



Review Article

Hypertension as a persistent public health problem. A position paper from Alliance for a Healthy Heart, Mexico

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Summary

Today, Mexico has more than 130 million inhabitants; 85 millions of them are adults of 20 or more years old. The population pyramid is still one of base wider and this base corresponds to adults younger than 54 years old. Despite predictions made 20 years ago, about a transformation of the population pyramid shape to a mushroom shape as a consequence of more life expected and adult population growth; this change has not been occurred. Hypertension has become the biggest challenge of noncommunicable chronic diseases to public health in Mexico. Around 30% of adult Mexican population has hypertension; 75% of them have less than 54 years old (in productive age); 40% of them are unaware but only 50% of aware hypertensive population takes drugs and, 50% of them are controlled (< 140/90 mmHg). Cardiovascular risk factors including hypertension, dyslipidemia, obesity, and diabetes often cohabit in the same person and are magnified one to another in terms of common pathophysiological pathways. Atherosclerosis, arrhythmias, stroke and heart failure are common and are the final pathologic end-points and explains why cardiovascular diseases occupy first place in mortality in Mexico and worldwide. The costs of care for these diseases are billions and if we do not generate appropriate strategies, their global impact can become a high threat to social development of the country. The life style like nutrition, sports habits of the Mexicans must be emphasized; there is poor education about this crucial topic. This position paper is focused on the principal controversies and strategies to be developed by all, government, society, physicians, nurses, patients and all people related with healthcare of hypertension, in order to confront this huge public health problem in Mexico.

Hypertension as a public health problem in Mexico [1-8]

Problem: There is an underreporting of hypertensive patients and it is partially unknown the exact number of controlled patients, their therapeutic adherence level and their interaction with other cardiovascular risk factors in Mexico.

Potential alternatives of solution in Mexico

1. High blood pressure is the principal cardiovascular risk factor in Mexico. It is frequently accompanied with overweight and obesity, dyslipidemia, diabetes and smoking. High blood pressure is an alarming pandemic and we need to measures such as national registers of blood pressure in adult populations and even in adolescents and children at home, work areas, schools or universities as a routine practice.

2. It should be emphasized that the largest hypertensive population in Mexico is below 54 years old and then their concatenation with other risk factors such as obesity, dyslipidemia, diabetes and smoking, should be analyzed in clusters and then specific measures has to be taken (health policies) for each sub group of age.
3. Offer better alternatives with or without drug therapy according to clusters and specific circumstances of patients.
4. Alliance for a Healthy Heart in Mexico (as a unifying CV association) could make specific proposals for various vulnerable groups taking into account relative and absolute numbers of hypertensive population data.
5. Adherence and real-world studies are necessary to document the real impact of the current therapeutics used in Mexico.

Hypertension's prevalence is dramatically rising. In most of developing countries the prevalence of noncommunicable diseases (NCCD) are nowadays higher than infectious disease, this change has been called epidemiological transition [1-10].

In addition, lifestyle and diet changes are favoring an increase in the prevalence of risk factors such as obesity, dyslipidemia and diabetes, and the importance of underlying genetic factors, and the influence of the environment is undeniable. Tobacco and alcohol spruce this complex transition to enhancing not only the prevalence of these diseases, but also its complications.

The culmination of the harmful interaction of all these factors is mainly the cardiovascular complication. Thus, cardiovascular diseases occupy the first place in morbidity and mortality in nearly two-thirds of the world's population. Each year, about 17 million people die worldwide from cardiovascular disease and it is estimated that every 4 seconds a coronary event occurs and every 5 seconds a Stroke would be happening [3-6].

In Mexico an average of different national surveys showed that the prevalence of hypertension is around 30% in adult population (>20 years old). However, if the new classification from AHA/ACC were considered, around 40 million of adult population should be considered hypertensive [7,8].

Thus, the paradigms used since the middle of the last century for the prevention of communicable diseases through national campaigns, together with the application of best and most potent antimicrobial, resulted in a considerable increase in life expectancy as evidenced by the percentage and total increase in the population aged between 20 and 69 years. Nevertheless, an inevitable consequence is the increase of risk groups for NCCD where hypertension is leading [7].

Although many efforts have been made to try to guide appropriate management of patients with hypertension, the accumulated experience shows that 50% of hypertensive patients unknown their illness; those who know they are carriers of hypertension, only half take medication and of these only half have good control (<140/90 mmHg). In addition, in Mexico 75% of hypertensive population have less than 55 years old.

This position paper was intended to approach the principal barriers and issues that a group of experts detected and selected to startup into a series of activities directed to raise awareness among the population and the Government of the urgent need for treat this important problem of public health:

1. Through questions to the Panel of experts that answer questions about crucial topics in the comprehensive care of arterial hypertension in Mexico.

2. Suggesting potential alternatives of solution.
3. Call on Government's decision makers, doctors and patients to collaborate in this joint action.

Some useful alternatives in Mexico

1. Create the national registry of hypertension in order to investigate studies and know not only the prevalence but also the concatenation with NCCD and monitor the to Pharmacologic and not treatment in the country.
2. It should be emphasized that the largest hypertensive population is below 54 years and then their association with other factors such as obesity, dyslipidemia, diabetes and smoking habit, should be analyzed in clusters, offering specific measures for each subgroup of age.
3. Offer more alternatives to drug and life-style therapies according to clusters.
4. The Alliance for a Healthy Heart could make specific proposals for various vulnerable groups taking into account relative and absolute numbers of hypertensive population data.

Conclusion: High blood pressure is the principal risk factor for cardiovascular disease in Mexico. It is accompanied, in order of frequency, with overweight and obesity, dyslipidemia, diabetes and smoking habit.

High blood pressure is an alarming pandemic and deserves national measures such as registration of blood pressure in all adult patients, while at work, schools or universities as a routine practice. The cluster analysis could help in a most sensible way to determine the best health policies.

Definition of hypertension [1-10]

Problem: there are several definitions of Hypertension in the office, which confuse to the health workers.

Alternatives of solution in Mexico

1. We have accepted as a definition of high blood pressure a sustained elevation of blood pressure equal or greater than 140 and/or 90 mmHg measured at the office, (systolic BP and diastolic BP, respectively) for the general adult population.
2. Those people with blood pressure level between 130-139 or 80-89 mmHg should have close monitoring and lifestyle modification.
3. We have accepted as hypertension when the BP level, measured at home is equal to or greater than 135/85 mmHg, and in case of ambulatory monitoring, high blood pressure is considered with other cut off points (Table 1).

Table 1: Different definitions of hypertension (ESH/ESC 2018)

Type of Measure	Systolic Blood Pressure (mmHg)	Diastolic Blood Pressure (mmHg)
At Medical Office	>140	>90
Ambulatory		
Day (Vigil)	>135	>85
Night (sleep)	>120	>70
Average 24 hrs.	>130	>80
Home	>135	>85



The Mexican Norm of Hypertension ("Proyecto para la Norma Oficial Mexicana" NOM-030-SSA2-2016), suggested 140/90 mmHg or more as a cutoff point to define hypertension. However in the presence of diabetes BP higher than 130/80 mmHg should be considered as hypertension.

