ABSTRACT

Here the study is about the perimetry which is the systemic measurement of visual field function for diagnosing several eye diseases like glaucoma, retina and neurological diseases. Here the projection is completely depended on the visual sensations that can be initiated using Visual Field Perimetry Octopus 900 before and after Trabeculectomy in Primary Open–Angle Glaucoma, in patients with primary open angle glaucoma undergone trabeculectomy pre-operatively, 1 and 3 month post-operatively in the Sub-Himalayan region. Normative data was collected from 27 patients having primary open angle glaucoma. The patient population consists of adults with open anterior chamber angle and with demonstrative Visual Field loss. Average Visual Field measurements were taken. Octopus 900 Perimetry was used to measure visual field at a week before surgery and 1 and 3 month post-operatively. Pre and post operative value were analyzed using Repeated Measure ANOVA with Bonferroni correction. Visual Field Changes were observed on a Perimetry Octopus 900 machine in which, though, minor fluctuations can be attributed to lowering of IOP, post-Trabeculectomy in POAG. The Mean value for MS were observed at 3rd month and the values came to be equal to 9.859 ± 5.5606 (p=0.043).The Mean MD came to be equal to 18.26 ± 5.164 (p=0.003) at 1 month period. The value of MD at third month came to be equal to 17.926 ± 5.4928 (p=0.012).The value of SLV were not significant throughout. Visual Field showed significant improvement in MS and MD post-operative, which was analyzed using Octopus 900 Perimetry machine. However the minor changes observed in present study could be improved by early stage analysis of Glaucomatous eye by using Perimetry.

KEYWORDS: Perimetry; Trabeculectomy; Visual Field; POAG; MS; MD; SLV
consistent state of eye is because of the structure of the sclera and a stable intraocular pressure, higher than the climatic pressure [5]. Glaucoma is a gathering of intense and ongoing, reformist, multi-factorial optic neuropathies in which intraocular pressure (IOP) and other contributing elements are answerable for a trademark, gained loss of retinal ganglion cell axons prompting decay of the optic nerve with self evident visual field defects [7]. The fundamental idea that impedance in watery humor surge brings about height of the IOP is a focal principle of glaucoma pathology and treatment. The glaucoma’s are ordered by the presence of the irido-corneal point. There are open point, shut point, and formative classifications, which are additionally separated into essential and optional sorts. Essential open-point glaucoma can happen with or without raised intraocular pressure; the last is some of the time called typical strain glaucoma. Essential open-point glaucoma incorporates grown-up beginning sickness (happening following 40 years old) and adolescent beginning ailment (happening between the ages of 3 and 40 years old), essential open-point glaucoma, in which the irido-corneal point is open (unhindered) and ordinary in appearance however fluid outpouring is decreased by 1.

Aim of the study:
It is about the study of perimetry which is the systemic measurement of visual field function for diagnosing several eye diseases like glaucoma, retina and neurological diseases. Here the projection is completely depended on the visual sensations that can be initiated using Visual Field Perimetry Octopus 900 before and after Trabeculectomy in Primary Open –Angle Glaucoma, in patients.

Perimetry
Perimetry is the systemic measurement of visual field function. (Gr. Peri: around Gr. Metrein: to measure). Perimetry is used extensively in diagnosis and follows up of several eye diseases such as in glaucoma, diseases of retina and neurological diseases [3].
The uniocular visual field may be defined as projection outwards of all retinal points at which visual sensations can be initiated. Perimetry alludes to the estimation of the visual field on a bended surface and has to a great extent supplanted campimetry in current clinical practice. The principal edges were bend borders that, similar to digression screen, utilized little round items as test targets. Light projection circular segment borders, for example, the Aimark, were presented during the 1930s, and the advancement of the Goldmann hemispheric projection edge in 1945 introduced the cutting edge time of quantitative perimetry. Perimetry connotes the determination of the peripheral outline of the field and scotometry the delineation of the blind areas or scotomata within its boundaries. The blind spot projected by the optic disc is a physiological scotoma. The new Octopus 900 technology provides Goldmann 900 bowl and supports the computer assisted Standard Goldmann Kinetic Program. The study of visual field and the methods by which they are measured is to consider Traquairs classical analogue of —an Island of vision surrounded by a sea of blindness. The shoreline of the island correspond to peripheral limits of VF which normally measure with maximum target stimulation approximately 60° above and nasal, 70-75° below and 100-110° temporal to fixation [4].
The decrease in visual field and the vertical loss of vision in glaucoma related with harm to the nerve fiber at the optic plate and has been broadly viewed as irreversible. Surely loss of visual fields is the most significant sign for medical procedure in glaucoma and this field misfortune can maybe be best shown by the utilization of robotized perimetry. It is imperative to know whether glaucomatous field imperfection can be improved after trabeculectomy.
for open point glaucoma. In this examination we have utilized mechanized perimetry to assess these progressions [10].

