Cardiovascular and Metabolic Science www.ancam.org.mx

Vol. 33 Suppl. 3
July-September 2022

doi: 10.35366/105194

The mexican health-care system and high blood pressure

El sistema de salud mexicano y la hipertensión arterial

Gabriela Borrayo-Sánchez, MD*

Keywords:
High blood pressure, intervention, healthcare systems.

Palabras clave:
Hipertensión arterial, intervención, sistemas sanitarios.

ABSTRACT

High blood pressure (HBP) is the most prevalent risk factor in the Mexican population. The Mexican Social Security Institute (IMSS) has more than 69 million recorded affiliated populations. HBP is the second most important disease that financially impacts the IMSS. It has been estimated that the cost to treat HBP is 52,284 million Mexican pesos, which is only exceeded by diabetes and cancer. HBP represents a financial burden and reinforces the need to focus on promoting healthy lifestyles, prevention, timely detection, and treatment adherence. Some studies have shown costly-effective interventions, especially when standardization of treatment protocols, risk-based treatments, and task sharing with healthcare providers. The Comprehensive Care Protocol is one of the first strategies for health services in Mexico that includes evidence-based, multidisciplinary activities within all care settings, particularly the primary one for the treatment of HBP, which is discussed in length in this paper.

RESUMEN

La hipertensión arterial (HTA) es el factor de riesgo más prevalente en la población mexicana. El Instituto Mexicano del Seguro Social (IMSS) tiene más de 69 millones de afiliados registrados. La HTA es la segunda enfermedad que más impacta financieramente al IMSS. Se ha estimado que el costo para tratar la HTA es de 52,284 millones de pesos mexicanos, sólo superado por la diabetes y el cáncer. La HTA representa una carga financiera y refuerza la necesidad de enfocarse en la promoción de estilos de vida saludables, la prevención, la detección oportuna y la adherencia al tratamiento. Algunos estudios han mostrado intervenciones costo-efectivas, especialmente cuando se estandarizan los protocolos de tratamiento, los tratamientos basados en el riesgo y el reparto de tareas con los proveedores de salud. El Protocolo de Atención Integral es una de las primeras estrategias para los servicios de salud en México que incluye actividades multidisciplinarias basadas en la evidencia dentro de todos los ámbitos de atención, particularmente el primario para el tratamiento de la HTA, que se discute ampliamente en este documento.

INTRODUCTION

High blood pressure (HBP) is the most prevalent risk factor in the Mexican population. Approximately 1/3 of the Mexican population older than 20 years of age have this condition. Furthermore, its frequency is greater than 50% when a subject had an acute coronary syndrome. Cardiovascular diseases (CVD) have been the leading cause of death for 20 years. In 2020, according to information from the National Institute of Statistics and Geography (INEGI), there was estimated excess mortality of 43%, where more than 218,000 deaths were attributable to cardiovascular causes. This impressive burden represents 62 thousand more than in 2019, exceeding the deaths observed for COVID-19.[1]

It has been estimated that more than 1.04 billion people live with the disease. The highest prevalence of HBP is reported in low-to-middle-income countries.[2] In Latin America, the prevalence of HBP is 44% (ranging between 17.7 to 52.5%), of which only 53.3%

* Former President of National Association of Cardiologists of Mexico (ANCAM), Member of GREHTA.

How to cite: Borrayo-Sánchez G. The mexican health-care system and high blood pressure. Cardiovasc Metab Sci. 2022; 33 (s3): s259-s265. https://dx.doi.org/10.35366/105194

receive treatment and 37.6% had blood pressure goals (< 140/90 mmHg). Moreover, better arterial pressure control has been reported within urban populations compared to rural communities (39.6 vs 32.4%). Of all the patients living with the disease, only 36.4% use two or more antihypertensive drugs.[3]

The Mexican Social Security Institute (IMSS) has more than 69 million recorded affiliated populations. This represents 54% of the national population estimated by the National Council of Population for 2021, as the number of adults requiring health services has consistently increased *(Figure 1)*. The IMSS has reported a population older than 20 years of 37,515,011, of which 7,749,578 have a previous medical diagnosis of HBP, which represents an estimated prevalence of 20.7%. 59.3% are women in this group, and 40.7% are men *(Table 1)*.

