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PHARMACOECONOMIC ANALYSIS OF OUTPATIENT COMBINED THERAPY OF ARTERIAL HYPERTENSION AND HYPERCHOLESTEROLEMIA

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Pharmacoeconomic analysis of outpatient therapy for patients with diagnosis of arterial hypertension (AH) and hypercholesterolemia has been carried out. Result of treatment is estimated by reducing risk of cardiovascular death.

Keywords: *pharmacoeconomics, arterial hypertension, hypercholesterolemia*

Проведен фармакоэкономический анализ амбулаторной терапии пациентов с диагнозом артериальная гипертензия (АГ) и гиперхолестеринемия. Результат лечения оценен по снижению риска сердечно-сосудистой смерти.

Ключевые слова: *фармакоэкономика, артериальная гипертензия, гиперхолестеринемия*

In economically advanced countries cardiovascular diseases take the first place among causes of disability and mortality of adult population. The rhythm of modern life causes rejuvenation of cardiovascular disease. According to the World Health Organization life expectancy in the western and the eastern countries is defined in 50% by diseases of the circulatory system. The highest mortality from cardiovascular disease among all European countries is in Russia. According to

digest of medical information-analytical center «Basic indicators of public health and health care organizations of Novgorod region for 2009» diseases of circulatory system is leading in appealability and among causes of mortality in hospitals.

Despite significant progress in creating of new and effective drugs for treatment of hypertension and hypercholesterolemia mortality rate remains high. There are many reasons: small availability of modern

diagnostic techniques and equipment in practical public health, lack of information awareness of physicians in diagnosis and treatment, time-lag in detection of disease, etc.

The main goal of treatment of hypercholesterolemia and hypertension is increasing of life expectancy, reducing of risk of cardiovascular death, improving of quality of patients' life (in prospect, for complications of this pathology). However, the drugs used in cardiovascular disease are costly, so commitment of patients to their health is low in Russia. According to some authors less than 6% of patients have taken statins for 3 years (from among those who were prescribed statins) [1]. Therefore it is particularly important to determine the most clinically effective and less financially costly treatment regimen.

In order to identify optimal treatment regimen we used method of pharmacoeconomic analysis of «cost-effectiveness». The study was based on Polyclinic №3 of Municipal Medical Institution, Central City Clinical Hospital (MMI CCCH), Velikiy Novgorod. Criteria basing on which we include patients in the research are: presence of hypertension of I-II degree and hypercholesterolemia, age up to 68 years. 70 people participated in the study. Drug therapy in this group of patients has been carried out usually for a long time; for analysis we used data of two months of therapy after the first patients' visit to doctor and achieving significant result of direct clinical effects (physical characteristics — decreasing of blood pressure and reduce of total cholesterol).

We identified seven treatment regimens which doctors use for combined therapy of hypertension and hypercholesterolemia. Treatment regimens were assigned with number in order of decreasing of frequency of use (Table 1).

Table 1

Regimens of combined therapy
of hypertension and hypercholesterolemia

№	Treatment regimen	Frequency of prescribing, %
1	Enalapril 5 mg, 2 times a day Atoris 20 mg for night	25,6
2	Renitek 10 mg, 2 times a day Atoris 20 mg for night	19,7
3	Renitek 5 mg, 2 times a day Simgal 20 mg for night	10,1
4	Renitek 5 mg, 2 times a day Crestor 10 mg for night	9,5
5	Amlotop 2.5 mg, once a day Atoris 20 mg for night	16,9
6	Amlotop 5 mg, once a day Simgal 20 mg for night	9,4
7	Betaloc Zok 12.5 mg, 2 times a day Atoris 20 mg for night	8,8

We calculated direct medical and nonmedical costs for eight-week therapy. Indirect costs are assessed difficult, so they remained outside of the analysis.

The direct medical costs included: cost of drugs, cost of visiting doctor (147 rubles × 2 doses = 294 rub.), and cost of test of total cholesterol in blood (60 rubles × 2 = 120 rub.). Cost of patient's travel to clinics were direct nonmedical costs.

