

STUDY ON THE EFFICIENCY OF ANGIOTENSIN CONVERTING ENZYME (ACE) INHIBITORS THERAPY IN A BATCH OF HYPERTENSIVE PATIENTS IN THE COUNTY OF ARGES (II)

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Keywords: therapy with ACE, prospective study

Abstract: The main objectives of this study is to demonstrate the effectiveness and efficiency of the therapy with ACE inhibitors on medium term (6 months) in the decrease of the systolic and diastolic blood pressure and to demonstrate the ACE inhibitors' influence on the level of total cardiovascular risk. The prospective study was performed in the Department of Cardiology within the County Emergency Hospital of Pitești, during 2009-2010, on a number of 357 patients. Clinical follow-up period was of 6 months. Although, the moment of patients' inclusion in the study was different, each patient was followed and treated according to the same operational plan. In defining the population of the county of Arges, I took into account the criteria of inclusion in the batch, respectively the exclusion criteria, as well as the criteria that required the premature interruption of the study.

Cuvinte cheie: terapia IECA, studiu prospectiv

Rezumat: Demonstrarea eficacității și eficienței terapiei cu IECA, pe termen mediu (6 luni), în scăderea valorilor tensionale sistolice și diastolice; demonstrarea influenței IECA asupra nivelului riscului total cardiovascular. Studiul prospectiv s-a efectuat în secția de Cardiologie a Spitalului Județean de Urgență Pitești, în perioada 2009-2010, pe un număr de 357 pacienți din cauzistica secției. Perioada de urmărire clinică a fost de 6 luni. Deși momentul introducerii în studiu a fost diferit, fiecare bolnav a fost urmărit și tratat după același plan operațional. Definirea populației argeșene studiate a luat în calcul criteriile de includere, respectiv excludere din lot, precum și criteriile ce au impus întreruperea prematură a studiului.

PURPOSE

The purpose of this study is to demonstrate the effectiveness and efficiency of the therapy with ACE inhibitors on medium term (6 months) in the decrease of the systolic and diastolic blood pressure and to demonstrate the ACE inhibitors' influence on the level of total cardiovascular risk.

METHODS

The prospective study was performed in the Department of Cardiology within the County Emergency Hospital of Pitești, during 2009-2010, on a number of 357 patients. Clinical follow-up period was of 6 months.

RESULTS AND DISCUSSIONS

Identification of target organs damage (type and prevalence of complications)

Cardiac damage

1. Left ventricular hypertrophy (LVH) is a serious complication of hypertension and an independent risk factor for coronary events, which increases the risk of sudden death.(1) The identification of the presence of LVH in the studied patients was done by ultrasound and by the echocardiographic method.

Electrocardiographic evaluation: LVH was observed upon the electrocardiographic examination in 52.62% of the patients included in the batch, with a prevalence of men (103) against women (85) - $p = 0.000188 < \alpha = 0.01$.

Figure no. 17. LVH prevalence in the studied group

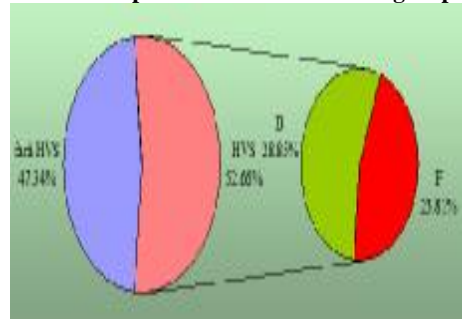
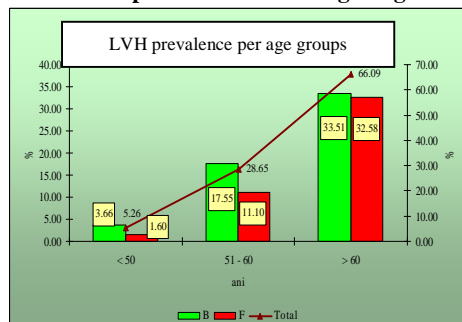


