Význam účinné korekce krevního tlaku u pacientů s kardiovaskulárním onemocněním

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3. květen 2025

Dopady arteriální hypertenze a kardiovaskulární onemocnění

IK+E M

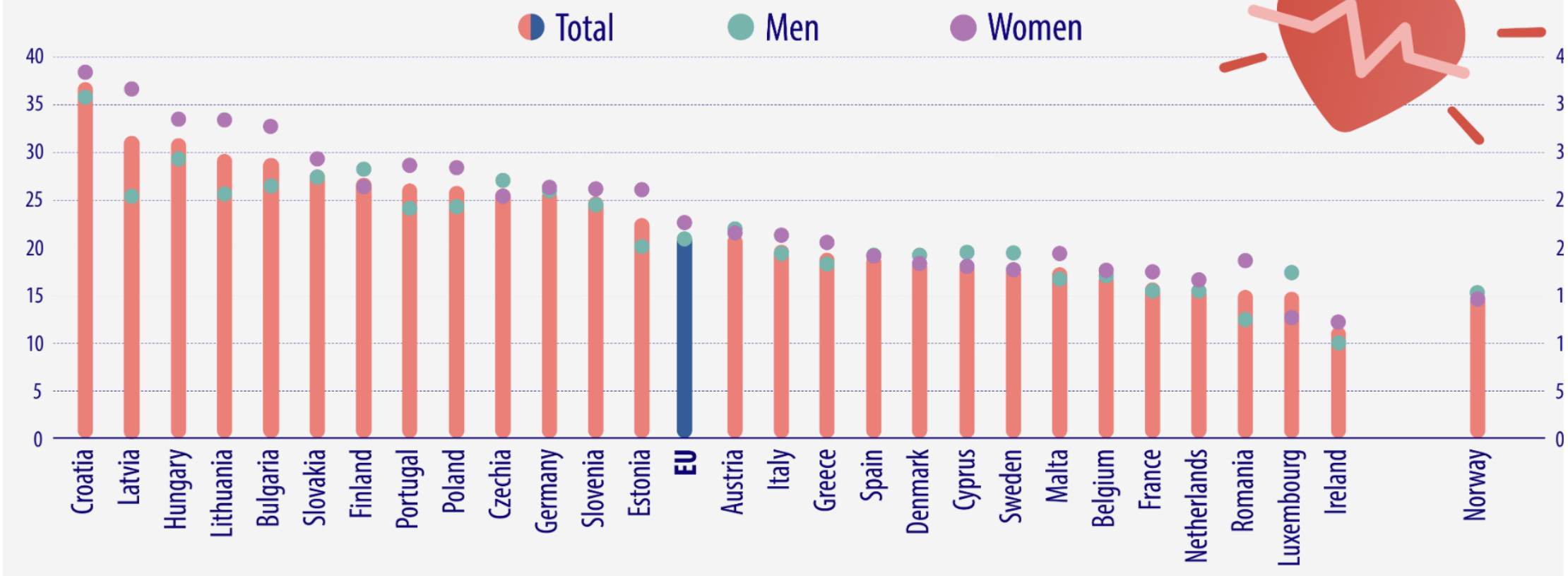
- **Arteriální hypertenze jako …**

Modifikovatelný riziko faktor pro CMP, srdeční selhání, kardiovaskulární onemocnění

Faktor spojený se stárnutím populace, komorbiditami, změnami životního stylu

Share of people with high blood pressure, 2019

(% of population 15+)



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Význam účinné korekce krevního tlaku u pacientů s kardiovaskulárním onemocněním

- Co na to doporučené postupy?

ESC European Society of Cardiology
European Heart Journal (2024) **45**, 3912–4018
https://doi.org/10.1093/eurheartj/ehae178

ESC GUIDELINES

2024 ESC Guidelines for the management of elevated blood pressure and hypertension

Developed by the task force on the management of elevated blood pressure and hypertension of the European Society of Cardiology (ESC) and *endorsed by the European Society of Endocrinology (ESE) and the European Stroke Organisation (ESO)*

Authors/Task Force Members: John William McEvoy *†, (Chairperson) (Ireland), Cian P. McCarthy ‡, (Task Force Co-ordinator) (United States of America), Rosa Maria Bruno ‡, (Task Force Co-ordinator) (France), Sofie Brouwers (Belgium), Michelle D. Canavan (Ireland), Claudio Ceconi (Italy), Ruxandra Maria Christodorescu (Romania), Stella S. Daskalopoulou (Canada), Charles J. Ferro [1] (United Kingdom), Eva Gerdts (Norway), Henner Hanssen (Switzerland), Julie Harris (United Kingdom), Lucas Lauder (Switzerland/Germany), Richard J. McManus (United Kingdom), Gerard J. Molloy (Ireland), Kazem Rahimi (United Kingdom), Vera Regitz-Zagrosek (Germany), Gian Paolo Rossi [2] (Italy), Else Charlotte Sandset [3] (Norway), Bart Scheenaerts (Belgium), Jan A. Staessen (Belgium), Izabella Uchmanowicz (Poland), Maurizio Volterrani (Italy), Rhian M. Touyz *†, (Chairperson) (Canada), and ESC Scientific Document Group

Význam účinné korekce krevního tlaku u pacientů s kardiovaskulárním onemocněním

IKEM

- Co na to doporučené postupy?

Definice *zvýšeného krevního tlaku* jako nové jednotky

Intenzifikace léčby, snížení hodnot cílového krevního tlaku

Akcentace významu domácího sledování („out-of-office“ měření)

Využití kombinovaných preparátů (single pill), inkluze SGLT2 inhibitorů

Modifikace životního stylu, digitální pomůcky

Renální denervace

Markery hypertenzí zprostředkovaného orgánového poškození (hypertension-mediated organ damage)

Význam účinné korekce krevního tlaku u pacientů s kardiovaskulárním onemocněním

- Co na to studie?

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 NOVEMBER 26, 2015 VOL. 373 NO. 22

A Randomized Trial of Intensive versus Standard Blood-Pressure Control

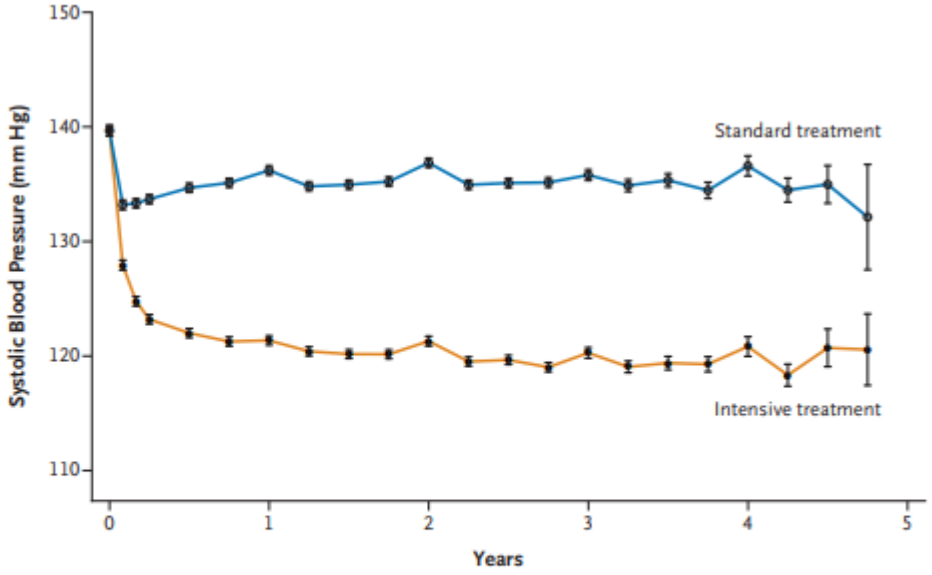
The SPRINT Research Group*

BACKGROUND

The most appropriate targets for systolic blood pressure to reduce cardiovascular morbidity and mortality among persons without diabetes remain uncertain.