The ACC and AHA in 2017 published updated guidelines that have caused controversy since they define hypertension if BP > 130/80 mmHg; However, we think that this is only a change of name, since it disappears Prehypertension and it is replaced by grade 1 Hypertension. People in grade 1 hypertension usually requires non-pharmacological treatment; and only those who have cardiovascular disease or high risk will be in the need of drug treatment, this concept relies on the SPRINT study which showed the reduction of cardiovascular events and death when the systolic blood pressure is below 120 mmHg.

2007, 2013 and the 2018 European guidelines maintained the same definition and classification, with emphasis in the last one in the use of the ambulatory and home blood pressure monitoring, as well as decrease BP to < 140/90 mmHg as the first therapeutic target, and if it is tolerated, ideally < 130/80 mmHg [1-5].

Today with the advancement in technology, and the decrease in cost, the blood pressure measurement outside the office, is recommended to increase the accuracy of the diagnosis of hypertension.

It is important to emphasize that the Official Mexican Norm, is of obligatory observance, and applies to health personnel in the entire Mexican Republic in addition has legal noncompliance implication.

Hypertension is defined now as multifactorial disorder characterized by sustained systolic blood pressure elevation, diastolic or both > 140/90 mmHg.

As Mexican Alliance for a Healthy Heart, we must participate with the health authorities to make studies and recommendations to our country.

Premature death in Hypertension [1-15]

Problem: the concept of premature death is important in public health, however in daily practice is fundamental to calculate the risk of the patient to develop complications, which may impact on time and quality of life, such as heart failure and stroke.

Potential alternatives of solution in Mexico

1. In order to make correct decisions in all patients with hypertension, about when and how to intervene, the risk for outcomes conferred by hypertension must be calculated. It is recommended for the calculation of hypertensive risk, the combination of blood pressure levels, the risk factors and the presence of evidence of organ damage [2-4]. It is preferable to calculate the lifetime risk than the 10-year risk, and to explain the importance of the hypertension process to the patient, it is convenient to communicate with more understandable terms such as "cardiovascular age," "vascular age," or "heart age" [1]. which can be estimated from the simple calculation of global risk such as the Framingham tables.
2. Premature death is defined as one that happens before a certain age, such as, for example, the age that corresponds to the life expectancy of the country where one is living. In general, in order to standardize comparisons, premature death has been defined as that which occurs before the age of 70. The use of the concept of premature death is more useful in Public Health, than the simple analysis of total deaths, because the problem is not to die, which is inevitable, but to die before the time that would be expected to live on average, and because many of these deaths are considered to be preventable.

Noncommunicable chronic diseases, among which the most important are cardiovascular disease, diabetes and cancer, are the main causes of premature death in the world, since they are responsible for 41 million premature deaths a year (over 70% of the total). Globally cardiovascular disease accounts for approximately 17 million deaths per year, nearly one third of the total. Of these, complications of hypertension account for 9.4 million deaths worldwide every year. Hypertension affects one billion people worldwide. The population risk attributable to Hypertension explains 13.5% of the total premature deaths, 60-70% of the stroke, 47% of the ischemic cardiovascular disease, 50% of the heart failure, 20% of the renal disease and 50% of these complications occur in people with blood pressure between 115 and 145 mmHg.

Approximately 85% of these premature deaths worldwide occur in low and middle-income countries, such as Mexico [9-11].

All these facts make it essential to calculate the risk of complications and premature death in all hypertensive patients, to plan effectively, not only the control of blood pressure, but taking into account other risk factors.

Risk is understood as the probability of developing an outcome in a given time. The risk can be expressed as the % probability of an event occurring in the person in a given time, when it is exposed to a risk factor (absolute risk), or that there is a greater or lesser probability that the outcome will be present in the person compared to a person with the same characteristics but who is not exposed to the factor in question (relative risk).

The risk for premature death, involved in the sustained elevation of blood pressure levels is strongly and directly related to the magnitude of this elevation and starts from the level of 115/75 mmHg and doubles for each elevation of 10/5 mmHg.

However, assessing the risk of the patient only by the magnitude of their blood pressure figures, a criterion supported by the North American guidelines of the JNC up to version 8, is an incomplete concept, it would only be true if this processes were unifactorial, in fact the relative weight of pressure levels (attributable risk), is variable and depends not only on the magnitude of the pressure but also on the age of the process, the presence of other risk factors and the presence and magnitude of the damage established.

Calculating a person's CV global risk is a relatively complex process, there are published over 150 cardiovascular risk prediction models. The most frequently used and recommended in different guidelines are: Framingham Heart Study, the Lipid Research Clinic Follow-up Cohort (The Cardiovascular Life Expectancy Model), the Dundee Cohort, the British Regional Heart Study, the Munster (PROCAM) Cohort, the Systematic Coronary Risk Evaluation (SCORE), and the Pooled Court Risk Calculator (ACC/AHA). Only about 25 of these models/calculators have been externally validated, the results and figures obtained vary according to the database they are derived from, choice of clinical endpoints and risk interval duration upon which the estimate is based.

From its first versions, the European guidelines calculate the risk for cardiovascular mortality and give indications of treatment by combining in a table the blood pressure levels, with the number of risk factors, the presence of diabetes, concomitant diseases and the existence of evidence of organic damage related to hypertension.

The 2017 ACC / AHA guidelines propose decision-making in what they classify as grade 1 arterial hypertension (130-139 / 80-89 mmHg), by calculating the patient's global risk with the use of the Pooled Court Risk Calculator, which allows to calculate the current 10 year ASCVD risk, the lifetime risk, the therapeutic impact and gives the specific recommendations for the case according to the ACC / AHA guidelines. Its main disadvantage is that it is not applicable to "Latino" populations.

The Mexican Alliance for a Healthy Heart recommends calculating the risk in all hypertensive patients, to develop and implement along with it, a lifelong program that is based on behavioral modifications, which include changes in lifestyle and very often, taking medication for the rest of life. For this purpose, it recommends using the tables of the ESH / ESH 2018, recommended by the "Norma Oficial Mexicana". In a complementary way, the lifetime risk is calculated, with the Pooled Court calculator and the vascular age with the Framingham tables, which allows explaining in a more understandable way to the patient, his health status and the risk they have when the management of their risk factors is neglected.

Measurement of blood pressure [1-20]

Problem: The measurement of blood pressure in clinics is often incorrect.

1. Recent international guidelines recommend the diagnosis of hypertension as follows: Repeated measurements of BP during the day and Ambulatory BP monitoring and home blood pressure monitoring
2. The traditional auscultator method at the office with mercury, aneroid or oscillatory devices have been used as a standard method for the detection, diagnosis and monitoring of hypertension. Office blood pressure has the advantage that the method is easy, is well standardized and is cheap, however its main disadvantage is that this method is operator dependent with a high degree of variability because inter-observer is not done according to the technique established by national and international standards, usually through ignorance, lack of training or lack of infrastructure suitable for blood pressure.

