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Research Article

ETIOLOGICAL SPECTRUM OF IRREVERSIBLE LOSS OF VISION IN TRIPOLI EYE HOSPITAL-LIBYA

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ABSTRACT

The study aimed to determine the causes of irreversible unilateral and bilateral severe visual loss that cannot be medically, optically or surgically rehabilitated, in patients followed at Tripoli Eye Hospital. A retrospective analysis was conducted on 43 patients with irreversible vision loss. Demographic and clinical data were collected, ocular diseases that could be treated, were excluded. Additionally, patients under 10 years of age were not included. The study showed unilateral irreversible vision loss (58%) were more prevalent than bilateral visual loss (41.8%). Male-to-female ratio was 2.07:1. Glaucoma was the most common cause (67.4%), followed by retinal diseases (21%). Primary open angle glaucoma was the predominant cause in the glaucoma group (51.7%), while tractional retinal detachment was the most common cause in the retinal group (44.4%), often associated with diabetes mellitus. Refractive amblyopia was the cause in all patients with refractive-related visual disability, which was unilateral and affected younger individuals (mean age: 31.6 years). Glaucoma and diabetic ocular complications are the commonest causes of irreversible vision loss observed at Tripoli Eye Hospital, Libya. Early detection of these conditions through effective screening at primary healthcare centers is crucial. As older age often associated with systemic diseases that can impact vision, early detection of ocular diseases linked to these conditions, such as diabetes mellitus, can prevent vision loss and maintains functional vision throughout a patient's life.

KEYWORDS: Irreversible vision loss, Visual disability, Glaucoma, Neovascular glaucoma, Amblyiopia, Tractional retinal detachment.

INTRODUCTION

Irreversible vision loss can result from various ocular diseases or as complications of systemic diseases, often leading to sever visual disability if not detected and treated early, such as glaucoma, age related macular degeneration, diabetic retinopathy (DR), retinal detachment of different causes, other vascular retinal diseases and amblyopia. Nearly in all these diseases, if not discovered early and treated, the end-stage is permanent damage to nerve fibers either at level of retina or optic nerve leading to severe visual disability. Of these ocular diseases, the most common cause of irreversible blindness is glaucoma of different types either primary or secondary glaucoma [1]. Primary open angle glaucoma (POAG) is the most common type of glaucoma that leading to irreversible vision loss. POAG is a chronic with insidious onset, slowly progressive, usually bilateral but not necessary symmetrical optic neuropathy as result of ganglion cell

loss with characteristic visual field defect and the most important risk factor is intraocular pressure level, but timely treatment to lower intraocular pressure is effective at slowing the rate of vision loss from glaucoma. It is estimated that 53 million people in the world have POAG in 2020 with prevalence of 3.0% in the population aged 40 to 80 years. Other types of secondary glaucoma: inflammatory, pseudoexfoliation, pigmentary and neovascular glaucoma. Neovascular glaucoma (NVG) is an aggressive, blinding secondary glaucoma, which is characterized by neovascularization of the anterior segment of the eye and leading to elevation of the intraocular pressure. The main etiological factor is retinal ischemia in which proliferative diabetic retinopathy (PDR) is the most common association [2]. Retinal diseases are common causes of irreversible loss of vision. Of the most common retinal disease is retinal detachment, either associated with retinal break; Rhegmatogenous retinal detachment (RRD) or tractionl retinal detachment (TRD) occur as result of fibrous bands in the vitreous, the most common cause being PDR [3]. Retinal detachment if not treated early particularly if involve the macula end with irreversible loss of vision. Diabetes is the most common systemic disease that can cause serious ocular complications, potentially resulting in irreversible vision loss. Advanced PDR affect 5-10% of diabetic patients, Type I diabetics being at particularly high risk, with 60% chance after 30 years [4,5]. PDR characterized by the appearance of abnormal retinal vascularization, if not treated early with laser photocoagulation these retinal new vessels may progress with fibrovascular membrane causing TRD or may bleed causing vitreous haemorrhage. Globally over 100 million individuals the DR is the leading cause of blindness and visual impairment, especially among working-age adults as result of retinal detachment and neovascular glaucoma [6]. Visual disability may be: i- sever, that include sever visual disability (No perception of light NPL)**,** perceptions of light (PL), hand movement (HM). ii- moderate which interpreted as best correct visual acuity of 6/18 to 3/36 [7]. iii- legal blindness, as defined in accordance with the World Health Organization criteria (Best corrected visual acuity less than 3/60 or a corresponding visual field loss to less than 10°,in the better eye despite all medical and surgical interventions [8].