Figure no. 18. LVH prevalence according to age



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CLINICAL ASPECTS

Echocardiographic evaluation. The method used was the mono- and two-dimensional transthoracic echocardiography with interventricular septum thickness monitoring (IVS): Normal 6-12 mm in men, 6-11 mm in women. The distribution of the hypertensive patients by the type of the left ventricular hypertrophy, diagnosed by echocardiography, revealed the presence of concentric LVH (with LVM normal or increased) in 57.89% of the studied group, asymmetric LVH in 22.32% of the patients, respectively with eccentric LVH in 19.79% of the remaining patients. Concentric LVH registered statistical significance ($p = 0$, z test)

Figure no. 19. Distribution of patients by type of LVH

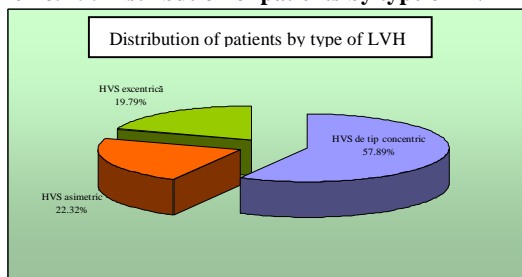
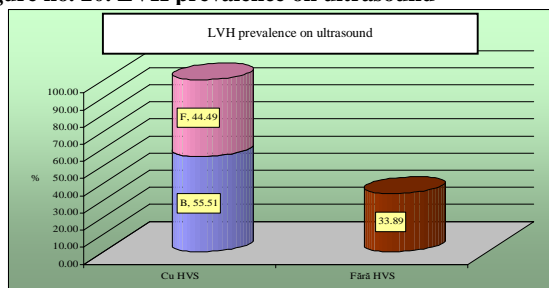
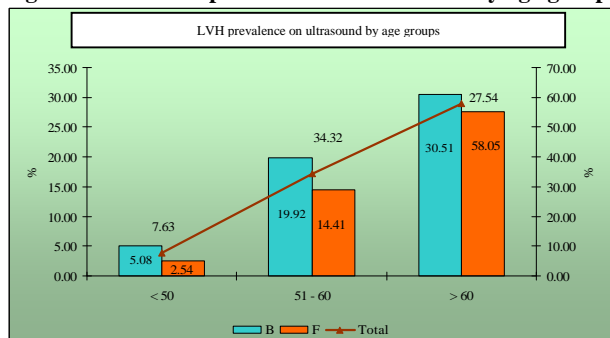


Figure no. 20. LVH prevalence on ultrasound



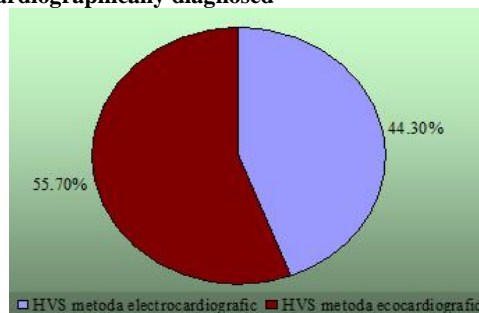
The prevalence of LVH diagnosed on ultrasound in the hypertensive study group according to age showed that most of the hypertensive patients (58.05%) were over 60 years old.

Figure no. 21. LVH prevalence on ultrasound by age groups



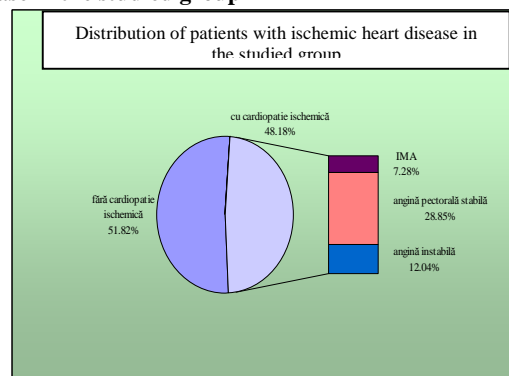
Relation between LVH electrocardiographically diagnosed and LVH echocardiographically diagnosed. The echocardiographic diagnosis of left ventricular hypertrophy was established earlier and was identified in a higher number of patients compared with the electrocardiographic diagnosis. The correlation between echocardiographic LVH and electrocardiographic LVH, (the difference) is statistically significant ($p = 0.000000000069 < 0.01$ z test).

Figure no. 22. Relation between LVH electrocardiographically diagnosed and LVH echocardiographically diagnosed



2. Ischemic cardiomyopathy assessed primarily by anamnesis (medical documents attesting the coronary disease) and clinically, with laboratory confirmation (ECG and/or echocardiography).

