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RESEARCH ARTICLE

STUDY ON PATTERN OF SECONDARY GLAUCOMA IN RURAL HOSPITAL

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Abstract

Introduction: Glaucoma is a chronic, progressive optic neuropathy leading to loss of visual function. It is the second most common cause of blindness.

Aim: To study the pattern of secondary glaucoma and to identify their known risk factors and its aetiology.

Methods: A observational, descriptive cross-sectional study was conducted at a tertiary care hospital in rural set-up. A total of 45 patients with raised IOP having suspected secondary glaucoma were evaluated. Evaluation was done on the basis of detailed history and clinical examination including visual acuity, anterior segment examination, intraocular pressure, gonioscopy and fundus evaluation.

Results: The mean age at presentation was 65.46±13.72 years with 60% (27) males and 40% (18) females. Diabetes mellitus was seen in 22.2% (10), long term steroid use in 2.22% (1). Out of 45 patients 46.66% (21) had lens induced glaucoma, 26.66% (12) had pseudoexfoliatory glaucoma, 2.22% (1) had steroid induced glaucoma, 2.22% (1) had pigmentary glaucoma, 35.56% (4) had neovascular glaucoma, 4.44% (2) had inflammatory glaucoma, 2.22% (1) had angle recession glaucoma, 4.44% (2) had pseudophakic glaucoma and 2.22% (1) had malignant glaucoma. The mean IOP was 42.75±9.98 mm Hg at the time of presentation. Vision was PL -ve in 8.88% (4), PL + and PR faulty in 15.55% (7), PL + PR + in 60% (27) and less than 6/36 in 15.55% (7). On funduscopy 13.32% (6) had glaucomatous optic atrophy, 6.66% (3) had advanced glaucomatous disc changes, 6.66% (3) had normal findings and in 73.26% (33) it was not visualized due to hazy media. Gonioscopy showed that 26.64% (12) had open angle out of which 2.22% (1) had pigmentation (sampaolesi's line), 4.44% (2) had neovascularisation of the angle, 2.22% (1) had angle recession and in 66.6% (30) gonioscopy was not possible due to corneal edema and pain.

Conclusion: All 45 patients were evaluated clinically and it was found that secondary glaucoma was most common in 61-70 years with male predominance. The most common type was lens induced type followed by pseudoexfoliatory type.

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Introduction:-

Glaucoma is a chronic, progressive optic neuropathy caused by a group of ocular conditions, which lead to damage of the optic nerve with loss of visualfunction.[1] Glaucomas are a group of diseases in which a progressive loss of retinal ganglion cells is characterized by recognised pattern of both visual functional loss and optic nerve head pallor and excavation.[2]

The estimated number of people with glaucoma worldwide is expected to rise from 76 million in 2020 to 111 million in 2040, with Africa and Asia being affected more heavily than the rest of theworld.[3][4]

IOP is an important and only modifiable risk factor, other risk factors associated with the disease being family history, increasing age, race and diabetes. The main cause of damage is IOP, outflow obstruction, that affect the pre-trabecular passage of aqueous humour, the trabecular flow, and the post-trabecular movement of aqueous humour and irido-trabecular contact.[5]

Glaucoma has been classified into primary and secondary glaucoma.

Secondary glaucoma refers to any case in which another disease, trauma, drug or procedure causes increased eye pressure, resulting in optic nerve damage and vision loss.[6]Secondary glaucomas are associated with ocular or systemic abnormalities responsible for elevated IOP; these diseases are often unilateral and acquired.[7]

Classification of secondary glaucomas :[8][9]

A. Secondary Open Angle Glaucoma - according to the point at which outflow is obstructed, which can be pre-trabecular, trabecular, and post- trabecular.

B. Secondary Angle Closure Glaucoma - aqueous outflow is impaired by apposition between the peripheral iris and the trabeculum. It can be :

i.With pupillary block

ii.Without pupillary block - Anterior ‘pulling mechanism’ and Posterior ‘pushing mechanism’.

