CLINICAL AND EPIDEMIOLOGICAL ASSESSMENT OF THE INCIDENCE OF ARTERIAL HYPERTENSION IN A PERMANENT MEDICAL CENTER

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CLINICAL AND EPIDEMIOLOGICAL ASSESSMENT OF THE INCIDENCE OF ARTERIAL HYPERTENSION IN A PERMANENT MEDICAL CENTER (Abstract): The present study shows the results of monitoring, evaluation and prediction of health status in a patient group with hypertension (HTN) seeking care in a permanent medical center. Materials and methods: The study evaluated 144 patients registered at the Permanent Medical Center of the Plugarı village, Iași County, who were diagnosed with HTN between 2011 and 2013. The study group included 80 male patients with an average age of 51.25 years with a diagnosis of essential hypertension (EHTN) stage I, II or III and 64 female patients (group II), with an average age of 48.4 years. Results: 44 patients (30.55 % of the total number of patients) were diagnosed with HTN stage I, of whom 27 were female (61.36 %) and 17 were male (38.64 %); 69 patients (47.93 %) had HTN stage II, of whom 21 were female (30.43 %) and 48 were male (69.57 %), and 31 patients (21.52 %) had HTN stage III, of whom 16 were female (51.61 %) and 15 were male (48.39 %). Conclusions: Patients at high risk for HTN and those with mild and moderate clinical forms were surveyed and were early treated. Economic and social benefits were achieved due to lower hospitalization costs, fewer days of temporary disability and reduced medical retirements. In our study groups, HTA had a higher prevalence, especially in men. Keywords: HYPERTENSION, CLINICAL EPIDEMIOLOGY, RISK FACTORS.

Clinical epidemiology of cardiovascular diseases (CVDs) has become increasingly important due to the fact that cardiovascular mortality ranks first nowadays in the world, especially in economically advanced countries, while there is also a trend of explosive growth in developing countries such as Romania (1, 2, 3).

Clinical research of CVDs puts the individual at the center of its development. Clinical epidemiology encompasses issues arising from the features of the larger population, from which these patients are drawn, aimed at identifying and managing risk factors that lead to disease and at finding effective means to prevent and control diseases.

The risk factors (RF) represent one of the major underlying elements of CVD
epidemiology, as they provide a rational and scientific basis for prevention and cure. Establishing the number of RF and their impact on CVD morbidity is a requirement of modern medicine, in which preventive measures gradually become just as important as treatment plans. The perfect case would be to succeed in replacing therapy with prevention (3,4,5).

The major aim of this study is to evaluate the clinical and epidemiological factors that play a role in the onset and progression of the disease, with a special interest in diagnostic stages and disease management in patients seeking care in a permanent medical center (6).

**MATERIAL AND METHODS**

The study included 144 HTN patients registered at the Permanent Medical Center of the Plugaru village, Iași county between 2011 and 2013. They were divided into two groups: the first group included 80 male patients with an average age of 51.25 years with a diagnosis of essential hypertension (EHTN) stage I, II or III and 64 female patients (group II), with an average age of 48.4 years.

<table>
<thead>
<tr>
<th>Age groups (years)</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SBP</td>
<td>DBP</td>
</tr>
<tr>
<td>20-29</td>
<td>126.1</td>
<td>75.8</td>
</tr>
<tr>
<td>30-39</td>
<td>125.5</td>
<td>80.8</td>
</tr>
<tr>
<td>40-49</td>
<td>133.8</td>
<td>84.2</td>
</tr>
<tr>
<td>50≥65</td>
<td>149.7</td>
<td>91.0</td>
</tr>
<tr>
<td>Group average</td>
<td>137.1</td>
<td>84.8</td>
</tr>
</tbody>
</table>

**TABLE I**

**Age-related variability of blood pressure**

![Fig. 1. Arterial pressure variability in relation with age group](image)
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Plugari village is divided into three rural areas with a plain landform, which are crossed by two rivers of local importance. Its population, mainly Orthodox, is undergoing a continuous demographic decrease, due both to migration to urban areas and especially to low birth rate and high mortality caused mainly by the aging trend in the community. Residents are employed in livestock farming and field cultivation (grain, fodder and vegetables).