METHODS

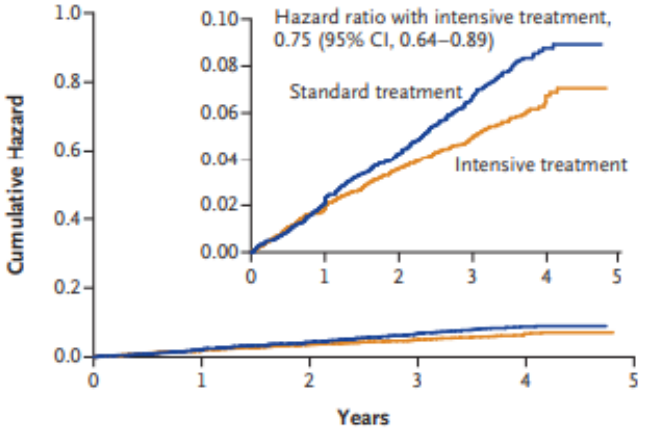
We randomly assigned 9361 persons with a systolic blood pressure of 130 mm Hg or higher and an increased cardiovascular risk, but without diabetes, to a systolic blood-pressure target of less than 120 mm Hg (intensive treatment) or a target of less than 140 mm Hg (standard treatment). The primary composite outcome was myocardial infarction, other acute coronary syndromes, stroke, heart failure, or death from cardiovascular causes.



No. with Data										
Standard treatment	4683	4345	4222	4092	3997	3904	3115	1974	1000	274
Intensive treatment	4678	4375	4231	4091	4029	3920	3204	2035	1048	286

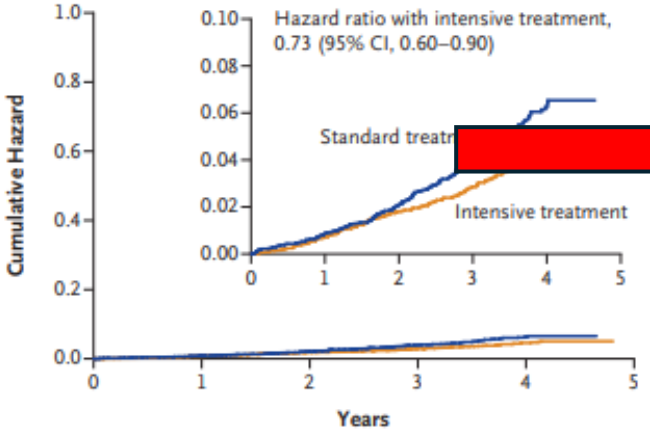
Mean No. of Medications										
Standard treatment	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9
Intensive treatment	2.3	2.7	2.8	2.8	2.8	2.8	2.8	2.8	2.8	3.0

A Primary Outcome



No. at Risk					
Standard treatment	4683	4437	4228	2829	721
Intensive treatment	4678	4436	4256	2900	779

B Death from Any Cause



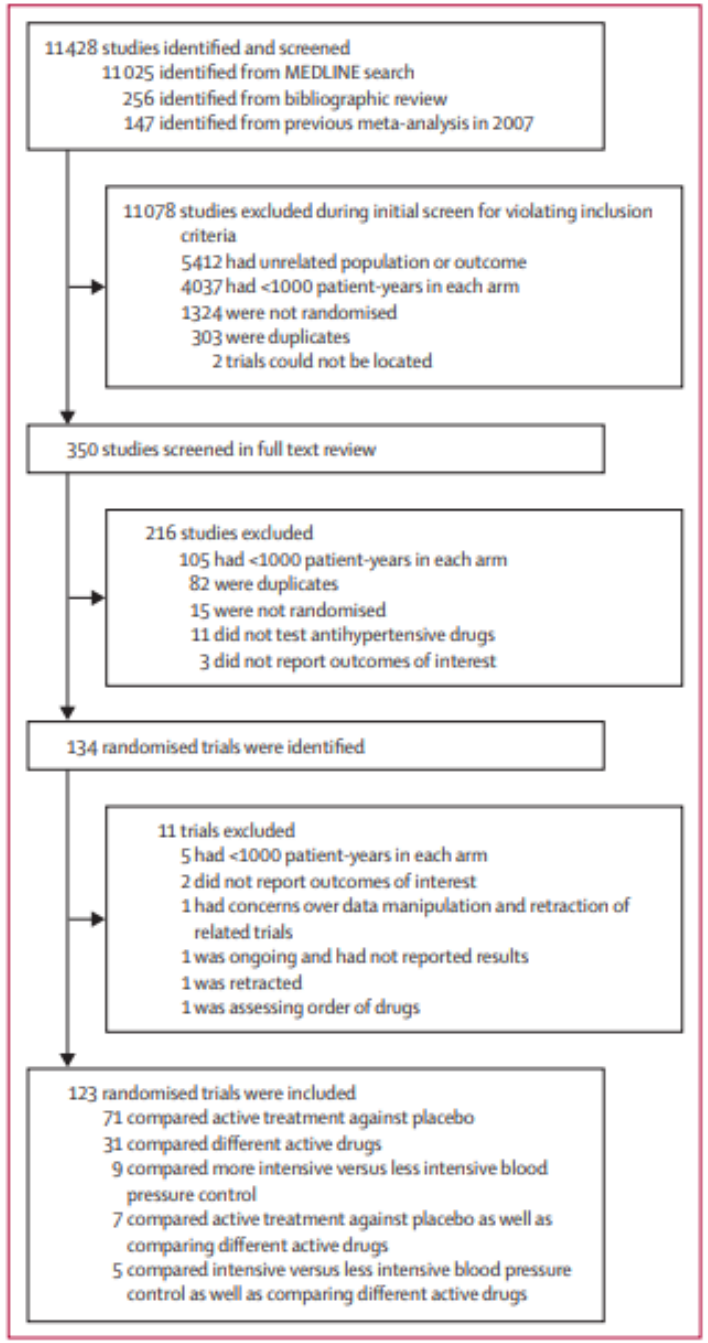
No. at Risk					
Standard treatment	4683	4528	4383	2998	789
Intensive treatment	4678	4516	4390	3016	807