Depending on the cause of rise in IOP it can be lens induced, inflammatory, neovascular, pigmentary, pseudoexfoliative, traumatic, steroid induced, aphakic or pseudophakic, corneal pathology related and miscellaneous causes.

Secondary glaucoma forms a large proportion of the glaucomas, especially in developing countries. This is because of high incidence of neglected cataract, cataract related surgical complications, trauma, ocular infections, inflammations, etc. The attending ophthalmologists treat the primary cause but often an undiagnosed secondary glaucoma leads to substantial loss of vision before it is identified and specific therapy instituted.[1]

Methods:-

A observational, descriptive, cross-sectional study was conducted at a tertiary care hospital in rural set-up. A total of 45 patients with raised IOP having suspected secondary glaucoma were evaluated over a period of 1.5 year-January 2021 to July 2022.

Inclusion Criteria:

1.All patients attending ophthalmology OPD with raised IOP having suspected secondary glaucoma.
2.All patients irrespective of age and gender.

Exclusion Criteria:
1.Patients diagnosed with primary glaucomas.
2.Congenital glaucomas.

Evaluation was done on the basis of detailed history and clinical examination. It included visual acuity, anterior segment slit lamp biomicroscopy, intraocular pressure measurement with applanation tonometer, gonioscopy with 3 mirror gonioscope and fundus evaluation with +90 D. Demographic data, aetiology and other significant findings were noted.

Results:-

Table1:- Age and Gender wise distribution of Patients with Secondary Glaucoma.

Age in years	Males	Females	Total (Percentage)
31-40yrs.	4	0	**4 (8.88%)**
41-50 yrs.	0	2	**2 (4.44%)**
51-60 yrs.	4	3	**7 (15.54%)**
61-70 yrs.	7	9	**16 (35.52%)**
71-80 yrs.	7	3	**10 (22.2%)**
81-90 yrs.	5	1	**6 (13.32%)**
Total	**27 (60%)**	**18 (40%)**	**45 (100%)**
Mean ± SD	**66.00 ± 15.72**	**64.66 ± 10.21**	**65.46 ± 13.72**

Table 2:- Pattern of Secondary Glaucoma.

Pattern	No. of Patients	Percentage (%)
Lens Induced Glaucoma	21	46.66
Pseudoexfoliatory Glaucoma	12	26.66
Neovascular Glaucoma	4	35.56
Inflammatory Glaucoma	2	4.44
Angle Recession Glaucoma	1	2.22
Pseudophakic Glaucoma	2	4.44
Malignant Glaucoma	1	2.22
Steroid Induced Glaucoma	1	2.22
Pigmentary Glaucoma	1	2.22
Total	**45**	**100**

Table 3:- Risk Factors in Patients with Secondary Glaucoma.

Risk Factors	No. of Patients	Percentage (%)
Diabetes mellitus	10	22.22%
Long Term Steroid Use	1	2.22%
None	34	75.56%
Total	**45**	**100.00%**

Table 4:- Association of Secondary Glaucoma and Risk Factors.

Type of Secondary Glaucoma	Diabetes Mellitus	Long Term Steroid	No Risk Factors	Total
Lens Induced Glaucoma	4	0	17	**21**
Pseudoexfoliatory Glaucoma	2	0	10	**12**
Neovascular Glaucoma	4	0	0	**4**
Angle Recession Glaucoma	0	0	1	**1**
Inflammatory Glaucoma	0	0	2	**2**
Malignant Glaucoma	0	0	1	**1**
Pigmentary Glaucoma	0	0	1	**1**
Pseudophakic Glaucoma	0	0	2	**2**
Steroid Induced Glaucoma	0	1	0	**1**

Total	**10**	**1**	**34**	**45**

Figure 1:- No.of Patients with IOP at the time of Presentation.

