

Evaluation of Physicians' Compliance with the Hypertension Protocol of the Municipal Health Department of the City of Curitiba

Ivan Maluf Jr, Mariana Ribas Zahdi, Natasha Unterstell, Eliane Mara Cesário Pereira Maluf, André Bonamigo de Sousa, Felipe Dominici Loures

Universidade Positivo, Curitiba, PR - Brazil

Abstract

Background: In Curitiba, systemic hypertension (SH) is the second leading cause of hospitalization and the leading cause of death from cardiovascular diseases. The protocols for the treatment of hypertension provide a systematic approach to patient management, aiming at improving the efficiency and quality of health services.

Objective: To evaluate medical professionals' compliance with the protocol of hypertension of the Municipal Health Department (MHD) of the city of Curitiba.

Methods: This was a cross-sectional observational study. The data collection for the study was conducted in four health units in Curitiba. The sample consisted of 200 hypertensive patients enrolled in the hypertension program. The collected data refers to the first two consultations. The data source was the electronic records of the health units. The protocol used for comparative analysis was the protocol of the Municipal Health Department of Curitiba.

Results: The non-conformity percentage between clinical practice and the protocol in the first consultation was 56.8% on hypertension grade classification, 63.8% on cardiovascular risk evaluation, and 54% on treatment. In the second consultation, the non-conformity percentage was 67% on risk evaluation, and 51.3% on treatment.

Conclusion: The non-conformity between clinical practice and the protocol of the MHD of Curitiba was evident on hypertension grade classification, cardiovascular risk evaluation, and treatment of hypertensive patients. This non-conformity may result in low efficiency of the health service, which hinders the efforts to reduce morbidity and mortality from cardiovascular disease in the population. (Arq Bras Cardiol 2010; 94(1) : 81-85)

Key Words: Hypertension / therapy; blood pressure; clinical protocols.

Introduction

Systemic hypertension (SH) is one of the most important and frequent public health issues in the world, with a prevalence of approximately 20% in the adult population¹. SH is recognized worldwide as the greatest preventable risk factor for stroke, myocardial infarction (AMI), peripheral vascular disease and renal failure². According to the United Nations (UN), the mortality ratio from cardiovascular diseases that are often associated with hypertension reaches up to 250/100 thousand inhabitants³. Even with advances in the treatment of cardiovascular diseases, the number of deaths from hypertension continues to increase, and it is estimated that in 2020 hypertension will be the leading cause of death worldwide⁴. Nevertheless, there are still no focused and sustainable measures that allow Latin and Central America health systems to develop effective programs and efficient control of diseases⁵.

In Curitiba, hypertension is the second leading cause of hospitalization and the first cause of death from cardiovascular diseases⁶.

In the last five years, expenditure on medicines has risen sharply in the world. In Britain and the U.S., this increase reached 50% and 173% respectively. Among the main causes identified as contributing factors to the failure in the control of hypertension are inadequate prescriptions. However, studies assessing the quality of prescriptions are still scarce³.

The compliance with protocols is related to higher quality prescriptions and therefore has a significant impact on the number of people with blood pressure control and also reduces cardiovascular events⁷. However, studies have shown that a large number of patients are not treated according to the protocols, especially because of the insistence on the use of a single medicine for patients whose clinical picture suggests the use of three or four combined medicines^{2,8}.

Because of this disagreement, in 1990 over 43 million Americans, aged over 18 years, met the diagnostic criteria for SH; however, only 50% of them were treated⁹.

Objective

The purpose of this study was to evaluate the compliance of physicians with the hypertension protocol of the Municipal Health Department of Curitiba.

Mailing address: Ivan Maluf Junior •

Av. Silva Jardim, 2833, ap. 501 - Agua Verde - 80240020 - Curitiba, PR - Brazil

E-mail: ivanmalufjr@yahoo.com.br

Manuscript received November 13, 2008; revised manuscript received December 01, 2008; accepted May 25, 2009.

Methods

This was a cross-sectional observational study. The data collection for the study was conducted in four health units (HU) in Curitiba, chosen by the Municipal Health Department, in 2006: Nossa Senhora da Luz unit and Augusta unit, which belongs to the Industrial City of Curitiba (CIC) administrative region; Jardim Gabinete unit, which belongs to the Santa Felicidade administrative region, and Capanema unit, which belongs to the Matriz administrative region.

The sample consisted of data collected from 200 patients in the course of two medical consultations, as part of the hypertension program. We selected patients from both genders aged over 35 years who were enrolled in the hypertension program in 2005. Women with blood pressure levels below or equal to 120/80 in the first consultation of the program, patients who were inactive in the program and those with secondary hypertension were excluded.

We collected information on two consecutive consultations, as of 2005; the first consultation refers to the first day of registration in the hypertension program.

