Original Paper

High Blood Pressure-A High Risk Problem for Public Healthcare

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ABSTRACT: High blood pressure is the most common cardiovascular disease and the first one due to mortality risk. Prospective studies showed that, until 2025, the number of individuals with HBP will increase up to 1.56 billion in adults, of which more than two thirds will be found in poor countries or developing ones. In the present study, we evaluated the clinical and epidemiological aspects of HBP in a group of 3050 patients admitted in the Department of Cardiology of the Public Hospital of Caracal, Olt county. The study on the distribution of patients according to sex allowed us to observe that most patients suffering from HBP were women, while the distribution according to the social environment showed that more than 2/3 of high blood pressure patients came from the rural area. By studying the distribution of patients according to age, we observed that most HBP patients were aged over 60 years old (86.49%).

KEYWORDS: *High blood pressure, cardiovascular diseases, mortality*

Introduction

High blood pressure (HBP) continues to represent the major burden of cardiovascular diseases, being the most common condition and the first one due to mortality risk [1,2].

A recent estimation showed that almost one billion people worldwide suffer from high blood pressure; of these, two thirds come from developing countries [1].

In real terms, approx. 640 million individuals with high blood pressure are recorded in the low-income countries, while only 330 million individuals with high blood pressure come from high-income countries. Prospective studies showed that, until 2025, the number of individuals with HBP will increase up to 1.56 billion in adults, of which more than two thirds will be found in poor countries or developing ones. [3].

The increase of high blood pressure in developing countries was attributed both to intrinsic factors, as well as to extrinsic ones [3].

Of these factors, the most important ones are: nutrition and demographic changes, reduction of physical effort and choosing a sedentary lifestyle, together with inappropriate health care systems [4,5].

Primary or essential high blood pressure comprises about 90-95% of all HBP cases and it is defined as a high blood pressure due to genetic factors, environment factors or due to an unhealthy lifestyle (excessive salt, alcohol intake or smoking) associated with a sedentary lifestyle and lack of physical effort, thus leading to obesity [6-8].

The incidence of high blood pressure increases with age [9] and it is associated with metabolic changes, such as insulin resistance or hyperlipidemia [10].

In its turn, HBP is associated with a high risk of ischemic heart disease, heart failure, stroke, peripheral artery disease, chronic kidney diseases, cognitive disorders and also with a high cardiovascular mortality [11].

Aim

The aim of our study was to retrospectively evaluate the clinical and epidemiological aspects of HBP in a group of patients that required hospitalization.

Material and methods

The study is retrospective, and it includes all patients with arterial hypertension over 18 years old admitted to the Caracal Municipal Hospital,

the Cardiology Unit from January 2013 to December 2017.

Over the retrospective data, we applied the operational criteria of age, sex, background, main pharmacological groups and the most common associated pathology.

All the patients included in the study were clinically and paraclinically diagnosed with primary HBP. For performing the study, the informed consent of all the patients was provided.

We have obtained the written permission from the Ethics Committee of the Public Hospital of Caracal for using these demographic anonymized statistical data.

All the clinical and paraclinical data were extracted from the clinical observation sheets, from the admission records and the data from laboratory tests.

Distributing the patients in the group of HBP degree was performed in accordance with ESC/ESH Guidelines for the management of arterial hypertension-2018 [12].

The data obtained were recorded in Microsoft Excel files, and then processed statistically, in order to analyze the relationships between the clinical and paraclinical data of the patients.

Data processing-descriptive analysis of the batch according to different parameters, their graphical representation-was performed in Microsoft Excel, using the commands Functions-Statistical, Pivot Tables, Chart and the functions in the Data Analysis menu.

To characterize the numerical data used in this paper, we used the fundamental statistical indicators: the arithmetic mean and the standard deviation, as well as the scattering indicators, minimum, maximum, median, quartiles.

The Chi-squared test was used to determine whether there is a significant difference between the expected frequencies and the observed frequencies for different HBP categories relative to the parameters taken in consideration.

Results

The number of HBP patients who required hospitalization in the Department of Cardiology of the Public Hospital of Caracal was about 610 patients a year, the smallest number being recorded in 2014 (502 patients), while the highest was recorded in 2016 (698 patients) (Fig.1).

We could state that the number of the admitted patients varied from one year to another with a maximum of 16-18% in comparison to the annual average.

