

Prevalence of Hypertension and Orthostatic Hypotension in Supercentenarians: Preliminary Results

Saidova L. B.

Bukhara State Medical Institute, Department of Internal Medicine in Family Medicine

Received: 2024, 21, Nov
Accepted: 2024, 22, Nov
Published: 2024, 24, Dec

Copyright © 2024 by author(s) and BioScience Academic Publishing. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).



Open Access

<http://creativecommons.org/licenses/by/4.0/>

Resume: Purpose of the study— to assess the prevalence and impact on mortality of arterial hypertension (AH) and orthostatic hypotension (OH) in supercentenarians (95 years and older).

Materials and methods The study participants were 82 supercentenarians aged 95 years and older (minimum age 95 years, maximum 105 years) who underwent a comprehensive geriatric assessment at home by a multidisciplinary team (geriatrician, nurse and social worker). Prospective observation lasted 3 years (36 months).

Results: History of hypertension was noted in 78%. The mean systolic blood pressure (SBP) in the supine position was 151 ± 27.9 mmHg (100 to 216 mmHg), and diastolic blood pressure (DBP) was 74 ± 12.8 mmHg (44 to 197 mmHg). OH was detected in 31% of 61 centenarians who performed the orthostatic test. The presence of OH was not associated with a higher intake of antihypertensive drugs. Forty-four study participants died within 3 years. Blood pressure (BP), history of hypertension, and the presence of OH did not affect mortality ($p > 0.05$). Conclusions: Supercentenarians have a wide range of SBP and DBP, a high prevalence of hypertension and OH. Blood pressure level, the presence of hypertension and OH did not affect mortality over 3 years. Additional studies are needed to better understand the health status of

centenarians and the factors affecting the prognosis.

Keywords: geriatrics, long-livers, orthostatic hypotension, arterial hypertension.

Relevance of the topic

Arterial hypertension (AH) is one of the most common diseases that reduces life expectancy and worsens quality of life. Its prevalence worldwide has increased from 600 million in 1980 to 1 billion in 2008, which is associated with both an increase in the overall population and an increase in life expectancy [1]. The prevalence of AH increases with age. According to a meta-analysis of national databases in the UK (2006), Canada (2007–2010), and the United States (2007–2009), the prevalence of AH in the elderly (age group 60 to 80 years) is, on average, twice as high as in middle-aged people (40–59 years), and varies from 53.2 to 63.7% in older patients and from 18.4 to 31.1% in middle-aged people [2]. The prevalence of orthostatic hypotension (OH) increases with age and occurs in 23% of people over 60 years of age [3]. OH can explain the phenomenon of blood pressure (BP) variability in elderly patients and is caused by high arterial stiffness, impaired baroreflex function, and decreased renal function [4]. Studies have shown that the presence of OH is an independent adverse prognostic factor for the development of cardiovascular complications, cognitive impairment and dementia, decreased functional status, loss of autonomy, and increased overall mortality [5]. OH is often associated with hypertension [6]. Most studies devoted to hypertension and OH did not include patients from the long-livers group (95 years and older).

The aim of our research The aim was to assess the prevalence of hypertension and OH among individuals approaching or having crossed the 100-year mark (95 years and older), as well as to assess their impact on survival during a 3-year prospective observation.