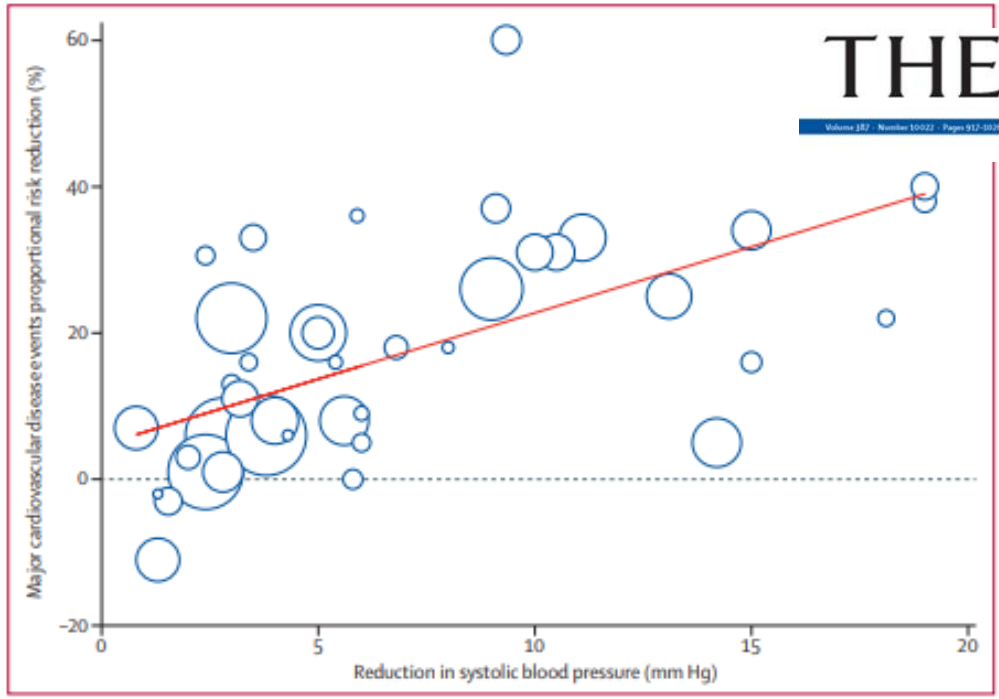
RESULTS

At 1 year, the mean systolic blood pressure was 121.4 mm Hg in the intensive-treatment group and 136.2 mm Hg in the standard-treatment group. The intervention was stopped early after a median follow-up of 3.26 years owing to a significantly lower rate of the primary composite outcome in the intensive-treatment group than in the standard-treatment group (1.65% per year vs. 2.19% per year; hazard ratio with intensive treatment, 0.75; 95% confidence interval [CI], 0.64 to 0.89; P<0.001). All-cause mortality was also significantly lower in the intensive-treatment group (hazard ratio, 0.73; 95% CI, 0.60 to 0.90; P=0.003). Rates of serious adverse events of hypotension, syncope, electrolyte abnormalities, and acute kidney injury or failure, but not of injurious falls, were higher in the intensive-treatment group than in the standard-treatment group.

CONCLUSIONS

Among patients at high risk for cardiovascular events but without diabetes, targeting a systolic blood pressure of less than 120 mm Hg, as compared with less than [redacted] resulted in lower rates of fatal and nonfatal major cardiovascular events and death from any cause, although significantly higher rates of some adverse events were observed in the intensive-treatment group. (Funded by the National Institutes of Health; ClinicalTrials.gov number, NCT01206062.)





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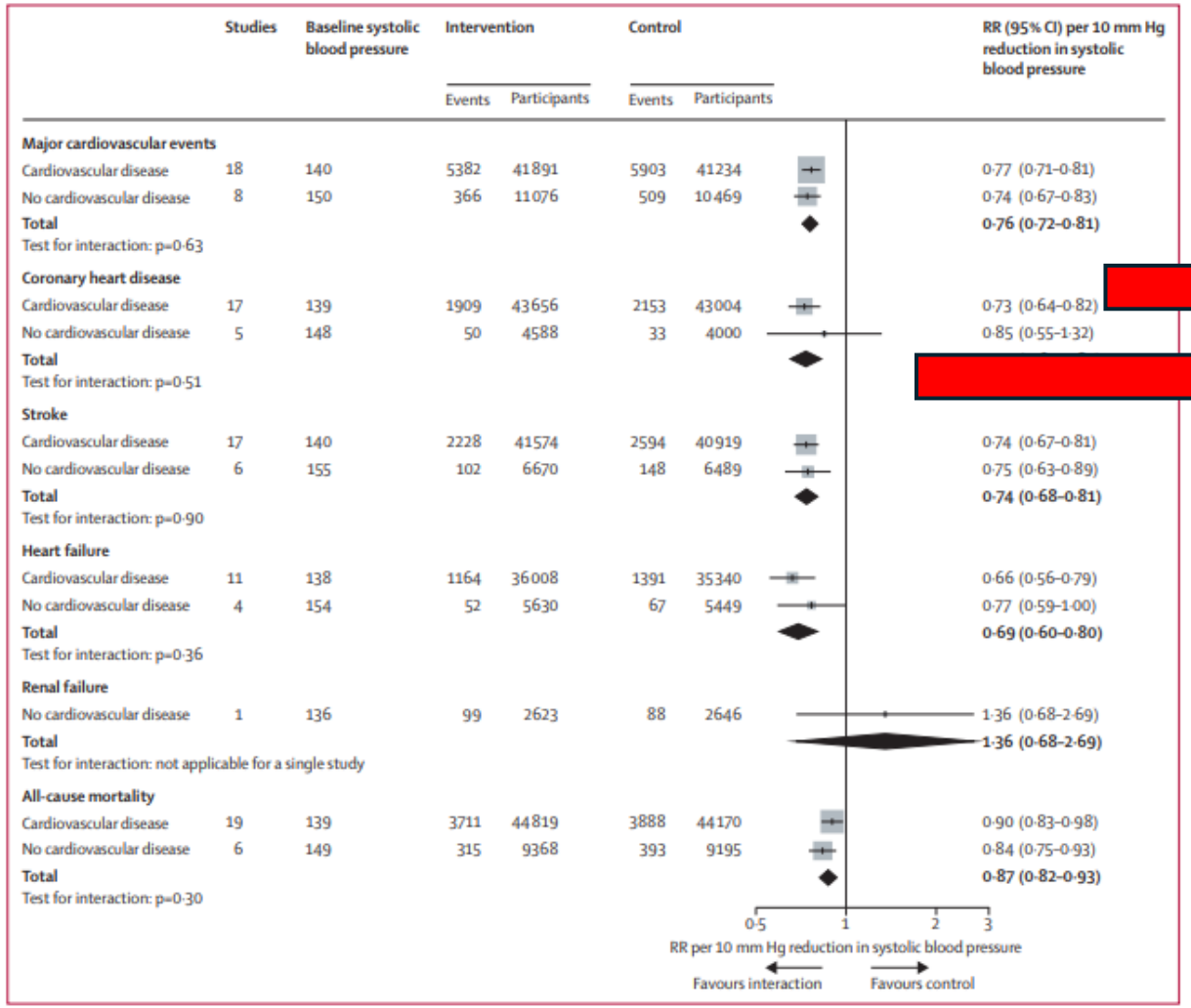
Blood pressure lowering for prevention of cardiovascular disease and death: a systematic review and meta-analysis

Dena Ettehad, Connor A Emdin, Amit Kiran, Simon G Anderson, Thomas Callender, Jonathan Emberson, John Chalmers, Anthony Rodgers, Kazem Rahimi

Summary

Background The benefits of blood pressure lowering treatment for prevention of cardiovascular disease are well established. However, the extent to which these effects differ by baseline blood pressure, presence of comorbidities, or drug class is less clear. We therefore performed a systematic review and meta-analysis to clarify these differences.