The study of the group of patients according to sex allowed us to observe that most patients suffering from HBP were women.

Thus, of the total 3050 patients, 1756 (57.57%) were women, while 1294 (42.43%) were men (Fig.2).

The prevalence of HBP in women was constant during the five years covered by our study.

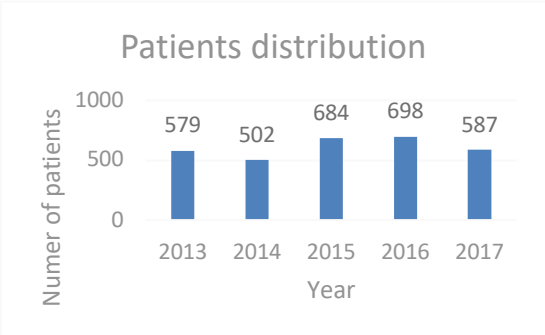

Fig.1. Patient distribution according to the year included in the study

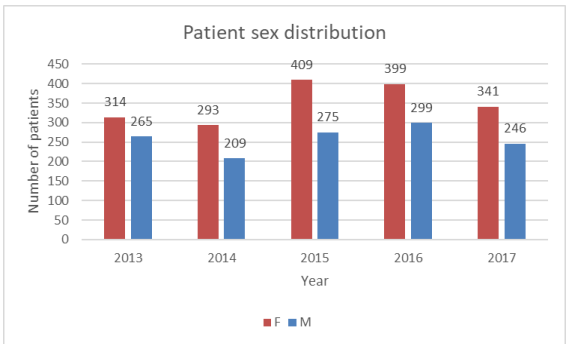

Fig.2. Patient distribution according to sex for every year of study

Regarding the values of systolic high blood pressure (SP), we distributed the patients into three categories:

-with SP values lower than 160mm Hg (1st degree HBP);

-with values between 160 and 180mm Hg (2nd degree HBP);

-with values over 180mm Hg (3rd degree HBP).

In our group, most patients presented with 2nd degree HBP (1401 cases, representing 45.94%), while the number of patients with 1st and 3rd degree HBP was almost the same: 1st degree HBP=810 patients, representing 26.55%; 3rd degree HBP=839 patients, representing 28.51%.

As seen from Fig.3, the number of women was higher than men in all degrees of HBP.

By analyzing the distribution of patients according to age, as observed in our chart (Fig.4), the number of patients with HBP increased with age.

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Most patients with HBP were aged over 60 years old. In the age group 60-89 years old we registered 2638 patients, representing 86.49% of the whole group, while 363 were patients under 60 years old, accounting for only 11.90%.

The high prevalence of the disease in patients over 60 years old is believed to be due to the reduction in artery elasticity, decrease of physical effort and adopting a sedentary lifestyle, nutritional changes that lead to weight gain, diabetes and obesity.

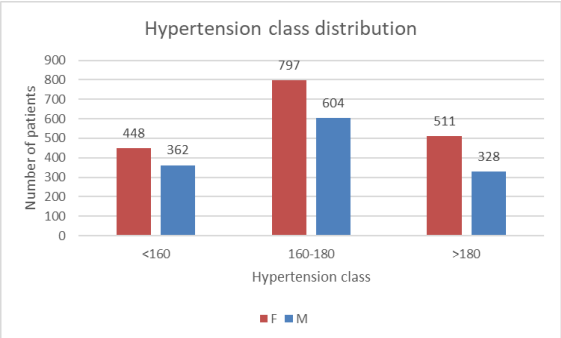

Fig.3. Patient distribution according to the three BP values intervals did not exhibit clear-cut differences ($\chi 2=5.78448$, $p=0.055444$)

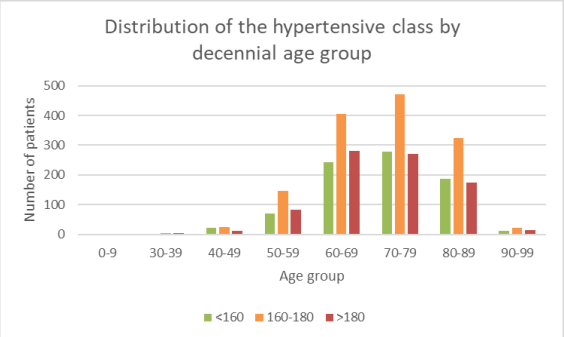

Fig.4. Patient distribution according to age, sex and BP values

From our chart, we could easily observe that the patients over 60 years old presented the most frequent forms of 2nd degree HBP, in all age decades, a clinical aspect that requires a more frequent observation of these individuals for preventing major complications generated by HBP.

