Hypertension and Frailty Syndrome in Old Age: Current Perspectives

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Abstract

Hypertension is both a health problem and a financial one globally. It affects nearly 30 % of the general population. Elderly people, aged ≥65 years, are a special group of hypertensive patients. In this group, the overall prevalence of the disease reaches 60 %, rising to 70 % in those aged ≥80 years. In the elderly population, isolated systolic hypertension is quite common. High systolic blood pressure is associated with an increased risk of cardiovascular disease, cerebrovascular disease, peripheral artery disease, cognitive impairment and kidney disease. Considering the physiological changes resulting from ageing alongside multiple comorbidities, treatment of hypertension in elderly patients poses a significant challenge to treatment teams. Progressive disability with regard to the activities of daily life, more frequent hospitalisations and low quality of life are often seen in elderly patients. There is discussion in the literature regarding frailty syndrome associated with old age. Frailty is understood to involve decreased resistance to stressors, depleted adaptive and physiological reserves of a number of organs, endocrine dysregulation and immune dysfunction. The primary dilemma concerning frailty is whether it should only be defined on the basis of physical factors, or whether psychological and social factors should also be included. Proper nutrition and motor rehabilitation should be prioritised in care for frail patients. The risk of orthostatic hypotension is a significant issue in elderly patients. It results from an autonomic nervous system dysfunction and involves maladjustment of the cardiovascular system to sudden changes in the position of the body. Other significant issues in elderly patients include polypharmacy, increased risk of falls and cognitive impairment. Chronic diseases, including hypertension, deteriorate baroreceptor function and result in irreversible changes in cerebral and coronary circulation. Concurrent frailty or other components of geriatric syndrome in elderly patients are associated with a worse perception of health, an increased number of comorbidities and social isolation of the patient. It may also interfere with treatment adherence. Identifying causes of non-adherence to pharmaceutical treatment is a key factor in planning therapeutic interventions aimed at increasing control, preventing complications, and improving long-term outcomes and any adverse effects of treatment. Diagnosis of frailty and awareness of the associated difficulties in adhering to treatment may allow targeting of those elderly patients who have a poorer prognosis or may be at risk of complications from untreated or undertreated hypertension, and for the planning of interventions to improve hypertension control.

Keywords

Frailty syndrome, hypertension, polypharmacy, orthostatic hypotension, falls, cognitive impairment, old age

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Hypertension is considered the most common disorder in the general population. It is both a health and a financial problem worldwide. The Writing Group of the American Society of Hypertension defines hypertension as a cardiovascular syndrome resulting from a number of interconnected factors.[1] Therefore, a comprehensive evaluation is required, involving both the cardiovascular system and other risk factors. In the global population, the prevalence of hypertension is 26.4 %, which is expected to increase to one-third of the population by 2025.[2] The elderly comprise a special group of hypertensive patients because of ageing-related processes. In accordance with data from the Framingham study, 58.9 % of people aged ≥65 and 70 % of those aged ≥80 years are hypertensive.[3] Most patients in the group have isolated systolic hypertension, with normal diastolic blood pressure (DBP) values – below 90 mmHg. In the elderly population, systolic blood pressure (SBP) is a more significant risk factor for cardiovascular complications than DBP. Chronic high SBP leads to left ventricular hypertrophy, as decreased elasticity of large blood vessels – particularly the aorta – puts extra strain on the heart.[4] The ageing process involves a number of changes contributing to the development of hypertension. Besides decreased blood vessel elasticity, these include increased collagen content in the extracellular matrix, decreased numbers of elastic fibres, increased vessel wall thickness, and decreased vessel lumen. In the elderly, the lower number of elastic fibres in the vessel wall contributes to increased SBP. Chronic high blood pressure (BP) leads to irreversible vascular changes and increases the risk of cardiovascular complications.[5] Treatment of elderly patients in line with the ESC/ESH (European Society of Cardiology/European Society of Hypertension) guidelines largely decreases the risk of stroke and mortality. Regardless of age, target BP values should be below 140/90 mmHg.[6] In elderly patients, anti-hypertensive treatment should be administered with caution because of the presence of atherosclerotic lesions, which lead to myocardial ischaemia and cerebrovascular incidents. An excessively

rapid BP reduction can result in decreased perfusion of vital organs and even enhance ischaemic lesions.[7]

