)[d]	11 (7.4)	27 (8.2)	90 (21.3)
Lower limb arteriopathy, %	18 (7.9)	54 (6.0)	5 (3.4)	16 (4.9)	33 (7.8)
CHD, %	79 (34.8)	161 (17.9)[d]	25 (16.8)	45 (13.7)	91 (21.5)
Stroke, %	43 (18.9)	127 (14.1)	21 (14.1)	51 (15.5)	55 (13.0)
All CV diseases, %	164 (72.2)	422 (46.9)[d]	64 (43.0)	125 (38.1)	233 (55.1)
Diabetes mellitus, %	37 (16.3)	148 (16.4)	19 (12.8)	43 (13.1)	86 (20.3)
Hypertension, %	177 (78.0)	633 (70.3)[c]	57 (38.3)	174 (53.0)	402 (95.0)
Charlson Comorbidity Index score	6.3 (1.9)	5.9 (1.9)[e]	6.0 (1.8)	5.9 (1.8)	6.0 (1.9)
Renal failure, %	12 (5.3)	47 (5.2)	7 (4.7)	12 (3.7)	28 (6.6)
OH (%)	30/199 (15.1)	145/795 (18.2)	19/130 (14.6)	50/290 (17.2)	76/375 (20.3)
BP, mm Hg[f]					
SBP	119 (8)	142 (16)[c]	120 (7)	146 (13)	147 (13)
DBP	65 (7)	75 (9)[c]	69 (7)	77 (8)	75 (9)
Pulse pressure	54 (8)	67 (13)[c]	51 (8)	69 (11)	72 (11)
Heart rate, beats/min[f]	75 (12)	74 (10)	76 (11)	74 (10)	73 (10)
Drugs, No.					
Anti-HTN	2.6 (0.8)	1.5 (1.3)[c]	0.5 (0.5)	0.5 (0.5)	2.7 (0.9)
Psychotropic	1.0 (0.9)	1.0 (1.0)	1.1 (1.2)	1.1 (1.1)	1.0 (0.9)
Total	8.2 (2.9)	6.8 (3.4)[c]	5.6 (3.2)	5.4 (3.1)	8.2 (3.2)

Abbreviations: ADL, activities of daily living; Anti-HTN, antihypertensive; BMI, body mass index (calculated as weight in kilograms divided by height in meters squared); BP, blood pressure; CHD, coronary heart disease; CV, cardiovascular; DBP, diastolic BP; MMSE, Mini-Mental State Examination; OH, orthostatic hypotension; SBP, systolic BP.

[a] Includes the 3 columns to the right.

[b] Maximum score, 6.

[c] $P < .05$ determined using the Mann-Whitney or χ^2 test for analysis of the exposed vs control groups.

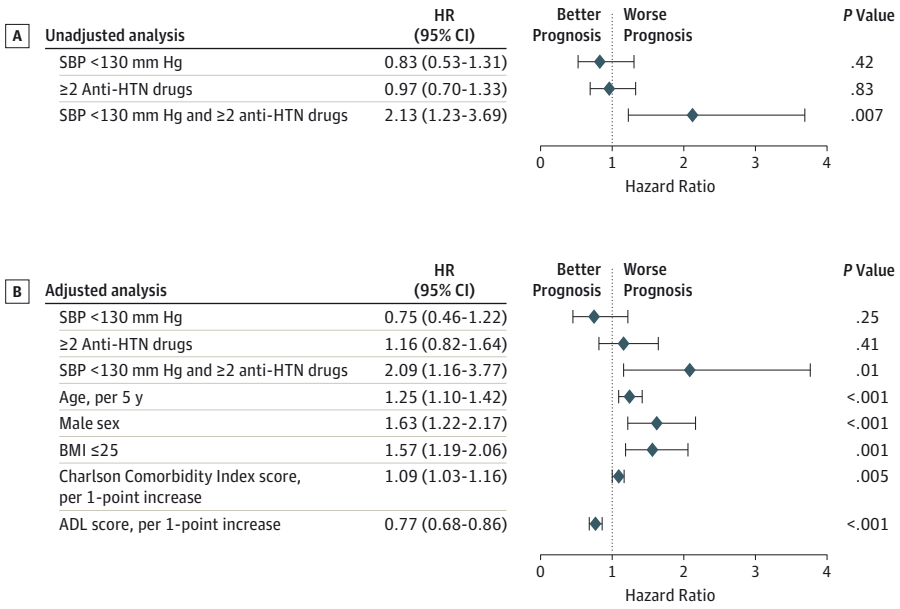
[d] $P < .001$ determined using the Mann-Whitney or χ^2 test for analysis of the exposed vs control groups.