HBP is the second most important disease that financially impacts the IMSS. It has been estimated that the cost to treat HBP is 52,284 million Mexican pesos, which is only exceeded by diabetes mellitus (96,823 million pesos) and cancer (19,951 million pesos). Therefore, it represents a financial burden and reinforces the need to focus on promoting healthy lifestyles, prevention, timely detection, and treatment adherence. Some studies have shown costly-effective interventions, especially when standardization of treatment protocols, risk-based treatments, and task sharing with healthcare providers.[4,5]

Comprehensive Care Protocol for systemic high blood pressure

The IMSS standardizes and systematizes care for all its patients living with HBP with the Comprehensive Care Protocol (PAI; abbreviation in Spanish). This protocol includes multidisciplinary activities that are integrated into all care levels. Particularly at primary care levels, it focuses on strengthening all healthcare workers' preventive strategies. Furthermore, there is the active participation of medical personnel, nursing, nutrition, social work, psychology, dentistry, and medical assistants, who specifically carry out promotion actions and identify risk factors for hypertensive-related complications in all people aged 20.

The Comprehensive Care Protocol for HBP highlights evidence-based activities related to adequate blood pressure measurement at clinical visits and home and ambulatory blood pressure monitors (ABPM). This strategy also seeks to replace dual or triple combination therapies using a single pill approach and promote non-pharmacological strategies.

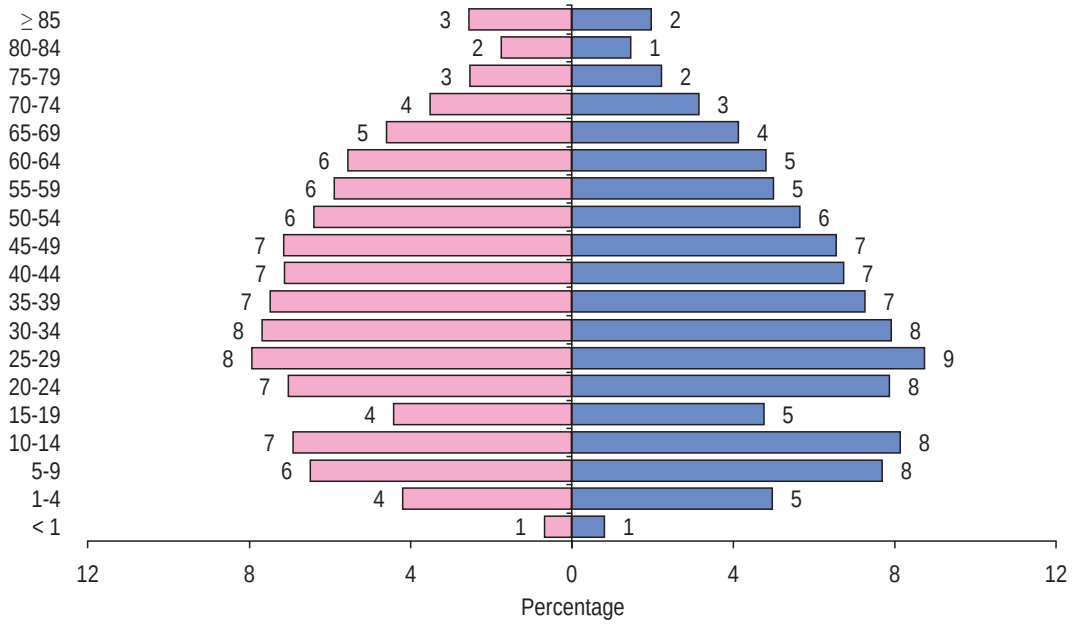


Figure 1: Population pyramid (CONAPO) showing an increase in the adult population.

Table 1: Census of IMSS beneficiaries aged 20 years and over living with high blood pressure.