OBJECTIVE OF THE STUDY

To determine the causes of irreversible unilateral and bilateral severe vision loss that cannot be medically, optically or surgically treated, in patients followed at Tripoli Eye Hospital. Determining that can initiate the government and eye care units in promoting, more suitable strategies, for a better awareness of these avoidable complications.

MATERIALS AND METHODS

A retrospective analysis was conducted on 43 patients (61 eyes), who presented to the outpatient department, with, unilateral or bilateral irreversible vision loss. Demographic and clinical data were collected, including age, gender, affected eye, underlying primary ocular disease, treatment received, degree of visual disability, and associated systemic diseases leading to ocular complications. Patients under 10 years of age, and treatable ocular diseases, such as refractive error, corneal opacity, keratoconus, cataract, diabetic maculopathy, operable retinal diseases, and any traumatic cause, were excluded.

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Irreversible visual disability was divided in to: No perception of light (NPL)**,** perceptions of light (PL), and hand movement (HM).

The clinical data were analyzed:

According to the cause of visual loss, patients were divided into 3 groups:

I-Glaucoma group.

II-Retinal group.

III-Refractive error group.

Each group further subdivided into the following subgroups:

i-The glaucoma subgroups include:

a- POAG (Primary open angle glaucoma).

b- NVG (Neovascular glaucoma).

c- S-PG (Seclusio-pupillae glaucoma).

d- CoG (Congenital glaucoma).

ii- Retinal subgroups include:

a- TRD.

b- RRD.

c- CD (Choroidal detachment).

d- RP (Retinitis pigmentosa).

e- MD (Macular diseases).

iii- RE (Refractive group).

RESULTS

This study considers 43 patients. There were 61 eyes (30 right eye and 31 were left eye) had irreversible vision loss. Twenty-fife patients (25 eyes) were unilateral and 18 patients had bilateral vision loss (36 eyes). Of the 43 patients, 29 were males (67.4%) and 14 females (32.5%). The most common causes of irreversible vision loss were glaucoma group (Table 1).

Table 1. Etiological groups of irreversible loss of vision

Group	Number of (%)
Glaucoma	29 (67.4%)
Retina	9 (21%)
Refractive	5 (11.6%)
Total	43 (100%)

The causes according to the sub groups:

I-Glaucoma subgroups:

POAG subgroup: fifteen patients (51.7%), NVG subgroup: eight patients (27.5%), Congenital glaucoma subgroup: three patients (10.3%), Seclusio-pupillae glaucoma subgroup : three patients (10.3%).

II-Retinal subgroups:

TRD subgroup: four patients (44.4%), RRD subgroup one patient: (11%), CD subgroup: one patient (11%), macular diseases subgroup: two patients (22.2%) and RP subgroup: one patient (11%)**.**

*III-Refractive error (RE) subgroup*s; Anisometropic amblyopia five patients (100%) (Table 2).

Table 2. Subgroups of irreversible loss of vision

Subgroup	No. of patients	% from each group	% from total, 43 patients
POAG	15	51.7%	34.8%
NVG	8	27.5%	18.6%
Co.G	3	10.3%	6.9%
S-P.G	3	10.3%	6.9%
TRD	4	44.4%	9.3%
RRD	1	11%	2.3%
CD	1	11%	2.3%
MD	2	22.2%	4.6%
RP	1	11%	2.3%
RE	5	100%	11.6%

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Sex distribution:
Among 43 patients, there were 29 males (67.4 %) and 14 females (32.5%).
Glaucoma group: twenty males (68.9%) and nine females (31%).
Retinal group: seven males (77.7 %) and two females (22.2%).
Refractive group: two males (40%) and three females (60%) (Figure 1).