[e] $P < .01$ determined using the Mann-Whitney or χ^2 test for analysis of the exposed vs control groups.

[f] Self-measured (mean of 18 measurements).

cording to the Kaplan-Meier method. The exposure factors entered in multivariate analyses were the 2 principal factors, SBP and antihypertensive therapy, and their interaction. These factors were divided into binary covariables (<130 mm Hg vs ≥130 mm Hg and <2 drugs vs ≥2 drugs) to meet the log-linearity condition of the Cox model. These cutoff points were selected from receiver operating characteristic curves as the values optimizing the sensitivity and specificity of the logistic regression model (Youden index): the cutoff for SBP (130 mm Hg) was identical to the value suggested in the previous analyses of the PARTAGE study data.[13] In addition to these exposure factors, univariate analyses of association between all baseline characteristics listed in **Table 1** and mortality identified 10 factors significant at the $P < .10$ level: age, sex, body mass index, activities of daily living, Mini-Mental State Examination score, Charlson Comorbidity Index score, cancer, heart failure, coronary heart disease, and CV comorbidities (including heart failure, coronary heart disease, lower limb arteriopathy, and stroke). These potential confounders were subsequently tested in multivariate analysis using an interactive backward selection method. The final multivariate model retained the exposure factors, their interaction, and the only cofactors found significant at the $P < .05$ level. The validity assumptions of the Cox model (proportionality of hazards, log-linearity of continuous cofactors, absence of colinearity, and interaction of independent factors) were thoroughly evaluated. Body mass index, which could not be considered as linearly associated with mortality, was divided into a binary factor (<25 vs ≥25 [calculated as weight in kilograms divided by height in meters squared]) as described above. In addition, 3 sensitivity analyses were carried out comparing patients with an SBP less than 130 mm Hg and receiving combination antihypertensive treatment (exposed) vs all others (controls): (1) on propensity score–matched patients using the nonparsimonious propensity score method[14] for the 10 baseline characteristics identified above (exposed, 211; controls, 211 [total,

Figure 1. Hazard Ratios (HRs) for All-Cause Mortality According to Systolic Blood Pressure (SBP) Levels, Number of Antihypertensive (anti-HTN) Drugs, and Interaction Between SBP and Number of Anti-HTN Drugs



The forest plots indicate a significant interaction in survival curves according to SBP and the number of anti-HTN drugs, contrasting patients with an SBP of less than 130 mm Hg who were receiving multiple BP medicines (n = 227) and all other participants (n = 900). Risk of death in the group with low SBP receiving multiple BP medicines did not change significantly after adjustment for several cofactors (hazard ratio [HR], 2.09; 95% CI, 1.16-3.77; $P = .01$, panel B). ADL indicates activities of daily living; BMI, body mass index (calculated as weight in kilograms divided by height in meters squared).

422; 106 deaths]), (2) with adjustment for CV comorbidities, and (3) with exclusion of individuals without hypertension but receiving BP-lowering drugs for other indications (exposed, 177; controls, 824 [total, 1001; 229 deaths]). All analyses were performed using NCSS, version 9 (NCSS, LLC) and SAS, version 9.3 (SAS Institute Inc) software.