**TRABECULECTOMY**

With its long-established history, remains widely practiced for glaucoma. Studies are robust in supporting its efficacy in lowering IOP[2]. Trabeculectomy is a surgical operation which lowers the intraocular pressure (IOP) inside the eye in patients with glaucoma. This is accomplished by making a little opening in the eye divider (sclera), secured by a meager hidden entryway in the sclera. The liquid inside the eye known as fluid humor, channels through the secret entryway to a little repository or bleb simply under the eye surface, covered up by the eyelid. The hidden entryway is stitched (sewed) in a way that keeps fluid humor from depleting excessively fast. By depleting watery humor the Trabeculectomy activity diminishes the weight on the optic nerve and forestalls or eases back additional harm and further loss of vision in glaucoma. Control of the eye pressure with a Trabeculectomy will not restore vision already lost from glaucoma [3].

**MATERIALS AND METHODS**

The rationale for the current study was, to prospectively study of Visual Field Perimetry Octopus 900 before and after Trabeculectomy in Primary Open –Angle Glaucoma, in patients attending Department of Ophthalmology, I.G.M.C Shimla. The stimulus for this work was only ophthalmological for the exploration of Visual Field by using the maximum means at our disposal. Educated assent was acquired from all selected people. Each subject went through broad assessment including Best Corrective Visual Acuity (BCVA) by utilizing Snellen's outline. Cut light bio-microscopy was done to survey the visual adnexa and the foremost fragment (AC Depth utilizing Van Herricks Grading) of eye utilizing a cut light bio-magnifying lens (Haag Striet-900). Intra ocular pressure is measured by using a Goldman's applanation tonometer. An open anterior angle chamber using Gonioscopy by Shaffer’s system using Goldmann Single Mirror Gonioscopic Lens. Optic Disc Examination- for glaucomatous changes was performed in dilated pupil with slit lamp (Haag Striet-900) using 90D lens (Magnification= 0.76). Fundus assessment was finished by utilizing the direct and indirect ophthalmoscope after papillary dilatation utilizing 5% phenylephrine and 1% tropicamide drops imparted on more than one occasion as required.

The criteria for inclusion were diagnosis of primary open angle Glaucoma, age taken was older than 40 years and not more than 80 years. No previous Glaucoma surgery, no cataract surgery during follow-up, no retinal or neurological disease and patients having significant cataract affecting perimetry were not taken. While the patient was under maximally tolerant medication, the indication for surgery was Optic Nerve Head Parameter and RNFL which was high risk of glaucomatous progression as well as worsening of the visual field. All patients eligible for surgery underwent baseline and postoperative Perimetry measurement. Perimetry pre-operatively were to be acquired within 1 week of the planned surgery.

**Surgical Technique:**

No pupillary dilatation and a bridle suture/corneal Traction Suture were inserted (commonly superior cornea). Site of Trabeculectomy was supero-nasal or supero- temporal. A fornix based flap of conjunctiva and Tenon capsule was fashioned superiorly. Epi- scleral tissue was cleared and major vessels cauterized.

An incision was made through about 50% of sclera thickness to create a trap-door lamellar sclera flap. This flap
was triangular according to preference. The superficial triangular flap was dissected forwards until clear cornea is reached.
A paracentesis was made in temporal peripheral clear cornea and air injected. The anterior chamber was entered along most of the width of the trapdoor base. Sclerotomy incision was 1mm clear of either side of sclera flap. After the initial linear incision into anterior chamber sclerotomy is fashioned with sclera punch.
A fistula 0.5mm to 1mm in height and 1.5 to 2mm in width created. Peripheral iridectomy was created. Superficial scleral flap was sutured to its underlying bed tightly with Apex sutures, using nylon 10-0 suture. Balanced salt solution was injected through the paracentesis to deepen the anterior chamber and test the patency of the fistula.
Conjunctiva/Tenon capsule flap was sutured. Irrigation through the paracentesis was repeated to produce a bleb. Steroid and antibiotic was injected under the inferior conjunctiva. Postoperative Perimetry was done at 1 and 3 month respectively. All data was collected on data forms.

Statistical analysis:
Data collected during the study was tabulated and analyzed by using Repeated Measure ANOVA with Bonferroni correction. The probability value (‘p’-value) was calculated and a value of <0.05 was implied to be statistically significant.

RESULT:
Automated Visual Field Analysis was done for Mean Sensitivity, Mean Deviation and Square Root Loss of Variance

MEAN SENSITIVITY:
The pre-operative values were taken and the Mean values were 8.73 ± 4.5493. The Mean values for MS were then observed at 1 Month and the Mean value were 9.267 ± 4.9947 (p=0.097). The Mean value for MS were then observed at 3rd month and the values came to be equal to 9.859 ± 5.5606 (p=0.043). The Mean Values were then depicted in the form of a graph for all observational period.