Anti-hypertensive Treatment in Elderly Patients

Considering the physiological alterations resulting from ageing and the presence of multiple comorbidities, treatment of hypertension in elderly patients poses a significant challenge to treatment teams. Age can affect the pharmacokinetics of the medication used and decrease the patient's capability to comply with treatment.[8] Age also has a significant impact on the function of all body systems, particularly the cardiovascular system. Processes occurring in the arteries contribute to increased arterial stiffness and calcium accumulation, as well as quantitative and qualitative alterations in vascular wall collagen. Consequences include atherosclerosis and decreased vascular elasticity, impaired sino-atrial node function, and decreased heart rate. All this leads to increased SBP, decreased left ventricular ejection fraction, and impaired response to orthostatic changes, seen in elderly patients. There is a risk of isolated systolic hypertension or diastolic heart failure.[9,10] Ageing also significantly affects the central nervous system (CNS). Cerebral perfusion decreases by 15–20 % in the elderly. The number of neurons in the grey matter, cerebellum, and hippocampus also declines. In consequence, elderly individuals may experience impaired memory or other cognitive functions, which restricts their activity and mobility in daily living. Ageing is also apparent in the kidneys, with structural and functional changes taking place. Both kidney weight and glomerular filtration are reduced. Between the ages of 40 and 90, kidney performance can decrease by up to 50 %.[11] Age also affects the regulation of urine density and pH by the kidneys.[12] In the digestive tract, ageing manifests itself in decreased oesophageal motor activity, referred to as presbyoesophagus.[13] Another ageing-related process in the digestive system is the decrease in digestive juice acidity because of gastric mucosal atrophy.[14] The respiratory system is also affected by ageing. Its impact mainly involves the gradual decrease in chest mobility because of costal cartilage ossification, and reduced muscle power. These processes increase susceptibility to bronchial infection.[15] Changes in the immune system are also significant in terms of the risk of infection, as they weaken the body's immunity. Systemic changes from ageing mainly include the decreases in muscle mass and lean body mass, and water content drops, primarily in the cartilage. Moreover, ageing involves a loss of bone mass, with degenerative processes and an increased risk of osteoporosis. This in turn increases the risk of falls, fractures, and other injuries. Compliance with treatment is adversely affected by the patients' impaired senses of vision, hearing, taste, and smell.[16] Ageing processes have a significant impact on the course of treatment. This includes changes in pharmacokinetics, including absorption (decreased active transport reduces the bioavailability of medication), distribution (extended half-life of fat-soluble drugs, increased serum concentration of water-soluble drugs), metabolism (slower oxidative metabolism results in higher concentrations of some drugs), and elimination (which is decreased because of lower kidney and liver perfusion; elimination of drugs and their metabolites may also be insufficient because of impaired kidney function).[17] Anti-hypertensive treatment of elderly patients in line with the ESH/ESC guidelines[18] largely reduces the risk of stroke and mortality from cardiovascular incidents. The basic drug groups used in elderly patients, if no special indications exist, are diuretics, calcium channel blockers (CCBs), angiotensin-converting enzyme (ACE) inhibitors, and angiotensin receptor blockers. Because of the increased risk of adverse events in the initial stage of treatment, a low initial dosage should be used, and later increased gradually with caution ('titrated') until the desired effect is achieved. Anti-hypertensive treatment in elderly patients should be started if the SBP is ≥140 mmHg, and the target SBP values should be <140 mmHg. In patients aged ≥80 years, pharmaceutical anti-hypertensive treatment is commenced if SBP is ≥160 mmHg and the comorbidity burden is low. In this patient group, SBP should be reduced more slowly and cautiously, with the target SBP value of <150 mmHg, or <140 mmHg in patients with isolated systolic hypertension. In people aged ≥90 years, continuation of anti-hypertensive treatment is recommended, provided that the treatment has been well tolerated in previous years (between the ages of 80 and 90 years) and produced satisfactory results. Reasonable anti-hypertensive treatment in elderly patients involves a non-negligible risk of DBP reduction below 65 mmHg.[18] While there is no optimum or target DBP value in the hypertension treatment process, a number of studies have demonstrated very low DBP values to be associated with increased risk of adverse events and cardiovascular incidents.[19,20] This risk increases with age.[21] DBP is also significantly affected by impaired compensation mechanisms in elderly patients, and by comorbidities such as ischaemic heart disease, kidney disease, or completed stroke, which affect the blood vessels. Undoubtedly, patients over the age of 85 are at increased risk of excessive DBP reduction, which may result in potentially serious health consequences or death.[22]