The clinical and epidemiological investigation included history, objective clinical examination and recording blood pressure. Mathematical statistical evaluations were made using the EpiInfo 2000 program and $X^2$, DS, $p$, t-Student tests.

Mean values of systolic blood pressure (SBP) and diastolic blood pressure (DBP) age groups based on decades showed a general tendency of progressive increase (tab. I, fig. 1).

The clinical and epidemiological sheet provided information on eating habits (lipid intake, daily consumption of cigarettes, smoking duration in years), lack of physical activity, physical effort, stress, behavioral types, dominant moods (aggressive, depressed, anxious, etc.)

RESULTS AND DISCUSSION

In population studies, the difference between "normal" and "pathological" is hard to demonstrate, due to variations depending on geographic area, lifestyle and socioeconomic characteristics. This is why our study centers upon the elderly (5).

As people grow old, they accumulate previously acquired und untreated diseases, so that at different ages an "inventory" of comorbidities at various stages can be found. Such associations express rather "the disease-related age" than "age-related diseases".

In the study group, the following conditions were diagnosed: hypertension (144: 3.84%), liver cirrhosis (152:4.06%); ulcer disease (129:3.44%); malignant diseases (109:2.91%); ischemic heart disease (102: 2.72%); chronic renal failure (14:0.37%); congenital anomalies of circulatory system (9:0.24%), chronic pulmonary heart disease and tuberculosis (5: 0.13%) (fig. 2).

There was a high ratio of CVDs, which are the leading cause of mortality, in all examinations of adults aged over 65 years made in the family doctor's practice. It is widely recognized that cardiovascular diseases have a chronic, disabling course and a poor prognosis, but early detection with screening tests is possible and required, especially in persons at high risk, leading to major medical and socioeconomic benefits.

HTN has an important place in the group of CVDs, as it affects about 10% of the general population, 25% of persons aged over 40 and 40% of those aged over 64. Although it is estimated that approximately 50% of HTN patients have mild forms of disease, the Framingham study has shown that even small increases in blood pressure are potentially dangerous, leading to shorter life expectancy (9, 10, 11).

In our study, group I included 80 male patients with an average age of 51.25 years with a diagnosis of essential hypertension stage I, II or III and group II included 64 female patients with an average age of 48.4 years (tab. II, fig. 3).

The most important mechanisms involved in the etiology and progression of HTN are as follows: increased sympathetic activity, altered transmembrane transport of ions (especially sodium and calcium ions), increased vascular reactivity due to the important role of endothelium in the regu-
lation of the vasomotor tone, stimulation of the renin-angiotensin-aldosterone system, dysfunction of local self-regulation mechanisms (prostaglandins and kinin-kallikrein system) metabolic factors, structural changes of blood vessels (8, 9, 10).

![Diagram of co-morbidities registered in studied patients](image)

**Fig. 2.** Co morbidities registered in studied patients

<p>| TABLE II |</p>
<table>
<thead>
<tr>
<th>Limits and the average age of the patients included in the study</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group</strong></td>
</tr>
<tr>
<td>I</td>
</tr>
<tr>
<td>II</td>
</tr>
</tbody>
</table>

![Pie chart showing distribution of cases by sexes](image)

**Fig. 3.** Distribution of cases by sexes

Epidemiological surveys suggest that CVDs epidemic in Eastern Europe might be caused also by other risk factors, such as psychosocial stress, environmental pollu-
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tion and nutritional deficiencies that might increase oxidative stress. This would be the result of an imbalance between different risk factors, as not only free radicals, but also protective antioxidants are produced, leading to an acceleration of atherogenesis. Recently, various infectious factors were also proposed as risk factors (10, 11).

