



Essential Hypertension in the Elderly: To Treat or Not to Treat? A Therapeutic Dilemma for the Geriatric Cardiologist



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Abstract

Essential hypertension, the most common type, is an important cause of morbidity and mortality in the elderly, a rapidly growing section of the population. It is a sad reality that until the 1950s treating benign hypertension was not thought to be necessary. The tragic death of Franklin Delano Roosevelt on April 12, 1945 at the age of 63 years, with a blood pressure of 350/195mmHg, and without treatment shocked the healthcare community. Now, with extensive research, the availability of affordable and effective treatments and lifestyle measures, freedom from unfounded phobias of adverse drug effects, and new approaches such as aroma, colour and music therapy have improved the quality of life for hypertensives generally and especially the elderly.

Keywords: Essential hypertension; Lifestyle recommendations; Aromatherapy; Colour therapy; Music therapy

Introduction

"There are few stories in the history of medicine that are filled with more errors or misconceptions than the story of hypertension and its treatment." _ Prof Marvin Moser (1925-2015)-Yale University School of Medicine.

Hypertension (HTN) is defined as: Having a systolic blood pressure (SBP) of 140mmHg or greater OR having a diastolic blood pressure (DBP) of 90mmHg or greater OR taking antihypertensive medication OR having been told at least twice by a physician or other health professional that one has HTN [1]. Prof. John Hay (University of Liverpool), while delivering a lecture in Bradford on February 25th, 1931, under the auspices of the British Medical Association, remarked "It is agreed that a high arterial pressure is essential for the efficient performance of muscular work". He added "There is some truth in the saying that the greatest danger to a man with high blood pressure lies in its discovery, because then some fool is certain to try and reduce it [2]. However, research has since established that HTN ("The Silent Killer") is a persistent non-physiologic elevation in blood pressure necessitating timely pharmacological and non-pharmacological interventions. Essential hypertension ('Essentielle hypertonie') is the most common type of HTN accounting for 95% of hypertensives.

What is elderly?

"Elderly! The forgotten golds of the past; the ignored tired souls of the society!" _ Mehmet Murat ildan (1965-) -Turkish thinker

Although, ageing is commonly measured by chronological age and conventionally a person aged 65 years, or more is often referred to as 'elderly', the process is not uniform across the population due to differences in genetics, lifestyle, and overall health. [3]. Thus, chronological age fails to address the heterogeneity observed among the 'elderly', particularly regarding their pharmacotherapy needs where pharmacokinetic and pharmacodynamic factors necessitate individualization of regimens [4]. In this article we have opted to follow the definition of The Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC-8) which defines 60 years and above as Elderly, for all HTN related issues [5]. It is a matter of great concern that, according to data from World Population Prospects 2017, the number of people aged 60 or over (13 per cent of the global population) is growing faster than all younger groups. It has also been projected that, by the year 2060, people living into their 8th, 9th and 10th decades of life will dominate our patient populations [6].

What is essential?

The term "Essential" in relation to Hypertension has a long and venerable history. It was coined, in 1911, by a German Physician Eberhard Frank as "Essentielle hypertonie". When applied to hypertension the epithet essential does not have its usual dictionary meaning of necessary or fundamental. The Oxford Dictionary gives an additional meaning: "(of a disease), with no known external stimulus or cause" and this is the sense when it is used to describe

hypertension. It is synonymous with idiopathic, which is more commonly used than essential though there are other medical conditions which are described as essential (e.g. thrombocytosis, tremor, blepharospasm).

Magnitude of the problem

“Old age is the most unexpected of all the things that can happen to a man” _ Leon Trotsky (1879-1940 CE)-Russian politician

Each year, cardiovascular diseases (CVD) kill more than 18 million people worldwide; a third of all global deaths, with this proportion expected to increase further. High systolic blood pressure is said to account for 10.4 million deaths annually- more than half of the CVD total and more people than all infectious diseases combined [6]. Eighty percent of CVD-related deaths take place in low- or middle-income countries and occur almost equally in men and women [7]. The life time risk for developing HTN in normotensive individuals aged 55-65 is >90% [8]. The global direct medical costs of hypertension are estimated at \$370 billion per year, with health care savings from effective management of BP projected at roughly \$100 billion per year [9]. For every death from CVD, there are up to three other serious CVD events, which also incur medical and social costs [10].