Frailty Definitions and Measures

Multiple studies have shown that frail older people are at high risk of developing adverse outcomes such as disability,[23,24] hospitalisation,[23] institutionalisation,[25] lower quality of life[26,27] and premature death.[28] However, there is still no consensus regarding the conceptual and operational definition of frailty.[29–31] Fundamentally, frailty is a medical concept, and as a result, it is often defined in the context of problems in physical functioning. An example of such a definition is the one produced by Fried et al.[23] These researchers define frailty as a "biologic syndrome of decreased reserve and resistance to stressors, resulting from cumulative declines across multiple physiologic systems, causing vulnerability to adverse outcomes."[23] Their operationalisation of frailty, the phenotype of frailty, is extensively used in both research and practice. The phenotype assesses frailty based on five criteria: physical inactivity, low walking speed, weight loss, exhaustion and low grip strength.[23] The debate on frailty is mainly focused on whether frailty should be defined only in terms of physical factors or whether psychological and social factors should be included as well.[32] According to Bergman et al.,[30] frailty provides a conceptual basis for moving away from organ- and disease-based approaches towards a health-based, integrative approach. An integrative approach is important because it starts from a holistic point of view and thus regards how humans function as a whole organism; a partial view could lead to fragmentation of care[33,34] and consequently to reduced quality of care being provided to frail older people. A definition of frailty that expresses this integrative approach is as follows: "Frailty is a dynamic state affecting an individual who experiences losses in one or more domains of human functioning (physical, psychological, social), which is caused by the influence of a range of variables and which increases the risk of adverse outcomes."[33] Recently, Sutton et al.[29] identified 38 multi-component frailty measures. One of these measures is the frequently used and cited Frailty Index developed by Mitnitski et al.[35] The Frailty Index is based on the cumulative deficit approach and proposes that frailty can be assessed by evaluating a large number of non-specified age-associated health deficits, usually at least 30.[35,36] Because both the phenotype of frailty[23] and the Frailty Index[35] are

difficult to put into practice in clinical or large epidemiological settings as they require objective measures implemented by trained staff and a clinical database with information regarding signs, symptoms and health problems,[37] alternative frailty measures – mostly self-reported – have been recommended for use in clinical practice.[38] Examples of self-reported questionnaires assessing frailty are: the FRAIL scale,[39] the Groningen Frailty Indicator[40] and the Tilburg Frailty Indicator (TFI)[41]. According to Sutton et al.,[29] the TFI has been the most extensively examined in terms of psychometric properties and also has the most robust evidence of reliability and validity. Nevertheless, the definition of frailty and adverse outcomes that best suits the unique needs of researchers, healthcare professionals (such as clinicians, nurses, physiotherapists and occupational therapists) and policymakers conducting the assessment of frailty determines the choice of the appropriate measure of frailty.[42]