Our study has rated the HTN risk factors, as follows: behavioral type (41.2%), a diet rich in fat and eggs (38.2%), stress (37.9%); sedentary lifestyle (25.8%), daily alcohol consumption (16.47%) excess salt intake (9.0%), passive smoking (4.7%) as compared to active smoking (1.94%). In women, endocrine disruption, especially during preclimacteric years, was also considered.

The analysis of the distribution of HTN staging showed that 44 patients (30.55%) were diagnosed with HTN stage I, of whom 27 were female (61.36%) and 17 were male (38.64%) (p = ≤ 0.05); 69 patients (47.93%) had HTN stage II, of whom 21 were female (30.43%) and 48 were male (69.57%) (p = ≤ 0.005) and and 31 patients (21.52%) had HTN stage III, of whom 16 were female (51.61%) and 15 were male (48.39%) (p ≥ 0.05) (fig. 4).

The process of atherosclerosis caused stroke in some patients with HTN stage II (24 cases: 16.66%).

Patients included in the study were on antihypertensive drug therapy (1, 2, 3 or more antihypertensive drugs) when blood pressure was measured, having a significant influence on results.

For instance, 42 patients (29.16%) have already received an antihypertensive drug; 59 patients (40.97%) two drugs and 43 patients (29.87%) over 3 antihypertensives.

The study of HTN values in groups based on age decades showed that 5 patients (3.47%) were aged less than 30 years, 51 patients (35.41%) in the 31-40 age group;

46 patients (31.94%) in the 41-50 age group; 34 patients (23.61%) in the 51-60 age group; 8 patients (5.55%) in the 61-70 age group (tab. III).

The study of the role of the genetic risk factor in HTN based on family history showed that 59 study group patients
(40.97%) had no parent with HTN; 62 patients (43.05%) had one parent with HTN and 23 patients (15.98%) had both parents with HTN.

**TABLE III**

<table>
<thead>
<tr>
<th>Age groups (years)</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;30</td>
<td>5</td>
<td>3.47</td>
</tr>
<tr>
<td>31-40</td>
<td>51</td>
<td>35.41</td>
</tr>
<tr>
<td>41-50</td>
<td>46</td>
<td>31.94</td>
</tr>
<tr>
<td>51-60</td>
<td>34</td>
<td>23.61</td>
</tr>
<tr>
<td>61-70</td>
<td>8</td>
<td>5.55</td>
</tr>
<tr>
<td>Total</td>
<td>144</td>
<td>100.00</td>
</tr>
</tbody>
</table>

**Analysis of the prevalence of some categories of risk factors**

**Smoking.** In evaluating smoking patients, we have quantified both the number of cigarettes smoked per day and the smoking duration (in years). Women in the study group, 64 women (44.44%), were mainly non-smokers and of the total number of 80 male patients, only 43 (29.86%) were smokers.

**Coffee intake.** Coffee intake of one cup per day was seen in 58 patients (40.27%) and 2-3 cups per day in 20 patients (13.88%).

**Sedentary lifestyle.** It was evaluated based on questioning. The results show that 31 patients (21.52%), mainly women (24; 16.66%) are rather sedentary, as compared to 7 male patients (4.86%) (p<0.005). 113 patients (78.47%) were reported as active, but mainly men think of them as active 80 (55.55%), as compared to 33 women (22.92%) (p≤ 0.05).

**Body mass index (BMI)** was calculated by measuring patient’s height and weight. By using the formula BMI = weight (kg) / height 2 (m²), different levels of over-weight and obesity, and also the relationship between obesity and HTN stages were assessed in the study group. In this respect, out of the patients with normal weight (BMI <25), 12 patients had HTN stage I (all male); 22 patients had HTN stage II (12 male and 10 female); 6 male patients had HTN stage III. Out of the overweight patients (BMI = 25-30), 11 patients had HTN stage I (7 male and 4 female), 25 patients had HTN stage II (16 male and 9 female) and 7 men had HTN stage III. In patients with obesity class I (BMI = 30-35), 14 patients had HTN stage I (equal male and female ratio), 28 patients had HTN stage II (12 male and 16 female) and 12 patients had HTN stage III. Obesity class II (BMI = 35-40) occurred mainly in patients with HTN stage II, while HTN stage I was diagnosed in only 1 woman and HTN stage III in 3 patients. Obesity class III (BMI > 40) was found only in 4 of the 144 HTN patients, of whom 3 patients with HTN stage II. Obesity class II and class III was more frequently associated with HTN stage II.

