** SUMMARY AND CONCLUSIONS **

In this study, we aimed to study the effect of various commercial anti-glaucoma drugs (pilocarpine, timolol and dipivefrin) on the corneal thickness and the corneal endothelial density in order to evaluate the effect of these widely used medications on the corneal endothelium.

A total of 39 patients (60 eyes) suffering from chronic simple glaucoma of whom 16 males (22 eyes) and 23 females (38 eyes) were included in this study. Another group of normal individuals (10 eyes) were included who used the preservative benzalkonium chloride. We excluded diabetic patients, cornea with dystrophic changes, and glaucoma patients subjected to surgical procedures or treated with laser. The age of all patients ranged from 40 to 50 years with a mean of 47.47 years and a standard deviation $\pm$ 1.98 .

We reached to the following conclusions :

1- There is no sex influence on the central corneal thickness or central endothelial density of either patients or controls.

2- The mean endothelial cell area, the mean central corneal thickness of patients whether males or females was higher and endothelial cell density was lower than that of controls before therapy which was statistically significant.

3- There was no significant effect of pilocarpine 1% and 2%, timolol 0.25% and 0.50%, dipivefrin hydrochloride 0.1% and benzalkonium chloride 0.01% on central corneal endothelial cell density, mean cell area or corneal thickness after 3 and 6 months of therapy in humans.

4- Experimental study on rabbits revealed both increase in central endothelial cell density and central corneal thickness both 3 and 6 months after instillation of pilocarpine (1% & 2%) , timolol maleate 0.5% , dipivefrin hydrochloride 0.1% and benzalkonium chloride 0.01% .

5- Inspite of the increased cell density in rabbit's corneas, yet central corneal thickness have increased denoting abnormally functioning endothelial cells most probably due to toxic effect of these drugs.

6- Histopathological examination on rabbits' cornea revealed variable cytological changes ranging from increased endothelial cell degeneration, marked decrease in number of

mitochondria with swelling and degeneration, marked stromal oedema, till rupture of posterior endothelial cell membrane with complete degeneration of the individual endothelial cells. This occurs after therapy with pilocarpine hydrochloride, timolol maleate, dipivefrin hydrochloride and also with the preservative (benzalkonium chloride).

This histopathological changes may be due to the active ingredient in these drugs or due to the toxic effect of the preservative present in all commercially available eye drops. Whatever the cause of insult, it seems that the rabbit's endothelial cells are more prone to toxic effects of antiglaucoma drugs and ophthalmic preservative in their commercial concentrations than does the human endothelial cells.