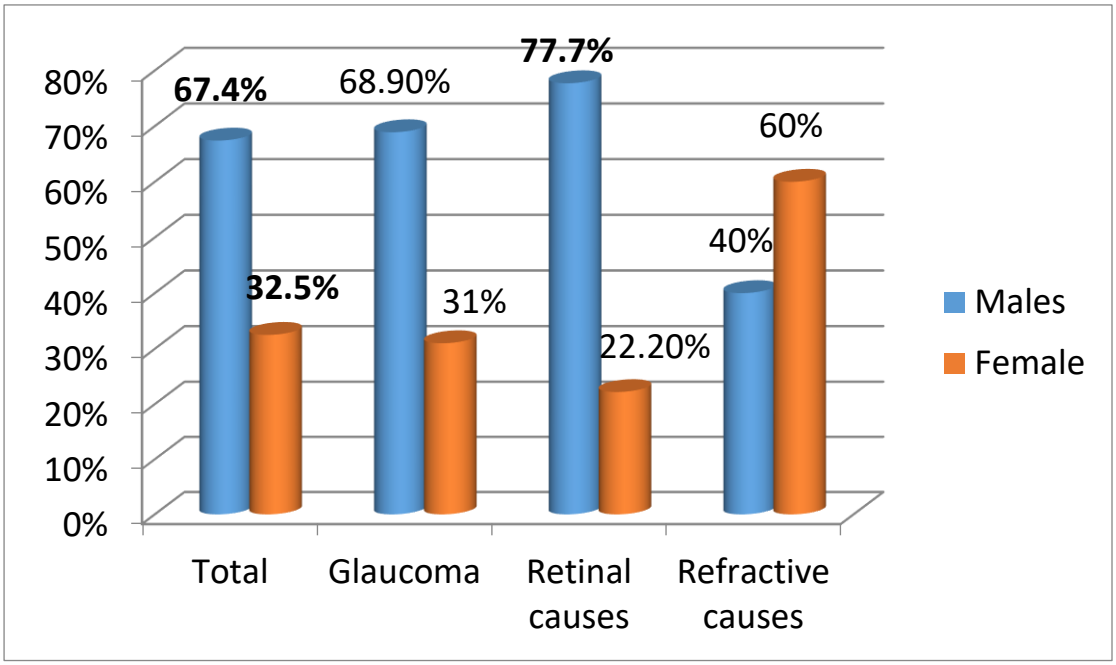

Figure 1. Sex distribution according to groups.

In patients with POAG; there were ten males (66.6%), and five females (33.3%). In NVG; there were six males (75%) and two females 25%). In S-PG; three males (100%). In CoG.; there was one male (33.3), and two females (66.6). In TRD; there were three males (75%) and one female (25%). In RRD; there was one male (100%). In CD; there was one male (100%). In MD; there was one male (50%) and one female (50%). In RP, there was one males (100%). In RE; there were two males (40%) and three females (60%) (Table 3).

Age distribution:
The age of patients in this study ranged from 13-90 years, with a mean of fifty-four years (males 55, females 52). For glaucoma group the mean age was 55.6 years (males 54.5, females 58) with range from 20-90 years. For retinal group, was 61 years (males 58.6, females 70) with range from 30-80 years. For refractive group it was 31.6 years (males 46.5, Females 21.6) with range from 13-80 years (Table 4).

Table 3: Sex distributions of subgroups

Causes	No.	M (%)	F (%)
POAG	15	10(66.6%)	5(33.3%)
NVG	8	6(75%)	2(25%)
CoG	3	1(33.3%)	2(66.6%)
S-PG	3	3(100%)	0%
TRD	4	3(75%)	1(25%)
RRD	1	1(100%)	0%
CD	1	1(100%)	0%
RP	1	1(100%)	0%
MD	2	1(50%)	(50%)
RE	5	2(40%)	3(60%)
Total	43	29(67%)	14(32.5%)

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Table 4. Mean age for all groups

Group	Mean	Range	Male	Female
Glaucoma	55.6	20-90	54.5	58
Retinal	61	30-80	58.6	70
Refractive	31.6	13-80	46.5	21.6
Total	54	13-90	55	52

In POAG: the mean age was 65.3 years (62.5 years in males, 71years in females), with a range of 30-90 years. In NVG; the mean age was 55.8 years (54.5 years in males, 60 years in females), with a range of 33-67 years. In congenital glaucoma: the mean age was 22.3 years (male20, female 23.5). In seclusio-pupillae glaucoma; the mean age was 39.3 years with a range of 29-60 years. In TRD; the mean age was 62.5 years (56.6 years in males, 80years in females) with a range of 45-80 years. In RRD; the mean age was 65 years. In CD; the mean age was 80 years. In RP, the mean age was 30 years. In macular disease; the mean age was 62 years (60 years in males, 65years in females) with a range of 60-65 years. In amblyopia; the mean age was 31.6 years (46 years in males, females 21.6 years in females) with a range of 13-80 years (Table 5).

