Pharmacotherapeutic Effect of Original Liposomal Latanoprost Composition in Experimental Glaucoma

I Mikheytseva1, G Grigorieva 2, N Pasechnikova1, S Kolomiichuk 1, N Konakhovich2.

1Filatov Institute of Eye Diseases, Odessa, 2Institute of Pharmacology and Toxicology, Kyiv, Ukraine

Objective: Objective - to establish the dynamics of intraocular pressure (IOP) with time and the duration of the hypotensive effect of the original latanoprost (LP) composition on a liposomal phospholipid's platform applied by eye drops instillations into the conjunctiva sac and subconjunctival injection for the experimental glaucoma (EG).

Methods: Ophthalmic experiments were carried out on Chinchilla rabbits (1 year old, weighing 2.5 - 3 kg). It was performed in compliance with European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes from the European Treaty Series (Strasbourg, 1986). The rabbits were divided into four groups: Group I - EG was simulated and treated with eye drops of liposomal form of LP; Group II - EG was modeled and treated with subconjunctival administration of liposomal form of LP; Group III - EG was modeled without treatment; Group IV - intact control. EG was induced by two injections of 0.1 ml of 0.3% carbomer in isotonic solution into the anterior chamber of the eyes at 10 days interval. Subconjunctival administration of the liposomal form of LP was applied by a 0.1 ml single injection immediately after the formation of the EG. Treatment of animals with eye drops of liposomal form of LP was carried out daily in the evening, one drop in both eyes. Follow-up duration was 10 weeks. IOP monitoring was carried out at key stages of the experiment for each group of animals.

Results: A study of the pharmacological efficacy and duration of action of the original liposomal form of LP was carried out on the EG model in rabbits administered by different routes. After EG modeling was performed (Group III), there was a persistent increase in IOP, with the IOP values being 51-65% higher than at control Group IV ($p < 0.001$). The IOP in animals with EG treated daily with LP instillations (Group I) was 31% lower than in untreated EG (Group III) ($p < 0.001$). A single subconjunctival injection of LP resulted in a 37% reduction of IOP in Group I compared to untreated animals in EG ($p < 0.001$), with the effect being as long as 10 weeks.

Conclusion: The results obtained in the experiment on the EG model indicated a significant hypotensive effect of long-term eye drops instillations and a single subconjunctival injection of the original latanoprost composition on a liposomal phospholipid's platform with an emphasis on the effect of a single subconjunctival injection of the medicine, which is clearly prolonged up to 10 weeks.