HOSPITAL-BASED ABC ANALYSIS OF PHARMACOTHERAPY IN KIDNEY AND LIVER TRANSPLANTATION

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Liver and kidney transplantation is the most effective and frequently the only radical method of treatment of patients with end-stage chronic kidney/liver diseases. Expenditure on transplantation is rather high. A number of patients with a reduced function of kidneys or liver is increasing rapidly. Thus, the problem is pressing and interdisciplinary. It has serious social and economic consequences for the Russian Federation. In this respect, analysis of the structure of use of medicinal preparations (MPs) enables to rationalize their application in clinical practice. This allows to carry out targeted measures to improve costly drug-induced therapy. Having analyzed prescriptions, it has been found out that MPs related to 52 pharmacotherapeutic groups were used in pharmacotherapy during kidney and liver transplantation within the analyzed period. ABC analysis revealed preparations included into group A, a group of immunosuppressants with the largest costs.

Key words: liver transplantation, kidney transplantation, chronic kidney disease, liver failure, ABC analysis, cost structure

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АВС-АНАЛИЗ ФАРМАКОТЕРАПИИ ТРАНСПЛАНТАЦИИ ПОЧЕК И ПЕЧЕНИ В УСЛОВИЯХ СТАЦИОНАРА

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Трансплантация печени и почек является наиболее эффективным и часто единственным радикальным методом лечения больных с терминальной стадией хронических болезней почек/печени. Затраты на трансплантацию достаточно высоки. В популяции достаточно быстро растет число пациентов со сниженной функцией почек или печени. Именно поэтому данная проблема является актуальной и междисциплинарной, имеющей серьезные социально-экономические последствия для РФ. В связи с этим анализ структуры использования лекарственных препаратов помогает рационализировать их применение в клинической практике, что позволяет проводить целенаправленные мероприятия для оптимизации дорогостоящего медикаментозного лечения. Проанализировав назначения пациентов, получили, что в фармакотерапии трансплантации почек и печени за анализируемый период были использованы ЛП 52 фармакотерапевтических групп. АВС-анализ определил препараты, которые входят в группу А — группу иммунодепрессантов, на которую приходятся наибольшие затраты.

Ключевые слова: трансплантация печени, трансплантация почек, хроническая болезнь почек, печеночная недостаточность, АВС-анализ, структура затрат

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Kidney and liver diseases hold a prominent place among disorders associated with the loss of labor capacity and need in high-cost therapy due to significant prevalence in the population, rapid decline of life quality, and high mortality of patients. They also result in the need of using costly methods of replacement therapy in end-stage disease such as dialysis and kidney transplantation [1].

Chronic kidney disease (CKD) is a gradual damage or loss of kidney function over 3 months under the influence of various etiological factors. Its anatomical basis is replacement of normal anatomical structures with fibrosis, which results in its dysfunction [2].

Liver failure occurs when the liver can no longer function. There is acute liver failure (quick loss of liver function that occurs during several days or weeks) and chronic liver failure (a slow decline in liver function during months or years).

Prevalence of chronic kidney and liver disease can be compared with such socially significant diseases as hypertension, diabetes, obesity and metabolic syndrome. Signs of kidney damage and/or decrease in glomerular filtration rate are found among at least every tenth representative of the general population [1].

Kidney and liver transplantation is currently the most effective and frequently the only radical, though costly, method of treatment of patients with end-stage chronic kidney/liver diseases.

Rapid growth of a number of patients with an impaired function of kidneys and liver is not a highly specialized, but general medical interdisciplinary issue with serious social and economic consequences for the RF.

Satisfied population needs in novel medicinal preparations with high effectiveness and novel medical devices relate to one of the most essential healthcare issues of the modern world [3].

Analysis of the structure of using medicinal preparations (MPs) allows to obtain data on their use in clinical practice, compare

countries, regions and various healthcare systems, and examine a change in the use of MPs over time. Examination of consumption of MPs allows to establish their non-rational use, and conduct targeted activities to optimize costly drug therapy [4].

Assessing the rational use of expenses on pharmacological support is one of the most actual tasks in modern healthcare.

The study objective was to perform ABC analysis of MPs used in hospital-based transplantation of kidneys and liver.

The objective of the research was to perform a pharmacoepidemiology analysis of MPs used during hospital-based transplantation of kidneys and liver.

MATERIALS AND METHODS

The study was carried out at a 200 bed multi-specialty hospital of Nizhny Novgorod, where both therapeutic and high-tech surgical aid was provided.

