

Hypertension in young adults : Experience of a Tunisian center

L'Hypertension artérielle de l'adulte jeune : L'expérience d'un centre Tunisien

Sameh Ben Farhat, Feres mansour, Chaima Ghorbel, Houcine Abdelhafidh, Maroua Salah, Hassan Abu Nada, Amine Boufares, Sami Milouchi

Cardiology department, Habib Bourguiba University Hospital, Medenin, Tunisia

Résumé

Introduction : Malgré la prévalence croissante de l'HTA chez les adultes jeunes ces dernières années, les données disponibles sont encore limitées.

Méthodes : Nous avons mené une étude observationnelle sur une période d'un mois dans le département de cardiologie de l'Hôpital Universitaire Habib Bourguiba de Medenine afin de déterminer les caractéristiques épidémiologiques, cliniques et thérapeutiques de l'HTA chez une population de jeunes adultes âgés de moins de 50 ans.

Résultats : Au total, 45 femmes et 28 hommes à l'âge moyen de 40,79 ans [$\pm 7,705$] ont été inclus. Les taux d'obésité et de surpoids semblaient plus élevés chez les femmes. Le tabagisme et l'hypercholestérolémie étaient significativement plus prévalents chez les hommes ($p < 0,05$). Quarante-deux pour cent des patients diagnostiqués d'HTA grade 3 étaient des femmes, mais il n'y avait pas de différence statistiquement significative des chiffres tensionnels entre les deux sexes. Trente-trois patients (45,2%) étaient sous mesures hygiéno-diététiques seules. La monothérapie, la bithérapie et la trithérapie antihypertensives étaient prescrites respectivement chez 26 (35,6%), 10 (13,7%) et 4 (5,5%) patients. Parmi les jeunes adultes déjà diagnostiqués, 26 (42,6%) étaient sous mesures hygiéno-diététiques seules, 53 (86,9%) patients étaient bien observants et 57 (93,4%) autres avaient des chiffres tensionnels bien contrôlés.

Conclusion : Les femmes semblent avoir des chiffres tensionnels plus sévères que les hommes. Cependant l'hypercholestérolémie était beaucoup plus fréquente chez ces derniers. En plus, nous avons remarqué une fréquence plus faible de comorbidités et d'atteinte d'organes cibles par rapport aux sujets plus âgés. Nous avons également constaté que le taux de contrôle tensionnel était plus important par rapport aux données publiées.

Summary

Introduction : Despite the increase in hypertension in young adults in recent years, there is still only limited data available on hypertension among them.

Methods : We conducted an observational study over a period of 1 month in the cardiology department of Habib Bourguiba University Hospital of Medenine to determine the demographic, clinical and therapeutic characteristics of hypertension among a population of young adults aged less than 50 years old.

Results : Forty-five women and twenty-eight men with an average age of 40.79 years old [± 7.705] were included. Obesity and overweight rates were likely higher among women. Smoking and hypercholesterolemia prevalences were significantly higher among men ($p < 0.05$). Ninety percent of patients with grade 3 hypertension were female, however, there was no statistically significant gender difference regarding blood pressure. Thirty-three (45.2%) patients were treated with lifestyle measures alone. Monotherapy, dual therapy, and triple therapy or plus were prescribed for 26 (35.6%), 10 (13.7%) and 4 (5.5%) patients respectively. Among patients followed for old hypertension, 26 (42.6%) were only on dietary and lifestyle measures, 53 (86.9%) were compliant to treatment and 57 (93.4%) were well-controlled.

Conclusion : Women seem to have more severe hypertensive status than men. However, hypercholesterolemia was significantly more common among men. Besides, we noticed a lower frequency of comorbidities and target organ damage compared to older subjects. We further found a high prevalence of well-controlled hypertension among young adults compared with other studies from abroad.

Mots-clés

Hypertension artérielle, Adultes jeunes, Maladies cardiovasculaires

Keywords

Hypertension, Young adults, Cardiovascular disease

Correspondance

Sameh Ben Farhat

Cardiology department, Habib Bourguiba University Hospital, Medenin, Tunisia

email : samehbenfarhat@yahoo.fr

INTRODUCTION

Over the past decades, as a result of considerable socio-economic growth and health development, Tunisia has experienced a real epidemiological transition marked by the emergence of cardiovascular diseases (CVD) as a leading cause of death. In fact, one in three Tunisians dies from a cardiovascular event (1).