Care for Frail Patients

Decreased exercise tolerance and progressive disability are manifestations of frailty. These signs largely affect the patient's wellbeing and quality of life. Comorbidities, including hypertension, are also of significance. The way these patients function on a daily basis is difficult because of limitations in basic activities, decreased independence and progressive disability. Proper nutrition and motor rehabilitation should be prioritised in care for frail patients. Motor exercises can improve quality of life, physical fitness and prognosis with regard to comorbidities. The most effective solution is resistance training, which increases muscle strength and endurance. Proper nutrition should include high-energy meals rich in ingredients counteracting the progressive weakening of the body. Vitamin supplements can also be included, and protein deficiency must be compensated for.[43] Elderly patients can benefit from an interdisciplinary approach to care. Important factors include early identification of polypharmacy by the treatment team, implementing appropriate treatment for comorbidities, identifying cognitive impairment and low mood, providing psychological support and preventing falls.[44] In recent years, a number of prevention programs have been launched that promote screening tests enabling quick identification of patients who are frail or at risk of frailty such as the FRAIL scale[39] and the TFI.[41] Consistent prevention activity programs have become a priority for many health care facilities and teams. In accordance with the guidelines, screening for frailty should include all patients older than 70 years who have one or more of the following symptoms: significant weight loss in the preceding year, fatigability, overall weakness, and a decrease in physical activity interfering with normal activity.[45] Frailty syndrome is undoubtedly a challenge for multidisciplinary teams providing health care for geriatric patients. In clinical practice, special attention should be paid to frail elderly patients, who should receive tailored treatment. Future activities in the field of frailty prevention and identification should include the development of screening tests and minimising the health impact of frailty, with particular attention paid to at-risk groups of patients. A key issue related to frailty is social awareness, as the consequences of the syndrome are both health-related and social. The latter include increased morbidity, more frequent hospitalisations, loss of one's social position and roles, and the risk of social isolation. Social acceptance may play a significant role in adapting to changes imposed by frailty syndrome.[46] Although no multi-centre studies exist that demonstrate differences in care for frail patients, the group certainly deserves more attention. As these patients are at a higher risk of complications following invasive procedures and of adverse effects from medication, they should be managed with extra caution.

Orthostatic Hypotension

Orthostatic hypotension (OH) results from an autonomic nervous system dysfunction, and involves maladjustment of the cardiovascular system to sudden changes in body position. The primary symptom of initial orthostatic hypotension (IOH) is a sudden drop of SBP by ≥20 mmHg, or of DBP by ≥10 mmHg, occurring within 3 minutes of standing. Another form of OH is delayed orthostatic hypotension (DOH). In this case, BP measurement should be performed 30 minutes after verticalisation. Differential diagnosis of DOH against vasovagal syndrome (VVS) is important. The syndrome accounts for approximately 40 % of BP drop incidents with syncope, while OH accounts for 10 %.[47] In VVS, hypotension and/or bradycardia occur in response to an exaggerated autonomic reflex. This produces a loss of consciousness lasting up to 20 seconds. VVS diagnosis involves a tilt test during extended verticalisation (up to 45 minutes), thereby reproducing the syncope in the diagnostic laboratory. First-line treatment for patients at risk of VVS includes alpha-sympathomimetics (midodrine, etilefrine).[48] Both VVS and OH are associated with patient age. The risk of OH increases in patients aged ≥65, and is found in approximately 30 % of the population.[49]

