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**Analysis of side effects of calcium antagonists and determination of ways to minimize them**

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**Introduction.** Diseases of the cardiovascular system, such as arterial hypertension, coronary heart disease, tachyarrhythmias, occupy a leading place in the structure of morbidity. Therefore, optimization of therapy for cardiovascular diseases is one of the urgent problems of medicine and pharmacology. Calcium antagonists (CA) are one of the first choice drug groups for the treatment of diseases of the cardiovascular system. However, we must not forget that any drug has not only pharmacological, but also side effects. The problem of side effects of drugs today is very important. In this regard, the analysis of the side effects of calcium antagonists and the search for ways to minimize them are relevant.

**Aim of the study.** To analyze the side effects of CA in Kharkiv and Kharkiv region for the period 2017-2021 and to provide recommendations for their reduction, an analysis of the evidence base and clinical effectiveness of CA.

**Materials and methods.** We conduct an analysis of side effects of calcium channel blockers in Kharkiv and Kharkiv region for the period 2017-2021. Based on the analysis of the evidence base of clinical effectiveness, we determined the conditions of rational use and ways to minimize the side effects of CA. We used methods of passive pharmacovigilance, method of spontaneous reports, method of system approach and system analysis in our work. To analyze the clinical effectiveness and conditions of rational use of CA, well-known databases were used: Cochrane Library, Trip Database, and PubMed. These databases contain systematized primary or secondary information on a specific clinical issue: the effectiveness and safety of various medical technologies.

**Results.** Analysis of cards-notifications with cases of adverse reactions for 5 years showed that the majority of side effects in the form of edemas of the legs,

redness and rash on the skin, itching, tachyarrhythmias, nausea, diarrhea, constipation develop when using Amlodipine-KV, Amlodipine-Farmak and Amlodipine-Astrafarm. These adverse reactions did not require additional hospitalization and did not cause disability of the patients.

Thus, according to the data of 10 systematic reviews, the most common side effects of CA are leg swelling and reflex tachyarrhythmia. One of the ways to minimize the side effects of amlodipine is to use its S-enantiomer. To achieve the optimal therapeutic effect of S-amlodipine, doses of the drug are two times smaller, which leads to fewer side effects. The use of isolated S-amlodipine instead of the racemic mixture has many advantages because the required dose and side effects can be reduced. Another way to improve the effectiveness and safety of CA is the use of modern drugs of the latest generation. So, for example, felodipine one of the most effective antihypertensive agents in the treatment of hypertension. Its pharmacodynamics is characterized by a highly selective effect on precapillary resistance vessels, and the effect on vascular tissue is one hundred times stronger than on the myocardium. An important place in the therapy of hypertension is occupied by the 3rd generation dihydropyridine derivative lercanidipine, which has a unique pharmacokinetics, is characterized by high lipophilicity and maximum vascular selectivity. The next direction of increasing the safety of CA is complex pharmacotherapy. The use of combined drugs, which include components with different mechanisms of action, pharmacokinetics and pharmacodynamics, is one of the promising directions for the prevention of various complications in patients with hypertension.

**Conclusions.** Thus, the most common side effects of CA are leg swelling and reflex tachyarrhythmia. Three main directions for increasing the level of safety of CA have been established. The first is related to the use of stereoisomers. The second direction is the use of drugs of the latest generation. A promising direction is also CA combination with antihypertensive drugs of other pharmacological groups. The results of the obtained studies can be used by practicing doctors and health care organizers to optimize the pharmacotherapy of cardiovascular diseases.