Alternatives of Solution in Mexico

Establish in each health care workplaces in the country "blood pressure measurement modules", with the following characteristics:

- Training Personnel.
- Technique and adequate equipment.

Problem: The blood pressure is measured at the majority of people with the same size of cuff [2-20].

Alternatives of solution in México

1. According to the project of the standard official Mexican PROY-NOM-030-SSA2-2017, for the prevention, detection, diagnosis, treatment and control of systemic arterial hypertension, most adults requires a cuff between 13 and 15 cm and 24 cm. length. The width of the cuff will cover around 40% of the length of the arm and the Chamber of air inside of the cuff must have a length that allows covering at least 80% of the circumference of the same, so some patients as thin people, obese, and children require different sizes of bracelets.
2. Wrist or thimble devices are not recommended.
3. Health personnel must have the various measures of cuff according to the perimeter and size of the arm of the patient. Equipment thimble are not recommended to measure BP, only in very specific cases such as the inability to take the blood pressure in the arm or wrist.

Problem: The term reactive hypertension is often used [1-15].

Alternatives of solution in México

1. The term reactive hypertension is used incorrectly when there is a transient



Box 1: Circumstantial Hypertension.	
Circumstantial Hypertension	
High BP at office and normal BP by HBPM or ABPM = "the reactive or white coat" hypertension	Normal BP at office and normal BP by ABPM or HBPM = Normal BP or Hypertension controlled
High BP at office and High BP by ABPM or HBPM = Uncontrolled Hypertension.	Normal BP at office and High BP by ABPM or HBPM = "Masked Hypertension"
BP= Blood Pressure, ABPM= Ambulatory BP Monitoring, HBPM = Home BP monitoring.	

elevation of blood pressure during a circumstance isolated as the office measurement, this concept is not well established. A better defined concept "circumstantial <hypertension!" (Box 1) which comprises the terms "white coat" and "masked" hypertension.

- 2. Those types of hypertension are only diagnosed by methods outside the office (ABPM and HBPM).

Problem: The home blood pressure monitoring is not used for adequate control of hypertension [3-21].

Alternatives of solution in México

- 1. Earlier this decade the NICE (National Institute for Health and Clinical Excellence) of England published the guide 127 for the clinical management of primary hypertension in adults, recommending for detection, diagnosis and control of Hypertension the inclusion of Ambulatory Blood Pressure Monitoring (ABPM) and Home Blood Pressure Monitoring (HBPM). These methods were considered as part of the definition of the HTA by the European ESC/ESH 2013 guidelines and ratified in the latest 2018 guidelines. In year 2015 Canadian Hypertension Educational Program (CHEP) recommended these methods for the diagnosis and control of patients with hypertension.
- 2. Also in the last guide of the ACC/AHA of the year 2017 corresponding values of the pressure inside the office and outside the office are introduced for maps & MPDA. Another concept that stemmed from the pressure inside and outside of the office was the term of the HTA "circumstantial", which introduced the terms of the "white coat" hypertension and "masked". These methods also allow you to monitor the variability of the PA, control of treatment antihypertensive and discard the misdiagnosis of hypertension in patients with hypertension grade I or with low risk. In the case of the map, it also allows to monitor the natural drop in pressure during sleep. In Mexico there are no regulations or clinical practice guidelines these methods as part of screening, diagnostic or monitoring of patients with hypertension, while they are methods that are increasingly are used and which have already been validated with clinical studies.
- 3. Outside the office (map and e) methods to detect masked hypertension and white-coat hypertension, they also allow to identify high blood pressure which could be circumstantial or spurious. It allows improving the knowledge of the blood pressure variability, risking stratification and promotes adherence to treatment, so it should promote its use.

Problem: The home measuring blood pressure is performed incorrectly [1-15].

Alternatives of Solution in México

- 1. According to international standards the e should be performed by patients, relatives or careers with a well-established protocol of at least 2 shots a day for a minimum of 7 days with a team of measurement well validated and an adequate training.



2. The monitoring blood pressure home should be legalized in all patients with suspicion or diagnosis of hypertension with equipment suitable for patient or family adequately trained.

What laboratory and imaging studies are crucial to risk stratification of hypertensive patients? [1-10]

Background: Once the diagnosis of systemic hypertension is established, laboratory tests and imaging studies should be performed in order to determine damage to target organs and to discard associated clinical conditions, including secondary hypertension.

Problem: The number of initial studies is still controversial and they are based on the recommendation by experts. They must be according to time of diagnosis, clinical condition and the setting where patient is attended. They must be from the simplest to complex studies. Infrastructure and economic situation also should be considered. In addition, according to history and physical findings, the patient may be referred to a specialist.

Potential alternatives of solution in Mexico

1. Initial laboratory studies in all hypertensive patients include: Hematocrit, hemoglobin and fasting glucose, glycosylated hemoglobin, urea, creatinine, uric acid and lipid profile: total cholesterol, lipoproteins (HDL, LDL, VLDL) and triglycerides, serum electrolytes: sodium, potassium, calcium and phosphorus. Liver function tests and urinalysis; if microalbuminuria is found then quantify protein in 24-hours urine.
2. Consider glucose oral tolerance test in patients with borderline levels. If the patient suffers from diabetes mellitus, glycated hemoglobin test is recommended. In selected cases high sensitive C-reactive protein can be determined. Imaging follow-up studies include: chest x-ray, transthoracic echocardiogram (TTE) and 12-lead electrocardiogram (ECG).
3. ECG will indirectly determine the presence of left ventricular hypertrophy which is a mortality predictor. Importantly, keep in mind that ECG sensitivity for detection of hypertrophy is low. However, left bundle branch block may indicate a worse prognosis. ECG can also detect changes in ischemic myocardium and rhythm and conduction abnormalities. TTE is a non-invasive study that provides structural and functional information of the heart. Ideally, in the hypertensive patient, this test should be performed by highly trained personnel and with optimal ultrasound equipment. If the presence of hypertensive heart disease is suspected, TTE plays a decisive role in assessing the degree of ventricular remodeling and therefore considering prognosis.
4. In addition, a TTE can inform about the systolic and diastolic function, left atrial volume and calculate pulmonary pressure. Finally, it is the study of choice to evaluate the structure and functional state of valves.

Conclusion: It should be noted the relevance of clinical data and acceptable initial laboratory and imaging tests in all patients with hypertension, as well as to analyze these data in order to determinate damage to target organs and finally to establish an risk stratification for initial and long term monitoring and treatment.