Elderly hypertensive patients are a special risk group for OH. Impaired cerebral circulation in this group is also a factor.[50] Causes of OH in hypertensive patients include use of some anti-hypertensive drugs, mainly including diuretics, ACE inhibitors, CCBs, and alpha blockers.[51] Symptoms preceding an OH incident include visual disorders, vertigo, dysarthria, and falling after verticalisation. In addition to anti-hypertensive treatment, factors contributing to OH include long-term immobility, exertion unadjusted to the patient's age, and excessively large meals. Recurrent OH incidents increase the risk of CNS lesions and stroke. Because of the high risk of OH in elderly patients, bedside BP measurements are routinely performed. The procedure involves BP measurement 10 minutes after lying down, and 3 minutes (IOH) or 30 minutes (DOH) after verticalisation – this is called a verticalisation test. It should be performed in the morning. The time of day is significant because of the decreased blood volume because of nocturia, which also increases OH risk. The head-up tilt table test is also used in OH diagnosis. The patient lies on the bed for 20 minutes, after which the bed is gradually verticalised up to an 80-degree angle over a 3-minute period. During this simulated verticalisation, BP is measured continuously.[52] Regularly recurring episodes of OH are a strict indication for treatment.[53] Depending on symptom intensity, pharmaceutical and non-pharmaceutical treatment can be used. Non-pharmaceutical methods include recommendations for head elevation when lying down (approximately 10–12 cm) and slow and gradual verticalisation, with the patient maintaining a sitting position for approximately 30 seconds before standing up fully. Other recommendations include simple exercises enhancing circulation in the lower extremities, and avoiding leaning. Consumption of alcohol and large, heavy meals is inadvisable. The patient should increase their fluid intake up to approximately 2.5 litres per day. If non-pharmaceutical treatment is ineffective, oral pharmaceutical treatment should be implemented. First-line treatment is dihydroergotamine, increasing vascular tone. The starting dose is 5–10 mg twice daily. Other agents used in OH treatment include sympathomimetics, such as etilefrine (Effortil®), midodrine (Gutron®), and norfenefrine (Novadral®), which increase BP by stimulating alpha- and beta-adrenergic receptors. Another class of drugs used is mineralocorticoids, for example, fludrocortisone (Cortineff®). These drugs increase BP by increasing sodium retention.[54] OH treatment is planned individually for each patient, taking into

account their age, comorbidities, and overall health. Treatment success depends on appropriate pharmaceutical treatment and lifestyle changes.[55]

Polypharmacy

Polypharmacy is one of the 21st century's great challenges in geriatrics. It involves the inappropriate and unnecessary administration of a large number of medications, some of which are potentially harmful and not medically indicated.[56] This problem is closely associated with the elderly population. Societal ageing and the increasing number of patients aged ≥65 increases its prevalence. According to estimates, approximately 50 % of patients aged 65 take five or more oral medications daily, and 12 % take 10 or more.[57] Polypharmacy contributes to adverse events and drug interactions. The risk of adverse events with two concurrent medications is approximately 5 %, but increases to 50 % with five concurrent medications. The risk of polypharmacy is increased by age-related factors, including the structural and functional changes in the body that contribute to slower metabolism and thus slower medication absorption. Because of the numerous comorbidities, treatment by more than one physician is often required. When pharmaceutical treatment is not appropriately supervised by the treatment team, multiple medications of the same type can be used, increasing the risk of adverse effects. Patient-related factors increasing the risk of polypharmacy include taking medication in a way other than prescribed, disregarding contraindications and adverse effects, as well as easy access to over-the-counter drugs and their abuse. Poor pharmaceutical management can also result from insufficient knowledge on the consequences of polypharmacy, both among patients and physicians. Drug interactions may result in enhanced or decreased effects, extended or shortened effect duration, or toxicity, resulting in abnormal heart rhythms, kidney and liver damage and CNS reactions.[58]