Medical cards of patients (n=34) who underwent pharmacotherapy during kidney and liver transplantation in 2018 and quarters I–III of 2019 were the study object.

ABC analysis of MPs used in therapy of kidney and liver failure was used throughout the study. All medicinal preparations were divided into three classes based on costs and taking into account their international non-proprietary name (INN): class A (10–20% of MPs with 80% of monetary funds spent), class B (10–20% of MPs with 15% of monetary funds spent), and class C (60–80% of MPs with 5% of monetary funds spent) [5]. ABC-analysis includes as follows:

1. Forming a list of MPs indicating trade names, prices per a counting unit used at a healthcare institution within a certain interval.
2. Calculating the percentage (%) of total expenditure: Total expenditure = (cost of MPs/ total expenditure on all MPs) × 100
3. Distribution of MPs in descending order of costs.
4. Calculating the cumulative percentage by summing up the percentage of expenses on every MP in descending order of their percentage in the sum of expenses.
5. Allocation of classes A, B and C.
6. Final analysis of every MP to determine whether it is reasonable to use the MP in case of certain nosological forms of diseases found at a healthcare institution in accordance with the profile of the rendered medical aid and acting clinical protocols [5].

The obtained data were utilized to form a database analyzed using MSO Excel and ABC-analysis. Expenses on the groups of MPs used in therapy during kidney or liver transplantation were estimated with the help of ABC analysis.

STUDY RESULTS

MPs from 52 pharmacotherapeutic groups were used in pharmacotherapy during the analyzed period. There were 98 positions of MPs as per INN.

The groups with MPs being used 3 or more times have been identified among pharmacotherapeutic groups. Other pharmacotherapeutic groups with MPs being used once or twice have been included into a separate group (table 1).

Table 1. Pharmacotherapeutic groups of MPs used in chronic kidney and liver failure

Pharmacotherapeutic group	Number of drugs, n (%)
Antimicrobial drugs	9 (9.19)
Beta-blockers	5 (5.10)
Proton pump inhibitors	4 (4.08)
Immunosuppressants	4 (4.08)
Regulators of water-electrolyte balance and acid-base balance in combinations	4 (4.08)
Macro- and microelements	4 (4.08)
Anticoagulants	3 (3.06)
Calcium channel blockers	3 (3.06)
Hematopoietic regulators	3 (3.06)
Diuretics	3 (3.06)
Hepatoprotective agents	3 (3.06)
Antiplatelet agents, adenosinergic agents, angioprotectors and correctors of microcirculation	3 (3.06)
Other preparations (1–2 administrations)	50 (51.03)
Total	98 (100.00)

In therapy of liver and kidney transplantation, the largest expenditure (group A) was for such a pharmacotherapeutic group as immunosuppressant medications (with 85.8% of share of expenses) (mycophenolic acid, immunoglobulin antimocytic and basiliximab) (table 2).

Priority MPs include mycophenolic acid with the largest expenditure (with 45.35% share of expenses) and immunoglobulin antimocytic (with 23.35% share of expenses).

Group B includes the MPs related to pharmacotherapeutic groups such as anticoagulants (with 3.84% share of expenses), regulators of water-electrolyte balance and acid-base balance including antidotes (with 5.51% share of expenses). These MPs were used both among patients who underwent therapy during liver and kidney transplantation, and among patients who were on supportive therapy.

Group C included the rest of MPs. Based on pharmacotherapeutic groups, it is possible to differentiate between quinolones/fluroquinolones (with 0.45% share of expenses) and hematopoietic regulators (with 0.35% share of expenses).

CONCLUSIONS

ABC-analysis is a relatively simple pharmacoeconomic tool, which allows a professional from a medical institution to assess whether the medicinal agents were used by hospitals in a reasonable way, and also to determine the most problematic issues of unreasonable use of medicinal agents.

Based on the results of the study it has been found out that MPs belonging to 52 pharmacotherapeutic groups were used in pharmacotherapy during the analyzed period. Total number of used MPs (as per INN) was 98. The conducted ABC analysis has shown that group A includes mycophenolic acid, immunoglobulin antimocytic and basiliximab (with 85.80% share of expenses), a group of immunosuppressive agents with the largest expenditure during kidney and liver transplantation.

Table 2. Expenditure on medicinal preparations of class A

INN	Course fee, RUB.	Frequency of administration	Total expenditure, RUB.	Share of expenses on MPs,%
Mycophenolic acid	296661.61	24	7119 878.82	45.4
Immunoglobulin antimocytic	282003.57	13	3666 046.42	23.4
Basiliximab	107392.81	25	2684 820.15	17.1

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