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OUTCOMES OF YAG LASER PERIPHERAL IRIDOTOMY IN GLAUCOMA PATIENTS IN BANGLADESH: A CLINICAL ANALYSIS

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ABSTRACT

Background: YAG Laser Peripheral Iridotomy (LPI) is a widely used procedure for managing primary angle-closure glaucoma (PACG) by creating an alternative pathway for aqueous humor outflow. In Bangladesh, where glaucoma remains a significant cause of preventable blindness, evaluating the outcomes of YAG LPI is crucial for optimizing treatment strategies. **Objective:** In this study our main goal is to evaluate the efficiency of YAG laser PI (peripheral iridotomy) in management of glaucoma patients in Bangladesh. **Method:** This cross-sectional study was done in the in the Tertiary Hospital from March 2023 to March 2024**.** A total of 180 consecutive patients were included. On the basis of Academy of Ophthalmology primary Angle Closure glaucoma preferred practice pattern patients were sub divided into three group: primary angle closure suspect (PACS) (#180° iridotrabecular contact [ITC], normal IOP and no optic nerve damage), n=60: primary angle closure (PAC) ($180° ITC with peripheral anterior synechiae [PAS] or elevated IOP, but no optic neuropathy), n=60; and primary angle closure glaucoma (PACG) ($180° ITC with PAS, elevated IOP and optic neuropathy,n=60. **Result:** during the study, 42% percent of the patients had undergone bilateral LPI. 2% produced hyphema in 1st year, followed by 1% produced hyphema in 2nd year, no patients found in 3rd year. mean power used in primary angle closure glaucoma was 132±127.8. On the basis of Logmar chart, mean percentage of visual acuity where before treatment visual acuity of the primary angle closure suspect was 81%, which was 3% increased after treatment, 84%. **Conclusion:** Based on our study, we conclude that laser iridotomy is a valuable tool in the clinical management of early primary angle-closure glaucoma. It effectively reduces intraocular pressure and improves visual acuity in patients. Additionally, early intervention with laser iridotomy may help lower the risk of progression to primary angle glaucoma.

KEYWORD: YAG laser PI (peripheral iridotomy), primary angle closure glaucoma, primary angle closure.

INTRODUCTION

Glaucoma, a leading cause of irreversible blindness worldwide, is characterized by progressive optic nerve damage, often associated with elevated intraocular pressure (IOP). One of the subtypes of glaucoma, angle-closure glaucoma (ACG), is prevalent in many regions, including Bangladesh. This condition occurs when the angle between the iris and cornea is reduced, preventing the outflow of aqueous humor and leading to elevated IOP. Early detection and effective management of ACG are crucial to prevent permanent vision loss. YAG Laser Peripheral Iridotomy (YAG LPI) has emerged as a commonly used procedure for treating ACG by creating a hole in the peripheral iris to improve aqueous humor drainage, thereby reducing IOP.[1-4]

In Bangladesh, the burden of glaucoma is significant, with ACG being one of the primary contributors to visual impairment. Despite the availability of various treatment options, including medication and surgery, YAG LPI has gained popularity due to its minimally invasive nature and effectiveness in controlling IOP. However, the outcomes of YAG LPI in the Bangladeshi population have not been comprehensively studied.[5-6] Understanding the efficacy, safety, and long-term outcomes of this procedure in local patients is crucial for refining treatment strategies and improving patient outcomes.

This clinical analysis aims to evaluate the outcomes of YAG LPI in patients diagnosed with glaucoma, particularly ACG, in Bangladesh. The study will assess various parameters such as reduction in IOP, improvement in visual field, and any post-procedural complications. It will also explore patient demographics

and any potential factors influencing the success of the procedure in this specific population.

Several studies conducted globally have shown that YAG LPI can effectively reduce IOP and prevent further optic nerve damage in ACG patients. However, there is limited data on the specific outcomes in the Bangladeshi context, where socio-economic factors, healthcare accessibility, and genetic predispositions may influence the effectiveness of the procedure.[7-9] This research aims to fill this gap by providing insights into how YAG LPI performs in the Bangladeshi population.