Falls

Falls among elderly patients are strictly associated with ageing processes in the body, affecting the nervous system, the musculoskeletal system, vision and hearing, and blood vessels. Chronic diseases, including hypertension, deteriorate baroreceptor function and result in irreversible changes in cerebral and coronary circulation. The risk of sudden drops in BP also rises. Organ complications of chronic hypertension, ischaemic heart disease and heart failure increase the risk of syncope, which often results in falls.[59] Anti-hypertensive treatment and medication side effects are also significant.[60] Comorbidities and decreased mobility also contribute to falls in elderly patients. Besides multimorbidity associated with cerebral and coronary atherosclerosis, age itself – with the resulting decrease in posture stability – can contribute to falls resulting in injury that limits the patient's independence and increases both their dependence on others and the risk of subsequent incidents.[61] Each fall is a traumatic experience for the patient, producing what is called 'post-fall syndrome'. This syndrome comprises psychological trauma and the fear of subsequent falls, resulting in further limitation of physical activity. The events can be triggered by sudden decreases in BP, which is why appropriate treatment choice is essential. Some drug groups are associated with a higher risk of adverse events. For example, diuretics often cause electrolyte disorders leading to arrhythmias, CNS disorders, impaired neuromuscular conductivity and decreased mobility. Treatment with sympatholytics can lead to cognitive impairment, which also contributes to the risk of falls. Fall risk can be limited with the appropriate anti-hypertensive treatment and specialised motor rehabilitation aimed at increasing muscle strength and improving balance during daily activities.[62]

Cognitive Impairment

Cognitive functions include a number of intellectual processes, such as short- and long-term memory, language processes (writing, reading, speaking), visual and spatial processes, abstract thinking and perceiving external stimuli. Normal cognitive function allows one to learn, remember and reproduce information, as well as to communicate it verbally or non-verbally. It also allows one to solve tasks, plan actions and make decisions. Overall, full cognitive function enables normal everyday bio-psycho-social functioning. Physiologically, ageing processes involve age-associated memory impairment or age-related cognitive decline.[63] Currently, symptoms of dementia are found in 2–10 out of 1000 patients aged >70, and 20–40 out of 1000 patients aged ≥80. It becomes significantly more common with age, though it will not occur in 50 % of 85-year-olds, and therefore cannot be exclusively attributed to ageing.[64]

Approximately 50 % of patients are affected by Alzheimer's disease, and approximately 10–15 % by vascular pathology. The risk of vascular pathology is increased by alcoholism, tobacco use, diabetes, hypercholesterolaemia, AF and hypertension. Initial reports on the impact of hypertension on vascular pathology were different. The association between high BP values and the development of vascular pathology was only confirmed in a long-term observation of BP before the development of cognitive impairment.[65] In the literature, particular attention is paid to transient falls in BP that may contribute to CNS hypoperfusion, leading to the development of ischaemic lesions in elderly patients.[66] At present, the association between hypertension and cognitive impairment in the elderly population is considered evidence-based.[67]

Adherence to Treatment in the Elderly Population

High SBP or, to a lesser extent, high DBP, is common in the elderly population and is associated with an increased risk of cardiovascular disease, cerebrovascular disease, peripheral artery disease, cognitive impairment, and kidney disease. Moreover, elderly patients are at increased risk of hypertension-related abnormalities. Based on research, the European Societies recommend anti-hypertensive treatment in elderly patients (>80 years), if the treatment is well tolerated. However, studies on treatment effectiveness and adherence mainly involve younger patients, and the representation of elderly patients (aged ≥75 years) is insufficient. Moreover, the available publications offer no guidelines for the treatment of elderly patients diagnosed with geriatric syndrome or its components (frailty, cognitive impairment).[68] Concurrent frailty and/or cognitive impairment in elderly patients is associated with a worse perception of health, increased number of comorbidities, and social isolation of the patient.[23] It can also be suspected to interfere with treatment adherence.[69] Few studies are available on the association between the components of geriatric syndrome and adherence to treatment. Those papers that discuss associations between frailty and adherence are based on populations with diseases other than hypertension.[70,71] There is a discussion in the available literature regarding the impact of frailty syndrome on adherence.[70,72] In a study by Jankowska et al., frailty was found in 63.9 % of hypertensive patients and was associated with worse adherence to anti-hypertensive treatment. Among factors negatively correlated with adherence, the authors identified being alone and some determinants