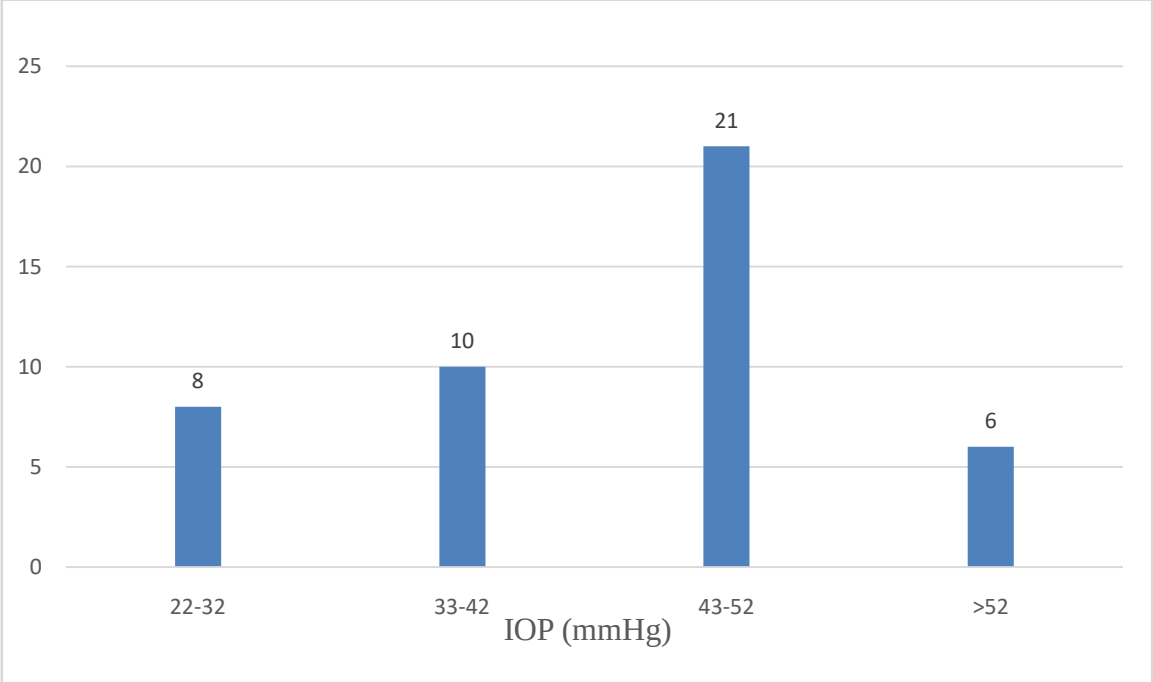

Figure 2:- Co-relation of IOPin Patients with Types of Secondary Glaucoma.