Arterial hypertension	Women ≥ 20	Men ≥ 20	All ≥ 20	Overall population ≥ 20	Prevalence arterial hypertension in adults ≥ 20 (%)
Guerrero	66,905	46,044	112,949	452,665	25.0
Sonora	169,696	115,440	285,136	1'164,573	24.5
Veracruz Sur	110,982	73,969	184,951	762,151	24.3
Sinaloa	169,534	114,088	283,622	1'190,676	23.8
Chihuahua	224,223	146,778	371,001	1'587,467	23.4
Nayarit	46,701	34,298	80,999	347,700	23.3
Durango	76,931	50,417	127,348	549,887	23.2
Veracruz Norte	150,598	97,117	247,715	1'082,140	22.9
Baja California	198,248	138,729	336,977	1'474,358	22.9
Yucatán	102,620	71,376	173,996	765,690	22.7
Aguascalientes	72,024	51,607	123,631	559,346	22.1
CDMX Norte	219,955	142,651	362,606	1'652,412	21.9
Morelos	69,719	48,754	118,473	545,356	21.7
Michoacán	125,091	86,835	211,926	984,364	21.5
Tamaulipas	174,359	117,885	292,244	1'364,719	21.4
Coahuila	194,700	134,770	329,470	1'556,046	21.2
Baja California Sur	34,781	27,766	62,547	301,081	20.8
National	4'595,160	3'154,418	7'749,578	37'515,011	20.7
CDMX Sur	297,475	192,210	489,685	2'376,236	20.6
Zacatecas	47,188	33,107	80,295	392,495	20.5
México Oriente	382,424	253,306	635,730	3'120,091	20.4
San Luis Potosí	99,467	70,076	169,543	833,197	20.3
Jalisco	367,832	263,449	631,281	3'165,263	19.9
Hidalgo	66,219	47,150	113,369	569,125	19.9
Campeche	26,968	20,102	47,070	236,566	19.9
Colima	31,952	24,814	56,766	289,052	19.6
Nuevo León	298,733	215,820	514,553	2'678,386	19.2
Guanajuato	191,926	133,850	325,776	1'701,254	19.1
Tabasco	43,047	31,572	74,619	415,638	18.0
Puebla	127,067	85,584	212,651	1'190,244	17.9
Chiapas	52,636	36,444	89,080	508,995	17.5
México Poniente	160,519	107,375	267,894	1'537,644	17.4
Oaxaca	40,017	29,137	69,154	435,355	15.9
Tlaxcala	26,075	18,359	44,434	279,792	15.9
Querétaro	80,207	58,194	138,401	877,723	15.8
Quintana Roo	48,341	35,345	83,686	567,324	14.8

Additionally, the model seeks to empower every patient, focusing on improving self-control, self-care, promoting lifestyle changes, and closer interaction with healthcare providers.[6] Furthermore, this method to treat HBP is also based on a matrix model in which healthcare experts from the three levels of care coordinate and participate for the benefit of patients. The level of demand of the activities was classified according to the scientific evidence

as Essential (activities derived from clinical trials, meta-analyses, systematic reviews, and international and national guidelines), Optional (activities that can be chosen among several with the same effectiveness the resource is not available) and Evitable (activities that are not useful/effective and in some cases can be harmful) *(Figure 2)*.