Specific Concerns for the Elderly Population

“Old age is like a plane flying through a storm. Once you're aboard, there's nothing you can do” _ Golda Meir (1898-1978 CE)-former Prime Minister of Israel

Many older patients also have co-morbidities such as prostatism, Parkinson's disease, depression and autonomic dysfunction. They are at risk of adverse effects (notably hypotension) from the drugs used to treat these conditions. Postprandial hypotension (PPH), a common clinically relevant disorder, yet under-recognized among the elderly population, is defined as “a decline in SBP greater than or equal to 20 mmHg, or the presence of a postprandial SBP less than or equal to 90 mm Hg (when the preprandial SBP is greater than or equal to 100 mm Hg) within 2 hours of eating a meal”. In the elderly with heart failure (HF), Parkinson's Disease, depression, those on dialysis and those with autonomic dysfunction its prevalence ranges from 40 to >80% [11]. It is a recognized predictor of cardiovascular mortality [12]. Postural or Orthostatic hypotension (OH) is also a common finding in the elderly, with a prevalence of 10-30%. The American Autonomic Society's 2011 consensus statement defines OH broadly as “a sustained reduction of SBP of at least 20mmHg or DBP of at least 20mmHg within 3 minutes of standing or head-up tilt” [13]. PPH and OH are more common in geriatric patients than was previously appreciated, with a high statistical probability that they can occur together. There is little overlap in the symptoms of OH (dizziness, fall risk) versus PPH (sleepiness, syncope), which can be helpful in diagnosis. The essential difference in pathophysiology between OH and PPH is in the triggers inducing the initial blood pressure fall. The trigger in OH is gravity, while that in PPH is abnormal release of vasodilator peptides. Gravity affects everyone, but the postprandial release of gastrointestinal peptides varies from person to person [14]. Hypertension-Hypotension

Syndrome (coexistence of supine hypertension with iatrogenic OH) poses a therapeutic dilemma, as treatment of one component can exacerbate the other [15]. Preventative treatments used in accordance with national guidelines for HF and chronic kidney disease (CKD) may also cause hypotension [16].

Adverse effects of hypotension include syncope and falls, which can cause serious problems such as hip fracture, and head injury as well as several symptoms, which adversely affect the quality of life [17]. Atypical presentations, common in the elderly, such as weakness, lethargy, being 'off legs', confusion and visual impairment may also be due to drug side effects [18]. Frailty, a clinically recognizable state of increased vulnerability, is also a matter of serious concern in the elderly. The prevalence ranges from 7% to 16% and appears to be greater in women. It increases with age and reaches 28% in the oldest old [19]. It has been defined, by Fried et al. [20] as “a clinical syndrome in which three or more of the following criteria are present: unintentional weight loss (10lbs. in past year), self-reported exhaustion, diminished grip strength, slow walking speed, and low physical activity”. Outcomes associated with frailty include functional and cognitive impairment, frequent hospitalization and sudden death. Compounded by the untoward effects of anti-hypertensive therapy and of medications for comorbidities, the elderly become more vulnerable to episodes of hypotension with deleterious effects. Anti-hypertensive therapy, once initiated, is not always regularly reviewed and titrated to adjust for physiological changes associated with ageing and the effects of additional drugs. Consequently, patients may remain on anti-hypertensive therapy, despite being hypo-tensive (variously defined as SBP <100, <110 and <120mmHg) resulting in increased hospital admissions and mortality [21].

To Treat or Not to Treat?