Data collection was performed by five medical students, who had been previously trained and were members of the team. A spreadsheet was created in Excel with the following study variables: gender; date of consultation; health unit; age; systolic blood pressure (SBP); diastolic blood pressure (DBP); body mass index (BMI); risk factors for cardiovascular disease; medications prescribed in the first and second consultations with dose and number of times taken daily; laboratory tests ordered in the consultations; and the hypertension grade classification determined in each consultation.

The classification of grade and risk of hypertension was based on the diagnosis of the first medical consultation for inclusion in the hypertension program of the health unit and compared with the criteria of the protocol. A comparison with the proposed treatment plan was also performed.

The protocol used was standardized by the Municipal Health Department of Curitiba in 2004.

The treatment regimens evaluated in the study included drugs that are available in the public health system, which are the same used in the protocol: hydrochlorothiazide, furosemide, propranolol, captopril, methyldopa, and long-acting nifedipine.

For data source, we used the electronic records of the health units (clinical information, comorbidities, and prescription).

The statistical program used for data analysis was SPSS version 13.

The study was reviewed and approved by the Ethics Committee of the Positivo University.

Results

Of the 200 patients who met the inclusion criteria of the study, 51 (24.5%) were from Augusta Health Unit; 63 (31.5%) from Nossa Senhora da Luz Health Unit; 55 (27.5%) from Jardim Gabinete Health Unit; and 31 (16.5%) from Capanema Health Unit. Most patients were women (57%). The median age was 52 years, with minimum age of 35 and maximum age

of 90 years. Of the patients, 40.7% were obese, and 47.8% of women had BMI above 30 kg/m².

In most cases, there was no record of smoking habit, history of stroke, target organ injury, dyslipidemia, renal or cardiac disease, or alcoholism.

Diagnosis and grades of hypertension

The median SBP was of 150 mmHg, with a minimum of 120 mmHg and a maximum of 250 mmHg. Among women, 64% had SBP below 159 mmHg, and 43% of men had SBP below 159 mmHg.

The median DBP calculated was of 100 mmHg, with a minimum of 80 mmHg and a maximum of 160 mmHg. A total of 51.8% of the women had DBP values between 60 and 99 mmHg, and 52.3% of the men had DBP values between 100 and 109 mmHg.

As for the cardiovascular risk factors studied, 11% of the patients had previous diagnosis of diabetes mellitus, predominantly men (16.3%).

The laboratory tests were evaluated based on the hypertension protocol recommended by Municipal Department of Health.

Some patients, already in the first consultation presented the results of laboratory tests. Of the 51 fasting blood glucose tests analyzed, 51% had values above 100 mg/dl. As for total cholesterol tests, 33.3% of them had values above the recommended levels. Among 44 triglycerides tests analyzed, 29.6% of them had high values. Other tests evaluated showed changes:

- HDL: Of 26 tests, 23.1% of them had levels below the recommended.
- LDL: Of 30 tests, 53.4% of them had high results.
- Creatinine: Of 50 tests, 22% of them had values above the upper limit of the normal range.

Six patients presented serum sodium test results, and the value was below the recommended in only one. There were 17 serum potassium tests, and in all cases the results were within normal range.

We ordered these tests for some patients, for evaluation in the second consultation. Of 73 fasting blood glucose tests, 27.3% had blood glucose greater than 100 mg/dl. In 29.5% of 71 tests, the total cholesterol level was high. Of 68 triglycerides tests ordered, 17.6% had altered results. Of 49 HDL tests ordered, only 7 had results below the recommended range. LDL tests were ordered for 50 people, and 40% of them had values greater than 130 mg/dl. A total of 50 partial urine tests were ordered: 3 tests showed hemoglobinuria, and 2 tests showed proteinuria. Serum sodium was altered in only one of 13 tests ordered, and serum potassium was altered in two of 39 tests ordered. Of 62 tests ordered, only two had values greater than 1.2 mg/dl.

As for the classification of hypertension grade, there was disagreement on the recommendation in 56.8% of cases. A total of 50.7% of patients who, according to the protocol, should be classified as grade 1 were not classified as such. As to grade 2, 60.4% were not in compliance. Of those who

should be determined as grade 3, 58.5% were not classified correctly (Table 1). This datum was analyzed only in the first consultation because, in order to change the patient's classification of hypertension, a minimum period of three months of stability in another grade is required. This study does not address this monitoring, so the classification of grades in the second consultation will not be presented here.

