Blood Pressure Control Rates in a Cardiovascular Preventive Ambulatory System 2002–2010

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Introduction: Increasing awareness, treatment and control rates of hypertensive patients is a worldwide problem especially in Central and East European countries.

The **objective** of the study was to determine the yearly changes in the achievement of treatment targets according to ESC 2003–2007 guidelines for the management of arterial hypertension in a preventive profiled ambulatory cardiology setting.

Patients and method: The study included 6591 hypertensive patients examined between 2002–2010 in the Procardia preventive ambulatory in Târgu Mureș, Romania. The sex distribution of the studied patients was 45.64% male average age 57.45 years, and 54.36% female average age 61.28 years. Patients received individually tailored self control education, lifestyle advice and drug treatment – the primary care providers were informed in detailed medical reports. We studied the yearly achievement of target blood pressure levels. We also analysed the frequency of investigations carried out for the global risk assessment screening for subclinical organ damage. We used "MedPrax" integrated patient data management system as an electronic health record. Statistical analysis was performed with the Open Office Calc programme.

Results: Target blood pressure values (under 140/90 mmHg in non diabetic patients and 130/80 in diabetic patients) were reached in 27.51%. The percentage of patients treated to target increased progressively from 15.25% to 36.29%.

Conclusions: The activity of the studied cardiology ambulatory setting provided a yearly increase in the level of blood pressure target achievement. Further improvement measures are needed to increase blood pressure control rates, with a specific attention to the diabetic patients.

Keywords: hypertension, target blood pressure, control rate

Introduction

Awareness, treatment and control rates of hypertensive patients is very low in Romania as showed in the SEPHAR study which assessed the prevalence, treatment rate, and control rate at national level. According to this study prevalence of hypertension in Romania in 2005 was 40.1% (22.9% newly diagnosed hypertensives and 17.2% previously diagnosed). The highest prevalence of hypertension was recorded in the 55–64 years age group and over 65 years age group. Anti hypertensive medication was used only in 39% of hypertensive patients, and only 7% of all hypertensive patients were well controlled (blood pressure under 140/90 mmHg) [1]. Hypertension control has to be be achieved in order to prevent target organ damage, and major cardiovascular complications of hypertension. Target values mean that complication rate (cardiovascular morbidity and mortality) is the lowest if these values are obtained.

The workup of a hypertensive patient has to include search for associated risk factors, target organ damage, and already established cardiovascular or renal diseases. These factors have a major influence on the prognosis of hypertensive patients. Diabetes also determines a lower target value (130/80 mmHg) [2].

Hypertensive patients have to be actively detected at the level of the primary care providers. Primary care providers need a good collaboration with the ambulatory cardiology setting in order to complete paraclinical workup and in order to treat high risk patients, or to manage resistant hypertension cases. This collaboration has the major scope to obtain target values in all hypertensive patients. It is clearly shown in the literature that target values are obtained in daily clinical practice only in approximately one third of patients even in countries with a well established medical care system with substantial material resources. Target achievement is influenced by many factors. These are related to the hypertensive patient (awareness, education level, social status, material resources), to the healthcare provider (awareness of current guidelines, current treatment recommendations, time constraints, practice management), to the patient-physician relationship (partner patient/non partner patient) and to the healthcare system (availability and affordability of drugs, compensation of prices, accessibility of healthcare providers at different levels, primary prevention messages). Any change in these complex influencing factors may lead to changes in target achievement levels.

Our study has the scope to determine the yearly changes in the achievement of treatment targets according to ESC 2003–2007 guidelines for the management of arterial hypertension in a preventive profiled ambulatory cardiology setting.

Patients and method

The study included 6591 hypertensive patients examined between 2002–2010 at the Procardia preventive ambula-

Table I.   Average risk factor level of the studied patients

	N	Minimum	Maximum	Mean		Standard Deviation
				Statistic	Standard Error	
Age	6591	16	95	59.76	.161	13.111
Total cholesterol, mg/dl	4298	42	560	206.27	.730	47.889
LDL, mg/dl	2550	33	351	133.20	.846	42.711
HDL, mg/dl	2734	13	112	45.03	.260	13.608
Triglyceride, mg/dl	4238	30	2420	149.93	1.705	110.969
Fasting glucose, mg/dl	4287	60	303	101.30	.455	29.787
Height, cm	6073	147	199	165.60	.152	11.809
Weight, Kg	6088	34	170	79.45	.200	15.619
BMI	6045	15	49	28.71	.062	4.793
Systolic BP	5983	90	250	147.91	.285	22.015
Diastolic BP	5982	50	150	88.54	.156	12.042

Table II.   Increasing rates of blood pressure control 2002–2010

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Diabetic patients at goal	12.50%	16.00%	22.14%	6.08%	8.21%	15.58%	17.22%	17.12%	25.14%	16.70%
Non-diabetic patients at goal	15.25%	22.38%	25.15%	24.77%	22.55%	26.39%	34.50%	33.33%	36.29%	29.52%
Overall BP control	14.93%	21.05%	24.52%	22.24%	20.10%	25.03%	30.92%	31.56%	34.72%	27.51%

tory center in Tîrgu Mureş, Romania. The sex distribution of the studied patients was 45.64% male average age 57.45 years, and 54.36% female average age 61.28 years.