“Hypertension may be an important compensatory mechanism which should not be tampered with, even were it certain that we could control it” _ Prof. Paul Dudley White (1886-1973)- Founder of Preventive Cardiology-1937

Treatment of HTN has gone through major extremes over the years, from the advice of a prominent cardiologist quoted above [22] to recent national and international guidelines to treat hypertension aggressively -the “Lower the Better Trend” [23]. The truth of the matter is that the treatment of HTN in the elderly was controversial until significant cardiovascular benefits were seen in several studies including the UK Prospective Diabetes Study (UKPDS) [24], the Systolic Hypertension in the Elderly Program (SHEP) [25], the Systolic Hypertension in China (Syst-China) trial [26], the Systolic Hypertension in Europe trial (Syst-Eur) [27], the Stroke Prevention Trial in Sickle Cell Anemia (STOP) [28], and the Hypertension in the Very Elderly Trial (HYVET) [29].

Specific Threshold at Which Anti-hypertensive Therapy Should be Initiated

“The blood pressure is [considered to be] raised when the SBP is 180 or over, and/or the DBP is 110 or over, on three consecutive examinations, and in the presence of clinical, radiological and cardio

graphic evidence of cardiovascular hypertrophy.” _ Dr. William Evans - (Textbook of Cardiology - 1st Edition 1948).

Dr. Charles Kaye Friedberg in his famous book “Diseases of the Heart” (1st Edition 1949) categorically stated that “people with ‘mild benign’ hypertension ... [defined as blood pressures up to levels of 210/100mmHg] ... need not be treated”. With the passage of time, despite growing knowledge, progress in recognizing the need for timely initiation of anti-hypertensive therapy was sub-optimal. So much so that the First JNC report, published in 1977, suggested that if BP was $\geq 160/95$ mmHg, it should be rechecked in 1 month for everyone. In people of >50 years with a BP of 140/90mmHg to 160/95mmHg, it should be rechecked within 6 to 9 months. No specific action was necessary unless the DBP was ≥ 105 mmHg. The emphasis in JNC-I was on treating the DBP; there were no recommendations for the staging of hypertension based on SBP. Since 1977, with the availability of more data from large clinical trials, the recommendations of the JNC reports have become increasingly aggressive and specific, with emphasis shifting more to the treatment of SBP, especially in those aged >59 years. The JNC-8 recommendation to change the threshold of treatment initiation for patients >60 years from 140/90mmHg to 150/90mmHg, against the “Lower the Better Trend”, is highly controversial. Those dissenting from the majority decision published a separate report in which they provided evidence that when compared to 150/90mmHg, initiation of therapy at 140/90 has more beneficial than adverse potential [30].

Target Goal of Blood Pressure (“Lower the Better Trend”)

“A goal properly set is halfway reached” _ Zig Ziglar (1926-2012 CE)-American Motivational Speaker

Target BP is the threshold value below which the patient’s BP should be kept during optimal anti-hypertensive therapy and once this goal is achieved there is no justification for alteration or intensification of therapy. The SHEP [25] and HYVET [29] trials demonstrated that reducing SBP to <140 mmHg in the elderly provided substantial benefit without unnecessary risks [31]. While aggressive blood pressure lowering in the elderly to <120 mmHg systolic could also lead to an increased risk of stroke through the J- curve phenomenon [32], this may be prevented through lower antihypertensive doses and avoidance of two-drug strategies during treatment initiation [5].

It needs to be emphasized that guidelines provide general guidance only and treatment decisions should be individualized based on the clinical state of the patient and the judgement of the physician. High prevalence of symptomatic PPH and OH has been demonstrated in in-patients of Dutch hospitals [33]. Regular BP monitoring, to look for hypotensive episodes, should, therefore be part of a comprehensive geriatric assessment.

A Textbook Case of Uncontrolled Hypertension

“Nearer, My God, To Thee” _ (President Franklin D Roosevelt ‘s Favorite Hymns)

Franklin Delano Roosevelt (FDR), President of United States for four terms is a textbook case of “uncontrolled hypertension” progressing to target organ damage and death from stroke. His BP in 1941 was 188/105mmHg. Consistent with the available medical knowledge and the opinion of the contemporary clinical community, his prescription consisted of phenobarbital, a low-fat low sodium diet and rest. There was little else that could be offered to him. On the morning of his death on April 12, 1945 his blood pressure was 350/195mmHg. Dr. Howard G. Bruenn, the attending cardiologist, certified the cause of death as cerebral hemorrhage.

