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) or where there are any contraindications. 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, Coblenz J, Fernandes BF, Burnier MN. Mydriatic and Cardiovascular Effects of Phenylephrine 2.5% versus phenylephrine10% both Associated with Tropicamide 1%. Ophthalmic Research 2009;42;2.