Method For this systematic review and meta-analysis, we searched MEDLINE for large-scale blood pressure lowering trials, published between Jan 1, 1966, and July 7, 2015, and we searched the medical literature to identify trials up to Nov 9, 2015. All randomised controlled trials of blood pressure lowering treatment were eligible for inclusion if they included a minimum of 1000 patient-years of follow-up in each study arm. No trials were excluded because of presence of baseline comorbidities, and trials of antihypertensive drugs for indications other than hypertension were eligible. We extracted summary-level data about study characteristics and the outcomes of major cardiovascular disease events, coronary heart disease, stroke, heart failure, renal failure, and all-cause mortality. We used inverse variance weighted fixed-effects meta-analyses to pool the estimates.



Standardised effects of a 10 mm Hg reduction in systolic blood pressure stratified by history of cardiovascular disease

Data are stratified by subgroups in which all (cardiovascular disease) or none (no cardiovascular disease) of the participants had a history of cardiovascular disease at baseline. A cardiovascular disease subgroup is not shown for renal failure because no trial that reported renal failure as an outcome reported an analysis stratified by the presence of cardiovascular disease. RR=relative risk.

Results We identified 123 studies with 613 815 participants for the tabular meta-analysis. Meta-regression analyses showed relative risk reductions proportional to the magnitude of the blood pressure reductions achieved. Every [illegible] significantly reduced the risk of major cardiovascular disease events (relative risk [RR] 0·80, 95% CI 0·77–0·83), coronary heart disease (0·83, 0·78–0·88), stroke (0·73, 0·68–0·77), and heart failure (0·72, 0·67–0·78), which, in the populations studied, led to a significant 13% reduction in all-cause [illegible] However, the effect on renal failure was not significant (0·95, 0·84–1·07). Similar proportional risk reductions (per 10 mm Hg lower systolic blood pressure) were noted in trials with higher mean baseline systolic blood pressure and trials with lower mean baseline systolic blood pressure (all p_{trend}>0·05). There was no clear evidence that proportional risk reductions in major cardiovascular disease differed by baseline disease history, except for diabetes and chronic kidney disease, for which smaller, but significant, risk reductions were detected. β blockers were inferior to other drugs for the prevention of major cardiovascular disease events, stroke, and renal failure. Calcium channel blockers were superior to other drugs for the prevention of stroke. For the prevention of heart failure, calcium channel blockers were inferior and diuretics were superior to other drug classes. Risk of bias was judged to be low for 113 trials and unclear for 10 trials. Heterogeneity for outcomes was low to moderate; the I^2 statistic for heterogeneity for major cardiovascular disease events was 41%, for coronary heart disease 25%, for stroke 26%, for heart failure 37%, for renal failure 28%, and for all-cause mortality 35%.

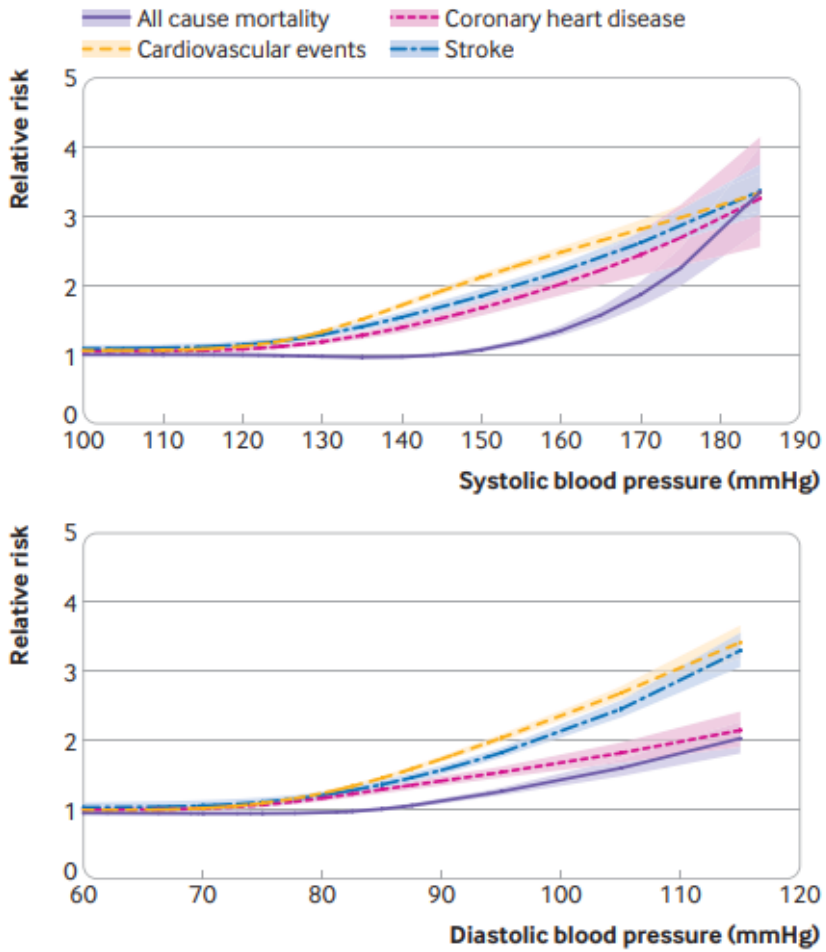
Interpretation Blood pressure lowering significantly reduces vascular risk across various baseline blood pressure levels and comorbidities. Our results provide strong support for lowering blood pressure to systolic blood pressures less than 130 mm Hg and providing blood pressure lowering treatment to individuals with a history of cardiovascular disease, coronary heart disease, stroke, diabetes, heart failure, and chronic kidney disease.

Funding National Institute for Health Research and Oxford Martin School.

Association between high blood pressure and long term cardiovascular events in young adults: systematic review and meta-analysis

Dongling Luo,[1] Yunjiu Cheng,[2] Haifeng Zhang,[3] Mingchuan Ba,[4] Pengyuan Chen,[4] Hezhi Li,[1] Kequan Chen,[5] Weihong Sha,[6] Caojin Zhang,[1] Hao Chen[6]

the bmj | *BMJ* 2020;370:m3222 | doi: 10.1136/bmj.m3222



| Nonlinear dose-response analysis of systolic blood pressure (top panel) and diastolic blood pressure (bottom panel) and risk of cardiovascular events, coronary heart disease, stroke, and all cause mortality. Shaded areas indicate 95% confidence intervals for corresponding coloured lines

OBJECTIVE

To evaluate and quantify the future risk of cardiovascular events in young adults with high blood pressure.

DESIGN

Systematic review and meta-analysis.

DATA SOURCES

Medline, Embase, and Web of Science were searched from inception to 6 March 2020. Relative risks were pooled using a random effects model and expressed with 95% confidence intervals. Absolute risk difference was calculated. Dose-response relations between blood pressure and individual outcomes were assessed by a restricted cubic spline model.

ELIGIBILITY CRITERIA FOR SELECTING STUDIES

Studies were selected that investigated the adverse outcomes of adults aged 18-45 with raised blood pressure. The primary study outcome was a composite of total cardiovascular events. Coronary heart disease, stroke, and all cause mortality were examined as secondary outcomes.

