

The importance of a multidisciplinary assistance program in the control of blood pressure in hypertensive elderly patients

A importância de um programa de assistência multidisciplinar no controle de pressão arterial no idoso hipertenso

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ABSTRACT

Objective: To verify if being placed on a geriatric multidisciplinary assistance program contributes to better blood pressure control.

Methods and Design: Cross-section study. Setting: A tertiary-care teaching hospital in São Paulo, Brazil. Participants: 110 hypertensive patients aged over 60 years. Measurements: Blood pressure of the elderly in the Geriatric Service, called "the reference group", was verified. Subsequently, blood pressure of the same elderly patients was verified after being placed on a multidisciplinary program - "the multidisciplinary group". **Results:** A significant difference between the "reference group" x the "multidisciplinary group" was found regarding the proportion of patients under blood pressure control ($p = 0.021$). In the "reference group", 24.7% of patients had controlled blood pressure while in the "multidisciplinary group" this proportion was 41.1%. **Conclusion:** Being placed on a geriatric multidisciplinary assistance exercise program significantly improved blood pressure control in hypertensive elderly.

Keywords: Hypertension; Elderly; Delivery of health care

RESUMO

Objetivo: Verificar se o fato de ser inserido em um programa de assistência geriátrica multidisciplinar contribui para um melhor controle da pressão arterial. **Métodos:** Estudo transversal. Local: um centro terciário de ensino de um Hospital de São Paulo, Brasil. Participantes: 110 pacientes hipertensos com mais de 60 anos. Medidas: a pressão arterial de idosos foi verificada em um serviço denominado "grupo de referência". Posteriormente foi feito o controle da pressão arterial do mesmo grupo de idosos depois de serem inseridos no programa multidisciplinar de exercícios. **Resultados:** Encontrou-se uma diferença significativa entre o "grupo de referência" e o "grupo multidisciplinar" em relação à proporção de pacientes que estavam em controle da pressão arterial ($p = 0,021$). No "grupo de referência", 24,7% dos pacientes tiveram pressão arterial controlada e no "grupo multidisciplinar", essa proporção foi de 41,1%. **Conclusão:** O fato de

ser inserido em um grupo geriátrico com assistência multidisciplinar para exercícios mostrou um significativo controle da pressão arterial no idoso hipertenso.

Descritores: Hipertensão; Idoso; Assistência à saúde

INTRODUCTION

Among the large numbers of organic functional alterations stemming from the phenomenon of senescence (physiological aging), those that affect the vascular system are prominent giving rise to progressive decrease in the quantity of elastin in artery walls, variable quantities of calcium deposition and deposition of collagen matrix in arterial vascular walls. These cause greater resistance in peripheral vessels⁽¹⁾.

The endothelium has an essential action in controlling blood pressure, since it is responsible for releasing a variety of vasodilating and vasoconstricting substances. Dysfunction of the endothelium promotes imbalance in release of these substances, so that vasoconstrictors prevail and hypertension is generated⁽²⁾. Among several causes of endothelial dysfunction, obesity, dyslipidemia, menopause-induced estrogen deficiency⁽³⁾, alterations induced by aging and by the hypertension itself⁽⁴⁾ and hyperuricemia⁽⁵⁾ are most notable. All these pictures are prevalent among elderly people⁽⁶⁻⁹⁾.

Upon ageing, the renin-angiotensin-aldosterone system becomes more susceptible to flow alterations. Thus, the kidneys may cause a greater peripheral vasoconstrictor response⁽¹⁾.

The increased peripheral insulin resistance is an attempt to compensate. Consequently, insulin levels may

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increase. Hyperinsulinemia might cause greater vascular reactivity and stimulate the sympathetic autonomous nervous system⁽¹⁰⁾.

All these factors contribute towards the fact that 65 to 70% of individuals aged 60 years or over suffer from this syndrome of multifactorial origin. This gives rise to the possibility of cardiovascular and metabolic abnormalities that may lead to functional and/or structural alterations in various organs, especially in the heart, brain, kidneys and peripheral vessels⁽¹¹⁾. Thus, it is essential to investigate causes and optimize the appropriate antihypertensive therapy.