If, after the age of 80, the chart shows a decrease of the number of HBP patients, this is not due to a "healing" of HBP, but to the death of old-age patients, due to cardiovascular diseases or other conditions.

From our chart, we could observe that HBP may also appear in individuals under 50 years old, even in the young population.

In our group, we recorded a patient under the age of 10 who presented a mild form of HBP (1st degree) and required hospitalization for establishing diagnosis and adequate treatment.

Also, in the age group 30-39 years (young adult group) we recorded six patients with HBP, of whom three presented with 2nd degree HBP and other three patients with 3rd degree HBP.

In the age group 40-49 years old, we recorded 57 patients, of whom 21 with 1st degree HBP, 25 with 2nd degree HBP and 11 with 3rd degree HBP.

Our data show that HBP may have an early onset in life, including teenagers, still, in the absence of any intense clinical signs and symptoms, the condition is diagnosed much later.

Knowing the fact that SP values represent a prediction factor for some major complications generated by HBP (strokes, myocardial infarction), in our study we also investigated the patients with systolic BP higher than 200mmHg.

Of a total number of 3050 patients, 364 (11.95%) patients showed SP values higher than 200mmHg.

Being aware of the fact that social environment may be a risk factor influencing HBP, we studied the case distribution according to the living environment (Fig.5).

We observed that in the rural area we recorded 2085 patients, representing 68.36%, while in the urban area we recorded 965 patients, representing 31.64%.

We noticed that more than 2/3 of the patients in our group came from the rural area, which proves that HBP is also influenced by the social environment.

The study on the presence of some risk factors, such as diabetes, obesity and dyslipidemia in the patients with HBP showed that 598 patients (19.60%) with HBP also had diabetes (Fig.6).

Of these, 178 patients had 1st degree HBP, 253 had 2nd degree HBP and 167 patients had 3rd degree HBP.

We may state that the number of patients with diabetes mellitus did not increase with the HBP degree.

Regarding obesity, 801 (26.26%) of the 3050 patients with HBP also presented obesity (Fig.7).

Dyslipidemia was observed in a large number of patients with HBP.

Thus, of the 3050 patients, 2447 (80.23%) presented dyslipidemia (Fig.8).

The largest number of patients with dyslipidemia (1106) were recorded with 2nd degree HBP.

As HBP is a risk factor for strokes and myocardial infarction, we evaluated these conditions associated with HBP.

We observed that of the 3050 patients, 163 (5.34%) presented strokes (AVC) (Fig.9), while a number of 254 (8.33%) patients presented myocardial infarction (Fig.10).

Neither the strokes, nor the myocardial infarction could be correlated with the HBP degree.

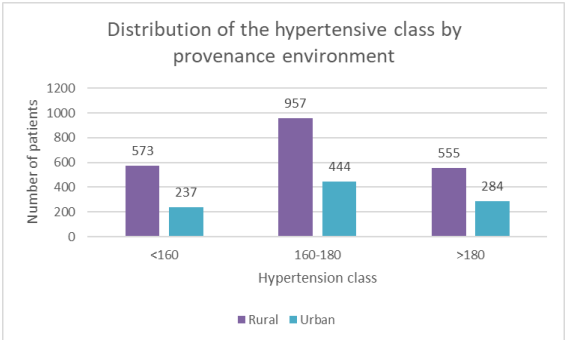

Fig.5. Distribution according to social environment and BP values did not show significant associations (χ2=4.0186, p=0.13408)

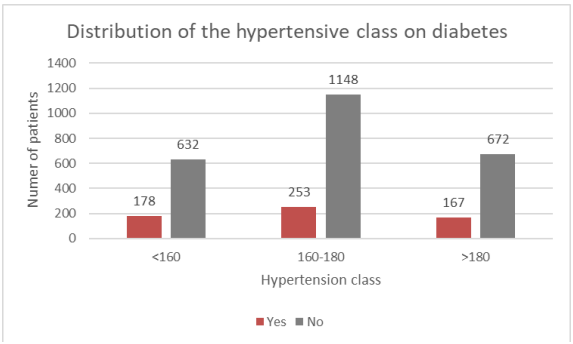

Fig.6. Correlation of HBP with diabetes mellitus did not show significant associations (χ2=5.0606, p=0.079633)