In the classification of cardiovascular risk, both consultations were analyzed, and a risk stratification was conducted for agreement analysis at each level, because the risk of the patient could be modified according to results of additional tests ordered in the first consultation. There was disagreement on the classifications in 63.8% of cases in the first consultation. A total of 46.9% of cases with data that, according to the protocol, should be classified as low risk, were not classified as such. Of those which should be classified as moderate risk, 57.1% were not in compliance. And, for high and very high risk, 66.7% and 91.7%, respectively, differed from the recommended protocol (Table 2). In the second consultation, there was disagreement on the recommendation in 67% of cases. Of the patients that should be determined as low risk, 50% of them were not classified as such. Only 38% were correctly classified as moderate risk, and there was disagreement on 67.5% and 92.6% of cases in the distributions of high and very high risk, respectively (Table 3).

Treatment

Among the 200 patients, 11 were not making use of anti-hypertensive drugs. The pharmacological treatment protocol recommended by the Municipal Health Department of Curitiba determines hydrochlorothiazide as drug of first choice in hypertension therapy, and it was prescribed in 51.5% of all cases in the first consultation. Of the patients who were on single medication therapy, only 34.2% made use of this drug. Captopril was the the most used drug (in 57% of cases), including as monotherapy (51.8%), followed by propranolol in 13% of cases. Drugs not included in the pharmacy of the health units were prescribed for 2.5% of patients treated. Other drugs were prescribed less frequently: methylodopa was prescribed for 1% of patients treated, furosemide and nifedipine for 4% and 8.5%, respectively.

Monotherapy was applied to most patients (57%). There were 32.5% of patients receiving two drugs, and 5% using three or more drugs.

In the analysis of compliance with the Curitiba MHD protocol, we found that, in the first consultation, in 54.7% of cases the treatment was not in accordance with the protocol, and in the second consultation, in 51.3% of cases there was non-compliance with the protocol.

Discussion

In Curitiba, in 2004 the total number of hypertensive patients enrolled in the program of the SUS was 85,783 patients. In 2005, there was an increase of 16,405 registered patients. In that same year, there were 830,269 consultations, and in 2004, there were 746,927 consultations. Of all the drugs available in the pharmacy of the health units in 2004, 48.6% were anti-hypertensive (68,045,973 tablets) medications. In 2005, a total of 79,933,945 tablets of anti-hypertensive drugs were distributed to the population of SUS users⁶.

The measures developed for the control of hypertension and its complications take into account several factors such as changes in living habits, medical treatment and compliance. The hypertension protocol of the Curitiba MHD was created with the objective of providing a systematic approach to patient management, aiming at improving the efficiency and quality of health services. It brings innovation in the approach by introducing new concepts such as disease management and case management which, if adequately conducted by the professional teams, will certainly help in the organization of the work process and in the optimization of available resources. Added to this, the aim would be to follow the target population in their areas of coverage and monitor the achievement of goals agreed by the health teams with respect to hospitalizations due to HBP, laboratory tests ordered and scheduled follow-ups¹.

Only one third of patients on treatment for hypertension achieve BP levels below 140/90 mmHg, which are the ranges recommended by the guidelines of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC VI)². This occurs regardless of the fact that there are more than 70 anti-hypertensive drugs available and specific protocols for the disease. The physicians' lack of compliance with the protocols significantly affects this statistic².

This study clearly shows that there is a disagreement between the treatment carried out in health units and the protocol of the Curitiba MHD, which was proposed as a

Table 1 – Comparison of grade classification of hypertension in the first consultation with grade classification by the protocol

| Grade classification in consultation | Grade classification by the protocol | | | | | | Total | |
|--------------------------------------|--------------------------------------|-------|----------|-------|--------|-------|-------|-------|
| | Mild | | Moderate | | Severe | | n° | % |
| | n° | % | n° | % | n° | % | | |
| Mild | 33 | 49.3 | 38 | 41.8 | 7 | 17.1 | 78 | 39.2 |
| Moderate | 23 | 34.3 | 36 | 39.6 | 17 | 41.5 | 76 | 38.2 |
| Severe | 11 | 16.4 | 17 | 18.7 | 17 | 41.5 | 45 | 22.6 |
| Total | 67 | 100.0 | 91 | 100.0 | 41 | 100.0 | 199 | 100.0 |

Table 2 – Comparison of the classification of cardiovascular risk in the first consultation with the protocol

| Risk classification in consultation | Grade classification by the protocol | | | | | | | | Total | |
|-------------------------------------|--------------------------------------|-------|----------|-------|------|-------|-----------|-------|-------|-------|
| | Low | | Moderate | | High | | Very high | | | |
| | n° | % | n° | % | n° | % | n° | % | n° | % |
| Low | 17 | 53.1 | 24 | 42.9 | 21 | 24.1 | 2 | 8.3 | 64 | 32.2 |
| Moderate | 12 | 37.5 | 24 | 42.9 | 32 | 36.8 | 9 | 37.6 | 77 | 38.7 |
| High | 3 | 9.4 | 8 | 14.2 | 29 | 33.3 | 11 | 45.8 | 51 | 25.6 |
| Very high | 0 | 0 | 0 | 0 | 5 | 5.8 | 2 | 8.3 | 7 | 3.5 |
| Total | 32 | 100.0 | 56 | 100.0 | 87 | 100.0 | 24 | 100.0 | 199 | 100.0 |