Twenty-five years later, Bruenn [34] wrote “I have often wondered what turn the subsequent course of history might have taken if the modern methods for the control of hypertension had been available”. He was absolutely right. The first edition of the ‘Blue Bible’ (Goodman & Gilman’s The Pharmacological Basis of Therapeutics) contains only 10 references to anti-hypertensives. Potassium thiocyanate, introduced in 1940, was found to be relatively ineffective in prescribed doses, and had many potential side effects. Similarly, other agents such as barbiturates, bismuth and bromides had little therapeutic effect. FDR’s tragic death was a blow to the reputation of health professionals as it demonstrated the limited potency of available medical care. A series of brainstorming sessions ended with a consensus on the dire need for research into heart-related health problems.

On the historic day of June 16, 1948 FDR’s successor Harry S. Truman signed “The National Heart Act”, creating and establishing “The National Heart Institute (NHI)” in the Public Health Service, and “The National Advisory Heart Council”. This paved the way for fruitful outcomes. Of presently available anti-hypertensives, the successful use of diuretics started in 1959, followed by calcium channels blockers (CCBs) in the 1960s, angiotensin converting enzyme inhibitors (ACEIs) in 1975 and angiotensin receptor blockers (ARBs) in 1986.

Managing Uncomplicated Essential HTN in Elderly (60-79 years)

HTN is the major modifiable risk factor for stroke and an important contributor to atherosclerotic coronary artery disease together with smoking and serum low-density lipoprotein concentration. Proper treatment of HTN can reduce the risk of stroke by up to 42% and of CHD by about 14% [35]. Management can be discussed under following headings. Hypertension in the very elderly (>79 years) is discussed separately below.

Pharmacological intervention

“Drugs are of priceless value when needed, but they are at best emergency measures of most temporary utility.... The more effective they are in the right place, the more harmful in the wrong one” _ Dr. Woods Hutchinson (1862-1930), “The Dawn of the New Doctor”-1914

There are four classes medication, recommended by JNC-8, for initial therapy [5]

- a) Thiazides (TDs)
- b) Angiotensin Converting Enzyme Inhibitors (ACEIs)
- c) Angiotensin Receptor Blockers (ARBs)
- d) Calcium Channel Blockers (CCBs)

Contrary to the recommendations of JNC-7, thiazides are no longer first choice. Other recommendations are:

- a) Choose a single drug, once daily, initially to simplify the regime.
- b) BP target should be reached within a month of initiation of therapy either by increasing the dose (when single) or switching to combination therapy (when indicated) contrary to the recommendations of JNC-7 where the duration was two months.
- c) Combination therapy can be highly rewarding and may be TD plus ACEI or CCB plus ACEI. However, ACEI plus ARBs is to be avoided because of more adverse effects, notably hyperkalemia.
- d) For African Americans, TDs and CCBs produce better outcomes including reduction of stroke risk. They have a relatively poor response to ACEI, because they are 'salt sensitive'.

Non-pharmacological intervention (lifestyle modifications)

"Hypertension is one of lifestyle-related diseases, and prevention of hypertension and effect of reduction of blood pressure can be expected by modifying lifestyle habits" [36]. "A Randomized Controlled Trial of Non-pharmacologic Intervention in the Elderly (TONE)", from 1992 -1998, was the first trial of sufficient size and duration to provide convincing evidence that reduced sodium intake and weight loss constitute a feasible, effective and safe non-pharmacologic therapy of HTN in the elderly [37]. The relevance of lifestyle changes for the treatment of hypertension progressively rises with increasing prevalence of risk factors for arterial hypertension with aging in the general population [38]. Similarly, the "Diet, Exercise & Weight Loss Intervention" (DEW-IT) trial highlights the efficacy of comprehensive lifestyle changes, as an adjunct therapy. Since weight loss is a major factor contributing to BP reduction [39], it should be a goal in elderly patients with a BMI >26 [40]. Reduced alcohol intake is often a key factor in reducing body weight and BP. An important but often underestimated factor in dietary guidelines is hyperuricemia, a proven predictor of HTN, necessitating a low purine diet [41]. The guidelines of The American College of Rheumatology list the following foodstuffs as rich in purines: sea food (sardine, shellfish), organ meats (brains, heart, kidney, liver, neck sweetbread and belly sweetbread), sugary beverages and foods (high fructose corn syrup-sweetened sodas, other beverages and foods) alcohol (particularly beer, but also wine and spirits). They recommend limiting male patients with gout to a maximum of 2 servings/day and females to a maximum of 1 serving/day. Table salt, including in sauces and gravies should be limited. This applies to hypertensives also. Lifestyle modifications - "the Earlier, the Better" have the potential to improve BP control and reduce the need for medication.

