Safety of Phenylephrine 2.5% Eye Drops for Pupillary Dilatation

Subir Sen
Prakash Mathew
Joint Clinical Leads
Central Mersey Diabetic Retinopathy Screening Programme

Adequate mydriasis is essential for obtaining acceptable and gradable fundus photographs for diabetic retinopathy screening. The commonly used eye drops for pupillary dilatation is Tropicamide 1% or 0.5%. However, the muscles of the iris are frequently resistant to these eye drops and adequate mydriasis is difficult to obtain with these drops alone. Phenylephrine (10% or 2.5% eye drops) acts synergistically with Tropicamide and result in superior mydriasis. Concerns have been raised about the cardio-vascular side-effects of 2.5% Phenylephrine Eye Drops when used for pupillary dilatation, and optometrists are reluctant to use these drops for mydriasis. We undertook a review of the literature to assess the safety of topical Phenylephrine 2.5% eye drops when used for mydriasis.

Review of Literature:-

In a young healthy adult the upper limit of safety for intravenous administration of phenylephrine is 1.5mg\(^1\) and Kumar et al\(^2\) have found that phenylephrine plasma levels after topical administration of the 2.5% drops is 0 – 1.720ng/ml after 20 minutes. Symons et al\(^3\) reported no significant change in the mean systolic and diastolic blood pressure in 126 patients receiving 10% phenylephrine. Malhotra et al\(^4\) in their study on 54 cases showed no difference in systemic cardiovascular effects of either the 2.5% or the 10% concentration. Bhatia et al\(^5\) found no statistically or clinically significant increase in blood pressure after instillation of 10% drops in 87% of normotensive and 76% of hypertensive patients. Mild rise of blood pressure (3 mm Hg systolic (SD 19.03); and 1 mm Hg diastolic (SD 11.5) was seen in 11% of normotensive and 15% of hypertensive patients. Motta et al\(^6\) found no changes in blood pressure or heart rate after instilling one drop of 2.5% or 10% phenylephrine drops in their group of 58 patients. Brown et al found no change in mean blood pressure or pulse rate after instillation of 10% phenylephrine in 100 patients\(^7\). Phenylephrine 2.5% is licensed for use in all age groups but the 10% drops are unlicensed in children and not recommended in this age group\(^8\).

Chin et al\(^9\) have reported significant increase in blood pressure after instillation of one drop of 2.5% or 10% phenylephrine pre-operatively. However, their study does not appear to take into account the effects of anxiety or adrenaline administered with the local anaesthetic prior to surgery. Samantaray and Thomas\(^10\) also reported a definite increase in blood pressure after topical use of phenylephrine in all of their cases.
Conclusion:-

The consensus of opinion, after review of all the available literature, appears to suggest that instillation of one drop of 2.5% phenylephrine eye drops in conjunction with Tropicamide 1% eye drops is safe and effective, except in children (below 12 years of age) and the frail and elderly (over 80 years of age). We believe that advice to instil one drop of 2.5% phenylephrine if adequate mydriasis is not obtained with Tropicamide 1% alone should be included in the protocol for pupillary dilatation for the Central Mersey Cluster for Diabetic Retinopathy Screening, subject to approval of the Programme Board.

References:-


6. Motta MMS, Coblentz J, Fernandes BF, Burnier MN. Mydriatic and Cardiovascular Effects of Phenylephrine 2.5% versus phenylephrine 10% both Associated with Tropicamide 1%. Ophthalmic Research 2009;42;2.