MEAN DEVIATION:
The MD was observed at the pre-operative period equal to 19.044 ± 4.6111. The Mean value came to be equal to 18.26 ± 5.164 (p=0.003) at 1 month period. The Mean value came to be equal to 17.926 ± 5.4928 (p=0.012) at third month.

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<th></th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>p-Value</th>
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<tr>
<td>MS : Pre Op</td>
<td>8.73</td>
<td>±4.5493</td>
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<tr>
<td>MS : 1 Month - Post Op</td>
<td>9.267</td>
<td>±4.9947</td>
<td>(p=0.097)</td>
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<tr>
<td>MS : 3 Month - Post Op</td>
<td>9.859</td>
<td>±5.5606</td>
<td>(p=0.043)</td>
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Das et al (2020): Diagnostic capability of perimetry  
Nov 2020  
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Fig 1: The MD was observed at the pre-operative period equal to 19.044 ± 4.6111

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<tr>
<td>MD : 3 Month</td>
<td>17.926</td>
<td>± 5.4928</td>
<td>(p=0.012)</td>
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Fig 2: The Mean value came to be equal to 18.26 ± 5.164 (p=0.003) at 1 month period
SQUARE ROOT LOSS OF VARIANCE:
The pre-operative value was observed and the Mean value was 7.822 ± 2.1344. The sLV at 1 month was 7.544 ± 2.1378 (p = 0.525). The last reading at 3rd month was observed to be 7.53 ± 2.138 (p = 0.851).

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<th>MEAN</th>
<th>STANDARD DEVIATION</th>
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<tr>
<td>PRE-OP</td>
<td>7.822</td>
<td>± 2.1344</td>
<td></td>
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<tr>
<td>POST-OP 1 MONTH</td>
<td>7.544</td>
<td>± 2.1378</td>
<td>0.525</td>
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<tr>
<td>POST-OP 3 MONTH</td>
<td>7.53</td>
<td>± 2.138</td>
<td>0.851</td>
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Glucomatous optic neuropathy causes reformist passing of retinal ganglion cells and their axons. These basic changes go before VF abandons as estimated by standard computerized perimetry. Visual field evaluation is a significant clinical instrument in the appraisal of patients with intense and constant visual infections. For these several tasks there may be different strategies. With automated perimetre’s, users may select the appropriate stimulus duration and interval according to what seems best in the patients. The mean deviation on Octopus perimetry is recorded as a positive worth. Qualities for worldwide lists (mean deviation (MD), design standard deviation (PSD)/misfortune fluctuation (sLV)) was taken for direct examination as was estimation of mean affectability (MS). MS was naturally determined on Octopus results. Figus et al (2011) found a small change in 10%.
MD after surgical IOP reduction. Dieng et al (2009) observed that the variables contemplated, just age and reviewed subsequent time from medical procedure impacted VF after trabeculectomy, the outcomes (59% improvement or steadiness), disregarding the little example size, contend for this careful therapy for certain patients with POAG [7].

In our study the Mean Sensitivity pre-operative value was 8.73 ± 4.5493, at 1 Month the mean was found to be 9.267 ± 4.9947 (p=0.097). The Mean value for MS at 3rd month was 9.859±5.5606 (p=0.043). The MS values showed significant increase at 3rd month. Similarly MD observed at pre-operative period was 19.044 ± 4.6111 Mean value at 1 month was 18.26 ± 5.164 (p=0.003). The Mean value at 3rd month was found to be 17.926 ± 5.4928 (p=0.012). The results showed a significant improvement in the follow-up period. Bertrand et al (2014) in his investigation assessed the paces of MD misfortune when trabeculectomy and indicated that there was an extensive decrease in the pace of MD misfortune after medical procedure. The normal distinction between the paces of MD misfortune when medical procedure was 0.20 dB/year (p = 0.15), a decrease of 56% overall. Despite the fact that this distinction was not factually huge, a general decrease of 56% of MD misfortune after medical procedure can be viewed as clinically noteworthy [11].

In our study the pre-operative value of sLV was observed and the Mean value was 7.822 ± 2.1344. The sLV at 1 month was 7.544 ± 2.1378 (p=0.525). The last reading at 3rd month was observed to be 7.53 ± 2.138 (p=0.851). All values showed numerical improvement but none were statistically significant. Similar studies done by various authors showed changes in the VF global indices, Figus et al (2011) found the normal pre-employable MD and PSD were - 14.05±3.37 and 8.58±1.79 dB, individually. At 3 and a half year, individually, MD diminished to -13.35±3.26 and -13.58±3.54 dB (P<0.06 and P<0.06), and PSD expanded to 9.20±1.86 and 8.97±1.52 dB (P<0.06 and P<0.06). He further adds changes in functional parameters did not show statistically significant correlation.