RESULTS

Seventeen observational cohorts consisting of approximately 4.5 million young adults were included in the analysis. The average follow-up was 14.7 years. Young adults with normal blood pressure had increased risk of cardiovascular events compared with those with optimal blood pressure (relative risk 1.19, 95% confidence interval 1.08 to 1.31; risk difference 0.37, 95% confidence interval 0.16 to 0.61 per 1000 person years). A graded, progressive association was found between blood pressure categories and increased risk of cardiovascular events (high normal blood pressure: relative risk 1.35, 95% confidence interval 1.22 to 1.49; risk difference 0.69, 95% confidence interval 0.43 to 0.97 per 1000 person years; grade 1 hypertension: 1.92, 1.68 to 2.19; 1.81, 1.34 to 2.34; grade 2 hypertension: 3.15, 2.31 to 4.29; 4.24, 2.58 to 6.48). Similar results were observed for coronary heart disease and stroke. Generally, the population attributable fraction for cardiovascular events associated with raised blood pressure was 23.8% (95% confidence interval 17.9% to 28.8%). The number needed to treat for one year to prevent one cardiovascular event was estimated at 2672 (95% confidence interval 1639 to 6250) for participants with normal blood pressure, 1450 (1031 to 2326) for those with high normal blood pressure, 552 (427 to 746) for those with grade 1 hypertension, and 236 (154 to 388) for those with grade 2 hypertension.

CONCLUSIONS

Young adults with raised blood pressure might have a slightly increased risk of cardiovascular events in later life. Because the evidence for blood pressure lowering is limited, active interventions should be cautious and warrant further investigation.

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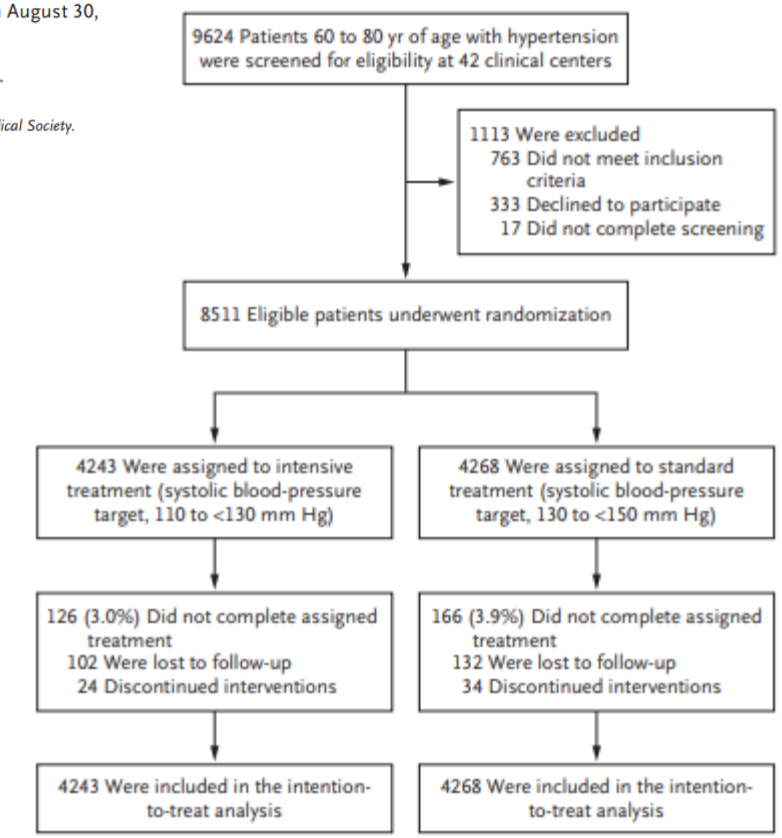


The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Trial of Intensive Blood-Pressure Control in Older Patients with Hypertension

Weili Zhang, M.D., Ph.D., Shuyuan Zhang, Ph.D., Yue Deng, Ph.D., Shouling Wu, M.D., Jie Ren, M.D., Gang Sun, M.D., Jinfeng Yang, M.D., Yinong Jiang, M.D., Xinjuan Xu, M.D., Tzung-Dau Wang, M.D., Ph.D., Youren Chen, M.D., Yufeng Li, M.D., Lianchen Yao, M.D., Dianfang Li, M.D., Lixin Wang, M.D., Xiaomei Shen, M.D., Xinhua Yin, M.D., Wei Liu, M.D., Xiaoyang Zhou, M.D., Bingpo Zhu, M.D., Zihong Guo, M.D., Hualing Liu, M.D., Xiaoping Chen, M.D., Yingqing Feng, M.D., Gang Tian, M.D., Xiuyin Gao, B.Sc., Kazuomi Kario, M.D., Ph.D., and Jun Cai, M.D., Ph.D., for the STEP Study Group*

BACKGROUND

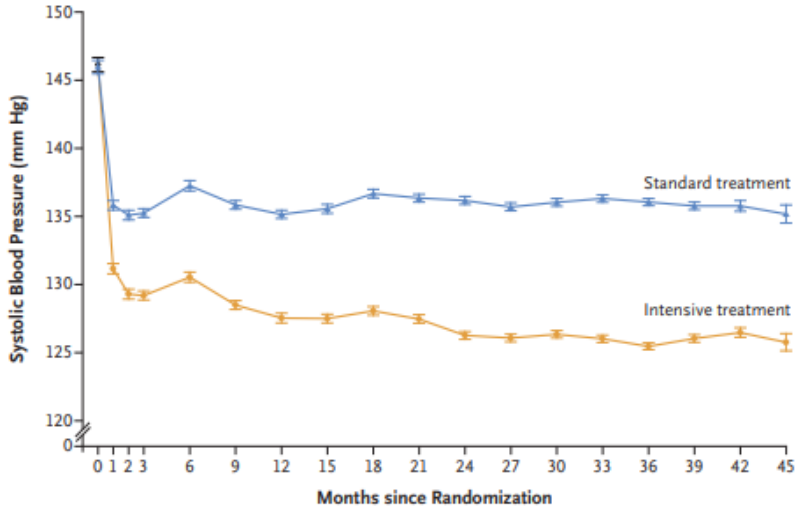
The appropriate target for systolic blood pressure to reduce cardiovascular risk in older patients with hypertension remains unclear.

METHODS

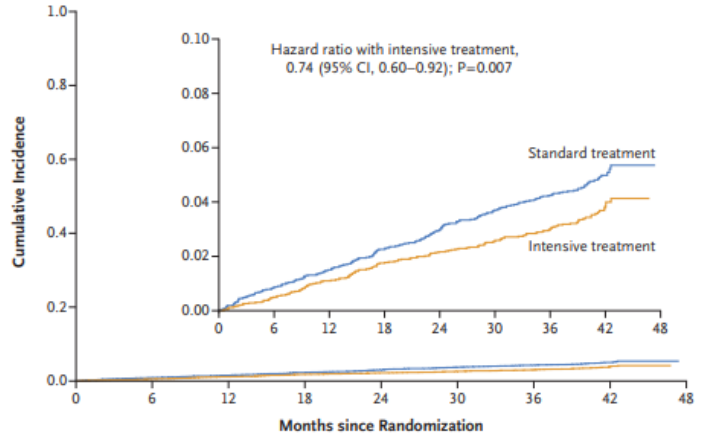
In this multicenter, randomized, controlled trial, we assigned Chinese patients 60 to 80 years of age with hypertension to a systolic blood-pressure target of 110 to less than 130 mm Hg (intensive treatment) or a target of 130 to less than 150 mm Hg (standard treatment). The primary outcome was a composite of stroke, acute coronary syndrome (acute myocardial infarction and hospitalization for unstable angina), acute decompensated heart failure, coronary revascularization, atrial fibrillation, or death from cardiovascular causes.