Hypertension, as a major modifiable cardiovascular risk factor, reaches around 30% of the Tunisian population aged between 30 and 70 years old and represents a real public health problem (2). It is now well established that antihypertensive treatment reduces significantly the risk of cardiovascular complications, however despite advances in care and emerging therapeutic options, adequate control of blood pressure (BP) remains insufficient (2).

Hypertension in young adults represents a particular entity. It is infrequent, less commonly diagnosed and less well controlled than in older subjects (3). In addition, it is labeled essential in most cases (90%) (4). The 10-year risk estimation of fatal CVD associated with hypertension, which is significantly influenced by age, can not be applied to this age group as it underestimates the overall lifetime cardiovascular risk among young adults (5). However, it can serve as an element of guidance in the treatment decision.

Despite the frequency and the diversity of studies on hypertension, only few of them concerned young adults. We aimed then at determining the demographic, clinical and therapeutic characteristics of hypertension among a population of young adults aged less than 50 years old from the southeast of Tunisia.

METHODS

We conducted an observational study over a period of 1 month in the cardiology department of Habib Bourguiba University Hospital of Medenin.

Subjects: We used the data of patients followed in our department and who were included in the Tunisian registry of hypertension between 15 April and 15 May 2019.

Among 1093 patients, young adults aged between 18 and 49 years old were enrolled. We excluded pregnant

women and hemodialyzed patients. A total of 73 patients were included in our study.

Study design: Epidemiological, clinical and therapeutic data were collected from previously or newly diagnosed hypertensive patients who presented for consultation or were hospitalized during the selected time period. The diagnosis of hypertension was established in the medical office by a manual BP measurement in 53 cases and automated measurement in 19 cases. Diagnosis was confirmed by BP self-measurement in only 1 case. 24-hour ambulatory BP monitoring (ABPM) was not performed in all cases. Hypertension was assessed, defined and classified according to the 2018 guidelines of the European Society of Cardiology (ESC) (6).

The WHO classification of the body mass index (BMI) was used to define obesity (7).

Statistical analysis: We used SPSS version 22.0 for Windows for statistical analysis. We performed a descriptive analysis. Quantitative variables were expressed as mean values \pm standard deviation. Qualitative data were expressed as numbers and percentages. Student's t-test and Chi-square test were used to compare qualitative and quantitative variables. A p value < 0.05 was considered statistically significant.

RESULTS

Study population: Adults aged less than 50 years old represented 6.68% (7.44% of women and 5.74% of men) of all hypertensive patients. The average age of patients was 40.79 years old [± 7.705]. There were 45 women and 28 men with a sex ratio of 1,6. Forty-eight (65.8%) of them were overweight while 4 (5.6%) patients were obese. Diabetes, dyslipidemia, and cigarettes smoking were found in 16 (21.9%), 14 (19.2%) and 10 (13.7%) patients respectively.

Obesity and overweight rates were likely higher among women. Smoking and hypercholesterolemia prevalences were significantly higher among men ($p < 0.05$). Demographic and clinical data of patients are shown in Table 1.

Blood pressure: Twelve (16.4%) cases of hypertensive patients were newly diagnosed. Among them, 2 patients had normal clinic BP the day of consultation while stage 1, stage 2 and stage 3 hypertension were seen in respectively 3, 2 and five patients.

Table 1 : Demographic and clinical characteristics of the study population.

	Female (n=45)	Male (n=28)	Total (n=73)
Age (years)	41.16 [± 6.72]	40.21 [± 9.175]	40.79 [± 7.705]
Age class			
[18-29]	3 (6.7)	5 (17.9)	8 (11)
[30-39]	14 (31.1)	4 (14.3)	18 (24.7)
[40-49]	28 (62.2)	19 (67.9)	47 (64.4)
Highest level of education attained			
High school diploma	17 (37.77)	11 (39.28)	28 (38.36)
Less than high school	28 (62.22)	17 (60.71)	45 (61.64)
Weight (Kg)	76.33 [± 7.62]	75.82 [± 4.7]	76.14 [± 6.62]
Height (cm)	168.47 [± 3.33]	173.61 [± 4.03]	170.44 [± 4.38]
BMI (Kg/m ²)	26.9 [± 2.6]	25.17 [± 1.5]	26.23 [± 2.39]
BMI class			
Normal weight	9 (20)	12 (42.9)	21 (28.8)
Overweight	32 (71.1)	16 (57.1)	48 (65.8)
Moderate obesity	3 (6.7)	0 (0)	3 (4.1)
Severe obesity	1 (2.2)	0 (0)	1 (1.4)
Diabetes	7 (43.8)	9 (56.3)	16 (21.9)
Cigarette smoke	2 (4.4)	8 (28.6)	10 (13.7)
Hypercholesterolemia	5 (11.1)	9 (32.1)	14 (19.2)
Chronic kidney disease	0 (0)	0 (0)	0 (0)
Ischemic stroke	0 (0)	1 (3.6)	1 (1.4)
Atrial fibrillation	1 (2.2)	0 (0)	1 (1.4)
Sleep apnea disorder	0 (0)	1 (3.6)	1 (1.4)
LVH (ECG)	2 (4.44)	1 (3.6)	3 (4.11)
Microalbuminuria	1 (12.5)	0 (0)	1 (7)
	n=8	n=6	n=14