Figure no. 23. Distribution of patients with ischemic heart disease in the studied group



The share of patients with stable angina is significantly higher $p = 0.0000000188 < 0.01$ z test

3. Heart failure – the confirmation of this comorbidity was based on clinical evidence and was supported by the changes identified by echocardiography; only the patients in class I and II were included in the study, those in class III and IV constituted an independent class of heart failure pathology.

Figure no. 24. Structure of the studied group according to the presence of heart failure

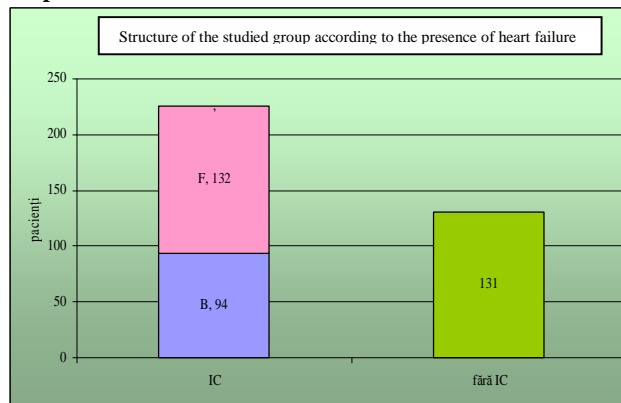
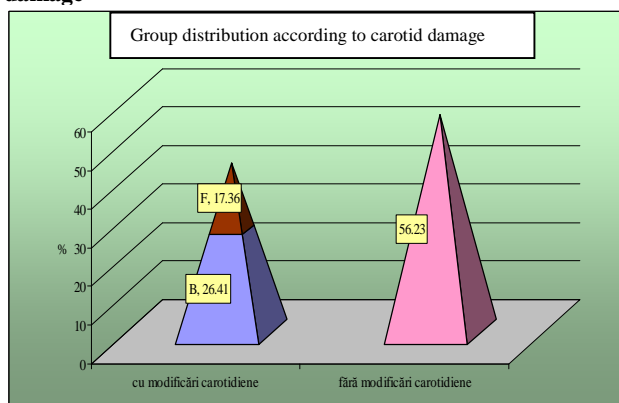


Figure no. 25. Group distribution according to carotid damage



Vascular damage. In order to identify vascular damage in the studied hypertensive patients, we used carotid arteries ultrasound, determining the intima-media complex thickness, the presence of carotid plaque and the ankle-arm index by continuous and nanometric Doppler method. The vascular study in the analysed group showed that 56.23% of the patients had no changes in carotid ($p =$ significantly higher $0.000000000000302 < 0.01$ t test). These were present in 43.77% of the patients, of which 26.41% were men and 17.36% women ($p = 0.000000084$ significant difference < 0.01 t test) with a male female ratio of 1.52.

Figure no. 26. Gender distribution of the studied group according to carotid damage

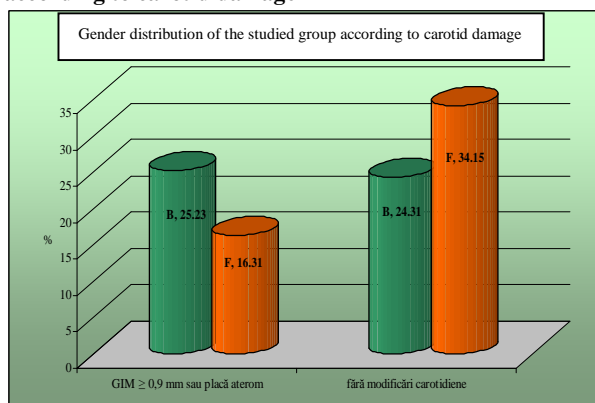


Figure no. 27. Vascular screening in the hypertensive patients (ankle-arm index)

