Trends in Antiglaucoma Topical Treatments

By Rouven Kraus, Sales - Aero Pump GmbH

The ophthalmic drug market is one of the fastest growing market sectors in the pharmaceutical industry. More than 285 million people suffer from visual impairments worldwide and the number of people affected by visual impairment is expected to rise in the future due to the increasing prevalence of ophthalmic disorders, primarily by extended life expectancy (aging populations) and also through increased air pollution and the rise in numbers of patients diagnosed with diabetes.

When considering 962 million people globally were aged 65 years or over in 2017, the number of people in this age bracket is expected to nearly double by 2050 - a total of 1.6 billion people.

5% of people aged 65 or over develop glaucoma, a group of optic neuropathies resulting from damage of the optic nerve caused by intraocular pressure, which is the second leading cause of irreversible blindness. With a predicted 80 million people affected by glaucoma by 2020, it will be one of the most prevalent ocular diseases.

Drugs are usually the first line of treatment for primary open-angle glaucoma (POAG), the most common type of glaucoma. Alpha agonists like Brimonidine decrease the production of aqueous humour and increase uveoscleral outflow. Beta blockers (i.a. Timolol) and Carbonic anhydrase inhibitors (i.a. Dorzolamide, Brinzolamide) decrease the aqueous humour through the ciliary body, whereas Miotics (i.a. Pilocarpine) and Prostaglandin analogues (i.a. Latanoprost, Bimatoprost, Travoprost) improve the drainage. Rho khinase inhibitors (i.a. Netarsudil) are a new class of glaucoma drugs, first launched in 2018. Such Rho khinase inhibitor eye drops reduce the elevated intraocular pressure (IOP) by suppressing the rho khinase enzymes which produce the aqueous humour.

Prostaglandine analogues are the standard first line treatment to decrease IOP due to their advantage of greater efficacy. Manufacturers have launched combination products combining the Prostaglandine analogues with a beta-blocker and these drugs are predominantly being used once or twice a day.

Single-use vials (often produced in the Blow-Fill-Seal technology) do not protect the contents from contamination after they are opened, meaning the patient needs to throw them away after the administration of just one dose. In this case, the more cost-effective option would be to use multidose containers, which enable the frequent use of the product to deliver the required dose daily.

The industry has been challenged to design multidose eye drops which satisfy all the regulatory guidelines set out by the authorities. EMA recommends sterile eye drops to be preservative-free, as it is known that preserving agents cause side-effects like irritation of the ocular surface, and also to dispense a defined metered dose with each drop.

Preservative-free multidose systems either have an airless container like the COMOD®-system or require a special sinter-filter with antimicrobial properties to compensate the vacuum formed inside the container after the drop is dispensed, as well as with a valve that forms a microbiologically tight seal (e.g. the 3K®-technology in Aero Pump's Ophthalmic Multidose System).

Due to the expiry of patents relating to anti-glaucoma products in the past few years, many generic products with a Prostaglandine analogue are under development. Based on the latest guidelines, those manufacturers are often looking to launch their products in preservative-free multidose containers (see below reference products).



Laboratoires Thea's Duocopt containing Dorzolamide and Timolol in the 3K®-system and the ergonomic designed Easygrip® enabling a safe grip and an easy administration of the drops for the patient



Bausch + Lomb's VIZITRAV containing Travoprost in the 3K®-system

The launch of novel anti-glaucoma drugs with additional neuroprotective properties that avoid loss of retinal ganglion cells are set to become a major breakthrough in glaucoma treatment. Currently, numerous clinical trials are taking place combining formulations with the benefits of using just one bottle for several medications.

For glaucoma patients and ophthalmologists it is an exciting time as these new medications promise improved characterizations by directly targeting the trabecular meshwork.

About Aero Pump's preservative-free Ophthalmic Multidose System

Aero Pump GmbH, together with its partner URSATEC Verpackung GmbH, have developed a preservative-free Multidose System with the so called 3K®-technology. Special germ-reducing components inside the 3K®-system ensure the microbiological safety of the device. This pump system is available for use with plastic or glass containers and in terms of reducing container interaction with the product, this is a particular advantage.

The 3K®-system delivers an accurate dose over the whole life cycle of the product, with one measured drop per actuation. Conventional squeeze devices on the other hand are known to have an imprecise dose accuracy; some can even create an extremely uncomfortable jet when squeezed.

The actuation force of Aero Pump's Ophthalmic Multidose System is stable, independent of the residual liquid inside the container. This fact is especially noticeable for older patients where it can be very difficult to eject the last few drops of the liquid, which can often lead to an increased residual volume when squeeze devices are used.

Alongside the development of the Ophthalmic Multidose Devices, Aero Pump has developed various customer-friendly actuation aids that enable a convenient application of the drop into the eye of the patient.



Contact

More information about the system can be requested directly from Aero Pump GmbH via email (sales@aeropump.de)