The study will also explore the safety profile of YAG LPI in glaucoma patients, including the incidence of complications such as corneal edema, iritis, or peripheral anterior synechiae. Additionally, patient satisfaction and quality of life post-treatment will be considered, offering a comprehensive view of the procedure's impact on patients' daily lives.

Ultimately, this research hopes to contribute to the growing body of knowledge regarding glaucoma management in Bangladesh, with the goal of enhancing clinical practices, improving patient outcomes, and reducing the burden of glaucoma-related blindness in the region.

OBJECTIVE

General objective

- To evaluate the efficiency of YAG laser PI (peripheral iridotomy) in management of glaucoma patients in Bangladesh.

Specific objective

- To detect clinical characteristics of patients.
- To identify complication rates by year of the patients.

METHODOLOGY

This cross-sectional study was conducted at the Tertiary Hospital over a period from March 2023 to March 2024. A total of 180 consecutive patients who presented to the glaucoma services were included in the study. The study population consisted of individuals diagnosed with primary angle closure (PAC), primary angle closure suspects (PACS), and glaucoma. Purposive sampling was employed to select participants based on specific inclusion criteria.

The study participants were classified into three groups according to the Academy of Ophthalmology's Primary Angle Closure Preferred Practice Pattern. The first group, primary angle closure suspect (PACS), included patients with less than 180° of iridotrabecular contact (ITC), normal intraocular pressure (IOP), and no optic nerve damage (n=60). The second group, primary angle closure (PAC), consisted of individuals with more than 180° of ITC, peripheral anterior synechiae (PAS) or elevated IOP, but no optic neuropathy (n=60). The third group, primary angle closure glaucoma (PACG), comprised patients with over 180° of ITC, PAS, elevated IOP, and optic neuropathy (n=60).

A comprehensive patient history was gathered, including details such as age, sex, socioeconomic status, duration and type of symptoms, systemic associations, and previous treatments. Initial evaluation involved both a thorough clinical examination and a detailed review of the patient's history. All relevant data were meticulously recorded in a data collection sheet.

The data collected were processed and analyzed using SPSS (Statistical Package for Social Sciences) for Windows version 22. To compare quantitative variables, an unpaired t-test was applied. Variables were expressed as range and mean ± standard deviation (SD). A p-value of less than 0.05 was considered statistically significant. Further analyses included the use of the Student's t-test, Pearson's correlation coefficient test, multivariate logistic regression analysis, and Fisher's exact test, as appropriate for the data.

RESULT

In table-1 shows age distribution of the patients where most of the patients (47%) belongs to age group 50-60 years. The following table is given below in detail.

Table 1: Age distribution of the patients.

Variable	Distribution	Percentage (%)
Age group	40-50	35
	50-60	47
	60-70	18

In figure-2 shows gender distribution of the patients where male was 70% and female was 30 %. Male patients were 58% higher than female. The following figure is given below in detail.