Materials and methods

Informed consent for the examination could be signed by the centenarian or his/her relative/guardian. The home visit to the centenarian was carried out accompanied by an assigned social worker. The study involved 82 centenarians aged 95 years and older (mean age was 98 years, minimum 95 years, maximum 105 years, standard deviation (SD) 1.9, of whom 87.8% were women) (Table 1). The study participants were examined at home by a mobile geriatric team (geriatrician, nurse and social worker) in the presence of relatives/guardians and/or caregivers. During the visit, the doctor conducted a physical examination, including measurement of blood pressure and heart rate. The measurement was carried out by the auscultatory method using a mechanical tonometer that passed the metrological examination in accordance with the current regulations. The measurement was performed in the supine position (in the study participants with severely limited physical activity — those who did not get out of bed) or sitting and 1 and 3 minutes after standing up. The criterion for OH was a decrease in systolic BP (SBP) by 20 mmHg or more and/or diastolic BP (DBP) by 10 mmHg or more 3 minutes after standing up [7]. The history of hypertension was clarified using available medical records. Information on current medication use was collected by interviewing the centenarian him/herself, relatives, caregivers, and social workers helping to purchase medications. Information on life status after 3 years was obtained by telephone contact with centenarians, relatives/caregivers, or by requesting the appropriate social service center. Statistical analysis was performed using GraphPad Prism Version 8.1.1. The results are presented as mean values (\pm standard deviation, $M \pm SD$). Qualitative values were compared using χ^2 (Ch-square). Survival was assessed using Kaplan-Meier survival curve analysis. Differences were considered statistically significant at $p < 0.05$.

Results

Prevalence of hypertension. A history of hypertension was detected in 64 of 82 study participants (78%). Of the examined, 53 (72.8%) were receiving antihypertensive therapy at the time of examination. Multicomponent antihypertensive therapy (3 or more drugs) was received by 8 people (14%), 27 people (42.2%) were taking only 1 drug. Drugs from the class of angiotensin-converting enzyme inhibitors and beta-blockers were the most common, and the frequency of their use was 35.9% and 32.8%, respectively. Drugs from other groups were taken by elderly patients less often: calcium channel blockers in 23% of cases, diuretics in 20% of cases. None of the subjects included in the study received therapy with centrally acting drugs and/or alpha-blockers. The mean SBP was 151.4 ± 27.9 mm Hg. SBP — 74 ± 12 mmHg, DBP — 74 ± 12 mmHg (Table 2). At the time of examination, 30% of the study participants had SBP less than 140 mmHg, and 17.8% had more than 180 mmHg. An orthostatic test was performed on 61 centenarians (14 refused, 7 could not assume an upright position). The magnitude of the decrease in SBP and DBP averaged 8.5 ± 17.3 mmHg (maximum decrease 50 mmHg) and -0.7 ± 11.5 mmHg (maximum decrease 36 mmHg).

Nineteen (31.1%) centenarians had OH. No differences in the prevalence of OH were found between individuals with and without hypertension: OH was registered in 15 centenarians (34.1%) with hypertension and in 4 (23.5%) without hypertension ($p > 0.54$). The number of antihypertensive drugs taken by centenarians with and without OH did not differ significantly: 1.6 ± 1.1 versus 1.1 ± 1.1 ($p = 0.08$). After 3 years, vital status data were obtained for 69 participants: 25 (36.2%) centenarians were alive and 44 (63.8%) had died. Among survivors, SBP and DBP values at the initial examination were 156.8 ± 24.7 and 78.61 ± 13.4 mmHg. Accordingly, hypertension was registered in 72%, and OH in 31.6%; among those who died, hypertension was registered in 84.1%, and OH in 32.3%; SBP and DBP at the initial examination were 145.9 ± 25.2 and 72.2 ± 13.9 mm Hg, respectively. Kaplan-Meier survival analysis did not reveal an association between mortality and the level of SBP and DBP, or the presence of hypertension or OH.