Characteristics of the Patients at Baseline.*

Characteristic	Intensive Treatment (N=4243)	Standard Treatment (N=4268)
Age — yr	66.2±4.8	66.3±4.8
Distribution of age — no. (%)		
60–69 yr	3220 (75.9)	3236 (75.8)
70–80 yr	1023 (24.1)	1032 (24.2)
Male sex — no. (%)	1990 (46.9)	1969 (46.1)
Body-mass index†	25.5±3.2	25.6±3.2
Blood pressure — mm Hg		
Systolic	146.1±16.8	146.0±16.5
Diastolic	82.7±10.6	82.3±10.5
Distribution of systolic blood pressure — no. (%)‡		
≤138 mm Hg	1416 (33.4)	1442 (33.8)
139–151 mm Hg	1406 (33.1)	1445 (33.9)
≥152 mm Hg	1421 (33.5)	1381 (32.4)
Renal dysfunction — no. (%)§	99/4180 (2.4)	97/4214 (2.3)
Fasting serum glucose — mmol/liter	6.2±1.8	6.2±1.7
Lipid profile — mmol/liter		
Total cholesterol	4.9±1.2	4.9±1.1
Median triglycerides (IQR)	1.3 (1.0–2.0)	1.4 (1.0–1.9)
High-density lipoprotein cholesterol	1.3±0.3	1.3±0.3
Low-density lipoprotein cholesterol	2.7±0.9	2.7±0.9
Medical history — no. (%)		
Diabetes mellitus	800 (18.9)	827 (19.4)
Hyperlipidemia	1591 (37.5)	1541 (36.1)
Cardiovascular disease	268 (6.3)	272 (6.4)
Framingham Risk Score ≥15% — no./total no. (%)¶	2588/3975 (65.1)	2576/3996 (64.5)



No. with Data								
Standard treatment	4268	4139	4086	4092	4072	3954	3857	1885
Intensive treatment	4243	4128	4086	4049	4050	3969	3894	1850
Mean No. of Medications								
Standard treatment	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Intensive treatment	1.5	1.7	1.8	1.8	1.9	1.9	1.9	1.9



No. at Risk								
Standard treatment	4268	4147	4070	4000	3938	3849	3664	1200
Intensive treatment	4243	4174	4109	4039	3970	3867	3694	1234

Cumulative Incidence for the Primary Outcome.

The primary outcome was a composite of stroke, acute coronary syndrome, acute decompensated heart failure, coronary revascularization, atrial fibrillation, or death from cardiovascular causes. The hazard ratio, 95% confidence interval, and P value for the primary outcome were calculated with the use of the Fine–Gray subdistribution hazard model for the competing risk of death, with adjustment for clinical center. The inset shows the same data on an enlarged y axis.

RESULTS

Of the 9624 patients screened for eligibility, 8511 were enrolled in the trial; 4243 were randomly assigned to the intensive-treatment group and 4268 to the standard-treatment group. At 1 year of follow-up, the mean systolic blood pressure was 127.5 mm Hg in the intensive-treatment group and 135.3 mm Hg in the standard-treatment group. During a median follow-up period of 3.34 years, primary-outcome events occurred in 147 patients (3.5%) in the intensive-treatment group, as compared with 196 patients (4.6%) in the standard-treatment group (hazard ratio, 0.74; 95% confidence interval [CI], 0.60 to 0.92; P=0.007). The results for most of the individual components of the primary outcome also favored intensive treatment: the hazard ratio for stroke was 0.67 (95% CI, 0.47 to 0.97), acute coronary syndrome 0.67 (95% CI, 0.47 to 0.94), acute decompensated heart failure 0.27 (95% CI, 0.08 to 0.98), coronary revascularization 0.69 (95% CI, 0.40 to 1.18), atrial fibrillation 0.96 (95% CI, 0.55 to 1.68), and death from cardiovascular causes 0.72 (95% CI, 0.39 to 1.32). The results for safety and renal outcomes did not differ significantly between the two groups, except for the incidence of hypotension, which was higher in the intensive-treatment group.

CONCLUSIONS

In older patients with hypertension, intensive treatment with a systolic blood-pressure target of 110 to less than 130 mm Hg resulted in a lower incidence of cardiovascular events than standard treatment with a target of 130 to less than 150 mm Hg. (Funded by the Chinese Academy of Medical Sciences and others; STEP ClinicalTrials.gov number, NCT03015311.)

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 MARCH 27, 2025 VOL. 392 NO. 12

Intensive Blood-Pressure Control in Patients with Type 2 Diabetes

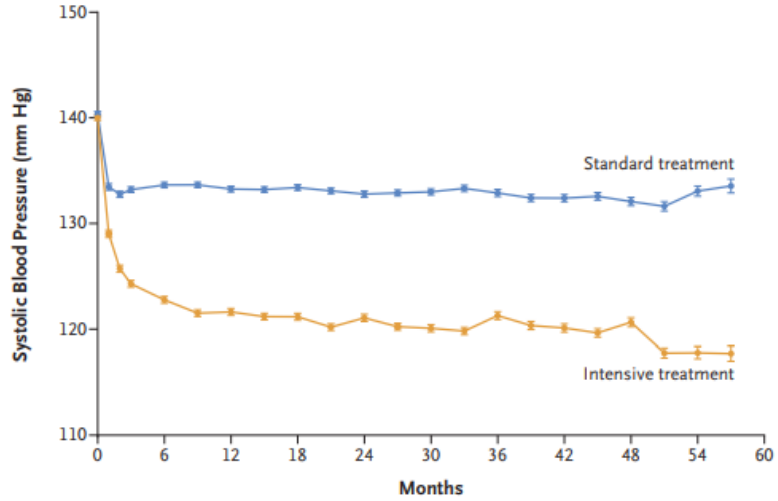
Y. Bi,[1,2] M. Li,[1,2] Y. Liu,[3] T. Li,[4] J. Lu,[1,2] P. Duan,[5] F. Xu,[6] Q. Dong,[7] Ailiang Wang,[8] T. Wang,[1,2] R. Zheng,[1,2] Y. Chen,[1,2] M. Xu,[1,2] X. Wang,[9] Xinhuan Zhang,[10] Y. Niu,[11] Z. Kang,[12] C. Lu,[13] Jing Wang,[14] X. Qiu,[15] An Wang,[16] S. Wu,[1,2,17] J. Niu,[1,2,18] Jingya Wang,[19] Z. Zhao,[1,2] H. Pan,[20] X. Yang,[21] X. Niu,[22] S. Pang,[23] Xiaoliang Zhang,[24] Y. Dai,[25] Q. Wan,[26] S. Chen,[27] Q. Zheng,[28] S. Dai,[29] J. Deng,[1,2] L. Liu,[30] G. Wang,[31] H. Zhu,[32] W. Tang,[33] H. Liu,[34] Z. Guo,[35] G. Ning,[1,2] J. He,[36] Y. Xu,[1,2] and W. Wang,[1,2] for the BPROAD Research Group*

BACKGROUND

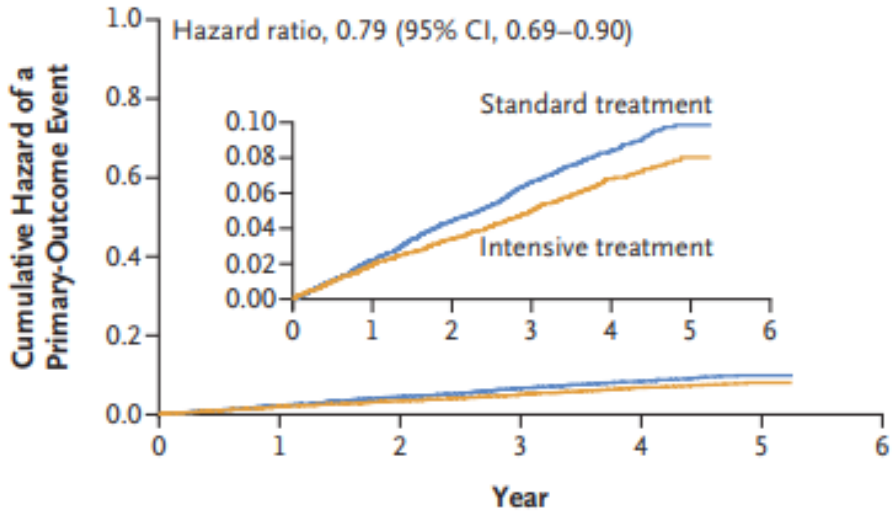
Effective targets for systolic blood-pressure control in patients with type 2 diabetes are unclear.