of frailty in accordance with the TFI (such as being alone, death of a loved one, serious illness, serious illness of the partner, and divorce or ending a relationship in the preceding year).[72] In a study by Koizumi et al.,[73] frailty in hypertensive patients was associated with limited physical activity, lower body weight, difficulties in ingesting solid foods and performing daily activities, and limitations in performing complex activities of daily living, correlated with the prevalence, treatment and control of hypertension.[73] In another study, Talegawkar et al.[74] investigated associations between frailty and adherence to the Mediterranean diet, and found that non-frail patients were more compliant with dietary recommendations than frail patients.[74] Contrary to the above, Chao et al. report better adherence in frail patients, though not in the hypertensive population.[70] The authors link better adherence found in frail patients to their older age, stating that elderly patients pay more attention to their illness and symptoms, and are thus more compliant with the prescribed treatment plans. Other authors suggest that the differences in adherence between frail elderly patients and younger individuals can be associated with cognitive impairment and with the less accurate reporting of adherence by the elderly, which may be the cause of artificially high results.[75] A similar discussion exists with regard to correlations between elderly age and adherence to anti-hypertensive treatment. Karakurt et al.[76] and Jassim Al Khaja et al.[77] report that patients above 70 years take their medication less consistently than younger patients. In research by Jankowska et al., younger age was associated with better reported health behaviours in the 'health practices' domain,[78] but worse adherence to pharmaceutical treatment.[79] Jackevicius et al.[80] and Lam et al.[81] report a correlation between younger age and better pharmaceutical adherence. On the other hand, some publications indicate older age as a predictor of better adherence to medication.[82,83] In elderly patients, factors decreasing adherence can also include multimorbidity and polypharmacy, adverse effects of treatment, unfulfilled expectations regarding treatment outcomes, and adverse drug interactions. Treatment outcomes do not always match patient expectations, which can result in discontinuation of the prescribed medication. As to the better adherence to treatment found in elderly patients, it has been explained by the presence of comorbidities, which makes patients perceive themselves as very ill and take the prescribed treatment seriously.[84] Identifying the causes of non-adherence to pharmaceutical treatment is a key factor in planning therapeutic interventions aimed at increasing control, preventing complications, and improving long-term outcomes and any adverse effects of treatment. Precise identification of contributors to low medication adherence is crucial for improving treatment effectiveness and for distinguishing those patients in need of additional supervision in order to decrease the risk of complications from untreated hypertension. Diagnosis of frailty and of the associated difficulties in adhering to treatment allows for targeting the elderly patients with a poorer prognosis and at risk of complications from untreated or undertreated hypertension, and for planning interventions to improve hypertension control.

Conclusions

The importance of high BP and the effect of lowering BP in older adults remain controversial because of the mixed evidence in this population. For frail elderly patients, consider starting treatment if the SBP is 160 mmHg or higher. If the patient is severely frail and has a short life expectancy, a SPB target of 160–190 mmHg may be reasonable. If the SBP is below 140 mmHg, anti-hypertensive medications can be reduced as long as they are not indicated for other conditions. In general, no more than two anti-hypertensive medications should be prescribed to avoid unnecessary administration of a large number of medications. There is little direct evidence to inform the risks and benefits of using anti-hypertensive medications to treat chronic health conditions when significant frailty is present. Since the frail elderly are vulnerable to poor health outcomes, it is important to assess the risk/benefit ratio of healthcare interventions, including drug therapy. Future clinical trials need to consider modifications to safely include frail older adults, and treatment recommendations for hypertension, specific to the frail elderly, should consider inclusion of evidence beyond randomised controlled trials. Management of hypertension in frail elderly people is a newly emerging problem, and it should be pointed out that work on frailty in this context will only be relevant if effective health promotion, prevention, treatment, rehabilitation, and care interventions can be identified. ■

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