

Comparison and Subjective Evaluation of Safety and Efficacy of Antihypertensive Drugs from the Group Angiotensin-Converting Enzyme and Diuretics

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Abstract

Introduction: Cardiovascular diseases are a very significant sociomedical problem in all countries of the world. Proper therapy of cardiovascular diseases, as well as their timely prevention, is one of the most important conditions for increasing life expectancy and maintaining quality of life. One of the most effective ways to achieve this goal is the timely detection and proper treatment of hypertension. Doctors note that in diseases such as stroke, coronary heart disease, including myocardial infarction, and heart and kidney failure, their level may be reduced as a result of adequate antihypertensive therapy. This is especially important for Ukraine, where the incidence of cardiovascular disease is increasing every year. Recently, along with the expansion of opportunities in the treatment of hypertension, there is enough information about the effectiveness of drugs that lower blood pressure. **Materials and Methods:** Methods such as questionnaires of patients (content analysis of case histories) were used. Data processing was performed using statistical and mathematical methods and graphical analysis. **Results:** There were some patterns of lowering blood pressure in patients on the background of monotherapy of hypertension and patients following the doctor's instructions for treatment. **Discussion and Conclusion:** As a result of the study, it was found that most patients follow the recommendations of doctors on the appointment of antihypertensive drugs.

Key words: Arterial hypertension, antihypertensive drugs, pharmacoepidemiological study

INTRODUCTION

Cardiovascular diseases are a major public health challenge, representing 10% of the global burden of disease.^[1] The annual number of deaths caused by cardiovascular disease is expected to rise by more than 33% over the coming two or three decades. Hypertension is among the most important modifiable risk factors for cardiovascular diseases.^[2] Meta-analyses of placebo-controlled trials of antihypertensive medication have shown that such treatment can prevent or postpone myocardial infarction and stroke. However, the key question remains: Which of the many available types of blood pressure lowering drugs is the better choice as first-line medication?

To study in more detail the subjective assessment of the effectiveness of antihypertensive monotherapy, the questionnaires of patients were structured. They were divided into groups

according to the drugs used by patients belonging to one or another clinical and pharmacological group: ACE inhibitors and diuretics.^[1]

The purpose of our study was to study of subjective factual and prognostic assessment of patients' effectiveness of treatment.

MATERIALS AND METHODS

The study used a questionnaire of 320 patients diagnosed with hypertension, the results of the study were processed

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by statistical and mathematical methods using graphical analysis.^[2] The study was conducted in 2019. The study was approved by the Ethics Committee. One hundred and forty-eight male and 172 female patients were used for this study.

RESULTS

A comparative intergroup analysis of indicators was conducted. The age and sex of the groups, the value of the average systolic blood pressure (SBP) and diastolic blood pressure (DBP) recorded at the reception, the level of manifestation of undesirable (side) effects of the therapy, the subjective assessment of the effectiveness of treatment, and the degree of satisfaction with this treatment were studied. To unify the calculations and compare the presented data, indicators of the frequency of side effects of therapy, subjective assessment of its effectiveness, as well as the degree of satisfaction with treatment were presented in points. Comparison of the studied indicators with the help of analysis of variance did not reveal significant differences in any of the studied features. There were also no significant differences in the level of education and the degree of compliance. To do this, subgroups were formed depending on the specific drug taken by patients. Further analysis was performed in these subgroups.

The angiotensin-converting enzyme (ACE) inhibitor group in monotherapy was represented by enalapril, captopril, quinapril, and spirapril.^[3-5]

Comparison of the general average values of the studied indicators of these groups did not reveal differences for any of them. However, statistically significant differences were found when comparing subgroups. The main studied indicators are presented in Figure 1, and the structure of the subjective assessment of the effectiveness of therapy is shown in Figure 2.

As mentioned above, the most numerous, both quantitatively and in terms of the structure of trade names, was a subgroup of enalapril. It was represented by drugs with commercial names renitek, enam, enap, and ednit. The analysis carried out on each of the studied indicators revealed heterogeneity of values only when comparing the criterion of subjective assessment by patients of the effectiveness of the therapy. It was determined that among patients treated with enam, this indicator was significantly lower ($P < 0.05$) than in patients treated with renitek. All other indicators did not have significant differences.

However, when comparing the absolute values, it becomes clear that patients who received enam as antihypertensive monotherapy gave the lowest evaluation of the effectiveness of this therapy. In the subgroup of enam were noted and the highest levels of SBP and DBP, which are recorded during a visit to the doctor. In addition, the fact that in the same subgroup according to the results of the analysis, there was a decrease in the dynamic indicators of the achieved level of health in relation to the initial (-8%) is noteworthy. Such negative dynamics was not observed in any subgroup not only in the treatment of ACE inhibitors but also in therapy with other drugs. It is the negative dynamics of patients' well-being on the background of enam, which determined the low actual level, led to the fact that when calculating the prognostic (expected) level of well-being, a fairly large value of the growth rate -26.1% . In this regard, it is probably not appropriate to recognize the validity of this indicator. In addition to the fact that the patients were treated with enam, although they expected some improvement in their well-being with constant treatment, the predicted level of their well-being was lower than in patients taking other enalapril drugs.