METHODS

We enrolled patients 50 years of age or older with type 2 diabetes, elevated systolic blood pressure, and an increased risk of cardiovascular disease at 145 clinical sites across China. Patients were randomly assigned to receive intensive treatment that targeted a systolic blood pressure of less than 120 mm Hg or standard treatment that targeted a systolic blood pressure of less than 140 mm Hg for up to 5 years. The primary outcome was a composite of nonfatal stroke, nonfatal myocardial infarction, treatment or hospitalization for heart failure, or death from cardiovascular causes. Multiple imputation was used for missing outcome data, with an assumption that the data were missing at random.



No. with Data										
Standard treatment	6407	5885	5663	5555	5257	4535	4091	3550	3187	1597
Intensive treatment	6414	5858	5612	5474	5244	4541	4119	3573	3198	1622
Mean No. of Medications Prescribed										
Standard treatment	1.6	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.3
Intensive treatment	1.7	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1



No. at Risk						
Standard treatment	6407	6087	5814	4626	3674	132
Intensive treatment	6414	6092	5871	4692	3738	112

The NEW ENGLAND JOURNAL of MEDICINE

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Intensive Blood-Pressure Control in Patients with Type 2 Diabetes

Y. Bi,[1,2] M. Li,[1,2] Y. Liu,[3] T. Li,[4] J. Lu,[1,2] P. Duan,[5] F. Xu,[6] Q. Dong,[7] Ailiang Wang,[8] T. Wang,[1,2] R. Zheng,[1,2] Y. Chen,[1,2] M. Xu,[1,2] X. Wang,[9] Xinhuan Zhang,[10] Y. Niu,[11] Z. Kang, J. Niu,[1,2,18] Jingya Wang,[19] Z. Zhao,[1,2] H. Pan,[20] X. Yang,[21] S. Chen,[27] Q. Zheng,[28] S. Dai,[29] J. Deng,[1,2] L. Liu,[30] G. Wang,[31] H. Zhu,[32] W. Tang,[33] H. Liu,[34] Z. Guo,[35] G. Ning,[1,2] J. He,[36] Y. Xu,[1,2] and W. Wang,[1,2] for the BPROAD Research Group*

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RESULTS

Of 12,821 patients (6414 patients in the intensive-treatment group and 6407 in the standard-treatment group) enrolled from February 2019 through December 2021, 5803 (45.3%) were women; the mean (±SD) age of the patients was 63.8±7.5 years. At 1 year of follow-up, the mean systolic blood pressure was 121.6 mm Hg (median, 118.3 mm Hg) in the intensive-treatment group and 133.2 mm Hg (median, 135.0 mm Hg) in the standard-treatment group. During a median follow-up of 4.2 years, primary-outcome events occurred in 393 patients (1.65 events per 100 person-years) in the intensive-treatment group and 492 patients (2.09 events per 100 person-years) in the standard-treatment group (hazard ratio, 0.79; 95% confidence interval, 0.69). The incidence of serious adverse events was similar in the treatment groups. However, symptomatic hypotension and hyperkalemia occurred more frequently in the intensive-treatment group than in the standard-treatment group.

CONCLUSIONS

Among patients with type 2 diabetes, the incidence of major cardiovascular events was significantly lower with intensive treatment targeting a systolic blood pressure of less than 120 mm Hg than with standard treatment targeting a systolic blood pressure of less than 140 mm Hg. (Funded by the National Key Research and Development Program of the Ministry of Science and Technology of China and others; BPROAD ClinicalTrials.gov number, NCT03808311.)

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Lowering systolic blood pressure to less than 120 mm Hg versus less than 140 mm Hg in patients with high cardiovascular risk with and without diabetes or previous stroke: an open-label, blinded-outcome, randomised trial

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Summary

Background Uncertainty exists about whether lowering systolic blood pressure to less than 120 mm Hg is superior to that of less than 140 mm Hg, particularly in patients with diabetes and patients with previous stroke.

Methods In this open-label, blinded-outcome, randomised controlled trial, participants with high cardiovascular risk were enrolled from 116 hospitals or communities in China. We used minimised randomisation to assign participants to intensive treatment targeting standard office systolic blood pressure of less than 120 mm Hg or standard treatment targeting less than 140 mm Hg. The primary outcome was a composite of myocardial infarction, revascularisation, hospitalisation for heart failure, stroke, or death from cardiovascular causes, assessed by the intention-to-treat principle. This trial was registered with ClinicalTrials.gov, NCT04030234.

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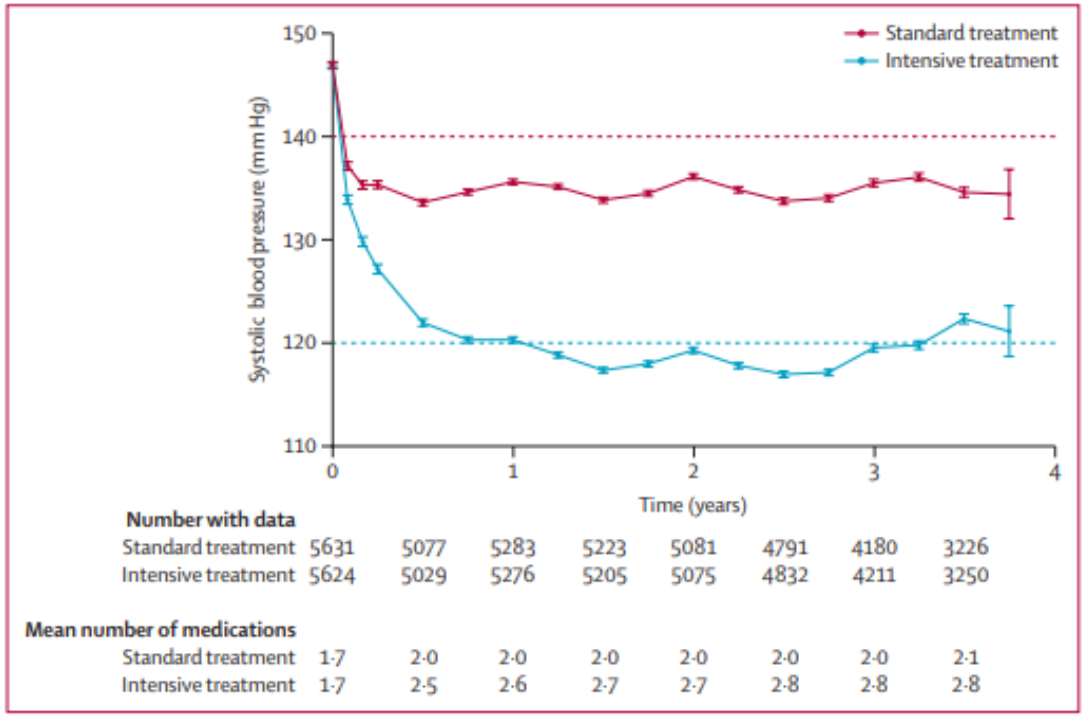