Exercise

"Start at Low and Progress Slow" _ (Dr. Edward Laskowski -Mayo Clinic)

The famous aphorism "Exercise is Medicine" has been attributed to Hippocrates (460-370 BCE), the Father of Rational Medicine, who is believed to be the first physician to provide a written exercise prescription for a patient. Modern "Prescriptions of Exercise" are based on the "FITT Principle" [42] which is "the process whereby the recommended exercise regimen is designed in a systematic and individualized manner in terms of:

- I. Frequency (How often?)
- II. Intensity (How hard?)
- III. Time (How long?)
- IV. Type (What kind?)"

There is convincing evidence that endurance (aerobic) exercise training improves exercise capacity and quality of life. The CDC Guidelines (Revised 2018), for Physical Exercise in the Elderly (65+ years), are in agreement with those of the NHS and WHO and include:

- a) 30 minutes moderate aerobic activity such as walking, water aerobics or dancing daily on 5 days/week
- b) Strength exercises that work all the major muscles, on 2 days a week.

It is interesting to note that Prof. Paul Dudley White, Cardiologist to President Dwight D Eisenhower, was a staunch advocate of the belief that lifestyle affected CAD and in keeping with his beliefs, he was a vigorous walker and bicycle rider. Moderate exercise raises the heart and respiration rates and it is recommended that one should be able to talk but not sing a song when exercising at the appropriate intensity. In cases of limited physical mobility (e.g. arthritis) or reduced fitness (e.g. cardiac problems) the elderly may not be able to stick to a regular exercise programme. Moreover, Post Exercise Hypotension (PEH), resulting in an immediate substantial reduction in BP, could also pose a serious problem in some cases. A Supervised Physical Exercise Programme (SPEP) has given promising results in those with such problems, as noted in a recent Brazilian study [43]. The truth of the famous quotation "The Beach.....[is a] place where salt lowers your blood pressure" has been demonstrated in a Japanese Study on 44 middle aged patients (not on medication), with Metabolic Syndrome subjected to walking exercises on a sandy beach for 8 weeks. This resulted in significant reduction of central SBP as well as HbA1c and TG [44].

DASH diet

"DASH is not a fad diet, but a healthy eating plan that supports long term lifestyle changes" _ (National Institutes of Health)

The DASH diet (Dietary Approaches to Stop Hypertension), to prevent and control HTN, is a dietary pattern promoted by the National Heart, Lung and Blood Institute (NHLBI) which is a part of the National Institutes of Health (NIH) of the United States. It is

rich in fruits, vegetables, whole grains and low-fat dairy foods, and includes meat, fish, poultry, nuts, and beans. It is limited in sugar-sweetened foods and beverages, red meat, and added fats. The DASH diet, when tested in the First DASH Study, led to a significant reduction in BP within two weeks [45]. It has been recommended by the United States Department of Agriculture (USDA) as one of its ideal eating plans for all Americans. DASH-Sodium is a combined approach of the DASH diet with sodium restriction.