Analysis of additional profile data showed that almost all patients who use enam experience adverse (side) effects while taking the drug, in particular, headache (30%), consider

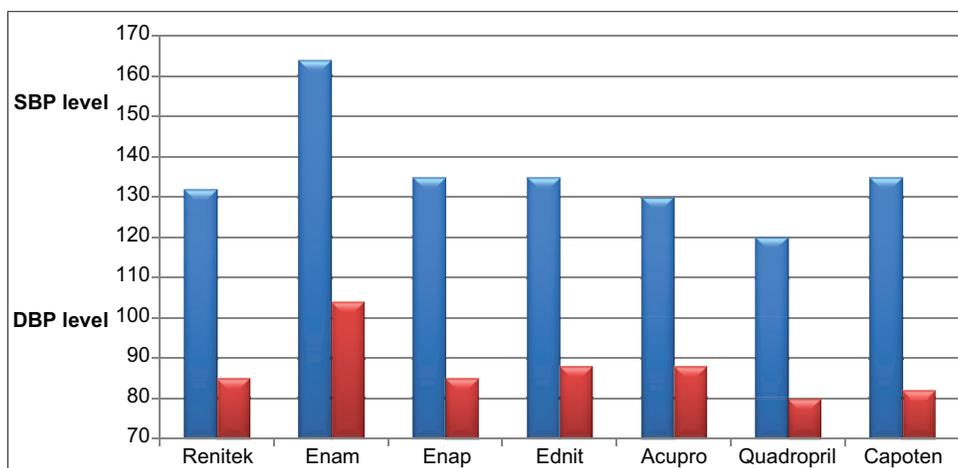


Figure 1: The level of blood pressure on the background of taking angiotensin-converting enzyme inhibitors, recorded during a visit to the doctor

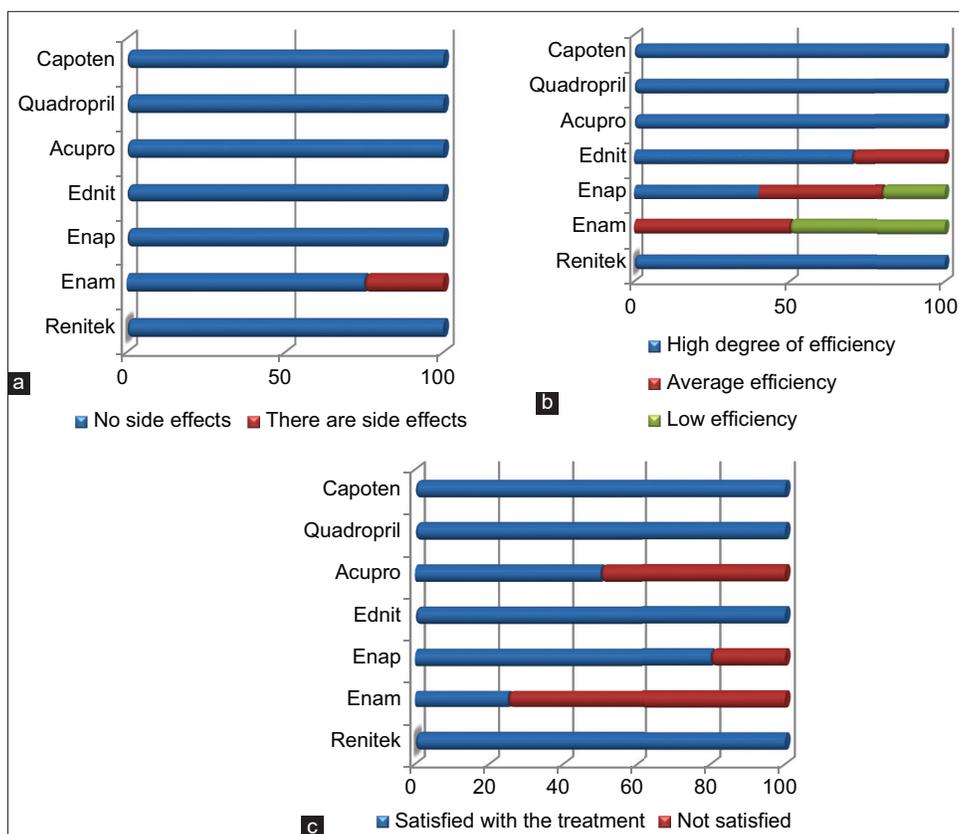


Figure 2: (a-c) The structure of the subjective assessment of the effectiveness of therapy with angiotensin-converting enzyme inhibitors

treatment ineffective (50%) and ineffective (50%), and, therefore, are not satisfied with the treatment (75%).

