1. INTRODUCTION

Netra i.e. Chakshurendriya is one of the five Dnyaendriyas mentioned in Ayurveda classics.⁠¹⁵ Chakshurendriya is the major tool to receive Pratyaksha Dnya.⁠² As per Ayurveda among all perceptions received by Dnyaendriyas, the most perception is received by just Chakshurendriya only.⁠³ It means Chakshurendriya is the most important Dnyaendriya of human. Ayurveda the most ancient medicinal branch in the world, has mentioned diseases of Eye, Ear, Nose, Throat, Head, Mouth and Teeth under Shalakyatantra branch.⁠⁴ Adhimantha, one of the eye diseases can be correlated with modern days Glaucoma. As per Sushruta, Adhimantha is a Sarvagata vyadhi. It is of four types viz. Vataja, Pittaja, Kaphaja and Raktaja.⁠⁻⁵ Among them Kaphaja Adhimantha is Sadhya vyadhi⁠⁶ in which Netra shotha, Srava, Kandu, Harshna, Siro Ruja are found as signs and symptoms. Many treatment regimens like Seka, Anjana, Ashchyotan, Lepa along with internal medicines are advised in the context of Kaphaja Adhimantha by Acharya Sushruta.⁠⁷ Symptoms of Kaphaja Adhimantha are Netra Shotha (Oedema), Srava (Lacrimation), Kandu (Itching), Harshna (hyper sensitivity), Siro Ruja (Headache) etc.⁠⁸

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Modern science has listed Eye as one of the five Sense Organ. It is always said that only blind person can understand and tell the importance of Eye. Blindness is a serious condition which permanently hampers Physical, Mental, Social life of patient. Childhood blindness, Glaucoma, Diabetic Retinopathy, Cataract, Refractive Errors, Corneal opacities, Age-related degeneration, Trachoma etc. are most common causes of Blindness in India. Prevalence of Glaucoma (POAG) is markedly increasing in India. About 11.2 million people over age 40 years are suffering from it. Global prevalence of Glaucoma for age ranging 40 years to 80 years is noted 3.54% as per study. As per modern Ophthalmology, Primary Open Angle Glaucoma is one of the types of Glaucoma. In POAG bilateral intra ocular pressure is raised with cupping of optic disc and visual field loss. It is characterised by Painless progressive loss of vision, Mild Headache, Mild eye itch, increasing difficulty in near work and frequently changes in Presbyopia correction due to failure of accommodation owning to pressure upon the ciliary muscles and its nerve supply, Defect in visual field. Signs are - Visual Acuity may remain till the last stage, Cornea is usually clear, Anterior Chamber depth is normal, Peripapillary reaction remain normal, Increased IOP with a large diurnal variations and Cupping of the optic disc. Despite of recent advances in modern Ophthalmology the diseases like Glaucoma are lacking complete cure.

Management of Glaucoma with certain Ayurvedic medicine was selected for present clinical trial. Punarnavasava internally was used as Trial drug while Tab Acetazolamide 250 mg was used as control drug to treat POAG. Justification for selection of the disease and the drug is mentioned below. Large number of patients of Glaucoma are available, generally 5th decade and older of persons are affected. Family history is present 5-20% cases of POAG. Patients cooperation is achieved easily because there is no any pain and difficulty are felt by patients during the treatment period. Punarnavasava is shothahara, mutral, sukshma-strotogrami, vyayavayi and hence useful to reduce IOP. On other hand many patients fail to achieve desire level of IOP with Acetzolamide, many need additional medication and side effects of Acetzolamide are being noted by many Ophthalmologists during day today practice.

2. MATERIALS AND METHODS

2.1. Objectives

- To study effect of Punarnavasava on symptoms Kaphaja Adhimantha w.r.t Primary Open Angle Glaucoma.
- To study effect of Punarnavasava on IOP and Visual Acuity in patients of Kaphaja Adhimantha w.r.t to Primary Open Angle Glaucoma.
- To compare efficacy of Punarnavasava with Tab Acetazolamide in Kaphaja Adhimantha w.r.t to Primary Open Angle Glaucoma.

2.2. Research Methodology

This was Randomized Controlled Trial. A medical camp was arranged at PMT’s Ayurveda College, Shevgaon in which 531 patients were registered. Sample size calculated at openepi.com gave the value 53 at 95% of confidence interval as per prevalence rate of Glaucoma i.e. 3.54%. Hence, out of 531 patients 54 patients were selected by lottery method for trial. Nature of the study was explained to all patients in their mother tongue and written consent was taken. Ethical clearance for the present trial was granted by IEC of our institute (PMT/AYU/IEC/2019/368). Those patients were further divided into two groups, each containing 27 patients. 27 patients of Trial group were treated with Punarnavasava (orally) while 27 patients of Control Group were treated with Tab Acetazolamide (orally). 8 patients were withdrawn due to irregular follow-ups and were replaced. Finally, study was carried out in 54 patients. Related clinical data of patients was recorded in specially designed CRF time to time.

2.3. Selection of Study subjects

2.3.1. Inclusion criteria

- Patients showing the signs symptoms of POAG.
Painless loss of vision.
Frequently changes in presbyopia glasses.
Sex: Both Sex.
Age: Above 20 years and Below 80 years.
Patient with family history of Glaucoma.
Patients with refractive error like Myopia.
Patients with refractive surgery like LASIK.
Patients agree for trial and ready to give consent.

2.3.2. Exclusion criteria

Age: Below 20 years and Above 80 years.
Patients with cardiac problem.
Patients suffering from HIV, AIDS, Cancer, DM Retinopathy.
Patients who were not agree for trial not ready to give consent.
COPD patients.