Number with data								
Standard treatment	5631	5077	5283	5223	5081	4791	4180	3226
Intensive treatment	5624	5029	5276	5205	5075	4832	4211	3250
Mean number of medications								
Standard treatment	1·7	2·0	2·0	2·0	2·0	2·0	2·0	2·1
Intensive treatment	1·7	2·5	2·6	2·7	2·7	2·8	2·8	2·8

Systolic blood pressure in the two treatment groups over the course of the trial

The systolic blood pressure target in the intensive treatment group was less than 120 mm Hg, and the target in the standard treatment group was less than 140 mm Hg. The mean number of medications is the number of antihypertensive medications administered with the adherence over 80% at the exit of each visit. I bars represent 95% CIs.

Findings Between Sept 17, 2019, and July 13, 2020, 11 255 participants (4359 with diabetes and 3022 with previous stroke) were assigned to intensive treatment (n=5624) or standard treatment (n=5631). Their mean age was 64·6 years (SD 7·1). The mean systolic blood pressure throughout the follow-up (except the first 3 months of titration) was 119·1 mm Hg (SD 11·1) in the intensive treatment group and 134·8 mm Hg (10·5) in the standard treatment group. During a median of 3·4 years of follow-up, the primary outcome event occurred in 547 (9·7%) participants in the intensive treatment group and 623 (11·1%) in the standard treatment group (hazard ratio [HR] 0·88, 95% CI 0·78–0·99; p=0·028). There was no heterogeneity of effects by diabetes status, duration of diabetes, or history of stroke. Serious adverse events of syncope occurred more frequently in the intensive treatment group (24 [0·4%] of 5624) than in standard treatment group (eight [0·1%] of 5631; HR 3·00, 95% CI 1·35–6·68). There was no significant between-group difference in the serious adverse events of hypotension, electrolyte abnormality, injurious fall, or acute kidney injury.

Interpretation For hypertensive patients at high cardiovascular risk, regardless of the status of diabetes or history of stroke, the treatment strategy of targeting systolic blood pressure of less than 120 mm Hg, as compared with that of less than 140 mm Hg, prevents major vascular events, with minor excess risk.

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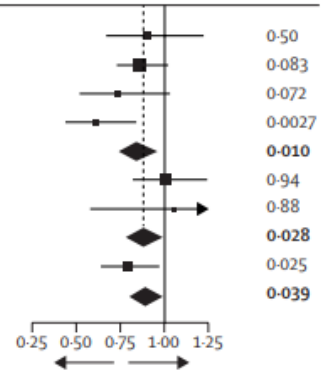
	Intensive treatment (n=5624)	Standard treatment (n=5631)	Hazard ratio (95% CI)	p value
Myocardial infarction	82 (1·5%)	91 (1·6%)	0·90 (0·67–1·22)	0·50
Stroke	262 (4·7%)	303 (5·4%)	0·86 (0·73–1·02)	0·083
Heart failure	57 (1·0%)	78 (1·4%)	0·73 (0·52–1·03)	0·072
Death from cardiovascular causes	59 (1·1%)	97 (1·7%)	0·61 (0·44–0·84)	0·0027
Major vascular events without revascularisation	**417 (7·4%)**	**495 (8·8%)**	**0·84 (0·74–0·96)**	**0·010**
Coronary revascularisation	183 (3·3%)	182 (3·2%)	1·01 (0·82–1·24)	0·94
Non-coronary revascularisation	23 (0·4%)	22 (0·4%)	1·05 (0·58–1·88)	0·88
Major vascular events (primary outcome)	**547 (9·7%)**	**623 (11·1%)**	**0·88 (0·78–0·99)**	**0·028**
Death from any cause	160 (2·8%)	203 (3·6%)	0·79 (0·64–0·97)	0·025
Primary outcome or death from any cause	**637 (11·3%)**	**714 (12·7%)**	**0·89 (0·80–0·99)**	**0·039**



	Intensive treatment (n=5624)	Standard treatment (n=5631)	Hazard ratio (95% CI)	p value
Serious adverse event*	2366 (42·1%)	2378 (42·2%)	1·01 (0·95–1·07)	0·78
Conditions of interest				
Serious adverse event only				
Hypotension†	7 (0·1%)	3 (0·1%)	2·33 (0·60–9·02)	0·22
Syncope‡	24 (0·4%)	8 (0·1%)	3·00 (1·35–6·68)	0·0071
Electrolyte abnormality	9 (0·2%)	13 (0·2%)	0·69 (0·30–1·62)	0·40
Injurious fall§	29 (0·5%)	20 (0·4%)	1·45 (0·82–2·57)	0·20
Acute kidney injury¶	3 (0·1%)	2	1·50 (0·25–8·99)	0·66
Emergency room visit or serious adverse event				
Hypotension†	17 (0·3%)	5 (0·1%)	3·40 (1·26–9·22)	0·016
Syncope‡	26 (0·5%)	12 (0·2%)	2·17 (1·09–4·30)	0·027
Electrolyte abnormality	10 (0·2%)	13 (0·2%)	0·77 (0·34–1·76)	0·53
Injurious fall§	40 (0·7%)	33 (0·6%)	1·21 (0·77–1·92)	0·41
Acute kidney injury¶	3 (0·1%)	2	1·50 (0·25–8·99)	0·66

Serious adverse events, conditions of interest, and monitored electrolyte abnormality

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Zamyšlení: Proč je arteriální hypertenze pořád na scéně?

- Fenomén „tichého zabijáka“ – asymptomatická ≠ nedůležitá
  (pacienti se cítí dobře, … až do doby, kdy se necítí)

- Změny v životné stylu jsou náročné
  (Sladkosti, Sůl, Stres, Sezení)

- Adherence (léky jsou předepisovány, ale ne vždy polykány)
  (nežádoucí účinky: 2% reálné, 98% Google-em indukované)

- Lékařská apatie (multifaktoriální etiologie)
  Lékaři mají rádi své pacienty a stabilitu. A občas se zdráhají intenzifikovat léčbu i když by měli – strategie „počkáme a uvidíme“ je někdy fajn, … až do vzniku hypertenzí zprostředkovaného orgánového poškození
- Lidská přirozenost jako *hlavní kardiovaskulární rizikový faktor*
  (neboli „To se mně nestane“ / Hypertenze na oslavu dorazí vždy, ať už jste připraveni či nikoliv)

Souhrn

- Arteriální hypertenze je jeden z *nejlépe modifikovatelných* rizikových faktorů kardiovaskulárních nemocí
- Zahajme léčbu včasně
- Nižší je lepší (v rámci zdravého rozumu) = <120-129 mmHg sTK
- Single pill je „in“ – mono je „out“
- Na životném stylu zaleží (sladkosti, sůl, stres, sedavý způsob života) jsou nepřátelé

Děkuji za pozornost

Lečme včasně, mířme moudře, kombinujme rozumně, a nepodceňujme edukaci

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