Discussion: The number of people reaching the age of 90–100 years is growing progressively every year. According to foreign publications, about 15% of women and 12% of men born in 1950 will live to be 90 years old, and more than 50% of those born in 2000 will be able to celebrate their 100th birthday [8]. The increase in life expectancy is explained primarily by the improvement in the quality of medical care. At the same time, it is known that in people who live to such an advanced age, the development of age-associated diseases does not occur or occurs significantly later in life [11]. This phenomenon is sometimes called "negligible aging" [10]. Another feature of very elderly patients is that traditional risk factors (hyperlipidemia, hyperglycemia) may not affect life prognosis, or the relationship with them may be inverse compared to younger people (for example, high total cholesterol is associated with lower mortality in people aged 85 years and older) [12, 13]. A J-shaped relationship has been described for BP and the risk of death in elderly patients; studies conducted in the USA (war veterans over 80 years old) and Europe (INVEST) demonstrated that in groups with SBP above 139 mm Hg and DBP above 89 mm Hg, survival was higher than in groups with more stringent BP control [14, 15]. In our study, a history of hypertension did not affect 3-year survival. We also did not find an effect of OH on survival, unlike the Honolulu Heart Program study, which noted an increase in mortality in men aged 71 to 93 years with OH [5]. The differences in the results can be explained by the older age of the patients included in our study, as well as a relatively small proportion of men in our sample ($n = 10$, 12.2%). Supercentenarians were not included in most multicenter studies devoted to the determination of modifiable risk factors affecting survival. At present, it is known that hypertension and OH are widespread in this age group. Foreign studies have demonstrated that some of the known risk factors cannot be used for this age group [12, 13]. Due to the resulting complexity of using standard prognostic factors and the uniqueness of the 100-year-old cohort, people need to continue research into creating algorithms for a personalized approach.

Conclusion

Supercentenarians have a wide range of SBP and DBP, and a high prevalence of hypertension and OH. According to our study, BP level, hypertension and OH do not affect mortality in the supercentenarian group over 3 years. Additional studies are needed to better understand the health status of centenarians and the factors affecting the prognosis.

References

1. World Health Organization (WHO). Global Health Observatory (GHO) data. Raised blood pressure. [Electronic resource]. URL: https://www.who.int/gho/ncd/risk_factors/blood_pressure_prevalence_text/en/
2. Joffres M, Falaschetti E, Gillespie C, Robitaille C, Loustalot F, Poulter N et al. Hypertension prevalence, awareness, treatment and control in national surveys from England, the USA and Canada, and correlation with stroke and ischemic heart disease mortality: a cross-sectional study. *BMJ Open*. 2013;3(8):e003423. doi:10.1136/bmjopen-2013-003423
3. Saedon NI, Tan MP, Frith J. The prevalence of orthostatic hypotension: a systematic review and meta-analysis. *Gerontol A Biol Sci Med Sci*. 2020;75(1):117–122. doi:10.1093/gerona/gly188
4. Aronow WS, Fleg JL, Pepine CJ, Artinian NT, Bakris G, Brown AS et al. ACCF Task Force. ACCF/AHA 2011 expert consensus document on hypertension in the elderly: a report of the American College of Cardiology Foundation Task Force on Clinical Expert Consensus Documents. *Circulation*. 2011;123(21): 2434–2506 . doi: 10.1161/CIR.0b013e31821daaf6. Epub 2011 Apr 25.
5. Masaki KH, Schatz IJ, Burchfiel CM, Sharp DS, Chiu D, Foley D et al. Orthostatic hypotension predicts mortality in elderly men: the Honolulu Heart Program. *Circulation*. 1998;98(21): 2290–2295 .
6. Di Stefano C, Milazzo V, Totaro S, Sobrero G, Ravera A, Milan A et al. Orthostatic hypotension in a cohort of hypertensive patients referring to a hypertension clinic. *J Hum Hypertens*. 2015;29(10):599–603. doi:10.1038/jhh.2014.130
7. Ostroumova OD, Cherniaeva MS, Petrova MM, Golovina OV. Orthostatic hypotension: definition, pathophysiology, classification, prognostic aspects, diagnostics and treatment. *Rational Pharmacotherapy in Cardiology*. 2018;14(5):747–756. doi.org/10.20996/1819-6446-2018-14-5-747-756. doi.org/10.20996/1819-6446-2018-14-5-747-756. [In Russian].
8. Christensen K, Doblhammer G, Rau R, Vaupel JW. Ageing populations: the challenges ahead. *Lancet*. 2009;374(9696):1196–1208. doi:10.1016/S0140-6736(09)61460-4
9. Crimmins EM. Lifespan and healthspan: past, present, and promise. *Gerontologist*. 2015;55(6):901–911. doi:10.1093/geront/gnv130
10. Franceschi C, Passarino G, Mari D, Monti D. Centenarians as a 21st century healthy aging model: A legacy of humanity and the need for a world-wide consortium (WWC100+). *Mech Ageing Dev*. 2017;165(PtB):55–58. doi:10.1016/j.mad.2017.06.002.
11. Evert J, Lawler E, Bogan H, Perls T. Morbidity profiles of centenarians: survivors, delayers, and escapers. *J Gerontol A Biol Sci Med Sci*. 2003;58(3):232–237.
12. Schatz IJ, Masaki K, Yano K, Chen R, Rodriguez BL, Curb JD. Cholesterol and all-cause mortality in elderly people from the Honolulu Heart Program: a cohort study. *Lancet*. 2001;358(9279):351–355.
13. Schupf N, Costa R, Luchsinger J, Tang MX, Lee JH, Mayeux R. Relationship between plasma lipids and all-cause mortality in nondemented elderly. *J Am Geriatr Soc*. 2005;53(2):219–226.