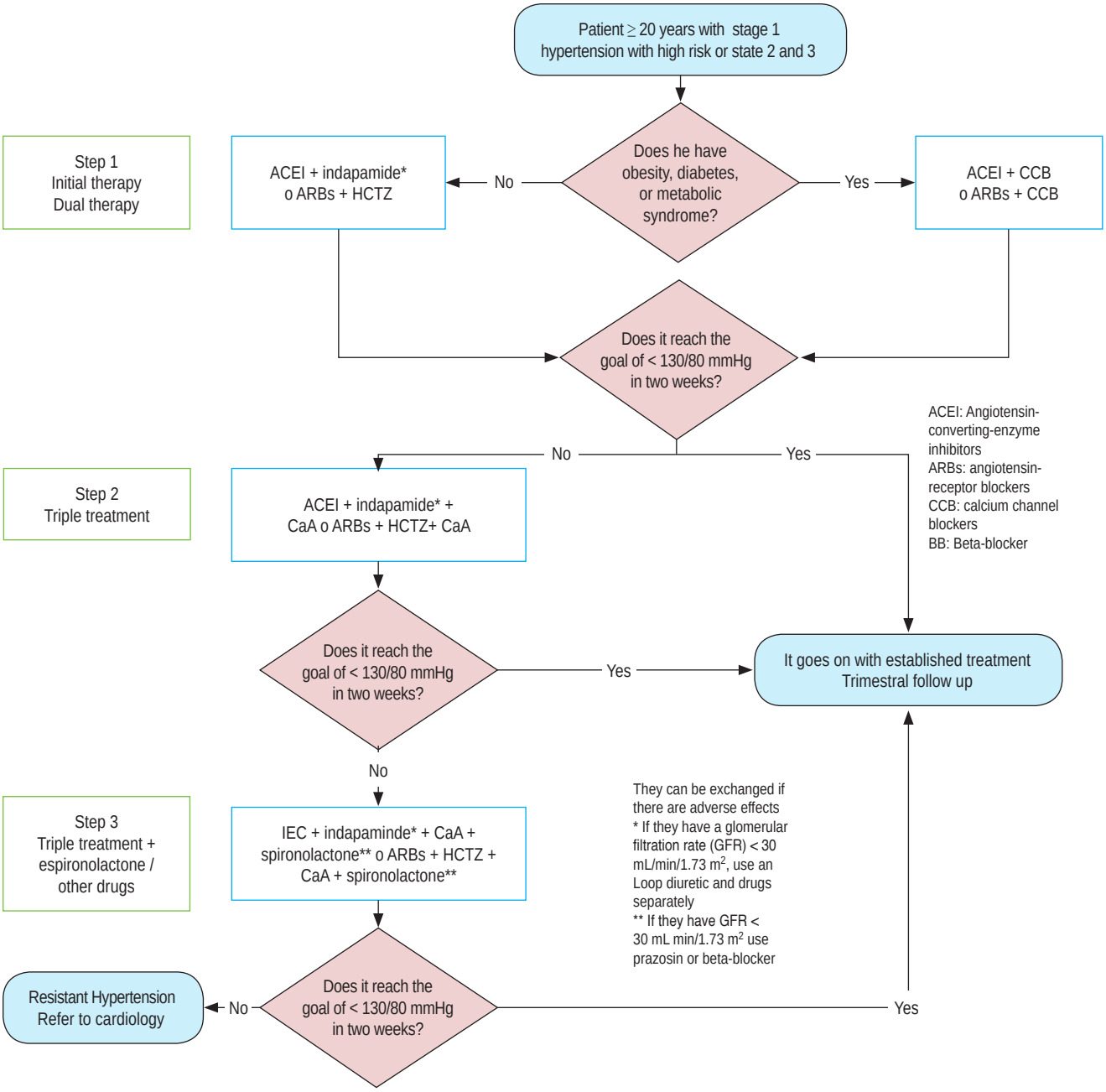
Graphic representation of the level of demand of the activities		
I	**O**	**E**
Indispensable	Optional	Evitable
Essential action or activity. It is mandatory observance	Action or activity that can be chosen among several with the same effectiveness	Actions or activities that are not useful/effective and in some cases can be harmful

Figure 2:

The High Blood Pressure Comprehensive Care Protocol includes multidisciplinary team activities at the three levels of care.

Table 2: Risk stratification in patients with high blood pressure.