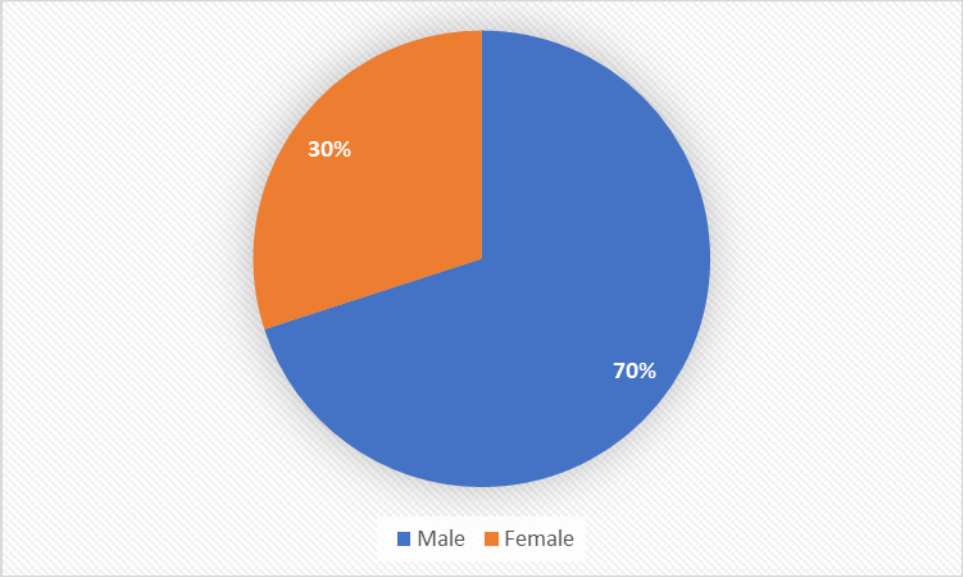

Figure-2: Gender distribution of the patients.

In table-3 shows residential area distribution of the patients where 78% patients belong to urban area The following table is given below in detail.

Table 3: Residential area distribution of the patients.

Residential area	%
Urban	78%
Rural	12%

In table-3 shows clinical characteristics of the patients where 42% percent of the patients had undergone bilateral LPI. The following table is given below in detail.

Table 3: Clinical characteristics of the patients.

Variable	mean±SD, %
% of eye: right eye left eye bilateral eye	 23% 35% 42%
Mean baseline iOP (mmhg)	19.49±11.1
Mean post-laser iOP (mmhg)	14.31±7.8
Diagnosis Primary angle closure suspect,	 34%
Primary angle closure	11%
Primary angle closure glaucoma	51%
Uveitic glaucoma	6%

In table-4 shows mean power use by year where mean power used in primary angle closure glaucoma was 132±127.8. The following table is given below in detail.

Table 4: Mean power use by year.

Variable	1st year	2nd year	3rd year
Mean power used in primary angle closure suspect	76.0±57.9	76.0±57.9	72.3±68.2
Mean power used in primary angle closure	143.5±72.5	143.5±72.5	87.9±41.1
Mean power used in primary angle closure glaucoma	87.9±41.1	136.6±86.4	132±127.8

In figure-3 shows complication rates by year where 2% produced hyphema in 1st year, followed by 1% produced hyphema in 2nd year, no patients found in 3rd year. The following figure is given below in detail.

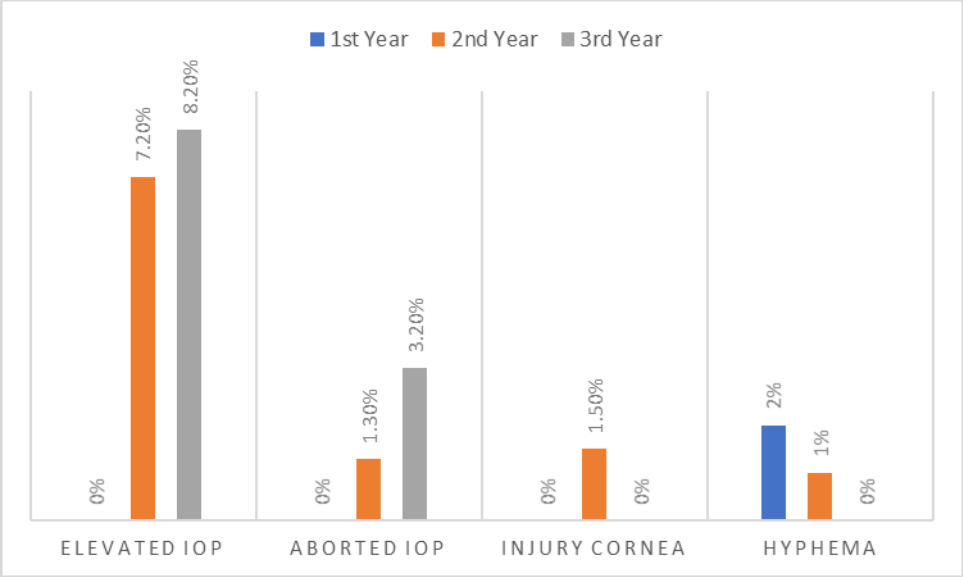

Figure-3: Complication rates by year.