Sodium restriction

“Hence if too much salt is used for food, the pulse hardens”_Huang Ti Nei Ching Su Wen (2698–2598 BC)-The Yellow Emperor’s Classic on Internal Medicine)

Although an association between high intake of sodium chloride and adverse cardiovascular effects was suggested nearly 5,000 years ago, Ambard & Beaujard, in 1904, were the first to postulate a link between dietary intake and BP. However, the first meaningful scientific evidence for a positive association between salt consumption and BP was published by Dahl [46] in 1960. The INTERSALT Study was one of the first large international epidemiological studies which indicated that BP increased with age only if accompanied by increased salt intake [47]. MacGregor et al. [48] in early 1980s, on the basis of the first double blind controlled study, suggested that moderate sodium restriction should be part of the management of essential hypertension. Many clinical trials have shown that a lower consumption of sodium decreases cardiovascular events and death [49]. Decreasing sodium consumption in Finland, by one-third, decreased BP and reduced both stroke and ischemic heart disease death by 75% to 80% [50].

Sodium sensitivity which is defined as “the extent of rise in blood pressure with an increase in Sodium Chloride intake” increases with age [51]. Elderly patients are relatively more salt sensitive because of their reduced ability to excrete a sodium load. This is partly due to the decline in kidney function with age and secondarily due to reduced generation of natriuretic substances, such as prostaglandin E2 (PGE2) and dopamine. In the elderly, limitation of dietary sodium intake and the use of diuretic agents is more effective in controlling HTN than in younger adults [52]. The Sodium Reduction Tool Kit was developed by a collaborative effort between CDC’s Division for Heart Diseases & Stroke Prevention (DHDSPP) and the Center for Global Health. One gram (1,000mg) of salt (sodium chloride) contains 390mg of sodium (43.5mmol sodium).

In the Second DASH Study, three levels of sodium intake tested were 3,300 mg (higher), 2,300mg (intermediate) and 1500mg (lower). The lower intake resulted in optimal reduction in BP in those who were hypertensive [53]. Although a daily intake of 1,500mg has been recommended by the The National High Blood Pressure Education Programme for the hypertensive elderly [54], the possibility of resultant hypotension should not be forgotten. Sodium restriction to not >5g sodium chloride daily (1950mg

sodium/85mmol of sodium) has been shown to reduce the required number and size of doses of anti-hypertensive drugs in a Polish study [55]. However, effective salt restriction is by no means easy to achieve [56].

Home blood pressure measurement (HBPM) program

“Surprisingly often, evidence-based treatments fail to succeed because of the human factor known for a few decades as “patient’s non-adherence”. [57]

One of the major causes of uncontrolled HTN is the patient’s inadequate adherence to the therapeutic regime. Adherence (or compliance) has been defined, by WHO, as “the extent to which a person’s behavior taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider” [58]. The consequences of drug non-adherence in the elderly (varying from 40% to 75%) may be serious, as has been shown by Salzman [59]. It has been established that non-adherence and clinical inertia are the main causes of poorly controlled BP in hypertensive patients. Whereas the former is a lapse on the part of the patient, the latter is solely iatrogenic, and the result of physicians’ failing to intensify or modify therapy despite being aware that their patients’ blood pressures are poorly controlled.

With a chronic, debilitating and frustrating illness like hypertension, there is a need for the patient to be centrally involved in monitoring and controlling his own disease. The Swiss study “Factors Influencing Results in Anti-hypertensive Treatment (FIRST)” highlighted the efficacy of a HBPM programme [60]. HBPM is an established and evidence-based measure which has been shown to improve patients’ knowledge of their medication and adherence to it, as exemplified by the EAPACUM-HTA Study, conducted in Spain on newly diagnosed or uncontrolled hypertensives [61]. A unique approach, introduced by researchers in Zurich University Hospital, was a colour-coded BP diary following a traffic light system (Green, Yellow, Red), on adherence to home BP monitoring. It significantly improved patient - doctor communication and triggered appropriate management strategies [62].

Alternative/Complementary medicine remedies

“Be stubborn about your goals and flexible about your methods”.

Comprehensive Approach

“Comprehensive Approach to Lower Measured Blood Pressure (CALM-BP)” is a multifactorial programme for BP control based on Complementary Medicine principles. The study was successfully carried out at the department of Integrated Medicine (Shiram) and the Research and Development Unit of Assaf Harofeh Medical Center, Israel. The interventions involved a multifactorial team approach in addressing physical, nutritional and psychological aspects of HTN with rewarding results [63].