Results

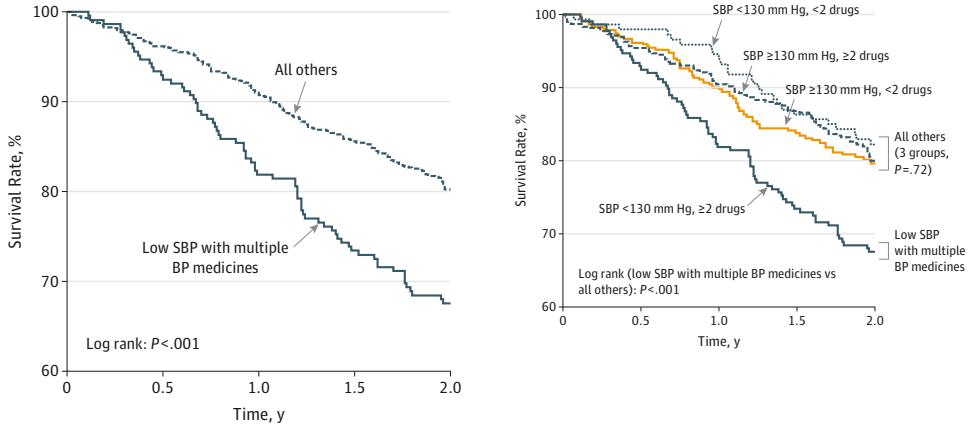
Systolic BP less than 130 mm Hg and combination antihypertensive treatment (≥2 drugs) were both associated with higher mortality rates in univariate analyses (SBP: HR, 1.36; 95% CI, 1.06-1.75; $P = .02$; combination treatment: HR, 1.28; 95% CI, 0.99-1.65; $P = .06$). In multivariate models after introducing these 2 factors along with their interaction, only the interaction term remained significant (HR, 2.13; 95% CI, 1.23-3.69; $P = .007$) (**Figure 1**A). Patients with low SBP who were receiving multiple BP medicines had an 81% excess of risk compared with other participants (unadjusted HR, 1.81; 95% CI, 1.36-2.41; $P < .001$). Other covariables independently associated with mortality were age, male sex, low body mass index, Charlson Comorbidity Index score, and degree of disability (low activities of daily living scale score) (Figure 1B). The excess of risk in patients with low SBP who were receiving multiple BP medicines persisted after adjustment for these cofactors (HR, 1.78; 95% CI, 1.34-2.37; $P < .001$). The 3 planned sensitivity analyses confirmed the significant excess of risk found in patients with low SBP who were receiving multiple BP medicines: propensity score–matched participants (unadjusted HR, 1.97; 95% CI, 1.32-2.93; $P < .001$; adjusted HR, 2.05; 95% CI, 1.37-3.06; $P < .001$), adjustment for CV comorbidities (HR, 1.73; 95% CI, 1.29-2.32; $P < .001$), and exclusion of patients without a hypertension history who were receiving BP-lowering agents (unadjusted HR, 1.82; 95% CI, 1.33-2.48; $P < .001$; adjusted HR, 1.76; 95% CI, 1.28-2.41; $P < .001$).

Table 1 lists the characteristics of patients with low SBP who were receiving multiple BP medicines compared with other participants. Patients with an SBP of 130 mm Hg or greater and no or only 1 BP medication were additionally described according to their SBP and therapy status. Patients with a low SBP who were receiving multiple medicines had lower activities of daily living scores, a more frequent previous history of CV disease (heart failure and coronary heart disease in particular), and a higher Charlson Comorbidity Index score more often than other participants.

A more detailed analysis of the antihypertensive drugs administered in the different groups receiving 1 or more of these drugs (eTable in the Supplement) was also conducted. In the combination therapy groups, patients with an SBP of less than 130 mm Hg compared with those whose SBP was 130 mm Hg or more were more frequently receiving loop diuretics and potassium-sparing diuretics, including mineralocorticoid receptor antagonists, but were less frequently given calcium channel blockers, thiazide diuretics, and angiotensin receptor blockers.