How should we stratify the cardiovascular risk of hypertensive patients in mexico? [6-15]

Problem: There are several clinical, laboratory and image parameters to determine the degree of cardiovascular risk in patients with hypertension. Nevertheless, studies should be directed to evaluate all, cardiovascular, stroke and renal risk, in order to determine the presence of structural or functional condition associated with high blood pressure.

Potential alternatives of solution in México

1. We need to keep in mind that having more than 55 years old, current smoking, total cholesterol > 200 mg/dl, diabetes mellitus, and family history of premature ischemic heart disease are considered important risk factors to develop cardiovascular disease. Therefore, we need to classify individually each patient.
2. The definition accepted for target organ damage is when hypertrophy of the left ventricle is demonstrated by TTE, proteinuria > 300 mg / 24 hours and/or serum creatinine > 1.3 mg/dl, abnormal creatinine clearance, presence of changes by atherosclerosis or plaque disease in vessels of neck, iliac or femoral arteries.
3. There is no doubt that there is an increased risk in hypertension, when target organ damage is demonstrated. Therefore, this possibility should be always investigated in a meticulous form at baseline and follow-up.
4. For risk stratification, we must consider the level of blood pressure, the presence of other cardiovascular risk factors, and determine the target organ damage, as well as associated cardiovascular disease.

Cardiovascular risk stratification

Chest x-ray must be included at initial assessment; it is accessible, low-cost and easily interpretable. It provides information about heart, great vessels, and lung parenchyma. Thus, we can detect cardiomegaly, dilatation or coarctation of the aorta.

The EKG should also be part of the initial study. It is accessible, low cost, easy and immediate results can be obtained. The main objective will be to evaluate the presence of hypertrophy, arrhythmias or heart blockade. Nevertheless we need to keep in mind that the sensitivity is low, and the specificity is acceptable.

There are different electrocardiogram scores that guide the calculation of hypertrophy of the left ventricle (LV). One of them is the Sokolow-Lyon, which considers hypertrophy when it is > 3.5 mV (35 mm) and is calculated by adding S wave voltage at V1 lead plus the R wave higher in V5 or V6: $SV1 + (V5 \text{ or } V6)$. The EKG can also detect myocardial ischemia.

Transthoracic Echocardiography (TE) [12]

In addition to rating structure and valve function, diameter cavities, systolic and diastolic function and different hemodynamic parameters, the echocardiogram determines the ventricular geometry and it has good sensitivity to the detection of LVH. Hypertrophy is currently considered when we calculate a ventricular mass of more than 99 gr/m² or more than 115 gr/m² for men and women respectively. Thus, we need to calculate the ventricular mass (LVM) and thickness of posterior wall to obtain relative wall thickness [(RWT: Diastolic diameter of LV by posterior wall thickness * 2)], TE enables to determine the presence of: concentric remodeling (normal LVM, and RWT > 0.45); eccentric hypertrophy (abnormal LVM, RWT < 0.45) and normal ventricular mass (LVM normal, and RWT < 0.45). The presences of LVH by TE or EKG are predictors of cardiovascular risk.

The transthoracic echocardiogram can bring out contractility state and segmental movement alterations in patients with myocardial ischemia. Filling of LV, and its pattern according to the A wave and wave speed, and their relationship, as well as the wave deceleration time can be characterized with pulsed Doppler. We can calculate also E wave of isovolumic relaxation, as well as e' wave and with tissue Doppler imaging. It allows categorizing the degree of diastolic dysfunction of LV, in normal, or dysfunction type I, II, or III. Increasingly the size of the left atrium (LA) takes more

importance as a predictor of risk in patients with hypertension. Currently the volume of the AI is considered abnormal when it is $> 34 \text{ ml/m}^2$.

Stratification of renal function: It is a fact that high blood pressure causes deterioration of renal function. Serum creatinine $> 1.5 \text{ mg/dl}$ in men and 1.4 mg/dL in women must enable to make more studies to determine the actual damage. Thus, these levels may eventually be related to debugging of creatinine clearance between $40 - 50 \text{ mL/min}$. In addition, 24 hour urine Creatinine clearance, quantification of proteins in urine and renal ultrasound, can be useful to establish the presence of target damage.

Remember that impaired renal function represents a strong predictor of poor prognosis since it is associated to cardiovascular complications and mortality.

Stratification of atherosclerosis and vascular damage

The carotid arteries, by its location and accessibility, have allowed their study with ultrasound. In addition to determining the direction and speed of blood flow, they rule out the presence of atherosclerotic plates. We can also calculate the intima-media thickness (IMT). It has proven to be an independent predictor cardiovascular events and stroke, when TIM is located above the percentile of normal for age and gender.

Conclusion: Stratification in patients with hypertension allows to identify low, intermediate or high risk and therefore it can be relevant to therapeutic decisions in order to reduce the morbidity and mortality. It is important to know the scope and limitations of each one of the methods of laboratory and Imagen and consider additional tests when it is necessary.

Monotherapy: when it is justified as a first-line? [1-12]

Problem: The first line antihypertensive therapy is still controversial. However this practice is overused in Mexico and therefore, recommendations are needed to clarify this controversy.

Alternatives of solution

1. We need to improve medical education about hypertension among general practitioners and specialists, and even among the hypertensive patients according to the new evidence published as 1A level of evidence.
2. According to 2018 European hypertension guideline there is an acceptable consensus about when could we use monotherapy, and it is among patients with low cardiovascular risk, classified as grade 1 ($140-159 / 90-99 \text{ mm Hg}$) hypertension (Always choosing the drug taking into account the comorbidities and sharing the decision taken with the patient). Monotherapy is also considered for those fragile patients over 80 years old and it depends on adverse effects of treatment strategy such as dizziness, orthostatic hypotension, or physical or mental deterioration; the same in patients with high normal blood pressure with established cardiovascular disease, especially coronary artery disease; and in isolated systolic hypertension.
3. 2017 North American Guidelines, considers monotherapy initiation in patients with arterial blood pressure grade 1 (SBP, $130-139 \text{ mm Hg}$, with $\geq 10\%$ cardiovascular risk in the next 10 years and targeting a goal of BP below $130/80 \text{ mm Hg}$). Emphasizes the need to exclude "white or masked hypertension at the office", choosing the drug by taking into account the comorbidities and sharing the decision with the patient.
4. In the Latin American 2017 Guideline (LASH), the recommendation for monotherapy is for those patients with grade 1 ($140-159 / 90-99 \text{ mm Hg}$) hypertension, with low to moderate cardiovascular risk and elderly patients

showing no adverse treatment as: dizziness, orthostatic hypotension, or physical or mental deterioration. He emphasizes there preferred drug for them in specific comorbidities.

5. The Canadian Guide (CHEP) suggests that in adult patients with diastolic hypertension with or without systolic hypertension, home therapy could be with monotherapy alone, in adults with isolated systolic hypertension monotherapy should be. In hypertensive patients with diabetes, indirectly indicated, that combination therapy can be used if you fail to reach the goal of blood pressure with a monotherapy standard dose.
6. In Mexico, the official norm (NOM) about hypertension, suggest beginning drug treatment when the patient is correctly diagnosed as hypertensive with high or very high risk leaving at the discretion of the treating physician those patients with low to moderate risk. Starting treatment with monotherapy in hypertensive patients without special conditions, with low dose and gradually increase. In fragile elderly leave the decision in attending physician.