Patients received indiviadually tailored self control education, lifestyle advice and drug treatment - the primary care providers were informed in detailed medical reports. Special importance had been accorded to encouraging self measurement o blood pressure values, and noting them in a simple patient agenda. In newly diagnosed cases telemetric measurement of blood pressure values were used in order to increase patient adherence. We studied the yearly achievement of target blood pressure levels. We used the clinical blood pressure values measured at the site of consultation. Target values were considered under 140/90 mmHg in non-diabetic patients respectively under 130/80 mmHg in diabetic patients. In patients with multiple visits in our setting we considered the blood pressure value of the latest consultation.

Characteristics of the studied population are summarized in Table I.

We also analyzed the frequency of investigations carried out for the global risk assessment and screening for subclinical target organ damage.

We used "MedPrax" integrated patient data management system as an electronic health record. All data was recorded during current patient consultations. Because of the descriptive nature of the results, no statistical test was applied to the data collected. Data analysis was performed with the Open Office Calc programme.

Results

Target blood pressure values (under 140/90 mmHg in non diabetic patients and 130/90 in diabetic patients) were reached in 27.51% of the studied patients. The percentage of patients treated to target increased progressively from 15.25% in 2002 to 36.29% in 2010 in non-diabetic patients, diabetic patients had a poor blood pressure control rate, as seen on table II.

Global cardiovascular risk is high in hypertensive patients due to the presence of associated risks, target organ damage and cardiovascular diseases. These factors must be identified during workup of the patient, that means a correct use of laboratory tests and founctional examinations (ECG, echography, radiology, ambulatory blood pressure monitoring).

The use of complementary investigations for the workup of hypertensive patients are illustrated on table IV.

Table III.   Blood pressure control rates and patient characteristics

Patient characteristics	BP control rate (%)
Age < 60 years	25.85%
Age > 60 years	29.00%
Male	27.83%
Female	27.24%
Urban	28.22%
Rural	26.25%
Grade 1	32.00%
Grade 2	28.25%
Grade 3	16.24%
Patients with CHD	28.91%
Patients without CHD	26.73%

Table IV.   Complementary examinations performed for risk asessment

Blood glucose	65.62%
Total cholesterol	66.26%
HDL	41.78%
LDL	39.13%
Triglyceride	64.30%
Creatinine	38.01%
ECG	90.99%
Echocardiography	22.27%
Fundoscopy	15.57%
Abdominal echography	14.79%
Vascular echography	3.70%

Table V.   Blood pressure control rates compared to other studies

Country	BP control rate	Year (study)
Albania	36.30%	2008 (BP-CARE)
Bosnia	20.70%	2008 (BP-CARE)
Belarus	21.70%	2008 (BP-CARE)
Czech Republic	51.00%	2008 (BP-CARE)
Latvia	18.90%	2008 (BP-CARE)
Romania	26.20%	2008 (BP-CARE)
Serbia	23.30%	2008 (BP-CARE)
Slovakia	29.00%	2008 (BP-CARE)
Ukraine	16.90%	2008 (BP-CARE)
Romania Procardia center	30.92%	2008 present study
USA	36.80%	2003-2004 NHANES

The need of complementary examinations also mean supplemental costs for the patient and for the healthcare system.

Discussions

The overall control rate of hypertension in our ambulatory cardiology setting is similar to the control rates found in other central and eastern European countries from the BP-CARE study. This study found a control rate 27.1% for average central and eastern European blood pressure control rate in specialized ambulatory settings, and a value of 26.2% for Romanian specialized care [3].

Comparable blood pressure control rates achieved in Central and East European countries are summarized in table V.

Blood pressure control rates are improving as analyzed in relation with the year of initial consultation. Improvement in blood pressure control rates are slowly achieved also in the United States and Western European countries. The National Health and Nutrition examination Surveys evidenced a slowly increasing blood pressure control rate in the United States. From 10% in 1976–1980 to 29% in 1988–1991, 27% in 1991–1994, 29.2% in 1999–2000 and 36.8% in 2003–2004.

Blood pressure control rates in diabetic patients is lower because blood pressure targets are lower for this patient subgroup. Also diabetic patients frequently need several medications for associated diseases and risk factors and it is known that the number of pills recommended and compliance are inversely related.

The level of investigations carried out for risk stratification: an ECG was made available in a much higher proportion of patients 90.99% than in similar studies in Western Europe [2]. Ultrasound examination is carried out relatively rare – the BP-CARE study found a frequency of echocardiography in Central and Eastern European countries of 64.5% compared with our results of 22.27%, respectively carotid ultrasound in BP-CARE study 24.1% compared with our 3.7%. Cardiac and vascular ultrasound examinations are not supported by the Romanian insurance system, so performing them increases the costs of patient consultation.

The major interventions applied for increasing blood pressure control rates in our setting was patient education, patient involvement in blood pressure monitoring, cardiovascular rehabilitation programs, and telemetric monitoring of blood pressure values.

Conclusions

1. The activity of the studied cardiology ambulatory setting provided a yearly increase in the level of blood pressure target achievement.
2. The improvement in control rates are the consequence of patient education, partner relationship with the treating physician, close follow-up in a complex system, performed by a multidisciplinary team.
3. Further improvement measures are needed to increase blood pressure control rates, with a specific attention to the diabetic patients.

Acknowledgment

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