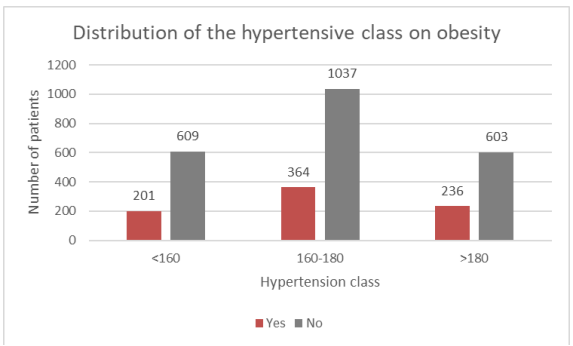

Fig.7. Correlation of HBP with obesity did not show significant associations (χ2=2.4427, p=0.294833)

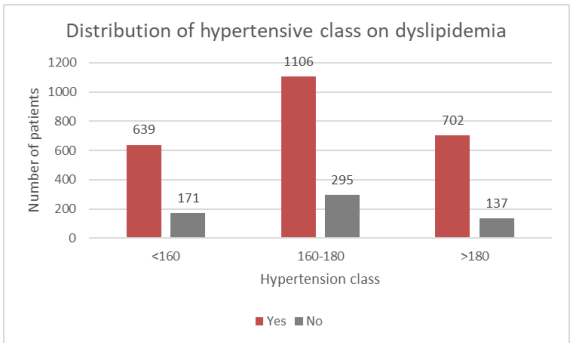

Fig.8. Correlation of HBP with dyslipidemia showed a significant dependency (χ2=8.6432, p=0.013279)

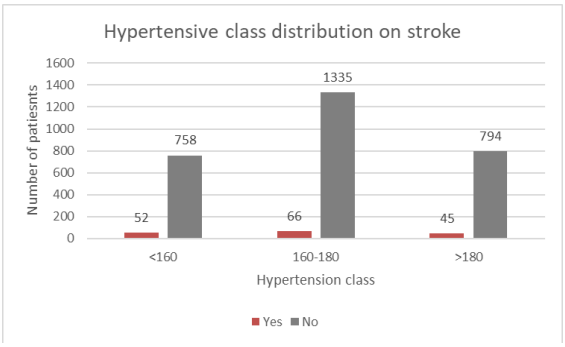

Fig.9. Correlation of HBP with stroke did not show significant associations (χ2=2.9636, p=0.227226)

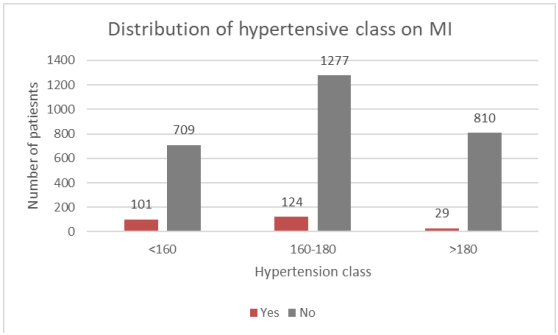

Fig.10. Correlation of HBP with myocardial infarction, showed a significant dependency (χ2=44.7772, p<0.00001)

Discussion

High blood pressure (HBP) is a chronic medical condition, where the blood pressure is constantly high, above the normal values (120-139/80-89mm HG).

Recent studies show that HBP is a major problem of public health care, affecting a billion people all over the world [13,14].

The disease has a complex pathogenesis, only partially understood up to now.

Some studies suggest that there are two types of major associated factors that influence the incidence of high blood pressure, namely: genetic factors and environment factors.

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Various clinical studies showed that there is a familial aggregation and a hereditary inheritance in multiple cases of essential high blood pressure.

According to some recent studies, there is estimated that the influence of genetic factors upon high blood pressure is about 20-55% [15,16].

It is believed that the genetic factors involved in high blood pressure are represented by a series of pathogenic genes with a low, but cumulative effect.