A combined novel approaches

“One of the best and most effective of treatments is to strengthen the mental and spiritual strengths of the patient, to give him more courage to fight illness, create a loving, pleasant environment for the patient, play the best music for him and surround him with people that he loves” _ Ibn Sina (980-1037 CE)-Physician, Philosopher

This comprises of Aroma therapy, Colour therapy and Music therapy combined to get the desired goal.

Aroma therapy

“Aromatherapy is a caring, hands-on therapy which seeks to induce relaxation, to increase energy, to reduce the effects of stress and to restore lost balance to mind, body and soul” _ Robert Tisserand (1948--)- “Aromatherapy: To Heal and Tend the Body-1988”

The use of aromatic plants dates back to pre-history (60,000 BCE) as has been shown by archeological research in Mesopotamia. In Ayurvedic Medicine (3,000 BCE), Chinese Medicine (2,800 BCE) and Egyptian Medicine (1,550 BCE) aromatic plants had multiple uses in a variety of mental and physical ailments of body and mind. Hippocrates (460-370 BCE) was declared the ‘Saviour of Athens’ when he ordered the inhabitants to burn considerable quantities of plants to fumigate the city – this warded off the plague. He recommended aromatic baths and massages as part of a healthy daily routine.

Although the foundation of modern aromatherapy is attributed to Rene-Maurice Gattefosse (1881-1950 CE), there were many great herbalists and physicians such as Ibn Sina (980-1037 CE), one of the greatest Arab physicians, who contributed much to plant medicine. The rose (*Rosa damascena*) is one of the plants with which he experimented. In Arab Medicine, the healing power of scents, essential oils and traditional oils as a way to correct imbalances, that are considered to be the source of disease, is widely accepted. Clinical studies conducted in Wonkwang University [64] and in Geochang Provincial College [65], on aroma therapy, showed a significant drop of BP in hypertensives. In Hee Kim et al. [66] reported an immediate BP lowering effect (within 10 minutes) and also long-term effects with inhalation of essential oils, in clients with essential hypertension.

Chromotherapy/colour therapy

“A certain blue enters your soul. A certain red has effect on your blood pressure” _ Henri Matisse (1869-1954 CE)- French artist

Chromotherapy is a method of treatment that uses the visible spectrum of electromagnetic radiation to treat disease [67]. It has a long and venerable history extending over centuries and over large parts of the globe including ancient Egypt, Greece, China and India. Ibn Sina advanced the art of healing through colours. He concluded that red moved the blood, blue or white cooled it, and yellow reduced muscular pain and inflammation [67]. Sir Isaac Newton (1642-1726 CE) adopted the seven-fold division of colours seen in the rainbow- Violet, Indigo, Blue (VIB), Green (G), Yellow, Orange, Red (YOR). Whereas VIB are termed electric or cool colours, YOR

are labelled magnetic or warm. G is primarily a tranquilizer and nerve sedative. Dr. Edwin Babbitt, regarded as the modern founder of the principles of colour therapy, has described the characteristics attributed to the primary colours as following:

- a) Red: An exciting colour at nearly the centre of heat
- b) Yellow: A medium colour and the centre of luminosity
- c) Blue: A fine colour which is cold, soothing, electrical

Blue has a calming effect on BP and has been shown to be beneficial in hypertensives. Red has opposite effects and needs to be avoided. How should one use colour to help one’s wellbeing? It could be by wearing colour, drinking or eating colour, colour breathing (a simple stress reducing activity involving mentally picturing/meditating on a colour that represents how you want to feel or/and what you want to let go in your life), or surrounding oneself with colour.

Music medicine

“Music is a therapy. It is a communication far more powerful than words, far more immediate, far more efficient” _ Yehudi Menuhin (1916-1999 CE) - one of the greatest violinists of the twentieth century

Music therapy originates essentially from the philosophy and views of the Greeks and was later re- shaped by Muslim scholars, through the application of Islamic values. Music interventions can be administered in different ways. They can be either live or recorded and administered either with or without the involvement of a music therapist. Moreover, the musical intervention can be chosen by the patient, by a music therapist or by a healthcare practitioner – the last especially in the field of research.