The average price of 1 package of drug in retail sales in Velikiy Novgorod was determined by taking into account the dosage and filling. Prices were taken as at 10.01.2011 in five major pharmacy networks, located in the city. Calculating of cost of each treatment regimen has been performed according to average cost of package in retail pharmaceutical market of Velikiy Novgorod and regime of medication. Direct costs of treatment are presented in Table 2.

Table 2

Direct costs of combined therapy of hypertension and hypercholesterolemia for 8 weeks

№	Treatment regimen	Medical costs			Non-medical costs	Total, rubles
		Costs of medication for 8 weeks, rubles	Cost of clinical tests, rubles	Cost of visiting doctor, rubles	Cost of travel to clinics, rubles	
1	Enalapril 5 mg, 2 times a day Atoris 20 mg for night	859,6	120	294	112	1385,6
2	Renitek 10 mg, 2 times a day Atoris 20 mg for night	934,6	120	294	112	1460,6
3	Renitek 5 mg, 2 times a day Simgal 20 mg for night	959,3	120	294	112	1485,3
4	Renitek 5 mg, 2 times a day Crestor 10 mg for night	3257,5	120	294	112	3783,5
5	Amlotop 2.5 mg, once a day Atoris 20 mg for night	1599,9	120	294	112	2125,9
6	Amlotop 5 mg, once a day Simgal 20 mg for night	1633,0	120	294	112	2159,0
7	Betaloc Zok 12.5 mg, 2 times a day Atoris 20 mg for night	1127,3	120	294	112	1653,3

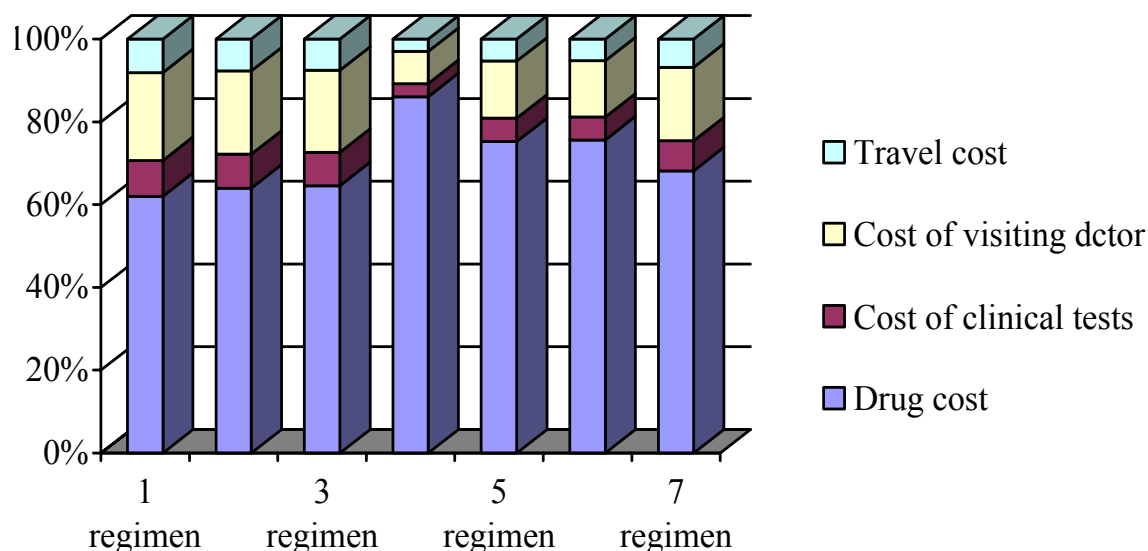


Fig.1. The structure of direct costs of combined therapy of hypertension and hypercholesterolemia

Depending on the treatment regimen 60-80% of all direct costs are accounted for the cost of drugs (Fig.1). This cost structure is typical for outpatient therapy.

Effectiveness of therapy was estimated by reducing of 10-year risk of cardiovascular death on a scale of SCORE. Such factors as age, sex, smoking status, total cholesterol and systolic blood pressure has been taken into account in defining of risk of cardiovascular death by SCORE scale. The resulting figure represents the probability of death from cardiovascular disease over the next 10 years expressed as percentage (Table 3). The greatest value and efficiency has combination of drugs Renitec and Crestor (Table 3).