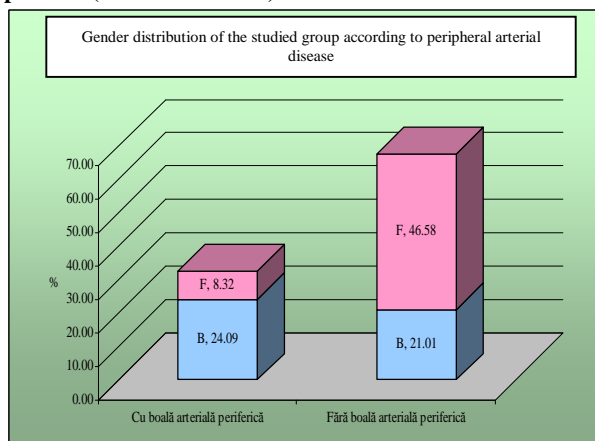
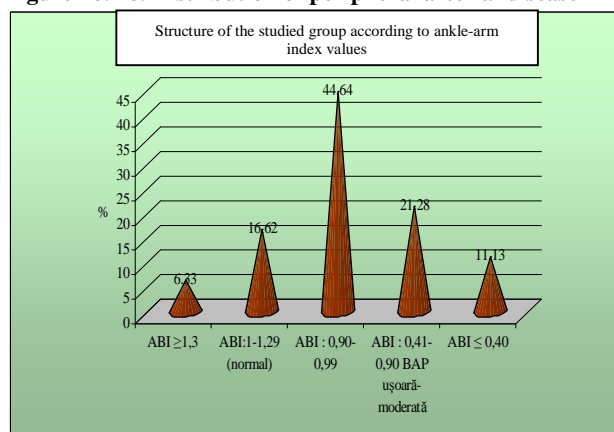


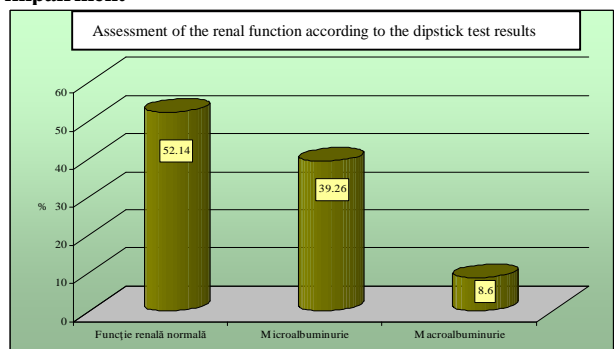
Figure no. 28. Distribution of peripheral arterial disease



By analysing the values of the ankle-arm index, we identified the patients who had peripheral vascular disease. Thus, 116 patients (32.41%) were diagnosed with peripheral arterial disease with a prevalence of 2 times higher in men as against in women, respectively 24.09% vs. 8.32% $p = 0 < 0.01$ t test.

Renal impairment. Impaired renal function in hypertensive patients is frequent and is a strong predictor of subsequent cardiovascular events and death, even in the treated patients. The diagnosis of hypertension-induced renal damage is based on a reduced renal function and increased urinary albumin excretion. In the assessment of the renal function, *creatinine clearance* was taken into account by the Cockcroft-Gault formula based on age, sex, body weight and serum creatinine of the patient and the presence of microalbuminuria, as evidenced by the dipstick tests.(2) We observed that 15.34% of the patients had a moderate decrease in the glomerular filtration rate (GFR), while 6.77% of patients had severely impaired renal function (GFR = 15-29 ml/min/1,73 m², significantly $p = 0.000000386$ great < 0.01 t test). The assessment of the renal function according to the dipstick test results showed that 140 patients (39.26%) had microalbuminuria ($p =$ significantly higher $0.000000000000054 < 0.01$ t test), 31 patients (8.6%) were identified with macroalbuminuria, and the remaining hypertensive patients, 52.14%, had normal renal function.

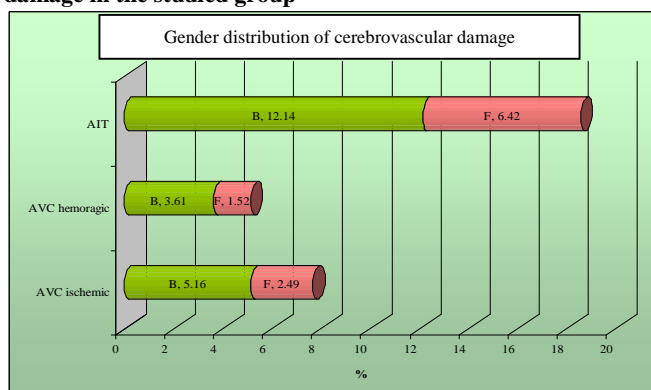
Figure no. 29. Distribution of patients according to the renal impairment