Non-pharmacological treatment in hypertension [1-15]

Problem: What role does non-pharmacological measures play in arterial hypertension in Mexico?

Alternatives of solution in Mexico

1. Nutrition and exercises are recommended by physicians, but few of them have training about these crucial recommendations. Standardized guidelines are necessary to be promoted in all country.
2. Using technology, several APPs can be developed to facilitate its prescription.
3. Until now, in relation to chronic noncommunicable diseases, traditional health systems have been focused on late medical attention, that is, with a focus on secondary or tertiary prevention. And despite having more and more therapeutic options in the market, those already in follow-up, have a low percentage in their control.

Two recent studies have shown that socioeconomic stratum plays an important role in the development of noncommunicable diseases due to the quality of food and the

Table 2: Recommendations for nonpharmacological treatment of Hypertension.

Measure	Ideal Target	Decrease in mmHg
Weightloss	Ideal body mass index between 18.5 - 25 kg/m ² Reduce 5.1 kg Even through medications and bariatric surgery	4.4 mmHg sistolic 3.6 mmHg diastolic (Neter et al., 2003)
Abdominal circumference	<94 in men <88 in women	
Fisical activity	At least 30 minutes a day, for 5 days of the week, including isometric exercise	8.3 / 5.2 mmHg
Reduction in sodium intake	<5 grams of salt per day, one teaspoon coffee maker. (Not less than 3 g / d of salt)	Between 2 – 4 mmHg per day
Consumption of food with potassium	Improves blood pressure, 90mmol or 3510 mg day	4 – 5 mmHg
Mediterranean diet or DASH	Consumption of fruits and vegetables, foods low in calories and low in saturated fats	As far as 11 mmHg
Coffee consumption	Protective effect Less than 5 feet per day.	
Decrease in tobacco consumption	Suspend it	
Decrease in alcohol consumption	14 units per week in men 8 units per week in women 1 unit = 125ml of wine = 250ml of beer	4 - 5 mmHg

increase in the consumption of tobacco and alcohol, implying that the implementation of public policies that go beyond the pharmacological treatment, mainly those related to education will improve cardiovascular health in a long term.

Specifically in Hypertension care, there are different models of empowering patients, the best known is the one designed by Edward Wagner who developed a model that improves self-control, self-care and promotes a closer interaction with the health system, including changes in lifestyle, essential and indicated in all hypertensive patients, of any degree, but also in the non-hypertensive patient to avoid or prolong the time of appearance (Table 2).

However, the attachment to these changes in lifestyle are not usually for a very long term, so we must monitor closely to determine, if there is no improvement, when starting pharmacological treatment. According to the European guidelines 2018, will reassess the patient 3 months after the suggested lifestyle changes (Esh et al., 2018).

Hypertension treatment [1-15]

Problem: In Mexico the treatment of high blood pressure often is delayed.

Alternatives of solution in Mexico

1. In order to improve the medical continuing education in all first contact physicians and keep them updated for correct decision making in hypertension treatment, we as Mexican Alliance for a healthy heart suggest online courses, use of cellular APPs and an annual campaign favoring messages for cardiovascular risk in schools and clinics of 1st and 2nd level of medical attention. All health institutions (IMSS, ISSSTE, PEMEX, Defense, Marine, Private and Ministry of health) should work together.
2. Early intervention: detection and management of co-morbidities such as: obesity, overweight, DM, Metabolic Syndrome, Dyslipidemia, Sleep Apnea Syndrome, hyperuricemia and ischemic heart disease as a complication.
3. Detection: We must detect all patients at low, medium and high risk. It is essential to reduce the progression of vascular damage, through non-pharmacological measures and pharmacological treatment. Nevertheless, the patient participation and commitment is essential to reach an adequate control.
4. Early antihypertensive Drug therapy: Specific groups with high risk should be considered to early and effective treatment with more strict aims.

Hypertension (HT) is the most common condition seen in primary care and leads to increased risk of cardiovascular disease (CVD) as a myocardial infarction (MI) stroke and chronic kidney failure (CKF) and death if it is not detected early and treated adequately. The main objective of the treatment of blood pressure (BP) should reduce cardiovascular morbidity and mortality (CV), while doctors require guidance on the appropriate pharmacologic management using the best scientific evidence.

Recent meta-analysis showed a significant reduction in events and CV mortality in patients with grade 1 hypertension, also in those with moderate cardiovascular risk under drug treatment, and specifically in patients with Diabetes Mellitus (DM). This risk reduction can be of around 19 % in mortality if a consistent reduction of 7 mmHg in systolic blood pressure is reached.

Physical inactivity, handling inappropriate diet, overweight and obesity (serious health problem that is on the rise) and diabetes mellitus are some of the main factors of cardiovascular risk (F-RCV) favoring the elevation of blood pressure, being early diagnosis especially in patients in early stage of life, and the management thereof

associated with pharmacological therapy adequate, fundamental to achieve a better control of the tension figures declining, heart failure, failure renal and early cardiovascular death (1) Total cardiovascular risk (TCVR):

- Early Mortality
- CV Mortality
- Hypertension mortality
- Stroke mortality

Recent international guidelines recommend for the diagnosis of hypertension as follows:

- Repeated measurements of BP during the day
- Ambulatory BP monitoring and home blood pressure monitoring at home

The guidelines are consistent in recommending that patients with hypertension grade 1 and high cardiovascular risk (HCVR) or moderate hypertension should receive drug treatment. There is less evidence that the reduction of blood pressure in patients with grade 1 hypertension and low to moderate CV risk (> 60 years) have indication for initiating treatment. There is uncertainty of reducing the normal high PA or grade 1 in elderly patients and low-risk patients (SEC).

Guidelines define that patients with systemic hypertension (HAS) grade 2 or 3 should receive pharmacologic antihypertensive therapy. In elderly patients (> 65 years), the management of the PA on a range of 130-139 mmHg is recommended.

Conclusion: The guidelines are consistent in recommending that patients with grade 1 hypertension and moderate-high cardiovascular risk should receive drug treatment to prevent premature deaths. There is less evidence that the reduction in PA in patients with grade 1 hypertension and low CV risk in patients (> 60 years). All the guides in patients with grade 2 and 3 hypertension should be handled changes in lifestyle and pharmacological antihypertensive treatment.

Blood Pressure at high normal limit [1-10]

Problem: What we need to do? And how we should give approaching to patients with blood pressure of 130-139/80-89 mmHg?