Table 5: Age distributions for subgroups

Causes	Mean age	Range	Males mean age	Females mean age
POAG	65.3	30-90	62.5	71
NVG	55.8	33-67	54.5	60
CoG	22.3	20-27	20	23.5
S.PG	39.3	29-60	39.3	0
TRD	62.5	45-80	56.6	80
RRD	65	65	65	0
CD	80	80	80	0
RP	30	30	30	0
MD	62	60-65	65	60
RE	31.6	13-80	46.5	21.6

Severe visual disability were seen in thirty patient (69.6%), and forty-two eyes (68.8%). The glaucoma group had the highest prevalence, with twenty-three patient (76.6%), and thirty-one eyes (73.8%). The retinal group had seven patients (23%) and eleven eyes (26%). No sever visual disability was in refractive group. Within the glaucoma group, the most severe visual disability seen in association with POAG in twelve patient (52%), and NVG in seven patients with 30%.

In the retina group, TRD accounted for 42.8% of severe visual disability.

Unilateral severe visual disability 60% more common than bilateral 40%. Glaucoma accounted for 65% of unilateral sever visual disability.

In glaucoma group we can see that POAG commonly associated with unilateral blindness (55.5% of patient with unilateral sever visual disability) and NVG with bilateral sever visual disability 33.3% of patient with bilateral sever visual disability.

Diabetic ocular complications were seen in thirteen patients (30% of total 43 patients) and twenty-two eyes (36% of total 61 eyes). Unilateral cases seen in four patients and bilateral in nine patients. Glaucoma as complication of diabetes was seen in eight patients

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(18.6% of 43 patients), while retinal causes were identified in five patients (11.6% of 43 patients). Within the diabetic group, severe visual disability was more prevalent in patients with NVG (11 eyes) and TRD (6 eyes).
Bilateral severe visual disability due to diabetic ocular complications (NVG and TRD), were seen in 58% of patients with bilateral severe visual disability (Table 6).

Table 6: Severe visual disability in Groups and Subgroup

Causes	Severe visual disability		
	No. of eyes (%)	Unilateral	Bilateral
Glaucoma group	31 eyes (23 pt. 76.6% of 30 pt.)	15 eyes (15 pt. 65% of 23 pt.)	16 eyes (8 pt. 34.7% of 23 pt.)
i-POAG	14 eyes (12 pt. 52% of 23 pt.)	10 pt. (83% of 12pt 55.5% of 18 pt. with severe unilateral loss of vision)	4 eyes (2 pt. 16% of 12 pt.)
ii-NVG	11 eyes (7pt. 30% of 23 pt.)	3eyes (3 pt. 42.8% of 7pt.)	8 eyes (4pt.-57% of 7pt) 33;3% of 12 pt. with severe bilateral loss of vision
Retina group	11eyes (7 pt. 23% of 30 pt.)	3 eyes (3 pt. 42.8% of 7 pt.)	8 eyes (4 pt. 57% of 7 pt.)
i-TRD	6 eyes (3 pt. 42.8% of 7 pt.)	0	6 eyes (3 pt. 100%)
Total	42 eyes (68.6% of 61eyes) 30 pt.(69.6% of 43 pt.)	18 eyes (42.8% of 42 eyes) 18 pt. (60% of 30 pt.)	24 eyes (57% of 42 eyes) 12 pt. (40% of 30 pt.)