Although there have been performed various studies for identifying the genes responsible for the onset of HBP, until now these have not been fully identified and characterized [16].

The environment factors involved in the HBP etiopathogenesis are much more numerous. These are represented by weight excess and obesity, smoking, mental stress, lack of physical activity, high caloric intake, diabetes, use of birth control pills, anxiety, irritability and emotional factors, etc. [16-19].

The high incidence of HBP represents a huge problem of public health care world widely, this being the main risk factor for other cardiovascular diseases, including heart disease, stroke and heart failure, kidney failure, etc.

Every year, approx. 17 million people die early due to cardiovascular diseases, of which 9 million deaths are caused by complications connected to HBP [3,20].

Moreover, HBP is a chronic condition that requires permanent monitoring and treatment, it requires high costs of hospitalization and leads to long periods of absence at work [21].

That is why diagnosis, control and monitoring of HBP represent a major challenge for health care all over the world.

Also, it is well-known the fact that HBP prevalence increases with age, even in the presence of some adequate measures for monitoring and prevention.

In our study, for staging HBP we used, like most Cardiologists in Romania, the Guide elaborated by the Working group for the management of high blood pressure of the European Society of Cardiology (ESC) and of the European Society of Hypertension (ESH), as well as the recommendations of experts within the World Health Organization (WHO), considering that a person with values higher than 140 for systolic pressure and 90 for diastolic pressure is a HBP patient [22].

Our study included 3050 patients with essential HBP who required hospitalization between 2013-2017 in The Public Hospital of Caracal, Olt County.

There should be specified that the number of patients with essential HBP recorded in GP offices in Olt County is much higher, most patients with essential HBP 1st and 2nd degree being checked up, monitored and treated in the ambulatory and in GP offices.

A particularity of our study group is the fact that the HBP prevalence was higher in women than in men.

Most studies showed that the HBP prevalence is higher in men [23,24].

It is possible that, in Romania as well, HBP may have a higher prevalence in men, but many of them are not be aware of the condition, due to the fact that in the first progress stages, HBP may not have any symptom.

Another particularity of our study was that more than 2/3 of patients with HBP came from the rural area.

We consider that these differences of HBP prevalence according to the social environment are due to a poorer medical knowledge of people living in the rural area, who, most of the time, do not pay attention to clinical symptoms, do not follow rules of prevention for cardiovascular diseases, they do not have an appropriate nutrition and, most of the time, they do not take the treatment prescribed by doctors correctly.

Other authors evaluating HBP in developing countries found that lack of medical knowledge in the rural areas, and especially the persistence of some traditional habits, led to a higher HBP prevalence in these areas, in comparison to the urban area [25,26].

We also found, like other authors [27-29], that the HBP prevalence increased by age, the most affected persons being those over 60 years old.

In our study, we identified a high number of patients with HBP and changes of the lipidic metabolism (dyslipidemias).

We consider that the change of lifestyle, characterized by reducing the physical effort and increase of caloric intake and stress are the main factors responsible for dyslipidemias, obesity and diabetes mellitus.

Numerous studies showed that HBP is associated with various metabolic changes, thus it may be considered a risk factor for other cardiovascular diseases (ischemic cardiopathy, rhythm changes, heart failure), diabetes mellitus, obesity, atherosclerosis, myocardial infarction, strokes, mental disorders, etc. [30-35].

Conclusion

HBP is one of the most common cardiovascular diseases. Of the 3050 patients admitted to the Department of Cardiology of the Public Hospital of Caracal between 2013-2017, 1756 patients (57.57%) were women, while 1294 (42.43%) were men.

By analyzing the distribution of patients according to age, we observed that most patients with HBP were aged over 60 years old.

Between the age interval 60-89 years old, there were recorded 2638 patients, representing 86.49% of the whole group, while the patients under 60 years old were 363, representing only 11.90%.

Most patients had 2nd degree HBP (1401 cases, representing 45.94%), while the numbers of patients with 1st and 3rd degree HBP were almost equal: 1st degree HBP=810 patients, representing 26.55%; 3rd degree HBP=839 patients, representing 28.51%.

A number of 364 patients (11.95%) presented values higher than 200 mmHg of systolic SP.

By studying the correlation between HBP and other diseases, there was observed that 163 patients (5.34%) presented strokes, and a number of 254 patients (8.33%) presented myocardial infarction.

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