When taking enap, 75% of patients did not experience adverse side effects. Other patients reported dizziness (15%), headache (5%), and cough (5%). In the subgroup that received this drug, 80% of patients were satisfied with the therapy, although 40% considered it ineffective. The increase for the achieved (actual) level of general well-being was 15% and for the prognostic (expected) –13%.

Patients receiving ednit had no side effects, in 2/3 of cases, the therapy was considered effective and 100% were satisfied with it. Blood pressure values did not differ significantly from similar indicators in other patients. The increase in the achieved level of well-being in relation to the initial was 17% and prognostic in relation to the actual –20%.

The highest subjective evaluations of efficacy and the best levels of blood pressure achieved, although without significant differences, were observed in the treatment of renitek. Against the background of its reception, patients did not notice side effects, considered the therapy effective, and were satisfied with its results. Renitek administration contributed to the most significant increase in enalapril drugs in terms of actual health (19%). For the forecast level, this figure was 12%.

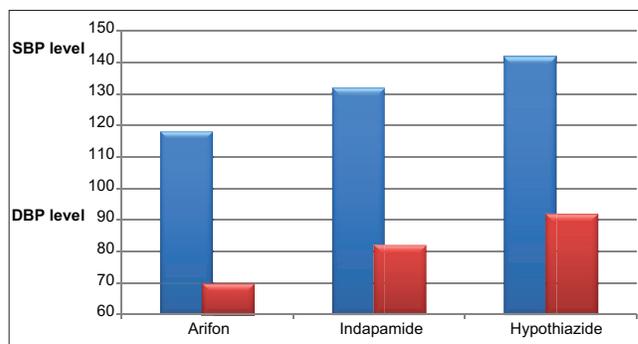


Figure 3: Blood pressure in patients receiving diuretics, recorded during a visit to the doctor

Comparative results of subjective indicators of well-being were obtained in the analysis of questionnaires of patients taking captopril drugs, presented in 100% capoten. There were no significant differences and the average blood pressure levels recorded at the time of the patients' visit. The action of capoten, according to patients taking it, helped to improve general well-being. The increase in the achieved level of general well-being according to the indications was 19% and for the forecast –31%.

In the questionnaires of patients, taking Accupro (quinapril) was not noted against the background of treatment of adverse events. This therapy was described by patients as effective,

but satisfied them only in 50% of cases. The increase in the achieved level of well-being was 6% and prognostic –9%.

When taking quadropiril (spirapril), no adverse events were observed. Patients evaluated this therapy as effective and satisfactory. The level of fixed blood pressure and absolute values did not differ significantly from similar mean values in other patients, but the increase in the achieved level of well-being was 60%, which was the highest among all compared groups. The increase in the prognostic level of health was 13%.

The group of diuretics in monotherapy was represented by drugs indapamide and hydrochlorothiazide. Comparison of these groups did not reveal significant differences for any of the studied indicators.

In the subgroups of patients receiving diuretic drugs, the lowest levels of SBP and the DBP was noted in patients with arterial hypertension on the background of receiving Arifon and Hypothiazide [Figure 3]. However, a comparison of these values revealed no statistically significant differences.

Antihypertensive therapy is carried out by Arifon, in the opinion of the patients studied did not cause them side effects, and its effect was assessed as effective. However, in half of the cases (50%), patients were not satisfied with the treatment [Figure 4].

No adverse side effects have been reported with indapamide. Opinions of patients about the effectiveness of this drug were divided equally: 50% of the therapy was considered effective

and 50% – ineffective. Half of the patients in this subgroup were satisfied with the treatment and half considered the therapy unsatisfactory. The increase in the actual and projected level of health according to the values was 14 and 12%, respectively.

The hydrochlorothiazide group was represented by a drug with the commercial name hypothiazide. Its use has not been associated in patients with side effects. One-third of the patients rated the therapy as effective, while 2/3 of the patients considered it insufficiently effective. Only one-third of hypertensive patients receiving hypothiazide were dissatisfied with this therapy. When prescribing this drug, the growth rates of the actual and predicted level of well-being were 6 and 8%, respectively.

In the described subgroups, the levels of subjective assessment of the therapy and absolute indicators were comparable. This is evidenced by the absence of statistically significant differences when comparing them.

The study of the actual use of antihypertensive drugs showed that one of the features of outpatient antihypertensive treatment is patients' non-compliance with prescriptions, which is mainly due to financial considerations.