Data are presented as the mean ± standard deviation ; or n (%)
 BMI, Body mass index ; LVH, Left ventricular hypertrophy ; ECG, Electrocardiogram

Ninety percent of patients with grade 3 hypertension were female, however, there was no statistically significant gender difference regarding BP values.

Table 2 summarizes the hypertensive status of patients.

Table 2 : Hypertensive status of patients.

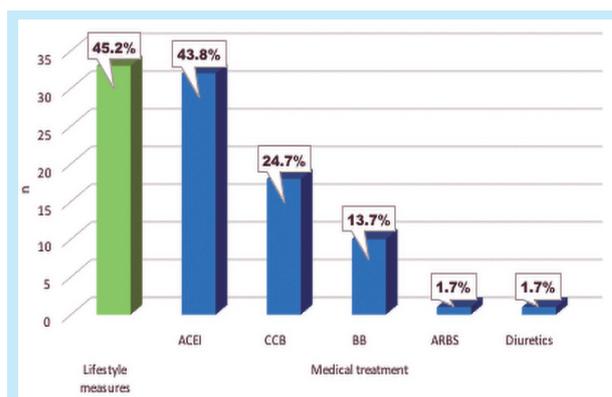
	Females	Inclusion n=73	Total
		Males	
HR	79.11[±13.96]	80.54[±13.15]	79.66[±13.58]
SBP (mmHg)	147[±25.37]	140[±16.83]	144.32[±22.6]
DBP (mmHg)	85.44[±15.37]	83.39[±12.40]	84.66[±14.25]
Class of BP			
Normal	8(50)	8(50)	16(21.9)
Normal increased	7(70)	3(30)	10(13.7)
Stage 1	10(52.6)	9(47.4)	19(26)
Stage 2	11(61.1)	7(6.9)	18(24.7)
Stage 3	9(90)	1(10)	10(13.7)

Data are presented as the mean ± standard deviation ; or n (%) DBP, diastolic blood pressure ;SBP, systolic blood pressure ;HR, heart rate

Treatment and observance: Thirty-three (45.2%) patients were treated with lifestyle measures alone. Among them, 18 (54.6%) subjects had optimal or high normal elevated BP, 6 (18.2%) others had stage 1 hypertension, 4 (12.1%) subjects had stage 2 hypertension and et 5 (15.2%) young adults had stage 3 hypertension. Twenty-six of them were already diagnosed while 7 patients were newly identified. Twenty-one (63.6%) of these patients were aged between 40 and 49 years old.

Twenty-six (35.6%) patients received monotherapy. Dual therapy was prescribed for 10 (13.7%) patients while 4 (5.5%) other subjects required triple therapy or plus. Angiotensin-converting enzyme inhibitors (ACEI), calcium channel blockers (CCB) and b-blockers were prescribed for 32 (43.8%), 18 (24.7%) and 10 (13.7%) patients respectively (Figure (1)). No adverse effects were mentioned.

Among patients who were followed for old hypertension, 26 (42.6%) were only on dietary and lifestyle measures, 53 (86.9%) were observant et 57 (93.4%) were well-controlled.



ACEI, Angiotensin-converting enzyme inhibitors ;ARBS, Angiotensin II receptor blockers ;BB, Beta-blockers ;CCB, Calcium channel blockers
 33 (45.2%) patients were treated with lifestyle measures alone while 40 (54.8%) subjects used antihypertensive drugs.

Figure 1 : Antihypertensive therapy in young adults.

DISCUSSION

Our results

We aimed to study the epidemiological and clinical characteristics of young hypertensive adults aged 18-49

years old and evaluate the efficacy of our therapeutic strategies.