Figure 2 illustrates the survival curves in patients with low SBP who were receiving multiple BP medicines and other patient groups. The survival rate in patients with low SBP and multiple medicines was markedly lower than in the other participants (main panel, $P < .001$); the survival rates in the 3 other therapy subgroups did not differ significantly (inset, $P = .72$). The distribution of the causes of deaths in the different groups according to the number of antihypertensive drugs and SBP levels is presented in **Table 2**. Compared with other patients, those with low SBP who were receiving multiple BP medicines exhibited both increased CV and non-CV deaths.

Figure 2. Kaplan-Meier Survival Curves in Patients With Low Systolic Blood Pressure (SBP) Receiving Multiple BP Medicines and All Other Groups



Patients Left at Risk					
Low SBP with multiple BP medicines	227	210	184	163	70
All others	900	859	800	747	271
SBP/anti-HTN drugs					
<130 mm Hg/<2	149	145	138	126	49
≥130 mm Hg/≥2	423	404	376	360	129
≥130 mm Hg/<2	328	310	286	261	93

Detailed description according to SBP and number of drugs is shown in the inset. Individuals with an SBP of less than 130 mm Hg who were receiving multiple BP medicines demonstrated higher mortality compared with those in all the other groups in their totality and in each of the subgroups (inset). Anti-HTN indicates antihypertensive.

Table 2. Distribution of the Causes of Deaths

Characteristic	≥2 BP Drugs/SBP <130 mm Hg, %				
	Yes/Yes	All Others[a]	No/Yes	No/No	Yes/No
Patients, No. (%)	227 (20.1)	900 (79.9)	149 (13.2)	328 (29.1)	423 (37.5)
Stroke	4.4[b]	1.4	0.7	1.8	1.4
Heart failure	5.7[c]	3.0	3.4	2.4	3.3
CHD and sudden death	2.2	3.2	1.3	3.1	4.0
Other CV	2.2	1.8	2.0	0.9	2.4
All CV deaths	14.5[c]	9.4	7.4	8.2	11.1
Cancer	4.4[c]	1.8	2.7	1.8	1.4
Infection	3.1	2.3	2.7	3.7	1.2
Fracture	1.3	0.4	0	0.9	0.2
Other non-CV deaths	8.8[c]	5.7	4.7	5.5	6.2
All non-CV deaths	17.6[d]	10.2	10.1	11.9	9.0
Total mortality	32.2[d]	19.7	17.5	20.1	20.1

Abbreviations: BP, blood pressure; CHD, coronary heart disease; CV, cardiovascular; SBP, systolic BP.

[a] Includes the 3 columns to the right.

[b] $P < .01$ determined using the Mann-Whitney or χ^2 test for analysis of the exposed vs control groups.

[c] $P < .05$ determined using the Mann-Whitney or χ^2 test for analysis of the exposed vs control groups.

[d] $P < .001$ determined using the Mann-Whitney or χ^2 test for analysis of the exposed vs control groups.

Discussion

The present study shows that, among very old, frail, institutionalized individuals, the subgroup with low SBP (<130 mm Hg) receiving combination antihypertensive treatment had a greater than 2-fold risk for mortality. This group represented 20% of the total studied population (ie, individuals aged >80 years living in nursing homes). The groups with similarly low SBP levels but receiving no or 1 antihypertensive drug exhibited a much lower mortality rate compared with those receiving more than 1 medicine. Moreover, the residents who did not have a low SBP but were receiving combination therapy did not exhibit higher mortality compared with the groups receiving no or 1 antihypertensive drug.

In addition, our results remained unchanged after adjustment for age, sex, and several covariables, including history of heart failure, cancer, and other major CV disease, as well as the Charlson Comorbidity Index score, all of which are prone to influence mortality. These findings were further confirmed by the propensity score comparing the group with higher mortality with matched individuals for 10 associated conditions.