In figure-4 shows visual acuity of the patients where on the basis of Logmar chart, mean percentage of visual acuity where before treatment visual acuity of the primary angle closure suspect was 81%, which was 3% increased after treatment, 84%. The following figure is given below in detail.

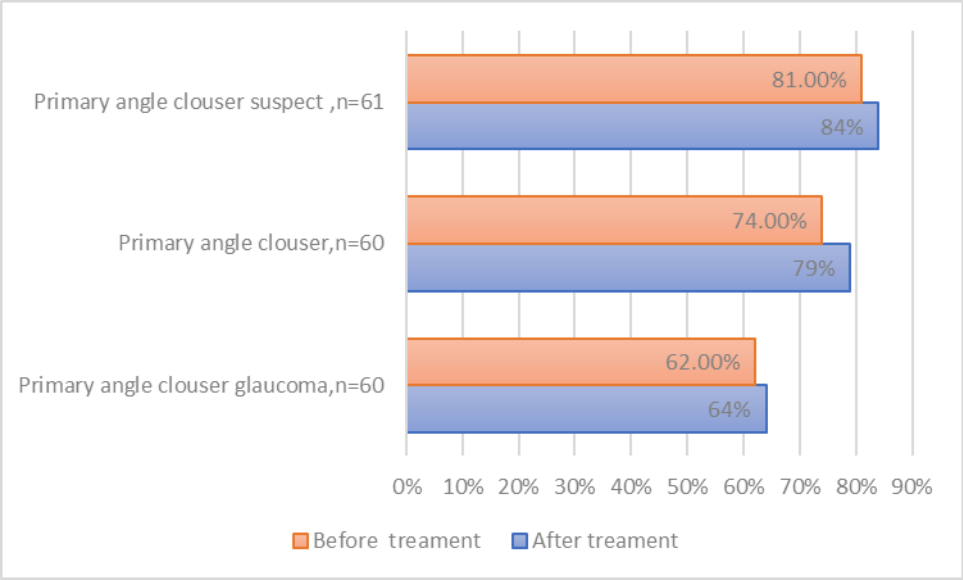

Figure-4: Distribution of the patients on the basis of visual acuity.

DISCUSSION

In our study most of the patients (47%) belongs to age group 50-60 years. Which is supported by other study where 50% patients belong to age group 50-60 years.[9]

In this study 42% percent of the patients had undergone bilateral LPI. Which similar to many studies.[10-11]

Where 2% produced hyphema in 1st year, followed by 1% produced hyphema in 2nd year, no patients found in 3rd year Which is comparable to the 8.9%–34.6% reported in the literature.[8-10]

When the overall complication rates between the groups were analyzed, there was no significant difference between the groups. In one study reported that, inflammation, hyphema, corneal decompensation, cataract formation, IOP elevation, retinal detachments and cystoid macular edema is more common with higher total Nd: YAG energy use in LPI procedures.[12-13]

During the study, on the basis of Logmar chart, mean percentage of visual acuity before treatment in primary angle closure suspect was 801%, which was 3% increased after treatment, 84%. But in primary angle closure glaucoma before treatment it was 62%, after

treatment only 2% was increased. Which was quite similar to other studies.[6-8]

Several studies over the years have shown that as IOP rises above 21 mm Hg, the percentage of patients developing visual field loss increases rapidly, most notably at pressures higher than 26-30 mm Hg. A patient with an IOP of 28 mm Hg is about 15 times more likely to develop field loss than a patient with a pressure of 22 mm Hg.[7-9] It is recommended that the iridotomies are created using the lowest laser energy necessary to minimize complications.[14]

CONCLUSION

From our study we can conclude that, laser iridotomy can be use as beneficial tool for the clinical treatment of early primary angle-closure glaucoma which can effectively reduce the intraocular pressure and improves the acuity level of patient. Early treatment by laser iridotomy may also reduce the risk rate to develop primary angle glaucoma.

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