Potential solution in Mexico

1. Impact on media, emphasizing the importance on cardiovascular disease and its cost, if we make early intervention in both, nonpharmacological treatment as well as adequate pharmacological treatment in patients at risk.
2. Intervene in mass information media to alert about the possible early complications in hypertension.
3. Always emphasizing the asymptomatic clinical presentation of hypertension.
4. More training and update for first contact physicians, in order to detect early co-morbidities, and how they can categorize the cardiovascular risk, specifically identifying groups at risk through complete clinical evaluation: take blood pressure in arms, 5 minutes after being seated, and using validated devices.
5. Global cardiovascular risk evaluation in this group of patients, always need to be considered For specific differences in blood pressure (BP), the relative risk cardiovascular (CV) is constant, and differs from absolute risk for

atherosclerosis, there is some evidence of lower relative risk but greater absolute risk in the elderly of developing atherosclerotic disease, drug treatment should be considered according to the tension figures but in the context of the total cardiovascular risk (CVR-T).

Meta-analysis showed that the reduction of the BP should be performed in according with the cardiovascular risk. It is easier to prevent CVD in patients with high risk than in those with low-risk, and in elderly than in young adults. Cumulative evidence have shown that a lower relative risk is reached in elderly patients than in young adults and a greater ability to prevent CVD attributable to the elevation of the PA in individuals with elevated and high CVR.

The reduction in the relative risk of CVD using antihypertensive drug is uncontroversial for groups at high and moderate cardiovascular risk such as those with left ventricular hypertrophy, Diabetes Mellitus, Atrial fibrillation and kidney disease. Consequently, the reduction of the absolute risk of CVD is attributable to the reduction of BP. The magnitude of the reduction in BP through drug treatment in patients at high risk always need to be considered (<130/80 mmHg), if it there is not contraindicated.

Task Force supports values of BP around 140/90 mmHg in hypertensive patients with low cardiovascular risk. The cardiovascular risk must be approached in an integral form; other comorbidities must be treated at the same time.

Conclusion: The general decision to use or not antihypertensive drugs should not be evaluated only in relation to Blood Pressure level; it must be established in relation to global cardiovascular risk.

How should we address patients with pregnancy hypertension? [13]

Problem: Pregnancy hypertension still as an important challenge worldwide. The diagnosis is frequently delayed. It is a real problem of public health in Mexico, primarily affect to the most vulnerable population (poor), with social backwardness; by 2015, Chiapas and Nayarit were the States with higher mortality.

Alternatives of potential solution in Mexico

1. An intensive national campaign to early pregnancy hypertension detection should be motivated.
2. It is also know that they represent one risk to the mother and the product mortality during the time of gestation and subsequently, women can develop chronic hypertension, diabetes, obesity, kidney disease or cardiovascular disease and stroke, therefore preeclampsia must be considered a cardiovascular risk factor.

Epidemiology: The prevalence of Arterial hypertension (AHT) in pregnancy in our country is between 5 and 10%; in the ENSANUT-2016 [20], scores than the 16.9% of women reported hypertension in at least a pregnancy.

According to the World Health Organization, maternal mortality occupies the first place of death among women at reproductive age, where the gestational hypertension participates. In Mexico by 2015, 21.2% of maternal deaths were related to hypertensive disorders.

Definitions

Chronic high blood pressure (pre-existing): It is hypertension that arises from before pregnancy or before the 20th week of pregnancy.

Gestational hypertension: It is hypertension to take place for the first time after the

20th week of pregnancy with blood pressure (BP) > 140/90 mmHg, at least on two occasions with one difference greater than six hours, in the absence of proteinuria or other systemic disorders.

Preeclampsia-eclampsia: Is the gestational hypertension with appearance of proteinuria (> 300 mg in urine from 24 hrs) or other alterations such as thrombocytopenia (< 100,000 platelets), liver damage (double of transaminase elevation), new renal failure (serum creatinine > 1.1 mg/dL), pulmonary or cerebral edema or visual disturbances. A severe variant is HELLP syndrome (hemolysis, increase in liver enzymes and platelets decreased).

Chronic hypertension with pre-eclampsia added can be possible and it is difficult to detect if we do not have medical history of patient.

Risk factors: First pregnancy, under 20 or over 40 years old; with prior pre-eclampsia, chronic hypertension, chronic renal disease, history of thrombophilia, multiple pregnancies, family history of pre-eclampsia, diabetes type 1 or 2, obesity and lupus.

Treatment: In proactively in some studies has been reduced the incidence and morbidity of preeclampsia using 60 to 80 mg/day of ac. acetylsalicylic, night administration. Unproven usefulness with vitamin C or E, diet low in Na, diuretics, I rest in bed or moderate exercise.

There is controversy in using drug treatment when the PA is between 140/90 and 160/110, by the likely association with fetal damage. With severe HTA > 160/110 is recommended to methyldopa 250 to 500 mg c/12 hrs., calcium antagonists as the nifedipino 30 mg c/24 hrs., or verapamil 180 mg c/12 hrs., and, beta-blockers; as second line. It is contraindicated ACEI and ARBs.

Cases with severe pre-eclampsia, eclampsia or HELLP syndrome, should be hospitalized and being treated by a multidisciplinary group with experience.

Resistant Hypertension [1-18]

Problem: how to identify the patient with resistant hypertension? And what would be the alternatives of its treatment in Mexico?

Alternatives of solution in Mexico

- Resistant Hypertension diagnosis requires detailed information about the medical history of the patient including characteristics of the style of life, drinking alcohol and sodium in the diet, substances and drugs that interfere with the blood pressure control, and the characteristics of the sleep.
- The most important cause of resistant hypertension is nonadherence and fail of correct combination of antihypertensive drugs, therefore more training and simple algorithms are needed to be applied for general practitioners. Secondary hypertension also needs to be explored and not found it.
- In patients with a good selection criteria interventional treatment using ablation of renal arteries may be considered.
- ABPM and HBPM are good methods to demonstrate resistant hypertension; therefore these devices should be accessible to general practitioners. In addition the essential medicines in health sector must be included beyond the current drugs. We suggest combined fixed-dose drugs in a single tablet to facilitate adherence and persistence in the treatment. Reinforce the need to maintain a healthy lifestyle with a diet low in sodium, moderate aerobic exercise and weight control.

Hypertension is normally defined as resistant or refractory when BP control objectives are not achieved (SBP < 140 mmHg and/or DBP < 90 mmHg), despite having established non-pharmacological measures, and treatment with a combination of three drugs or at correct doses, one of whom must be a thiazide diuretic. According to this definition, the prevalence of resistant hypertension is not negligible; 15% would have you have resistant and 8% receiving 4 or more drugs.

If we have a patient like this, we should be considered referral to a specialist dedicated to Hypertension. Remember, this kind of hypertension usually is accompanied by important target organ damage and high cardiovascular risk. Resistant hypertension is associated with older age (especially > 75 years), male gender, Afro-Americans, higher initial BP at the time of the diagnosis of hypertension, obesity, diabetes mellitus, chronic kidney disease, and a coronary risk according to Framingham score at 10 years > 20%.

