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IBOPAMINE IN OPHTHALMOLOGY

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ABSTRACT
Ibopamine is currently used in ophthalmology. This molecule acts on both adrenergic and dopaminergic receptors. The adrenergic receptors are responsible for a marked mydriasis without accommodative paralysis, while the dopaminergic receptors promote the production of aqueous humor. That's the reason why ibopamine may be useful for diagnostic purposes in ophthalmology. This short communication aims at presenting the most intriguing evidence on ibopamine and discusses the profile of patients who may be best suitable to this molecule.

KEY-WORDS: I*bopamine, provocative test, safety mydriasis.*

INTRODUCTION

Ibopamine is used in ophthalmology since 1986[1,2]. Ibopamine induces a marked mydriasis without accommodative paralysis and increases the production of aqueous humor: that's the reason why ibopamine may be useful for diagnosis and therapy in multiple clinical pictures in ophthalmology.

This short communication aims at presenting the most intriguing evidence on ibopamine and discusses the profile of patients who may be best suitable to this molecule.

Pharmacology of ibopamine

Ibopamine is a dopaminergic prodrug. Upon adsorption, it is rapidly transformed into the active metabolite epinine, a catecholamine with multiple agonist activity on DA-1 and alpha-adrenergic receptors[3,4]. After entering the conjunctival sac through the cornea, ibopamine is hydrolyzed into epinine by the esterases of the aqueous humor and ocular tissues (Fig. 1).

In its active form, ibopamine stimulates the α-adrenergic and D1 dopaminergic receptors. The interaction with the α- adrenergic receptors of the dilating muscle of the pupil promotes the mydriatic effect of ibopamine[5]. Ibopamine has no effect on the ciliary muscle and the mydriasis is not associated with cycloplegia (Fig. 2,3).

On the other hand, the D1 dopaminergic activity increases the stimulation of aqueous humor production[5-7].

The administration of ibopamine 2%, i.e. the dose currently used in clinical practice, is not associated with any clinically-relevant local or systemic adverse effect: a single drop contains 1 mg of ibopamine, while the oral dose is >200 mg/day. Ibopamine can also be used in the pediatric setting, even in relatives of glaucoma patients[4]. In particular, electrophysiological assessment showed that ibopamine is not retinotoxic[7]. After local instillation, normal refraction is preserved[5].

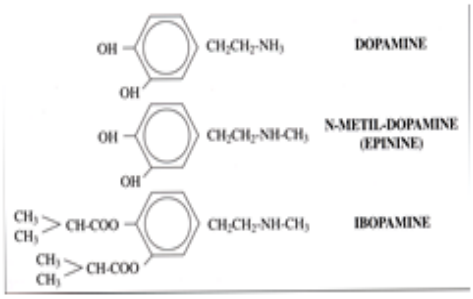

Fig. 1

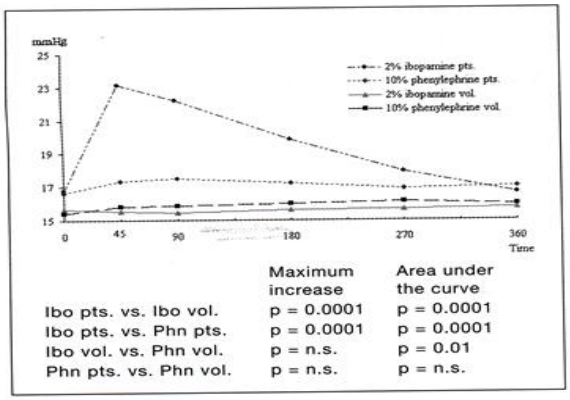

Fig. 2 Inraocular Pressure

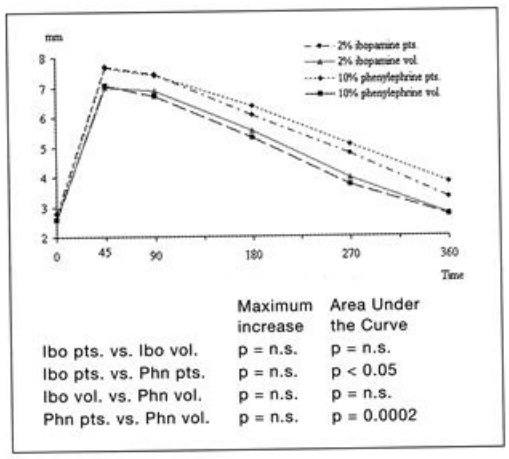

Fig. 3 Pupillary diameter

Legenda

Fig. 1 Chemical formulas of dopamine, epinine and ibopamine.

Fig. 2 The effect of ibopamine eyedrops on the intraocular pressure (IOP) in glaucomatous patients vs healthy volunteers compared to phenylephrine eyedrops.

Fig. 3 The effect of ibopamine eyedrops on the pupil diameter of glaucomatous patients vs healthy volunteers compared to phenylephrine eyedrops.

CONCLUSIONS

Ibopamine has both an α-adrenergic and a D1 dopaminergic action. This peculiar mechanism of action makes ibopamine able to induce a mydriatic effect without cycloplegia as well as an increase in the production of aqueous humor. Of note, these effects are not associated with the onset of serious adverse events or alterations of visual acuity, as shown by extensive clinical experience collected on this molecule. The duration of ibopamine action is short, with a peak at about 45 minutes since administration, and usually lasts no more six hours, thus comparing favorably with other molecules used in the ophthalmology setting. This pharmacological test is positive when there is an increase of at least 3 mmHg from the baseline.

Given the above-mentioned characteristics, and beyond its established role in the provocative test, ibopamine may find a role in Ophthalmology, in almost all patients who do not need a cycloplegic effect. In particular, ibopamine can be particularly suitable in the induction of diagnostic mydriasis in some patients such as those who need an extensive mydriasis or must avoid cycloplegic effect. Moreover, the short duration of action of ibopamine and the favorable safety profile of this molecule can support its use in the induction of diagnostic mydriasis in patients at particular risk of adverse events or with angle closure. Ibopamine may be considered for patients with concomitant systemic conditions including cardiovascular disease, benign prostatic hyperplasia or diabetes. Furthermore it can be used also in patients affected by glaucoma and relatives of glaucoma patients, and subjects at risk of ocular hypotony or hypothalamia.

In the future, it will be interesting to further explore the efficacy and safety of ibopamine in the above-mentioned indications. Such studies will help expand knowledge on the use of this dual-acting molecule in the ophthalmological setting.

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