DISCUSSION:

This study evaluate the irreversible causes of loss of vision in one or both eyes that could not be treated further. The burden of the irreversible blindness is a major public health concern, and many studies has been conducted in different regions of the world to help in developing a plan for early detection and prompt treatment. This study aims to analyze the causes of irreversible loss of vision among patients followed up at Tripoli Eye Hospital, Libya.
In this study we reported a clear predominance of males patients (67.4 %), with male: female ratio was 2.07:1, which agreed with other studies that also confirm male predominance, with male: female ratio was 2.17:1 [9], another study showing the male to female ratio as 3:2 [10]. However, some studies have shown a higher prevalence of blindness in females, while other show no difference in sex distribution [11-13]. More attention toward the health of males, as they are generally the earing members in the family may be a reason for their seeking healthcare, and this may be a factor contributing to the higher of irreversible loss of vision in this population.
Age is a well-recognized risk factor for blindness as evidenced by previous studies [12,14,15]. The results of this study are similar to many other studies

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in literature [16,17,18], as more than 50% of patients were 60 years or older. The mean age of the patients was 54 years (Males: 55, Females: 52), with ranging from 13-90 years, which was nearly similar to other study in India [9], in which the mean age of the patients was 57 years. And is in accordance with the mean age of 58 years observed in patients with irreversible blindness in a study performed in Saudi Arabia [10]. However, in other study examining 3850 subjects for causes of low vision and blindness, the mean age of the blind persons was slightly higher (68.6 years) [19]. As growing population of elderly early detection of disease and pathology is necessary for reducing visual morbidity.

In this study, the most common cause of irreversible loss of vision (unilateral and bilateral) was glaucoma, accounting for 67.4% of cases.

Followed by retinal causes 21%, and less severity of visual loss in refractive group with 11.6%. Within the glaucoma group, POAG was the most common cause of irreversible loss of vision (51.7%), followed by NVG because of complications of PDR (27.5%). In the retinal disease group, irreversible loss of vision was most commonly seen as a result of TRD (44.4%) as a complications of PDR. These findings are consistent with other studies [9,10].

In this study, the most common causes of bilateral sever visual disability (30%) were glaucoma and retinal diseases, but refractive errors were not associated with severe visual disability. These findings are consistent with other similar studies [9,20]. This was in accordance with the findings of POAG being the commonest cause of irreversible blindness in the western countries [21]. However, they are contrary to the findings of primary closed angle glaucoma (PACG) being the commonest cause of irreversible blindness in the Asian population [22]. These findings similar to other studies [9,11,23,24,25]. Glaucoma ranks second among the foremost causes of blindness worldwide accounting for up to 8% of sever visual disability. Affecting at least 12 million people and causing blindness in nearly 1.2 million people and remains undetected in more than 90% of the cases in the community [26,27]. Our findings support this, as glaucoma accounted for a significant number of cases with irreversible blindness. Glaucoma is the foremost cause of irreversible blindness and more than 50% of cases remain undiagnosed [11,28].

Glaucoma is a result of irreversible damage to retinal ganglion cells. While an early intervention could minimize the risk of vision loss in glaucoma, its asymptomatic nature makes it difficult to diagnosis until a late stage [23]. There are an estimated 67 million people with primary glaucoma and 8 million people with secondary glaucoma. Approximately 6.7 million people are blind due to glaucoma according to world organization definition (VA < 20/400). The International Classification of Diseases- 11(2018), globally, at least 2.2 billion people have a near or distance vision impairment. One billion people includes those with moderate or severe distance vision impairment or blindness due to unaddressed refractive error (88.4 million), cataract (94 million), glaucoma (7.7 million), corneal opacities (4.2 million), diabetic retinopathy (3.9 million), and trachoma (2 million) [29].

In this study as seen that the commonest causes of bilateral severe visual disability was glaucoma (different causes) then retinal diseases. Complications of PDR leading to tractional retinal detachment involving the macula, NVG, were the commonest

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cause of total bilateral blindness with 58% of patients with total bilateral blindness, then POAG seen in 53 % that comes second to PDR as cause of sever visual disability, which also similar to other study [30]. As there is difficulty for large numbers of people to take primary ocular care in early life particularly those living in areas away from large city ,the diagnosis of a hidden ocular diseases like glaucoma may be missed as it need regular screening of ocular diseases because of missing of patient's complaint.

CONCLUSION

Glaucoma and diabetic ocular complications are the primary causes of irreversible vision loss observed at Tripoli Eye Hospital, Libya. Early detection of these conditions, through effective screening at primary healthcare centers is crucial. As older age often associated with systemic diseases that can impact vision, early detection of ocular diseases linked to these conditions, such as diabetes mellitus, can prevent vision loss and maintain functional vision throughout a patient's life span. However, a larger study sample is required to evaluate this observation. This study could help developing a plan for early detection and treatment of irreversible causes of vision loss before reaching the end stage of the disease.

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