The prognosis of resistant hypertension compared with the prognosis of those who reach more easily BP control remains to be carefully determined; however, the risk of myocardial infarction, stroke, kidney disease and death in adults with resistant hypertension may be 2 to 6 times more frequent than those without resistant hypertension.

Interventional treatment [4]

Recently, several interventional techniques have been developed for the treatment of the resistant hypertension. Percutaneous sympathetic denervation of renal arteries is performed on efferent and afferent nerves by a Radiofrequency catheter.

Denervation may reduce BP at 6 months in around 33/11 mmHg compared to the control group without observing an increase in the rate of complications with the procedure. Therefore, the technique offered promising results. However it has been discussed in the Symplicity HTN-3 trial, (5). In this study a renal angiogram was performed and consequences or complications were not detected. However, important differences between groups were not detected.

The results were different from Symplicity Registry where an important reduce of BP was detected. (-20,2 mmHg) Nevertheless, a correct selection of patients was recommended including patients with correct diagnosis and BP clearly elevated. (>160mmHg). (6), The European guides 2018 (3) recommended apply this procedure to those patients without any doubt of resistant hypertension. It is also suggested that patient must be included in an official registry.

Devices for stimulation of the carotid baroreceptors have been also developed, in order to inhibit sympathetic activity and activate the parasympathetic, getting lower HR, increase vasodilation, and natriuresis and decrease Renin secretion. It involves implanting a subcutaneous generator (similar to a pacemaker) connected via infra-clavicular electrodes to the carotid sinuses.

This technique has shown a sustained BP reduction of up to 53/29 mmHg at 5 years of follow up. However, in a clinical trial in phase 3 with 265 patients the efficacy of the device was weighed down by a high incidence of complications associated with the procedure (up to 1/4 of the patients suffered any complications). In any case, the development of this technique is being much slower than denervation and 2018 European guidelines suggest its use in a restriction form (clinical trials).

Finally, many of these patients will require treatment with a combination of multiple antihypertensive, being some of them initially an ACEI/ARB along with a dihydropyridine calcium antagonist and a thiazide diuretic, ideally the combination of antihypertensive drugs in a single tablet, to improve adherence and persistence to treatment. Note that he has been a good response in these patients when we



adding spironolactone treatment, perhaps in relation to the presence of a primary hyperaldosteronism (undiagnosed) or secondary (due to treatment). In fact in 2015 year was published a trial of great relevance in the field of resistant hypertension and which confirms the usefulness of spironolactone. Therefore, it should not be acceptable define as "truly" resistant hypertension unless not be controlled after adding spironolactone.

Conclusion: We must identify patients with true resistant hypertension and differentiate them from pseudo-resistant. Patients with true resistant hypertension to adequately deal with 3 antihypertensive drugs as an inhibitor of the Renin system angiotensin (ACE/ARA II) more a dihydropyridine calcium antagonist and a thiazide diuretic, of preferably in a single fixed combination tablet, which should have several presentations with a variety of doses (a standard initial dose and another dose maximum). If the patient does not reach control we can add a fourth drug that must be spironolactone. If for some reason the spironolactone is not tolerated beta blockers as bisoprolol or with vasodilatory properties such as nebivolol may be used.

Hypertension in mexican women [7-20]

Problem: In Mexico the cardiovascular risk in women is underestimated. We need to educate more all physician of first contact in order to identify and classify the cardiovascular risk in women with hypertension. Hypertension during pregnancy is a great unresolved challenge.

Alternatives of solution in Mexico

1. We need to make campaigns to stimulate to all women to measure their cardiovascular risk after 20 years old.
2. Diabetes, dislipidemia and obesity are more frequent than men after 50 years old. The answer to drugs may be different in some cases than in men.
3. The early detection and control of hypertension in pregnancy need to be expanded and better and practical algorithms still to be elaborated and defunded.

Cardiovascular (CV) disease is the leading cause of morbidity and mortality for women worldwide. In Mexico this problem is higher because of the underdiagnoses. In addition, the role and weight of risk factors in relation to gender are not completely clarified as well as their treatment. Cumulated evidence shows that pathophysiology of hypertension in woman presents different aspects in relation to phase of life, with an impact on treatment. The only certainties that we have nowadays regarding hypertension therapy in women are really few and may be summarized in: how we need to treat or, better, what not to use in hypertension in pregnancy and how to treat acute severe hypertension in pregnancy. We have some certainties also on treatment of hypertension associated to some women's comorbidities.

We need to consider guidelines and analyzing what happens in the real world, we believe that women have similar major CV risk factors of men, although a minor CV global risk. However, there are some data that suggest that hypertension and diabetes are more important risk factors in women than in men. In RENASCA-IMSS, a Mexican register of coronary syndromes, from 37,168 consecutive cases; women had more cardiovascular risk factors than men; hypertension (72.2% vs. 55.5%), diabetes (54.3% vs. 40.9%), dyslipidemia (38% vs 35%) (Women vs. Men respectively).

Blood pressure reduction and benefit by treatment appear similar in women and men, suggesting that we should aim for similar target of blood pressure, although the lower global risk profile should imply different target. Theoretically, recommended drugs are similar in women and men, but in women we must take in account CV risk

profile, comorbidity, side effects, and reproductive health. Finally, registries and observational studies show that fewer women reach the target values of blood pressure and that women receive more frequently prescription of “other” classes of drugs than those recommended by guidelines, even after normalization by age and comorbidities.

We need to assert that we should use similar drugs classes with evidence derived from large clinical trials, both in women and men. There are nevertheless side effects much more common in women. First of all, from airways by ACE inhibitors and we know moreover that asthma is more frequent in young women and chronic obstructive pulmonary disease (COPD) in the elderly. This allows us to say that ACE inhibitors are not preferred in women with COPD or asthma, because of the risk of side effects. Swollen ankles from calcium antagonists are more common in women than in men, that maybe an argument to favor diuretic therapy in women, although diuretics generally are not able to solve the problem. Sometimes alpha-blockers also, which have a strong indication in hypertensive men with prostatic problems, induce swollen ankles in women, but the association with diuretics may cause severe hypotension. Another gender related difference with impact on pharmacological treatment is the prevalence in women of comorbidities, such as autoimmune diseases.

Women attempt primary care more often for inflammatory disease and pain, they consume more steroids and nonsteroid anti-inflammatory drugs, which may counteract anti-hypertensive therapy because of possible side-effects on the.

Finally, postmenopausal status is associated with a 60% increased risk of metabolic syndrome (MS) and another cause of hypertension in post-menopause is obesity.

Hypertension associated with MS has a more severe cardiovascular risk and the response to therapy is less favorable than the isolated form of hypertension. This effect is due to MS-induced systemic endothelial dysfunction and chronic subclinical inflammation, factors that are recognized as powerful risk factors for cardiac and cerebrovascular events.