A variety of terms are used for music-based interventions, such as ‘music therapy’, ‘receptive music’ and ‘music medicine’. According to the definition of the American Music Therapy Association, “music therapy is the clinical and evidence-based use of music interventions to accomplish individualized goals within a therapeutic relationship by a credentialed professional who has completed an approved music therapy program”.

The Russian Physician Dr. Dogiel, detected that changes occur in blood circulation according to the sonority and the loudness of the sound and the type of instrument, in a study conducted in 1880 in Germany [68]. A study, conducted in the Chinese University of Hong Kong, on elderly subjects aged 63-93 years, suggested that listening to a certain type of music serves to reduce high BP [69]. Studies conducted in the Erasmus University in the Netherlands [70], and the Federal University Sergipe-UFS Brazil [71] gave similar results.

Limitations of lifestyle modifications

Lifestyle changes do have a real place in HTN management but by themselves they may not be enough to protect patients against HTN related complications. The truth of the matter is that only a small number of patients adhere to non-pharmacological interventions, both in the short and the long term [72]. Evidence

from the National Institutes of Health shows that the average BP decrease over 6 months in hypertensive patients undergoing lifestyle interventions was only 5.5/4.5mmHg [73]. Their effect is generally to augment, not to replace, pharmacotherapy. Moreover, once antihypertensive treatment has been initiated, it is unlikely that the patient can revert to BP control by life style modification alone [74].

Considerations in octogenarians (80-89 years) and above

“Lower the Better but not too Low”

Until 2008 there was uncertainty as to the benefit of antihypertensive treatment for the fastest growing sector of the population and guidelines were naturally cautious in their recommendations [75]. The Hypertension in the Very Elderly Trial Pilot Study' (HYVET Pilot), was the largest international, double blind, placebo-controlled trial of its kind. It employed a Prospective Randomized Open Blinded Endpoints (PROBE) design, randomizing 1283 patients, mean age 83.8 years (>60% female) from 10 countries with an entry requirement for a BP of 160-219/90-109mmHg. The results categorically rejected the long-held notion that it was safe to leave alone the gradually rising BP of the very elderly, for fear of doing more harm than good. It was concluded that they can be treated with clear benefits, and no additional risks. The recommended target was <150/80mmHg [76]. However, lower BP goals should not be sought. The Japanese Trial to Assess Optimal Systolic Blood Pressure in Elderly Hypertensive Patients (JATOS) study showed that lowering SBP below 140mmHg did not confer any additional benefit [75].

Managing isolated systolic hypertension

Isolated systolic hypertension (ISH), the most common form of HTN in the elderly, is defined as the presence of SBP of greater than or equal to 140mmHg with a DBP <90mmHg [77]. With a rapidly aging population globally, the number of those with ISH is expected to increase substantially. It is a matter of concern that ISH is associated with a two-to-four-fold increase in the risk of myocardial infarction, left ventricular hypertrophy, renal dysfunction, stroke, and CV mortality [78]. Compared with TDs and CCBs, ACEIs and ARBs have distinctly less efficacy in patients with ISH [77].

Conclusion

Essential hypertension is one of the most troublesome but, at the same time, preventable maladies of the geriatric population. Treating HTN in the elderly was historically controversial because of reservations in the contemporary clinical community about anticipated untoward effects of anti-hypertensive medications in this age group, PPH and OH (which can often occur together), hypertension-hypotension syndrome and fragility syndrome were all issues of concern. Now there are soundly based management guidelines for initiating appropriate therapy in the elderly and clearly defined targets. The overall situation is much more optimistic. Lifestyle recommendations with the option of complementary/

alternative medicines, to augment standard pharmacotherapy have substantially reduced the risk of stroke and other cardiovascular complications in the elderly, who should no longer meet the tragic end of FDR.

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