14. Oates DJ, Berlowitz DR, Glickman ME, Silliman RA, Borzecki AM. Blood pressure and survival in the oldest old. *J Am Geriatr Soc.* 2007;55(3):383–388. doi:10.1111/j.1532-5415.2007.01069.x
15. Denardo SJ, Gong Y, Nichols WW, Messerli FH, Bavry AA, Cooper-Dehoff RM et al. Blood pressure and outcomes in very old hypertensive coronary artery disease patients: an INVEST Substudy. *Am J Med.* 2010;123(8):719–726. doi:10.1016/j.amjmed.2010.02.014
16. Saidova, L.B., Saidova, M.K., Mirzaeva, D.B., Kuvvatov, Z.K., & Ashurova, N.G. (2019, July). Optimization of medical care for patients with acute poisoning at the prehospital stage by emergency medical care team. In *Of XY international Research and practice conference England, London* (pp. 120-122).
17. Saidova, L.B., Saidova, M.K., Shodiev, A.S., Kuvvatov, Z.K., & Ashurova, N.G. (2019). Improving the quality of rendering assistance with acute poisons of sychopharmacological preparations according to the Bukhara center of emergency medical assistance in the toxicology division of XY international Research and practice conference England. *PROSPECTS OF WORLD SCIENCE-2019*, 127.
18. Saidova, L.B., Saidova, M.K., Kuvvatov, Z.Kh., and Abdullaeva, N.Z. (2019, June). Real-life practice: Glycoside poisoning – diagnostic and treatment challenges. In: *4th eduindex international multidisciplinary conference, Zurich, Switzerland* (pp. 37-38).
19. Saidova, L. B., & Shodieva, N. U. (2021). Frequency of risk factors for overweight and obesity in young adults-review lecture. *Biology and Integrative Medicine*, (1 (48)), 194-206.
20. Saidova, L. B., & Shodieva, N. U. (2021). Prevalence of Risk Factors for Overweight and Obesity in Young Adults During the Covid-19 Pandemic in Primary Health Care. *Central Asian Journal of Medical and Natural Science*, 137-141.
21. Saidova, L.B., Saidova, M.K., Kuvvatov, Z.Kh., and Abdullaeva, N.Z. (2019). Real-life practice: Glycoside poisoning – diagnostic and treatment challenges. *4th International Multidisciplinary Conference eduindex, Zurich, Switzerland*.
22. Saidova, L. B., Karimov, U. A., & Saidova, M. K. (2009). Morbidity of preschool children attending and not attending preschool institutions. *Issues of Practical Pediatrics*, 4(2), 90-93.
23. Saidova, L. B., & Nazarova, A. B. (2022). Prevention of infertility in women of reproductive age with obesity and vitamin D deficiency.
24. Saidova, L. B. (2020). Improving the quality of life of patients with chronic glomerulonephritis using statins. *Biology and Integrative Medicine*, (2 (42)), 14-23.
25. L. B, S., & M. Sh., J. . (2023). Clinical and Prognostic Aspects of the Course of Type 2 Diabetes Mellitus in Patients Who Survived Covid-19. *Journal of Injury and Disability Research*, 2(7), 75–78.