Young adults represented only 7% of the hypertensive population. A large proportion of them was over 40 years of age. We also highlighted some gender differences. Women were more likely to be obese and had more severe hypertensive status than men. However, hypercholesterolemia was significantly more common among men. Besides, we noted a lower frequency of comorbidities and target organ damage compared to older subjects (3).

Although a large proportion (42.6%) of patients diagnosed were only under lifestyle measures, most of their BP values were within the normal range. We should mention that we have based our evaluation of BP control achievement only on one measurement, which is not enough. ABPM, not performed for lack of resources, may prove useful in this situation as far as it can identify possible white coat hypertension, very common in this age group, and provides better evaluation of BP control. We further noted that 5 of them had stage 3 hypertension and required medical therapy instead. Finally, when it is prescribed, medical treatment included often either an ACEI or a CCB which is consistent with the recommendations.

Literature findings

Several epidemiological studies have shown that hypertension has been increasing in incidence among young adults. The prevalence of hypertension among United States young adult males and females was estimated to be 20% and 15% respectively (8). The CARDIA study showed an increased prevalence (20%) of hypertension among young adults too (9).

The Framingham offspring study showed that 14.2% of men 20-49 years old and 12.9% of females of the same age had hypertension (10). Ramakrishnan et al also noted similar observations and found a hypertension prevalence of 60.2% among adults aged between 18 and 45 years old (11).

A considerable proportion of the high prevalence can be attributed to the sharp increases in obesity and diabetes mellitus among young adults. Changes in lifestyle behaviors such as physical inactivity and unhealthy food intake might be incriminated too (10). In addition to that, gender also appears to have an impact on hypertension (12).

Experts expect an explosion of cardiovascular and renal disease in future decades (3). In fact, many studies showed that high BP in the younger years increased the likelihood of cardiovascular events later in life (13,14). An observational study conducted in India showed that 4.4% of hypertensive young adult males had cardiovascular complications attributed to hypertension after a mean follow-up of 12.5 years (15). A nationwide Swedish cohort study over 1.2 million young men showed that high BP in the younger years portends higher cardiovascular events after a 37-years follow-up (16).

Once a diagnosis of hypertension is confirmed, we should envisage further assessment of target organ damage. However, routine tests to search for secondary causes are not recommended unless clinical suspicion is high (3).

Early detection and adequate BP control in hypertensive young adults can prevent cardiovascular, renal and neurologic complications. In most cases, therapy for young hypertensive adults is based on expert opinion and the large majority of recommendations were extrapolated from evidence in older patients (6). As a first step and in all cases experts emphasize lifestyle changes. Actually, studies showed that exercise and weight loss improved clinical BP among young adults (17,18).

The role of pharmacotherapy in this age group is controversial and should be considered after failure of lifestyle changes, in patients with target organ damage or secondary causes and those with severe hypertension (4). CCBs and either an ACEI or angiotensin receptor blocker should be prescribed in the frontline treatment of these patients (6).

Thiazide or thiazide-like diuretics should be considered as a second intention treatment and be reserved in cases of severe hypertension or black individuals (3,4).

Finally, compared to older adults, literature data showed a delay in treatment initiation and lower control rates of BP among young adults (19). In fact, less than 40% of them achieve optimal BP control (20). A recent study has identified many barriers in hypertension management in young adults such as patients' awareness, frequent false diagnosis, greater BP variability, non-adherence to lifestyle modifications and reluctance to start antihypertensive therapy (21). Understanding these barriers is essential to develop effective interventions and improve hypertension management among young adults.

CONCLUSION

Despite the low rates of antihypertensive medication initiation among young adults, BP control was achieved in most cases. The major limitations of the study could

be the poor quality of data, the absence of long-term follow-up and the lack of a standardized method to evaluate BP control. Further large-scale and prospective studies are needed to provide more objective evaluation of hypertension among young adults.