Data from our group demonstrated many years ago that the number of antihypertensive drugs used to maintain blood pressure in the normal range ($<140/90$ mmHg) was on average higher in hypertensive women with MS (4.5 ± 1) versus hypertensive women without MS (3.5 ± 1 ; $P < 0.05$). The principal treatment was ACE inhibitors and ARBs. In particular, hypertensive women with MS, antihypertensive the treatment produced a more modest improvement of both endothelial dysfunction and subclinical inflammation comparing to the other group. In the real word nevertheless, these commonly quoted general recommendations deriving from different guidelines do not appear totally confirmed.

Conclusion: Women have similar major CV risk factors as men, but after menopause can be higher. Blood pressure and diabetes may have greater impact; we should consider also reproductive history in women. Blood pressure reductions and benefits by treatment appear similar in women and men in relative terms, suggesting that we should aim for similar target pressure, although the lower global risk profile should imply different target. Recommended drugs should be similar in women and men, but we must take in account CV risk profile, comorbidity, side effects, and reproductive health. However, registries and observational studies show that fewer women reach the target values of pressure and that women are more frequently prescribed “other” classes of drugs, even after normalization by age and comorbidities.

Blood pressure devices [10-20]

Problem: There are several types of devices for the measurement of the blood pressure which are not reliable.

Alternatives of solution

1. Equipment for the measurement of blood pressure in large number of products and models are offered in Mexico. However many of them do not have certification or validation.
2. Mexico has technical standards for validation and certification of equipment for measuring blood pressure as the PROY-NOM-009-SCFI-2007, "measuring instruments - sphygmomanometers with mercury, elastic sensor gauges and" to measure the blood pressure of the human body - specifications and methods for testing", NOM-024-SCFI-2013, "Commercial information for packaging, instructions and warranties of electrical, electronic products and home appliances", in addition studies of quality developed by the national laboratory of protection to the consumer, where you can verify certification, validation and quality facilities in Mexico.
3. Only aneroid or digital equipment certified for taking blood pressure should be used. You should always carry out training medical personnel, family and patient envelope adequate measurement technique.

Hipertensive emergency and urgency [5-20]

Problem: Hypertensive urgency is over diagnosed.

Alternative of solution in Mexico

1. The terms of Hypertensive emergency and crisis should not be used. Hypertensive urgency should be reserved for the disproportionate and acute, increase of blood pressure putting at risk life or the function of any organ.

Problem: Hypertensive urgency is not adequately treated [1-15]

Alternatives of Solution in México

1. The only reasons that require immediate decrease of blood pressure with drugs and requiring hospitalization are: encephalopathy hypertensive, stroke or acute coronary syndrome, acute heart failure, aortic dissection, acute renal failure, severe pre-eclampsia or eclampsia.

Suggested Definitions for Mexico:

Crisis -Sudden change in the course of a disease.

Emergency. -Action and effect of emerge. Unforeseen event that requires special attention and a quick solution because of risk of death.

Urgency. - Situation that needs to be solved immediately. In Hospital; set of people and facilities that exist to treat patients who need immediate medical care.

We do not know if it is in crisis when we do not know their previous situation, and if there was a sudden change. Following these words the most correct definition is urgency.

We have discussed it since 1995 (first national consensus of hypertension) and was accepted the term of urgency, for those cases that, by the significant elevation of blood pressure, the presence of risk indicators or the acute target organ damage require immediate treatment. In the II and III consensus it was considered high blood pressure uncontrolled to the elevation of diastolic, systolic pressure or both with minor acute damage to target organ, or demonstration by the presence of clinical indicators of risk and urgency when a result of the acute elevation of blood pressure give target organ damage.

However, the terms still used both in our country like those used at the international level but they are confused; for example it was published in the consensus made by the Mexican Institute of Social Security in 2016, hypertensive crises can be divided into hypertensive urgency or emergency, according to the presence or absence of acute damage to target organ; Note down that hypertensive cardiovascular emergency include heart failure, acute coronary syndrome, aortic dissection and sympathomimetic hypertensive crises.

The latest guides the ACC/AHA6 North American defined hypertensive crisis when there is blood pressure > 180/120 mm Hg. Emergency when it occurs damage to organ bank for example dissection of Aorta, severe pre-eclampsia or eclampsia or crisis for pheochromocytoma, which requires immediate attention in an intensive care unit and on the other hand when there is no damage to white body is It is considered only a marked elevation of blood pressure and requires resetting of Pharmacotherapy.

More recently European guidelines define hypertensive emergency when there are hypertension grade III associated with acute damage to white body, (e.g. fundus with bleeding in flame, papilla edema, encephalopathy, acute heart or renal failure) that requires immediate intervention with intravenous drugs; while urgency is also severe elevation of blood pressure, but without acute damage to target organ.

If we use our language well and serve as published in the 030-SSA2-2009 NOM for the prevention, treatment and control of the HTA and the NOM 20179 project will understand that single elevation of blood pressure without damage to white body is not urgent and that the true urgency requires immediate reduction and must be attended by specialist or at the second level of care, and hypertensive encephalopathy, cerebral hemorrhagic or ischemic vascular event, acute coronary artery disease, failure acute heart, aortic dissection, acute renal failure and severe pre-eclampsia or eclampsia.

Health policy recommendations from mexican alliance for a healthy heart [1-25]

1. High blood pressure is a serious public health problem in Mexico. Nevertheless, until now there has not been a national campaign promoted by the health authority to confront this problem. There are no permanent detection campaigns within the work centers, schools and universities, public places or health centers. There are no educational population health programs on general factors of cardiovascular risk, in particular on hypertension, which should include the importance of the implementation of healthy lifestyles.
2. There is a lack of continuing professional development programs for first contact physicians on the detection, including the reliable measurement of blood pressure, or on the control and treatment of high blood pressure. This includes physicians who work in social security (IMSS, ISSSTE, SS etc.) as well as those who practice at private clinics. The courses given are occasional, limited and without any follow-up. Nevertheless, there are programs of health education in hypertension for nurses and other personnel involved in health.
3. Most of the doctors ignore national or international guidelines on high blood pressure including the NOM. However, there is not distribution of publications on these themes promoted by the health authority or health institutions.
4. The essential medicines in health sector are limited and only include very old antihypertensive whose dosage is complicated. Combination therapies which are adapted to the recommendations of current hypertension guidelines should be included. This will improve the adhesion and consequently the control of hypertension. Hence access to anti-hypertensive drugs for all hypertensive people, independently of their social security scheme, is imperative.

In conclusion, public policy on chronic diseases in Mexico is very poor and need to

be changed. The federal Government and most local governments have neglected this serious public health problem whose human and material cost is enormous. Without the direct intervention of the health authority and health institutions, including the educational institutions, it will not be possible to mitigate this serious epidemic of cardiovascular disease that now overwhelms the Mexicans. More adequate training to all, physicians, nurses, patients, society and health systems are needed and still to be resolved.

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