DISCUSSION AND CONCLUSION

Analysis of the structure of the actually used drugs, as in the previous stage, revealed the leadership of ACE inhibitors, which were dominated by enalapril drugs. They were represented by

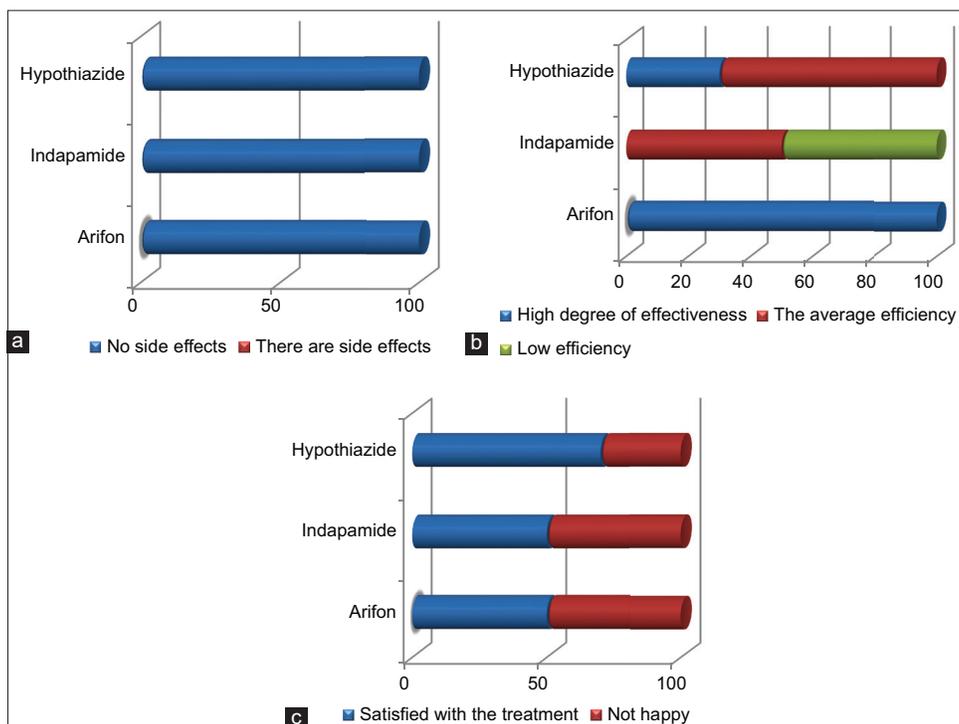


Figure 4: (a and b) The level of blood pressure on the background of diuretics, recorded during a visit to the doctor. (c) The structure of the subjective assessment of the effectiveness of diuretic therapy

the largest number of brands, a comparative analysis of the subjective assessment of the effectiveness of which revealed statistically significant differences. Differences were also found in the indicators within the subgroups of patients who received other drugs as antihypertensive monotherapy, but the difference in subjective assessment was not significant. No statistically significant differences were found when comparing the indicators of the groups corresponding to the main clinical and pharmacological groups of antihypertensive drugs.

These studies have not been previously conducted by Ukrainian scientists, so we do not have the opportunity to compare our results with other scientific works.

Thus, the results obtained at this stage of the work supplemented the data on the structure of the actual use of drugs, which was necessary for the selection of specific drugs in the rest of the study and showed differences in patients' subjective assessment of different treatment alternatives, which were later used as indicators of efficiency and usefulness in pharmacoeconomic analysis.

CONCLUSION

As blood pressure increases, it is more difficult to control it at the target level through lifestyle modifications alone, and treatment with antihypertensive drugs becomes necessary. The occurrence of cardiovascular disease can be prevented by

reducing the blood pressure with antihypertensive drugs. This comprehensive framework introduces a new way of doing observational health-care science at scale. The approach supports equivalence between drug classes for initiating monotherapy for hypertension – in keeping with current guidelines, with the exception of diuretics superiority to angiotensin-converting enzyme inhibitors and the inferiority of calcium channel blockers.

REFERENCES

1. Gavorník P, Dukát A, Gašpar L, Hučková N, Slezáková L, Kusendová K, *et al.* Arterial hypertension-multicirculus vitiosus vasorum. *Vnitr Lek* 2015;61:25-34.
2. Latvia R. Development Trends in Medical Science and Practice: The Experience of Countries of Eastern Europe and Prospects of Ukraine: Monograph/Edited by Authors. Latvia: Baltija Publishing; 2018. p. 230.
3. Kovalenko VM. Diseases of the circulatory system as a medical and social and socio-political problem. *Anal Stat Man* 2015;278:52-8.
4. Sakhandia IV, Kosyachenko KL. Assortment of herbal medicines of the treatment of cardiovascular diseases. *Wiad Lek* 2018;71:1104-8.
5. Jelínek L, Václavík J. Treatment of arterial hypertension in the elderly. *Cardiol Rev* 2018;12:48-62.

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