REFERENCES

1. Ben Romdhane H, Bougateg S, Skhiri H, et al. [The first Tunisian cardiovascular diseases register: processes and results]. *Rev Epidemiol Sante Publique*. 2004;52(6):558-564. doi:10.1016/s0398-7620(04)99094-3
2. Ben Romdhane H, Ben Ali S, Skhiri H, et al. Hypertension among Tunisian adults: results of the TAHINA project. *Hypertens Res*. 2012;35(3):341-347. doi:10.1038/hr.2011.198
3. De Venecia T, Lu M, Figueredo VM. Hypertension in young adults. *Postgrad Med*. 2016;128(2):201-207. doi:10.1080/00325481.2016.1147927
4. Mangena P, Saban S, Hlabyago KE, Rayner B. An approach to the young hypertensive patient. *S Afr Med J*. 2016;106(1):36-38. doi:10.7196/samj.2016.v106i1.10329
5. Miyazaki K. Overdiagnosis or not? 2017 ACC/AHA high blood pressure clinical practice guideline: Consequences of intellectual conflict of interest. *J Gen Fam Med*. 2018;19(4):123-126. doi:10.1002/jgf2.176
6. Grassi G. The European Society of Cardiology (ESC)/European Society of Hypertension (ESH) 2018 guidelines for hypertension diagnosis and treatment: New concepts and recommendations. *Pharmacol Res*. 2019;139:489-490. doi:10.1016/j.phrs.2018.10.001
7. Physical status: the use and interpretation of anthropometry. Report of a WHO Expert Committee. *World Health Organ Tech Rep Ser*. 1995;854:1-452.
8. Schiller JS, Lucas JW, Ward BW, Peregoy JA. Summary health statistics for U.S. adults: National Health Interview Survey, 2010. *Vital Health Stat* 10. 2012;(252):1-207.
9. Loria CM, Liu K, Lewis CE, et al. Early adult risk factor levels and subsequent coronary artery calcification: the CARDIA Study. *J Am Coll Cardiol*. 2007;49(20):2013-2020. doi:10.1016/j.jacc.2007.03.009
10. Garrison RJ, Kannel WB, Stokes J, Castelli WP. Incidence and precursors of hypertension in young adults: The Framingham offspring study. *Preventive Medicine*. 1987;16(2):235-251. doi:10.1016/0091-7435(87)90087-9
11. Ramakrishnan S, Zachariah G, Gupta K, et al. Prevalence of hypertension among Indian adults: Results from the great India blood pressure survey. *Indian Heart J*. 2019;71(4):309-313. doi:10.1016/j.ihj.2019.09.012
12. Cornoni-Huntley J, LaCroix AZ, Havlik RJ. Race and sex differentials in the impact of hypertension in the United States. The National Health and Nutrition Examination Survey I Epidemiologic Follow-up Study. *Arch Intern Med*. 1989;149(4):780-788.
13. Leeson P. Hypertension and cardiovascular risk in young adult life: insights from CAVI. *Eur Heart J Suppl*. 2017;19(suppl_B):B24-B29. doi:10.1093/eurheartj/suw061
14. de Kouchkovsky I, Mayfield J, Kohlwes J. Hypertension in Young Adults and Subsequent Cardiovascular Disease. *JAMA*. 2019;321(13):1310. doi:10.1001/jama.2019.0061
15. Kumar KVSH, Patnaik S. Incidence of essential hypertension in young adult males followed for over two decades. *Indian Heart Journal*. 2018;70:S1-S3. doi:10.1016/j.ihj.2017.11.016
16. Sundström J, Neovius M, Tynelius P, Rasmussen F. Association of blood pressure in late adolescence with subsequent mortality: cohort study of Swedish male conscripts. *BMJ*. 2011;342:d643. doi:10.1136/bmj.d643
17. Bersaoui M, Baldew S-SM, Cornelis N, Toelsie J, Cornelissen VA. The effect of exercise training on blood pressure in African and Asian populations: A systematic review and meta-analysis of randomized controlled trials. *Eur J Prev Cardiol*. 2020;27(5):457-472. doi:10.1177/2047487319871233
18. MacMahon SW, Macdonald GJ, Bernstein L, Andrews G, Blacket RB. Comparison of weight reduction with metoprolol in treatment of hypertension in young overweight patients. *Lancet*. 1985;1(8440):1233-1236. doi:10.1016/s0140-6736(85)92310-4
19. Johnson HM, Thorpe CT, Bartels CM, et al. Antihypertensive Medication Initiation Among Young Adults with Regular Primary Care Use. *J Gen Intern Med*. 2014;29(5):723-731. doi:10.1007/s11606-014-2790-4
20. King CC, Bartels CM, Magnan EM, Fink JT, Smith MA, Johnson HM. The importance of frequent return visits and hypertension control among US young adults: a multidisciplinary group practice observational study. *J Clin Hypertens (Greenwich)*. 2017;19(12):1288-1297. doi:10.1111/jch.13096
21. Johnson HM, Warner RC, Bartels CM, LaMantia JN. "They're younger... it's harder." Primary providers' perspectives on hypertension management in young adults: a multicenter qualitative study. *BMC Res Notes*. 2017;10. doi:10.1186/s13104-016-2332-8