2.3.4. Diagnostic criteria

Classical lakshanas of Kaphaja Adhimantha
Raised Intra ocular pressure
Cupping of the optic disc

2.4. Instruments

Goldman Applanation Tonometer
Zeiss 4 Mirror Gonioscope

2.5. Drug administration

Market preparation of Punarnavasava\textsuperscript{16} (Sandu pharmacy) was used in patients of Trial Group. Tab Moxaid 250 mg (Acetazolamide,\textsuperscript{17} Goldshield Pharmaceuticals Ltd.) was used in patients of Control Group. Drug administration is mentioned in the Table No 1.

2.6. Assessment criteria

All subjective and objective parameters were graded for ease of assessment before and after treatment. Gradations were as follows.

Heaviness

0: No heaviness
1: Mild heaviness but can perform routine work
2: Moderate heaviness and routine work is disturbed
3: Severe heaviness and can’t do routine work

IOP

0: 12 to 22 mm of Hg
1: 23 to 28 mm of Hg
2: 29 to 34 mm of Hg
3: More than 34 mm of Hg

3. RESULTS AND DISCUSSION

3.1. Epidemiological observations

54 patients were included in the study. Few epidemiological findings are as follows. 37 (68.51\%) patients were found in age group 50 to 59 years. Prevalence of POAG was found maximum in 6\textsuperscript{th} decade of life. 35 (64.81\%) patients were male, it was by chance only. Housewives (22, i.e. 40.74\%) and Farmers (15, i.e. 27.77\%) were found maximum among all occupations. All 54 patients were Hindu. It was also by chance only because maximum population near our hospital is Hindu. Middle economy patients (27, i.e. 50\%) were found maximum.

3.2. Changes in parameters

Heaviness:

In Trial Group; before treatment, 9 patients were of grade III, 15 patients were of grade II and 3 patients were of grade I while after treatment 3 patients were of grade III, 16 patients were of grade II, 6 patients were of grade I and 2 patients were of grade 0. In Control Group; before treatment, 10 patients were of grade III, 19 patients were of grade II and 6 patients were of grade I while after treatment 11 patients were of grade II, 14 patients were of grade I and 1 patient were of grade 0 (Figure No 1).

Intra Ocular Pressure:

In Trial Group; before treatment, 2 patients were of grade III, 18 patients were of grade II and 7 patients were of grade I while after treatment 13 patients were of grade II, 12 patients were of grade I and 2 patients were of grade 0. In Control Group; before treatment, 2 patients were of grade III, 19 patients were of grade II and 6 patients were of grade I while after treatment 11 patients were of grade II, 14 patients were of grade I and 2 patients were of grade 0 (Figure No 2). In the present study parameters assessed were Heaviness and Intra Ocular Pressure. The parameters were moderately reduced.
after treatment in both Groups. It means Punarnavasava and Tab Acetazolamide 250 mg both drugs have reduced Heaviness and Intraocular pressure in patients of POAG. But decrease in parameters was slightly better in Control Group as compared to Trial Group.

3.3. Statistical analysis

Statistical analysis was done Intra-Group (Paired t Test) and Inter-Group (Unpaired t Test). Paired t Test has shown significant effect of both the drugs on Heaviness and Intra Ocular Pressure. Hence it is concluded that, both trial drug and control drug are significantly effective to reduce Heaviness and Intra Ocular Pressure. The values of t, P, Mean and SD are shown in Table No 2. Unpaired t Test has shown insignificant difference between effect of both drugs. Hence it is concluded that both trial drug and control drug almost equally effective to reduce Heaviness and Intra Ocular Pressure. Mean difference values of control drugs are slightly better it shows effect of control drug is slightly better than trial drug but not significantly greater than expected by chance. The values of t, P, Mean and SD are shown in Table No 3.

3.4. Probable mode of action of Punarnavasava

Kaphaja Adhimantha is Sarvagata vyadhi of Netra in which Kapha is dominant as the name suggests itself. Rasa is dushya and samprapti prarak is strotavarodhajanya samprapti. Due to Kapha, Rasa, Strotavarodha along with Guru guna of Kapha Shotha and Gaurava are present. Punarnavasava is Madya janya sandhana in which Punarnava is the main constituent. Punarnavasava is Mutral, Shothahara, Sukshma-strotogami, Strorodhnashak and vyavayi. Due to above properties it helps to breaks pathogenesis of Kaphaja Adhimantha giving relief in symptoms. Perhaps Kaphaja Adhimantha has been narrated as Sadhya vyadhi no complete cure is available for it. But drugs like Punarnavasava have moderate effect to reduce Heaviness and IOP in Kaphaja Adhimantha.

3.5. Limitations

Kaphaja Adhimantha should be treated with multiple drugs rather than treating it with single drug like Punarnavasava. Use of combination of drugs may give more fruitful results. Shodhan paschhat shaman chikitsa may give better decrease in IOP. Such clinical trials are recommended in future on large sample size.

4. CONCLUSION

Kaphaja Adhimantha can be correlated with Primary Open Angle Glaucoma. It is commonly found in people above age of 40 years. Till date there is no complete cure for POAG. Ayurvedic drugs can give moderate effect to reduce symptoms. Punarnavasava can reduce Heaviness and IOP moderately (20 to 22 % relief) in Kaphaja Adhimantha (POAG).

5. REFERENCES

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6. TABLES AND FIGURES

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Table No 1 Drug Administration

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Table No 2 Paired t Test (Intra-group analysis)

Table No 3 Unpaired t Test (Inter-group analysis)

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