Table 3 – Comparison of the classification of cardiovascular risk in the second consultation with the protocol

| Risk classification in consultation | Grade classification by the protocol | | | | | | | | Total | |
|-------------------------------------|--------------------------------------|-------|----------|-------|------|-------|-----------|-------|-------|-------|
| | Low | | Moderate | | High | | Very high | | | |
| | n° | % | n° | % | n° | % | n° | % | n° | % |
| Low | 14 | 50.0 | 24 | 48 | 17 | 19.8 | 3 | 11.1 | 58 | 30.4 |
| Moderate | 12 | 42.9 | 19 | 38 | 35 | 40.7 | 8 | 29.6 | 74 | 38.7 |
| High | 2 | 7.1 | 7 | 14 | 28 | 32.5 | 14 | 51.9 | 51 | 26.7 |
| Very high | 0 | 0 | 0 | 0 | 6 | 7.0 | 2 | 7.4 | 8 | 4.2 |
| Total | 28 | 100.0 | 50 | 100.0 | 86 | 100.0 | 27 | 100.0 | 191 | 100.0 |

method of comparison. Despite this evidence, we recognize the difficulty in conducting this comparison with effectiveness. We also observed that measuring the compliance with a protocol is not an easy task, because usually this is often done through inaccurate criteria. Therefore, new methods are being studied to assess compliance, because it is known that the introduction of a new protocol substantially alters the detection, risk assessment and treatment of hypertension^{10,11}.

Laboratory tests are extremely important to search for other risk factors, eliminate the presence of secondary hypertension and show whether or not there is target-organ damage, which often is subclinical¹². In this context, such laboratory tests are required and recommended by various protocols, and they have been adopted by the Curitiba MHD¹. It is known that protocols based on cardiovascular risk are more efficient than those based only in blood pressure⁴. Despite their importance, we observed in this study that laboratory tests were ordered in 31.8% of consultations, and not all recommended tests were ordered, and the electrocardiogram was required in only one. In the absence of such data, it was not possible to calculate the number of undiagnosed patients with diabetes mellitus type II, renal failure and dyslipidemia. The control of high blood pressure has better cost-effectiveness in the reduction of macrovascular disease resulting from diabetes⁸.

The agreement rate in the first consultation between the drugs prescribed and those recommended by the protocol was only 45.3%. Similar results of poor compliance were found in the literature¹³. Grade and risk classifications in disagreement with the protocols result in inadequate treatment. Recent studies have shown that greater compliance

with the recommendations of the medical protocols is beneficial, as it reduces the incidence of cardiovascular risks and renal complications, and reduces blood pressure levels. The recommendations in the existing protocols are based on scientific evidence of a significant reduction in morbidity and mortality resulting from hypertension¹⁴.

Although not the most frequently used, hydrochlorothiazide was prescribed for 51.5% of patients, showing good compliance in clinical practice. This result differs from other studies that show distrust on the part of physicians in the use of this drug as first choice¹⁵. For many years, beta-blockers have been routinely prescribed by most primary care physicians; however, according to recent studies, there was a breach of that tradition, because this class of drugs is not considered first-line antihypertensive drugs anymore^{7,16,17}. In this study, we found that propranolol, a beta-blocker, was administered to 15% of the patients. It is often necessary to prescribe more than one drug to achieve blood pressure levels considered normal, and it appears that the practice was somewhat overlooked². In this study, monotherapy was used in 57% of the cases.

Given the absence of some information for the classification of patients, the evaluation of this study was based on available data. Information such as smoking habit, history of stroke and associated cardiovascular and renal diseases was absent in almost all records, hindering the determination of an accurate classification and the prescription of a correct treatment. Thus, there was a disagreement with the protocol, which requires the evaluation of risk factors for a correct stratification of risk and grade classification of patients¹. The results evaluated showed little compliance with the protocol of the MHD, on

diagnosis and classification of risk, and also on treatment of hypertension, because on average only 50% of the physicians followed the MHD recommendations.

Conclusion

The non-conformity between the clinical practice and the procedures recommended by the protocol of the Municipal Health Department of Curitiba was clearly shown both on grade and risk classification of hypertensive patients on treatment. Compliance with the protocol may be an important tool in the control of hypertension and may contribute to reduce morbidity and mortality from cardiovascular disease in the population.

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Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Sources of Funding

There were no external funding sources for this study.

Study Association

This study is not associated with any post-graduation program.