Despite the ever-growing volume of research on adequate treatments for hypertension, with an increasing number of original or review articles in the literature that help understanding hypertensive syndrome in the elderly, there is a very large hiatus between diagnosis and effectiveness in treating this disease.

Trying to achieve better control over blood pressure, new proposals have emerged. The present investigation aimed to study the role of a multidisciplinary care service in relation to blood pressure among hypertensive elderly patients.

The Multidisciplinary Care Group for Elderly Outpatients ("GAMIA") has existed for more than 20 years, within the Geriatrics Service of HC-FMUSP, in São Paulo. This team comprises a variety of professionals who deal with health among the elderly, including social workers, nurses, dentists, physiotherapists, physicians, dietitians, psychologists and occupational therapists⁽¹²⁾.

Every year since 1984, growing numbers of elderly people have been coming for care at the General Geriatrics outpatient clinic of this Geriatrics Service. They tend to have differentiated contact with other health sector professionals.

OBJECTIVE

The objective of this study was to investigate whether the hypertensive elderly individuals followed up at specialized services presented better pressure control after being seen by a multidisciplinary care team.

METHODS

Number of patients

One hundred and ten patients with prior diagnoses of arterial hypertension were selected from the "Multidisciplinary Care Group for Elderly Outpatients" - GAMIA program. All these patients were undergoing treatment with professionals at this Geriatrics Service.

These patients were selected according to appointments for outpatient consultations. They were invited to

participate in this study as stated in the informed consent, which was in accordance with the rules of the Research Ethics Committee of FMUSP. Later, they underwent monthly systolic blood pressure measurements, and the number of evaluations performed ranged from 4 to 17.

All patients had their systolic blood pressures measured by the same investigator. For this purpose, a duly calibrated mercury sphygmomanometer was used, with the patients seated and arms supported, and after resting for at least five minutes.

Comparisons were made between the pressure measurements obtained before these patients enrolled on the multidisciplinary care group (GAMIA), and the measurements obtained after their enrolment, only after finishing the investigations.

Creation of a Method for Investigating Systolic Arterial Hypertension Control by Means of a Blood Pressure Control Index (BPCI)

In view of the need to establish standardization between pressure measurements and the independent variables, a criterion named the Blood Pressure Control Index (BPCI) was established. This resulted from the ratio between the number of blood pressure measurements lower than 140x90 mmHg, divided by the total number of measurements from each patient:

$$\text{BPCI} = \frac{\text{Number of measurements under control}}{\text{Total number of measurements}}$$

Individuals were considered to have their pressure under control when at least 50% of pressure measurements were within the limits of normality, i.e. BPCI \geq 0.5.

RESULTS

To evaluate the control over blood pressure, the measurements were taken exclusively in the seated position. The evaluation was over a mean period of 14 months, with a median of 17 times.

Control over systolic arterial hypertension among elderly people at the Geriatrics Service of HC-FMUSP versus control over systolic arterial hypertension among the elderly people at the Geriatrics Service of HC-FMUSP who went on to enroll in GAMIA (table 1).

Table 1. Blood pressure control index - "reference group" vs. "multidisciplinary group"

Blood pressure control index ratio between "reference group" vs. "multidisciplinary group"	Controlled		Uncontrolled		p value
	n	%	n	%	
"Reference group"	21	24.7	64	75.3	P = 0.021 *
"Multidisciplinary group"	37	41.1	53	58.9	

* significant

A statistically significant difference was found between the reference blood pressure measurements and the control index relating to the proportion of patients with blood pressure under control ($p = 0.021$). In the reference group, 24.7% of the patients had their blood pressure under control, while this proportion was 41.1% in the research group.

Correlations were investigated between BPCI and other factors that might influence patient control over their blood pressure, which were subdivided into biosocial variables, co-morbidities and antihypertensive therapy established.

No statistically significant differences were found in the correlations between the biosocial variables and the BPCI (table 2). Although not statistically significant, the results showed that white patients achieved worse pressure control than the non-white ($p = 0.052$). Moreover, patients with monthly income of at least four minimum monthly salaries achieved better pressure control than those who received less than four minimum monthly salaries ($p = 0.088$).

When the co-morbidity variables were investigated, no statistically significant differences in BPCI were found in relation to obesity, alcohol consumption, smoking, diabetes and hypercholesterolemia (table 3).

