Short Communication

NETARSUDIL – A REVIEW

ABSTRACT:

Glaucoma currently affects over 60 million people worldwide and also one of the leading cause of irreversible blindness. Early Medical intervention is the preliminary therapy to prevent the progression of optic nerve damage and vision loss by reducing the Intra Ocular Pressure (IOP). IOP is the regulated balance between production of aqueous humour and the rate of aqueous flow via uveoscleral outflow pathway and trabecular meshwork pathway (TM). There are many groups of drugs like beta blockers, carbonic anhydrous inhibitors, prostaglandin analogues etc., are available. Netasurdil which is the Rho – associated protein kinase (ROCK) inhibitor is the novel group of drugs which has been in research for the Glaucoma.

Keywords: *Netarsudil;Glacuoma; intraocular pressure*.

Introduction: Worldwide, Glaucoma affecting over 60 million people and continues to be the leading cause of irreversible blindness. Medical intervention is the preliminary therapy to progression of optic nerve damage and vision loss prevention by reducing the IOP. IOP is the regulated balance between production of aqueous humour and the rate of aqueous flow via uveoscleral outflow pathway and trabecular meshwork pathway (TM). A new ocular hypotensive glaucoma medication through topical route – Netarsudil is approved by the FDA in December 2017[2].

Mechanism of Action: Netarsudil is a potent inhibitor of Rho – associated protein kinase (ROCK). ROCK is a serine/threonine protein kinase which accelerates the actin stress fibres assembly and focal adhesion within the trabecular meshwork. Netarsudil acts by three novel mechanisms for lowering Intraocular pressure[2]. First is it lowers the IOP by relaxation of TM and ciliary muscle contraction which leads to increase in the outflow of aqueous by the conventional method[2]. Second, by ROCK1 & ROCK2 inhibition which are usually present in higher amounts in the trabecular meshwork. Lastly by decreasing the episceleral venous pressure and decreasing the production of aqueous humor[2].

Indication: Netarsudil is used in open angle glaucoma or ocular hypertension for the purpose of elevated intraocular pressure[1] reduction.

Dosage: Netarsudil Ophthalmic solution containing 0.2 mg/mL

Pharmacokinetics: The systemic exposure of Netarsudil were evaluated in 18 adults and it was found that no quantifiable plasma concentration of netarsudil was found following the post dose day 1 and day 8. Metabolised by esterases in the eyes after ocular dosing[1].

Adverse effects: Most occuring ocular adverse effects with Netarsudil is conjunctival hyperemia, corneal verticillata, instillation site pain, conjunctival hemorrhage[1].

Nonclinical toxicology[1]: Netarsudil is not mutagenic in mouse. Regarding carcinogenicity and fertility, long term studies have not been performed.

Uses in specific population[1]: **Pregnancy** –Data is not available on Netarsudil for the use in pregnant women for any associated risk. In pregnant rats and rabbits, on i.v. administration during the period of organogenesis, Netarsudil does not produce any fetal abnormalities in rats and rabbits.

Geriatric Use[1]: There was no differences in terms of safety or effectiveness have been observed between geriatric and other adult patients.

Clinical studies: Netarsudil was evaluated in three randomized and controlled trials, with open angle glaucoma or ocular hypertension patients. In Study 1 & 2 enrolled subjects with baseline IOP < 27mm hg and study 3 enrolled subjects with base line IOP < 30 mm hg. The duration was 3 months for study 1, 12 months for study 2 & 6 months for study 3. All three studies have demonstrated the reduction of IOP of 5mm hg for subjects treated with Netarsudil 0.02% once daily in the evening[1].

Conclusion: Netarsudil has a mechanism of action and it is unique through which it lowers the IOP. Also it has notable side effect of conjunctival hyperemia which could be treated by administering once in a day before bed time. In general, Netarsudil may be helpful to the normotensive or steroid induced glaucoma[2] patients.

REFERENCES:

1) Product Information of Netarsudil – FDA
2) Dasso L, Al-Khaled T, Sonty S, Aref AA. Profile of netarsudil ophthalmic solution and its potential in the treatment of open-angle glaucoma: evidence to date. Clinical Ophthalmology (Auckland, NZ). 2018;12:1939.