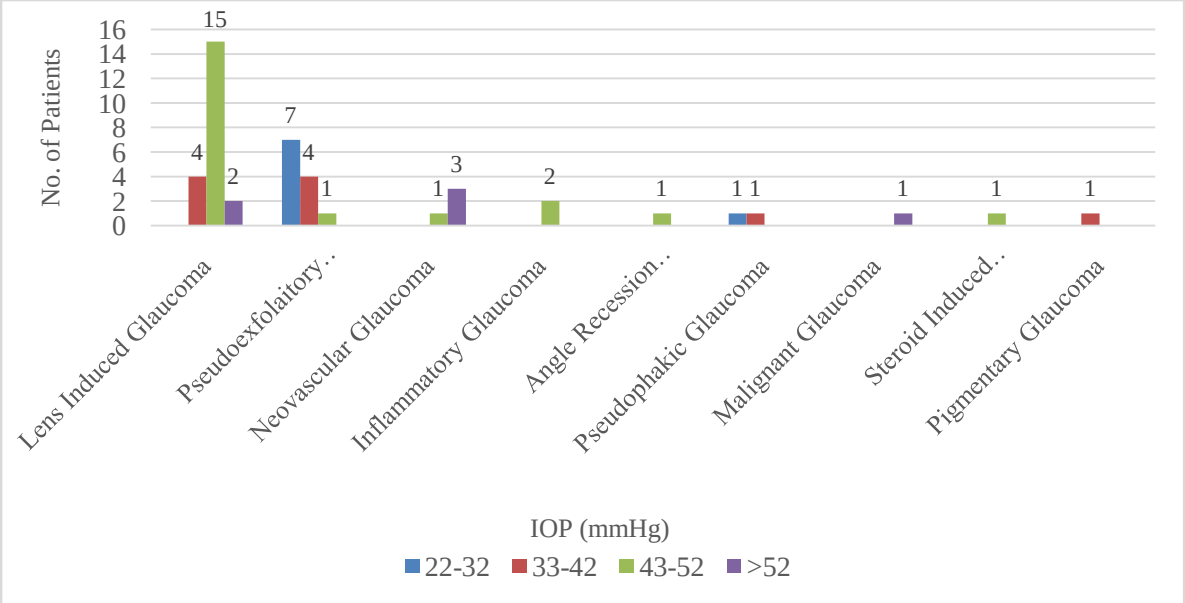

Table 5:- Visual Acuity inPatients with Secondary Glaucoma.

Type of Secondary Glaucoma	PL -ve	PL+ PR FAULTY	PL+ PR+	4/60-6/36
Lens Induced Glaucoma	1	3	17	0
Pseudoexfoliatory Glaucoma	1	1	6	4
Neovascular Glaucoma	2	2	0	0
Inflammatory Glaucoma	0	0	1	1

Angle Recession Glaucoma	0	0	1	0
Pseudophakic Glaucoma	0	1	0	1
Malignant Glaucoma	0	0	1	0
Steroid Induced Glaucoma	0	0	1	0
Pigmentary Glaucoma	0	0	0	1
Total (Percentage)	**4 (8.88%)**	**7 (15.55%)**	**27 (60%)**	**7 (15.55%)**

Table 6:- Fundus Examination inPatients with Secondary Glaucoma.

Type of Secondary Glaucoma	Glaucomatous Optic Atrophy	Glaucomatous Disc Changes	Normal Fundus	Not Visualised
Lens Induced Glaucoma	0	0	0	21
Pseudoexfoliatory Glaucoma	2	2	2	6
Neovascular Glaucoma	1	0	0	3
Inflammatory Glaucoma	1	0	0	1
Angle Recession Glaucoma	0	0	0	1
Pseudophakic Glaucoma	1	1	0	0
Malignant Glaucoma	0	0	0	1
Steroid Induced Glaucoma	1	0	0	0
Pigmentary Glaucoma	0	0	1	0
Total (Percentage)	**6 (13.32%)**	**3 (6.66%)**	**3 (6.66%)**	**33 (73.26%)**

Table 7:- Gonioscopy findings in Patientswith Secondary Glaucoma.

Type of Secondary Glaucoma	Open Angle	Angle Recession	Neovascularisation of angle	Not Possible
Lens Induced Glaucoma	0	0	0	21
Pseudoexfoliatory Glaucoma	10	0	0	2
Neovascular Glaucoma	0	0	2	2
Inflammatory Glaucoma	1	0	0	1
Angle Recession Glaucoma	0	1	0	0
Pseudophakic Glaucoma	0	0	0	2
Malignant Glaucoma	0	0	0	1
Steroid Induced Glaucoma	0	0	0	1
Pigmentary Glaucoma	1	0	0	0
Total (Percentage)	**12 (26.64%)**	**1 (2.22%)**	**2 (4.44%)**	**30 (66.6%)**

In this study the mean age at presentation was 65.46± 13.72 years with male 60% (27) and female 40% (18) (Table 1).Lens induced glaucoma was the most common type with 46.66% (21) which included phacomorphic type being 42.22% (19), lens particle type being 2.22% (1) and phacolytic type being 2.22% (1). Inflammatory glaucoma was seen in 4.44% (2) with 2.22% (1) having Posner-Schlossman Syndrome with signs of anterior uveitis and 2.22% (1) having signs of chronic uveitis.Diabetes mellitus was seen in 22.2% (10) out of which 8.88% (4) had neovascular glaucoma, 2.22% (1) had long term steroid use and led to steroid induced glaucoma (Table 3 and 4).