There are no clear recommendations regarding target BP level in the treatment of hypertension in very old, frail individuals. The recent European guidelines[2] recommend reduc-

ing the SBP to between 140 mm Hg and 150 mm Hg in individuals older than 80 years whose SBP is 160 mm Hg or higher. These guidelines are in line with a post hoc analysis of the Systolic Hypertension in the Elderly Program,[15] in which the greatest benefits of lowering stroke risk were observed in patients with an SBP of less than 150 mm Hg but not in those with an SBP of less than 140 mm Hg. Accordingly, excessive reduction of the BP in the elderly population, particularly in those with CV disease, may be deleterious, presumably because of a decreased perfusion of target organs.[16-18] However, there is no clear indication as to which strategy should be followed when the SBP levels are lower. In fact, little is known about whether a low SBP (eg, <130 mm Hg) should prompt a reduction in the number of antihypertensive drugs in individuals with hypertension.

Our findings point to the potentially crucial issue of overtreatment in frail elderly individuals. One hypothesis is that orthostatic hypotension could be involved in the observed greater mortality rate in the more frail and polymedicated population compared with all other groups. However, orthostatic hypotension was not more prevalent in the different subgroups (Table 1). Moreover, in a previous analysis in the same cohort,[19] the investigators reported an increased risk of orthostatic hypotension in individuals with high supine BP levels rather than in those with low SBP. Another possibility is that very old, frail individuals with low BP more frequently develop hypoperfusion of key organs, such as the brain, kidneys, and heart, due to impaired autoregulation. However, a low SBP in persons who are not receiving combination antihypertensive therapy was not associated with higher mortality rates in the present study.

The higher mortality rate in the exposed group was observed for both CV and non-CV causes. This finding could suggest that the increase in non-CV–associated mortality resulted from comorbidities. However, several findings suggest that this was not the case. First, the exposed group showed no higher prevalence of major indexes of bad health compared with the group receiving combination antihypertensive treatment but with an SBP of 130 mm Hg or higher. Second, there were no significant differences in body mass index, Charlson Comorbidity Index score, or history of cancer between these 2 groups. Third, all-cause mortality in the exposed group persisted after several adjustments for CV and non-CV morbidities as well as after propensity score matching.

The present study focused on frail elderly individuals, which is a rapidly growing segment of the population. Recommendations for treatment of these patients have been extrapolated from studies conducted in younger and/or more robust elderly individuals. Accordingly, the present findings showcase that the treatment of hypertension in old frail patients should not be directly extrapolated from the population at large without caution.

A supplementary methodologic strength of this study is the fact that SBP at baseline was determined using assisted self-measurements. This approach enabled a large number of BP measurements per patient,[11] with the findings based on the mean of 18 measurements.

One putative limitation of the present study is the observational design, which precludes us from drawing definitive conclusions. Moreover, some of the antihypertensive drugs may have been used to treat conditions other than hypertension, and it is possible that these other conditions might explain some of the increased mortality in patients with low SBP who were receiving multiple medicines. Although the all-cause mortality rate in individuals with low SBP was also observed after adjustment for comorbidities, we were not able to adjust for the severity of the comorbid conditions; therefore, it is possible that greater severity of some of the conditions in patients receiving multiple medicines might explain the higher mortality rates.

Conclusions

The treatment of hypertension to prevent CV complications and death is well justified. However, as reported in a recent systematic review, after the age of 65 years, "the current evidence is insufficient to determine the safest, most beneficial hypertension regimen in older adults."[20(p897)] Furthermore, during the past few years, studies[9,13] have shown that frailty status, compared with chronological age, can better identify the relationships between BP levels and the risk of morbidity and mortality. The results of the present study highlight our limited understanding of the benefits and harms of BP treatment in frail, older nursing home patients. Since the evidence in these patients is scarce, physicians should be more cautious when implementing international guidelines, which propose to reduce the SBP to a level between 140 mm Hg and 150 mm Hg. These guidelines are based on studies that did not include nursing home residents and included few frail elderly patients. Rather, in nursing home residents and frail elderly patients, it is advisable to conduct a more comprehensive assessment (eg, comorbidities, polymedication, and frailty) to optimize therapeutic decisions. More importantly, these findings call for controlled clinical trials, which should provide critical information to guide physicians on how to treat hypertension in various segments of the elderly population.

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Author Contributions: Dr Benetos had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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Acquisition, analysis, or interpretation of data: All authors.
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