When correlations between the BPCI and the antihypertensive therapy adopted were investigated, it was found that there was better pressure control among the patients who were using diuretics, calcium channel blockers and central action blockers, while the patients in this study who were using beta-blockers and angiotensin-converting enzyme (ACE) inhibitors presented worse pressure control (table 4). With regard to the funding source for the medication, when it was either solely the patient themselves or the public service covering costs, pressure control was statistically better than when the medication came from the two sources consecutively (table 4).

DISCUSSION

In reports on "Prevention, Detection, Diagnosis and Treatment of Arterial Hypertension" published by the United States National Institutes of Health over recent years, using data from the National Health and Nutrition Examination Survey, it was demonstrated that only a small proportion of hypertensive patients who underwent treatment were considered to be receiving proper therapy. The latest report (VII Joint National Committee – 2003) presented better control; nevertheless, only approximately 34% of hypertensive patients had pressure levels that were properly under control⁽¹³⁾.

Table 2. Blood pressure control index vs. biosocial variable

Biosocial variable	Controlled		Uncontrolled		p value
	n	%	n	%	
Sex					
Female	33	45.2	40	54.8	p = 0.102
Male	4	23.5	13	76.5	
Age					
72.8 ± 6.5	62		86		p = 0.137
74.8 ± 6.1	62		89		
Skin color					
White	25	35.7	45	64.3	p = 0.052
Not-white	12	60.0	8	40.0	
Marital status					
Married	14	48.3	15	51.7	p = 0.178
Single	7	58.3	5	41.7	
Widow (er)	15	32.6	31	67.4	
Live					
With spouse	23	39.0	36	61.0	p = 0.571
Without spouse	14	45.2	17	54.8	
Education					
No education	6	27.3	16	72.7	p = 0.129
Educated	31	45.6	37	54.4	
Income (in minimum wages)					
Above 4	25	36.2	44	63.8	p = 0.088
Up to 4	12	57.1	9	42.9	

Contrary to what was thought some years ago, present-day studies have demonstrated that systolic hypertension is as severe as, or more severe than diastolic hypertension⁽¹⁴⁾. In epidemiological surveys, such as Framingham and MRFIT (Multiple Risk Factor Intervention Trial), systolic blood pressure greater than 160 mmHg was a more important risk factor than diastolic blood pressure greater than 100 mm Hg⁽¹⁵⁾.

Table 3. Blood pressure control index vs. Co-morbidities

Co-morbidities	Controlled		Uncontrolled		p value
	n	%	n	%	
Obesity					
Not obese	26	40.6	11	42.3	p = 0.883
Obese	38	59.4	15	57.7	
Alcoholism					
Yes	33	45.8	39	54.2	p = 0.069
No	4	22.2	14	77.8	
Smoking					
Yes	32	43.8	41	56.2	p = 0.276
No	5	29.4	12	70.6	
Diabetes					
No	33	42.9	44	57.1	p = 0.413
Yes	4	30.8	9	69.2	
Hypercholesterolemia					
No	27	37.5	10	55.6	p = 0.164
Yes	45	62.5	8	44.4	

Table 4. Correlation between "blood pressure control index" vs. "hypertensive treatment established" and vs. "funding source of drugs"

Hypertensive treatment established	Controlled		Uncontrolled		p value
	n	%	n	%	
Drugs					
Diuretic	74	55.6	59	44.4	
Calcium antagonists	213	49.8	215	50.2	
Angiotensin converting enzyme (ACE) inhibitors	50	34.7	94	65.3	p < 0.001*
Beta-blockers	49	30.2	113	69.8	
Central channels blockers	47	47.0	53	53.0	
Funding source of medicines					
Supplied by the patient	307	45.1	373	54.9	
Supplied by public services	167	46.5	192	53.5	p = 0.017*
Supplied by both	166	37.6	275	62.4	

* significant

Another point of enormous importance is the potential for complications resulting from systolic arterial hypertension in elderly people. Although it is an asymptomatic disease even in this age group, systolic arterial hypertension leads to functional and structural alterations in several organs and systems. The heart, brain, kidneys and peripheral vascular system are closely implicated in a very wide range of involvement. Among the neurological complications cited are transient cerebral ischemia, hemorrhagic cerebrovascular accident and ischemic cerebrovascular accident⁽¹⁶⁾, in which roughly 70% of elderly patients affected are hypertensive⁽¹⁷⁾. Moreover, the cardiac complications include left ventricular hypertrophy, cardiac failure and coronary diseases, and it has been observed that around 60% of elderly individuals who are affected by myocardial infarct have systolic arterial hypertension⁽¹⁷⁾.