Risk factors + end-organ damage either with symptoms or without symptoms	Normal blood pressure or within limits (≥ 130/85 and < 140/90 mmHg)	Level 1 (≥ 140/90 and < 160/100 mmHg)	Level 2 (≥ 160/100 and < 180/110 mmHg)	Level 3 (≥ 180/110 mmHg)
Without risk factors	Low-risk	Low-risk	Moderate-risk	High-risk
≥ 1 or 2 risk factors	Low-risk	Moderate-risk	Moderate to high risk	High-risk
≥ 3 risk factors	Moderate-risk	Moderate to high risk	High-risk	High-risk to very-high risk
End-organ damage	Moderate to high risk	High-risk	High-risk	Very-high risk
Previous CVD or kidney impairments + T2D	Very-high risk	Very-high risk	Very-high risk	Very-high risk



Recommendations for the prescription of antihypertensives

1. Monotherapy must be tried only on patients with level HAS and low risk, or in special cases like fragile adults, patient hypersensitive to dual therapy, or pregnant women.
2. The first and second step should be tried with combined drugs in one single pill.
3. The general goal is < 130/80 mmHg but no less than 110/70 mmHg.
4. Always take into account the calculated glomerular filtration rate to appropriately indicate the corresponding diuretic.
5. In step 3, spironolactone should be added to triple therapy, if the goal of BP control is not achieved, after taking tests to assess renal function and/or risk of hyperkalemia. If there is a contraindication to spironolactone, prazosin or a beta-blocker can be considered.
6. The main cause of resistant hypertension is pseudo resistance, that is basically because of the lack of adherence in taking medication and also the lack of adherence to non-pharmacological treatment, which is crucial.

Figure 3: Step by Step Treatment algorithm for patients with high blood pressure.

Risk stratification is highly relevant within the Comprehensive Care Protocol. This approach is based on risk estimations that emphasize target organ damage, the number of risk factors, the presence of established cardiovascular and renal disease, and prevalent diabetes mellitus. The risk stratification also considers the degree of HBP to implement dual or triple antihypertensive treatments *(Table 2)*. The final objective of this approach is to implement diverse actions to promote healthy lifestyle habits, prioritize primary prevention, make a prompt diagnosis, and assure an adequate classification and stratification of cardiovascular risk.[7-9]

Finally, the Comprehensive Care Protocol for HBP attaches to the most relevant modifications proposed in the European and American HBP guidelines that prioritize dual antihypertensive therapies with Angiotensin-II Receptor Antagonists (ARA2) or Angiotensin Enzyme Inhibitors (ACEI) plus an antagonist of calcium (CaA). In particular cases, an optimal strategy would be using a triple therapy using ARA2/ACE inhibitors plus CaA plus first-line thiazide diuretic in patients without blood pressure goals (< 130/80 mmHg). It is essential to mention that monotherapy is always encouraged in mild HBP, low cardiovascular risk in older adults with faility or pregnant women *(Figure 3)*.[8,10,11]

Summary of essential activities in medicine

1. Promotes and participates in health promotion.
2. Promotes primary prevention in patients at risk of HBP.
3. Appropriately measures blood pressure in all health-care units.
4. It adequately stratifies cardiovascular risk in patients with HBP into low, medium, and high risk to establish pharmacological and non-pharmacological treatment goals according to the stratification.
5. Detects and treats comorbidities associated with cardiovascular risk.
6. Intentionally looks for target organ damage.
7. Use combined first-line therapies (Use step 1, step 2, step 3 of this protocol) in all hypertensive patients of medium/high risk and reserve monotherapy for cases of mild SAH or very sensitive patients or frail patients.
8. Promotes the use of Home Blood Pressure Monitoring and the use of the logbook.
9. Provides appropriate follow-up of the patient with HBP to guarantee the achievement of goals in the short, medium and long term.
10. Indicates Ambulatory Blood Pressure Monitoring in cases of diagnostic doubt or difficult control.
11. Detects and sends to the corresponding level the cases of major hypertensive emergencies with repercussions on the target organ.
12. Detects possible cases of secondary HBP and sends to the corresponding level with all the basic studies including ABPM or MDPA.
13. Detect cases of true resistance and send to third level, which will proceed according to the case.
14. Receive training in HBP, at least once a year
15. Various

CONCLUSIONS

The Comprehensive Care Protocol is one of the first strategies for health services in Mexico that includes evidence-based, multidisciplinary activities within all care settings, particularly the primary one. Additionally, this approach gets the benefit that all three care levels are highly coordinated to give standardize, preventive, diagnostic, and therapeutic approaches. In the latter, emphasis is placed on dual and triple therapy as the first line according to cardiovascular risk with the use of «one-single» pill approach, allocating monotherapy to low-risk patients, frail, and pregnant women. Non-pharmacological strategies are a fundamental part of the Comprehensive Care Protocol, as these should be emphasized along with the patient contribution, self-care, and empowerment to prevent hypertensive-related complications.