Majority of the patients, 46.62% (21) had IOP in the range of 43-52 mmHg (Figure 1).

The mean IOP was 42.75±9.98 mm Hg at the time of presentation. Vision was PL -ve in 8.88% (4), PL + and PR faulty in 15.55% (7), PL + PR + in 60% (27) and less than 6/36 in 15.55% (7) (Table 5).Funduscopy by 90+ D revealed that 13.32% (6) had advanced glaucomatous optic atrophy, 6.66% (3) had glaucomatous disc changes, 6.66% (3) had normal findings and in 73.26% (33) it was not visualized due to hazy media (Table 6).

On gonioscopy 26.64% (12) had open angle out of which 2.22% (1) had pigmentation(sampaolesi's line), 4.44% (2) had neovascularisation of the angle, 2.22% (1) had angle recession on gonioscopy and in 66.6% (30) it was not possible due to corneal edema and pain (Table 7).

Discussion:-

In this hospital based observational, descriptive, cross-sectional study, 45 patients with secondary glaucoma were evaluated.

Secondary glaucoma was found to be more common in older age group, 35.52% (16) patients belonged to the age group of 61-70 years. Our study differs in this regard with the study by **Gadia et al**[6] who in their study reported that the majority of patients, 30% belonged to the age group of 41-60 years.

There was male predominance noted in this study with M:F ratio of 1.5:1, which correlates with **Gadia et al**[6] who reported M:F ratio of 2.2:1, and **Gurung et al**[10]who reported M:F ratio of 1.5:1.

In our study, out of 45 patients, the most common cause of secondary glaucoma was lens induced glaucoma 46.66% (21), followed by 26.66% (12) being pseudoexfoliatory glaucoma. Our study correlates with **Gurung et al**[10]who reported lens induced glaucoma was most common 32%.Our study also correlates with **Awasthi et al**[11] who reported lens induced glaucoma was the most common contributing to 65%.Our study does not correlate with **Gadia et al**[6] who reported in their study, the most common cause of secondary glaucoma was post-vitrectomy 14%.Our study does not correlate with **Agarwal et al**[12]who reported aphakic glaucoma 37.7% to be the most common cause of secondary glaucoma.

In our study, majority of the patients, 60% (27) had reduced vision to PL+ PR+ and 8.88%(4) had no PLand majority belonged to lens induced type. Our study correlates with **Rohatgi et al**[13]where the visual acuity was only PL+ and 5 cases had no PL.

Majority of the patients,had IOP in the range of 42.75±9.98 mm Hg at presentation. **Gurung et al**[10]reported the average IOP at presentation was 40±11 mm Hg.**Gadia et al**[6]reported baseline IOP ≥ 30 mm Hg.

In73.26% (33) fundus was not visualized due to hazy media, 13.32% (6) had glaucomatous optic atrophy, 6.66% (3) had glaucomatous disc changes and 6.66% (3) had normal findings. Gonioscopywas not possible in 66.6% (30) patients at the time of presentation due to corneal edema and pain and in 26.64% (12)open angle was noted out of which 2.22% (1) had pigmentation(sampaolesi's line), 4.44% (2) had neovascularisation of the angle and 2.22% (1) showed angle recession.

Conclusion:-

All 45 patients were evaluated clinically and it was found that secondary glaucoma was most common in 61-70 years with male predominance. The most common type was lens induced type followed by pseudoexfoliatory type.

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