Coefficients «cost/effectiveness» have been calculated for each alternative treatment regimens with formula 1.

$$CEA = \frac{DC_1 + DC_2}{Ef}, \quad (1)$$

CEA — coefficient «cost-effectiveness»; DC_1 — direct medical costs (the cost of medications, clinical tests, vis-

iting doctor), rub.; DC_2 — direct non-medical costs (cost of travel to clinics, laboratories), rub.; Ef — reducing of 10-year risk of cardiovascular death, difference between risk before and after treatment, %.

Coefficient «cost/effectiveness» shows the number of monetary units (rubles) to be spent on therapy to reduce 10-year risk of cardiovascular death by 1%. Lowest cost per unit of effectiveness belongs to Renitec and Simgala (Scheme 3), but as result of using this regimen for 8 weeks risk reduced only on 4.65%. Costs of regimens 4 and 5 are more significant, but with higher efficiency. Regimens 1 and 2 have the opposite situation — low cost and low efficiency. 6 and 7 treatment regimens do not guarantee greater efficiency at lower cost, so at this stage we can say that they will not be optimal.

Regimens 1, 2, 3, 4 and 5 were exposed to incremental analysis. This analysis allows determining cost effectiveness in terms of money using more expensive or cheaper options. Cost effectiveness is evaluated in com-

Table 3
Cost effectiveness of combined therapy of hypertension and hypercholesterolemia

№	Treatment regimen	Direct costs, rub.	Reducing of 10-year risk of death (effectiveness), %	CEA, rub.	CEA _{N/3} , rub.
1	Enalapril 5 mg, 2 times a day Atoris 20 mg for night	1385,6	2,94	471,3	61,9
2	Renitec 10 mg, 2 times a day Atoris 20 mg for night	1460,6	4,55	321,0	247,0
3	Renitec 5 mg, 2 times a day Simgal 20 mg for night	1485,3	4,65	319,4	Basis regimen
4	Renitec 5 mg, 2 times a day Crestor 10 mg for night	3783,5	8,37	452,0	617,8
5	Amlotop 2.5 mg, once a day Atoris 20 mg for night	2125,9	4,80	442,9	4270,7
6	Amlotop 5 mg, once a day Simgal 20 mg for night	2159,0	4,03	535,7	Not dominant
7	Betaloc Zok 12.5 mg, 2 times a day Atoris 20 mg for night	1653,3	2,73	605,6	Not dominant

parison with the basic treatment regimen for which we took regimen 3 as it has the lowest coefficient of cost-effectiveness. Cost-effectiveness calculated by the formula 2 is presented in Table 3.

$$CEA_{N/3} = \frac{DC_N - DC_3}{Ef_N - Ef_3}, \quad (2)$$

$CEA_{N/3}$ — cost effectiveness using more expensive or cheaper options of regimen N compared with the basic regimen 3, rub.; DC_N — direct costs when using scheme N , rub.; DC_3 — direct costs when using basic regimen 3, rub. ($DC_3 = 1485.3$ rubles.); Ef_N — reducing of 10-year risk of cardiovascular death when using regimen N , %; Ef_3 — reducing 10-year risk of cardiovascular death when using basic regimen 3, % ($Ef_3 = 4,65\%$).

When using regimens 1 and 2, you can save 61.9 and 247 rubles per unit of effectiveness correspondingly. Application of regimens 4 and 5 will require spending additional 617.8 and 4270.7 rubles per efficiency unit respectively.

Thus, optimal treatment regimen for combination therapy of hypertension and hypercholesterolemia according to coefficient «cost/effectiveness» is the 3rd regimen: Renitec 5 mg 2 times a day + Simgal 20 mg for night. In case of money deficit patient can be prescribed treatment regimen 1 and 2. If it is necessary to reduce significantly risk of cardiovascular death we recommend Renitec 5 mg 2 times a day + Crestor 10 mg for night, since this regimen of all the above has very high productivity and reasonable cost-effectiveness.

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