Left ventricular hypertrophy is one of the most frequent cardiac manifestations among hypertensive patients. Some studies reported that elderly individuals (more than 65 years old) present this type of remodeling more intensively than younger individuals⁽¹⁸⁾. It is known that such remodeling has been identified as one of the risk factors for sudden death, myocardial infarct ion and cardiac failure⁽¹⁹⁾.

Cardiac failure affects approximately 4.9 million Americans (about 2% of population), and more than 400 thousand new cases are diagnosed each year (American Heart Association, 1998), (National Heart, Lung And Blood Institute, 1996)⁽²⁰⁻²¹⁾. Its incidence and prevalence increase exponentially with advancing age⁽²²⁾: it is relatively rare among young adults but affects around 10% of individuals over 80 years old⁽²²⁾. In the United States, between 70% and 80% of patients with cardiac insufficiency have systolic arterial hypertension or coronary insufficiency⁽²³⁾.

The data also indicate that systolic arterial hypertension is the most important risk factor for developing coronary insufficiency, both in young and in elderly individuals⁽²⁴⁾.

Another extremely important factor is the growth in the prevalence of congestive heart failure and chronic renal failure over recent years⁽²⁵⁾.

Because of these complications, systolic arterial hypertension has become the most frequent cause of leave or absence from work for treatment. It ranks fourth in terms of duration of sick leave and is the leading cause of retirement due to ill health in our setting⁽²⁶⁾.

A variety of studies and scientific surveys have cast light on how some factors, including lifestyle habits or comorbidities, may contribute towards arterial hypertension among the elderly, thus linking sedentary lifestyles, smoking, alcohol consumption, diabetes

mellitus, obesity and hypercholesterolemia with elevated values for blood pressure⁽¹⁰⁻¹¹⁾.

In a multicenter study conducted with 2196 elderly people who were seen in cardiologic and geriatric outpatient clinics of Brazilian institutions, it was observed that only 7% of patients did not present vascular risk factors, while 81% of individuals evaluated presented one to three risk factors and 12% had at least four risk factors for cardiovascular disease⁽²⁷⁾.

With regard to treatment, the studies that were completed up to 1990 were based only on diastolic blood pressure and significant decreases in cardiac events were demonstrated among patients who achieved blood pressure reductions⁽¹⁵⁾.

More recently, four surveys demonstrated that treatment of systolic blood pressure over 160 mm Hg led to decrease in cardiovascular morbidity-mortality, and the reduction was as effective as, or more effective than in diastolic blood pressure⁽¹⁵⁾.

Another meta-analysis involving eight studies comprising 15693 patients with systolic hypertension alone, who were followed up for a period ranging from three to eight years, concluded that treatment was justified for elderly patients with systolic arterial hypertension alone in whom the systolic blood pressure was greater than or equal to 160 mm Hg⁽²⁸⁾.

In addition to this evidence, it is believed that effective treatment of systolic arterial hypertension may bring other benefits, such as those related to loss of cognitive function and dementia⁽²⁹⁾.

From this point on, proposals for rigorous treatment aiming to achieve pressure levels within normal values will no longer depend on patient age, but rather on the chance of decreasing that patient risks.

Amidst attempts to increase the pressure control among hypertensive elderly individuals, our study demonstrated that the fact that these elderly patients were enrolled in a multidisciplinary care group was conducive to improvements in their pressure levels.

Other factors that presented statistically significant results, such as funding for medication and the type of treatment established, in which coadjuvant action towards controlling the hypertension was observed, may also have been influenced by the multidisciplinary care group itself.

CONCLUSION

The efforts towards optimizing real control over blood pressure among hypertensive elderly individuals must be intensified, given that to date, most hypertensive individuals still present higher than ideal pressure values.

Enrolment on a multidisciplinary care program may significantly increase the control over systemic arterial hypertension among the elderly.

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