Kotecha et al (2001) in their examination watched, around 33% of eyes kept on showing glaucomatous movement after trabeculectomy, and that movement was distinguished transcendently by changes in VF affectability. Changes in VF affectability are available in just a little extent of eyes. Similar results were also observed by Dieng et al (2009), Sahli et al (2012), Yildrim et al (1990), Lazaro et al (2007), Kalpana et al (2014), Fiona et al (2014).

DISCUSSION:
Glaucomatous optic neuropathy causes reformist passing of retinal ganglion cells and their axons. These basic changes go before VF abandons as estimated by standard robotized perimetry. Visual field appraisal is a significant clinical device in the evaluation of patients with intense and constant visual infections. For these several tasks there may be different strategies. With automated perimetre’s, users may select the appropriate stimulus duration and interval according to what seems best in the patients. The mean deviation on Octopus perimetry is recorded as a positive value. Values for global indices (mean deviation (MD), pattern standard deviation (PSD)/loss variance (sLV)) was taken for direct comparison as was value of mean sensitivity (MS). MS was automatically calculated on Octopus results. Figus et al (2011) found a small change in MD after surgical IOP reduction. Dieng et al (2009) saw that the variables contemplated, just age and reviewed subsequent time from medical procedure affected VF after trabeculectomy, the outcomes (59% improvement or solidness), notwithstanding the little example size, contend for this careful therapy for certain patients with POAG [7].
In our study the Mean Sensitivity pre-operative value was 8.73 ± 4.5493, at 1 Month the mean was found to be 9.267 ± 4.9947 (p=0.097). The Mean value for MS at 3rd month was 9.859 ±5.5606 (p=0.043). The MS values showed significant increase at 3rd month. Similarly MD observed at pre-operative period was 19.044 ± 4.6111 Mean value at 1 month was 18.26 ± 5.164 (p=0.003). The Mean value at 3rd month was found to be 17.926 ± 5.4928 (p=0.012). The results showed a significant improvement in the follow-up period. Bertrand et al (2014) in his examination assessed the paces of MD misfortune when trabeculectomy and demonstrated that there was an extensive decrease in the pace of MD misfortune after medical procedure. The normal contrast between the paces of MD misfortune when medical procedure was 0.20 dB/year (p = 0.15), a decrease of 56% all things considered. In spite of the fact that this distinction was not measurably critical, a general decrease of 56% of MD misfortune after medical procedure can be considered clinically significant [11].

In our study the pre-operative value of sLV was observed and the Mean value was 7.822 ± 2.1344. The sLV at 1 month was 7.544 ±2.1378 (p=0.525). The last reading at 3rd month was observed to be 7.53 ± 2.138 (p=0.851). All values showed numerical improvement but none were statistically significant. Similar studies done by various authors showed changes in the VF global indices, Figus et al (2011) found the normal pre-usable MD and PSD were -14.05±3.37 and 8.58±1.79 dB, separately. At 3 and a half year, separately, MD diminished to -13.35±3.26 and -13.58±3.54 dB (P<0.06 and P<0.06), and PSD expanded to 9.20±1.86 and 8.97±1.52 dB (P<0.08 and P<0.06). He further includes changes in utilitarian boundaries didn’t show measurably huge relationship [8]. Kotecha et al (2001) in their investigation watched, roughly 33% of eyes kept on showing glaucomatous movement after trabeculectomy, and that movement was distinguished overwhelmingly by changes in VF affectability. Changes in VF affectability are available in just a little extent of eyes. Similar results were also observed by Dieng et al (2009), Sahli et al (2012), Yildrim et al (1990), Lazaro et al (2007), Kalpana et al (2014), Fionaet al (2014).

Various studies have shown that after Trabeculectomy VF global indices progression has either stabilized or slightly improved showing the benefits of lowering the IOP in POAG. In the present study the Mean IOP at 3rd month post operatively was found to be 11.81± 3.552, which could be a possible reason for the stabilization or improvement in parameters taken in the study. Our findings corroborate other reports regarding the significance of a lower IOP during follow-up. One possible explanation for changes in visual field indices are the restoration of normal axoplasmic flow, after reduction in IOP.

CONCLUSION

Perimetry is used for the measurement of visual field. The decrease in visual field and the vertical loss of vision in glaucoma related with harm to the nerve fiber at the optic plate and has been broadly viewed as irreversible. Certainly loss of visual fields is one of the early indications for surgery in glaucoma, and this field loss can perhaps be best demonstrated by the use of automated Perimetry. The minor changes observed in present study could be improved by early stage analysis of Glaucomatous eye using Perimetry.

REFERENCES

2. Shum JW, Leung DY. Surgical Decisions in Primary Open Angle Glaucoma with Low or Normal