REFERENCES

1. Geografía (INEGI) IN de E y. Mortalidad. Regist Adm Vitales Natal Matrim 1994. [Accessed January 5, 2022] Available in: https://www.inegi.org.mx/temas/mortalidad/
2. Mills KT, Bundy JD, Kelly TN, Reed JE, Kearney PM, Reynolds K et al. Global disparities of hypertension

prevalence and control: a systematic analysis of population-based studies from 90 countries. Circulation. 2016; 134: 441-450. Available in: https://doi.org/10.1161/CIRCULATIONAHA.115.018912
3. Lamelas P, Diaz R, Orlandini A, Avezum A, Oliveira G, Mattos A et al. Prevalence, awareness, treatment and control of hypertension in rural and urban communities in Latin American countries. J Hypertens. 2019; 37: 1813-1821. Available in: https://doi.org/10.1097/HJH.0000000000002108
4. Hipertensión Arterial n.d. [Accesado Marzo 31, 2022] Available in: http://www.imss.gob.mx/salud-en-linea/hipertension-arterial
5. Kostova D, Spencer G, Moran AE, Cobb LK, Husain MJ, Datta BK et al. The cost-effectiveness of hypertension management in low-income and middle-income countries: a review. BMJ Glob Health. 2020; 5: e002213. Available in: https://doi.org/10.1136/bmjgh-2019-002213
6. Arnett DK, Blumenthal RS, Albert MA, Buroker AB, Goldberger ZD, Hahn EJ et al. 2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease: A report of the American College of Cardiology/American Heart Association Task Force on clinical practice guidelines. Circulation 2019; 140: e596-646. Available in: https://doi.org/10.1161/CIR.0000000000000678
7. Flegal KM, Kit BK, Orpana H, Graubard BI. Association of all-cause mortality with overweight and obesity using standard body mass index categories: a systematic review and meta-analysis. JAMA. 2013; 309: 71-82. Available in: https://doi.org/10.1001/jama.2012.113905
8. Whelton PK, Carey RM, Aronow WS, Casey DE, Collins KJ, Dennison Himmelfarb C et al. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the prevention, detection, evaluation, and management of high blood pressure in adults: executive summary: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. Hypertens Dallas Tex 1979. 2018; 71: 1269-1324. Available in: https://doi.org/10.1161/HYP.0000000000000066
9. Gibbons GH, Harold JG, Jessup M, Robertson RM, Oetgen WJ. The next steps in developing clinical practice guidelines for prevention. J Am Coll Cardiol. 2013; 62: 1399-1400. Available in: https://doi.org/10.1016/j.jacc.2013.08.004.
10. Unger T, Borghi C, Charchar F, Khan NA, Poulter NR, Prabhakaran D et al. 2020 International Society of Hypertension global hypertension practice guidelines. J Hypertens. 2020; 38: 982-1004. Available in: https://doi.org/10.1097/HJH.0000000000002453.
11. Mounier-Vehier C, Nasserdine P, Madika A-L. Stratification of cardiovascular risk in women: Optimize the medical care. Presse Medicale Paris Fr 1983. 2019; 48: 1249-1256. Available in: https://doi.org/10.1016/j.lpm.2019.09.049

Author contributions: Each author contributed important intellectual content during manuscript drafting or revision and accepted accountability for the overall work by ensuring that questions pertaining to the accuracy or integrity of any portion of the work are appropriately investigated and resolved.

Funding: The authors received no specific funding for this work.

Conflict of interest/financial disclosure: The authors declare that they have no conflict of interests.

Correspondence:
Gabriela Borrayo-Sánchez, MD
E-mail: gborrayos@yahoo.com.mx