Brain damage. The evaluation of brain damage in the studied patients with stroke was made by imaging techniques, respectively by cranial computed tomography (CT) and rarely by MRI. I noticed a number of 112 (31.34%) cerebrovascular events in the studied group, with a double prevalence in men (20.91%) than in women (10.43%), as shown in the table above. (Significantly higher $p = 0.000000000748 < 0.01$ t test). Of these, the most numerous events were the transient ischemic

accidents.

Figure no. 30. Gender distribution of cerebrovascular damage in the studied group

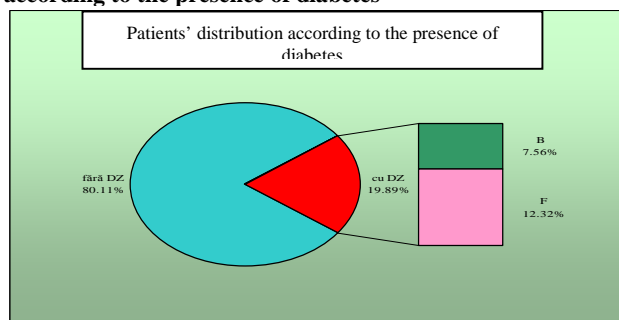


Presence of comorbidities

1. **Diabetes mellitus** – the existence of associated pathology has been confirmed:

- anamnestically - diabetics under medical treatment and/or under hypoglycemic diet;
- by detection during the study - the diagnosis of diabetes supported by hyperglycemia a jeun, after two measurements, for values more or equal to 126 mg / dl, respectively for postprandial blood glucose values above 198 mg / dl, according to ESH/ESC 2007 criteria.

Figure no. 31. Distribution of the studied group of patients according to the presence of diabetes



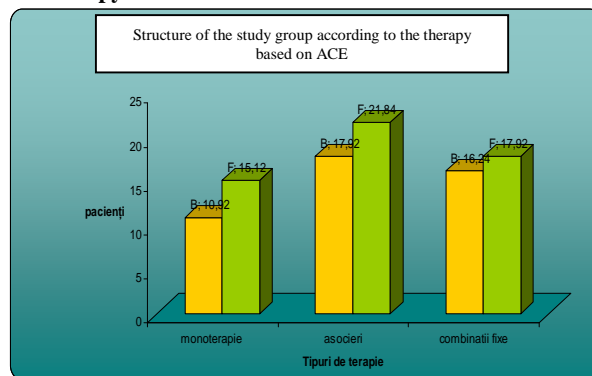
2. **Chronic renal failure.** Of 357 patients, 3 men and 2 women had chronic renal failure. They were also known with essential hypertension, not secondary, being subsequently diagnosed with chronic renal failure.

ACE inhibitor therapy. The clinical research recommends ACE as a useful pharmacological group suitable for the initiation and maintenance of the antihypertensive treatment, both alone and in certain fixed drugs combinations or associations. ACE inhibitor therapy was guided according to the stages of hypertension, presence of cardiovascular risk factors and comorbidities, as well as according to certain signs of target organ damage.

The main purpose of the ACE therapy is to improve the quality of life and to reduce mortality and morbidity due to cardiovascular disease. Therefore, monotherapy was primarily addressed to the patients with hypertension in stages I and II and to a large extent, to those newly discovered. As combinations of ACE inhibitors with other antihypertensive agents, in accordance with the recommendations of the hypertension treatment protocols, we chose diuretics such as thiazide diuretic (indapamide) and calcium antagonist. With a view to increase the patients' compliance to treatment, as well as due to the advantage of the minimum effective dose of fixed drug

combinations, we used this type of medication, both in the newly detected patients and in those with different stages of hypertension.

Figure no. 32. Structure of the studied group according to the therapy based on ACE



CONCLUSIONS

The evolution of the studied group under the ACE treatment, influenced by the identified risk factors and comorbidities, supports the idea that ACEs have an important therapeutic influence proved both in decreasing blood pressure values and in protecting the target organs and preventing complications.

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