**Abdominal perimeter,** used as an index that quantifies the distribution of adipose tissue, and abdominal (android) obesity are widely recognized as the most common aspects associated with hypertension and vascular risk. In our study group, abdominal obesity was present in 37 men (25.69%) and 6 women (4.16%) (p<0.005). Median risk was correlated with values of
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Waist circumference ranging between 94 and 102 cm in men and of 80-88 cm in women and it was seen in 24 men (16.66%) and 19 women (13.19%). A high risk (≥ 102 cm in men and 88 cm in women) of 33 (23.61%) in men and of 22 (15.27%) in women (p ≤ 0.05) was recorded.

The waist to hip ratio (abdominal-gluteal ratio) (WHR) was calculated by dividing the waist perimeter to the hip perimeter. Android obesity has WHR values higher than 0.8 in women and higher than 0.9 in men. Both men and women in the study group had a higher WHR than normal (43% of men and 29% of women) (p≤0.05). It was associated mainly with HTN stage II (26% of men and 19% of women) (p≥0.05).

Fasting blood glucose levels above 110 mg/dl were found in 49 patients (34.02%), of whom 23 (15.97%) were female and 26 (18.05%) were male (p ≥ 0.05).

Cholesterol levels above 240 mg/dl were found in 83 patients (57.63%), of whom 36 (25.00%) were female and 47 (32.64%) were male (p ≤ 0.05).

Clinical and epidemiological studies have also shown the presence of HTN risk factors, such as overwork, psychiatric treatments and negative emotions.

Studies of population groups similar to ours have shown risks over large temporal and spatial scales (3, 5, 8, 11).

CONCLUSIONS

Our clinical and epidemiological prospective study, conducted on a representative group of patients seeking care at the family medicine practice has made some contributions by showing the role of modifiable risk factors in the occurrence and outcome of cardiovascular diseases. Thus, it was shown that preventive measures taken to reduce cardiovascular risk under the supervision of the family doctor significantly decrease morbidity and mortality rates.

Clinical and epidemiological surveillance plays an important role in disease prevention, increases the use of ambulatory care and decreases the need for hospital care, with significant economic gains for the individual, the family and the community.

REFERENCES

SLEEP APNEA AND EMERGENCE OF PNEUMONIA

Sleep apnea is a sleep disorder characterized by obstruction of upper airway which caused hypoxemia, hypercapnia and sleep fragmentation. This disorder is linked with cardiovascular diseases and cognitive impairment. Patients with sleep apnea have an increased risk of pulmonary aspiration and immune perturbations which could facilitate emergence of pneumonia. The link between sleep apnea and pneumonia was evaluated in a cohort study published in Canadian Medical Association Journal, conducted by Dr. Vincent Yi-Fong Su and colleagues. This study has a duration of 11 years and followed the emergence of pneumonia in a lot of the 34 100 patients (68 16 with sleep apnea and 27 284 controls, with the same comorbidities). The results showed that the patients with sleep apnea had a higher risk to develop pneumonia than the control group (9.36% and 7.77% respectively). For the patients with severe sleep apnea, the risk of pneumonia was higher than the cases with milder severity. Also, the use of continuous positive airway pressure (CPAP) therapy has increased the emergence of pneumonia, the adjusted risk being 1.32 for the cases who received CPAP therapy. The authors showed that sleep apnea is a risk factor for pneumonia (Su VYF, Liu CJ, Wang HK et al. Sleep apnea and risk of pneumonia: a nationwide population-based study. CMAJ. 2014 DOI: 10.1503/cmaj.131547).

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