

# Argon Laser Treatment of Retinal Lesions at the CHU-IOTA in Bamako, Mali

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## Abstract

**Introduction:** There are many types of retinal lesions: exudative, degenerative and post-traumatic. Some can lead to retinal detachment (RD). The treatment indicated for these neovascular diseases of the eye is retinal photocoagulation with the Argon laser. The aim of this study was to investigate retinal lesions treated with the Argon laser at IOTA University Hospital. **Patients and Method:** This was a prospective cross-sectional study over a 9-month period. All patients seen at CHU IOTA during our study period who presented with a retinal pathology treated with the Argon laser or a retinal detachment with a giant tear in the contralateral eye and who had given their consent were included. One session consisted of treating the maximum surface area of half a retina. **Results:** We collected 263 cases. The age group 40 to 60 years was the most represented with 48.7%. Diabetes was the most frequent antecedent with 47.1%. Neovessels were the most common type of lesion, accounting for 68.4% of cases. Pan-retinal photocoagulation was performed in 74.5% of patients. **Conclusion:** Retinal lesions represent a major risk of functional visual loss. Physical treatment with retinal photocoagulation has a curative effect on ischaemic lesions and a preventive effect on retinal detachment.

## Keywords

Retinal Lesions, Diabetes, Argon Laser, DDR

## 1. Introduction

There are many types of retinal lesions, some of which can lead to RDD. The RDD of the severely myopic represents 30% to 35.5% of rhegmatogenous retinal detachment (RDD) [1]. Diabetic retinopathy is the leading cause of blindness in

industrialised countries before the age of 50. Its prevalence increases with the duration of diabetes. Retinopathy is a frequent complication of sickle cell disease that can lead to blindness [2]. Retinal ischaemia and choroidal neovascularisation are angiogenic retinal diseases. An increase in vascular endothelial growth factor (VEGF) has been demonstrated in all patients with neovascular diseases of the eye [3]. The treatment indicated for these diseases is retinal photocoagulation with the Argon laser, an ablative treatment that destroys the peripheral retina in order to preserve the central macula, responsible for 90% of human vision. Laser photocoagulation destroys the photoreceptors, which are then replaced by glial cells, allowing increased diffusion of oxygen from the choroid to the inner retina [4]. This improvement in oxygenation leads to a reduction in hydrostatic pressure in the capillaries and inhibition of cellular production of VEGF. Together, these effects are thought to lead to the ultimate inhibition of neovascularisation and a reduction in oedema.

The aim of this work is to study retinal lesions.

## 2. Methodology

We conducted a prospective cross-sectional study from 1 January to 30 September 2022 at CHU IOTA and involved all patients seen during our study period. The following were included:

- Patients with retinal pathology treated with Argon Laser.
- Patients who had a DDR with a giant tear in the contralateral eye.
- Consenting patients.

Each patient was seen by a senior ophthalmologist, then an FGA was performed systematically in cases of exudative and proliferating lesions, and the patient was then scheduled for the laser.

The patient was given a brief explanation of the procedure, its purpose and the likely effects of the laser:

- For the treatment of tears, 3 to 5 laser rows were performed around the tear.
- The treatment of diabetic and sickle cell retinopathy was based on circumferential retinal panphotocoagulation, which means that the entire peripheral retina was treated in order to reduce its oxygen requirements. An average of 2000 to 3000 impacts are achieved in 4 sessions. Ischaemic venous occlusions were treated by sectorial photocoagulation.
- Macular oedema was treated by focal laser. 3 to 10 fine and soft laser impacts were performed around the vascular anomalies.

Two weeks were observed between sessions and the patient saw his doctor again 15 days after the last session.

## 3. Results

We collected 263 cases during the 9 months of the study.

The 40 to 60 age group was the most represented with 48.7% (Table 1).

Males predominated (52.9%).

Diabetes was the most frequent medical history with 47.1% (**Table 2**).

Contralateral DDR accounted for 11.4% of the ophthalmological history, and neovascular lesions were the most common type of lesion, accounting for 68.4% (**Table 3**).

AVB was the most frequent circumstance of discovery with 76% (**Figure 1**).

Among retinal lesions, proliferative diabetic retinopathy was the most common with 42.6%. Macular damage was observed in 41.8% of cases.

Involvement was bilateral in 39.5% of cases. Pan-retinal photocoagulation was performed in 77.5% of patients (**Table 4**).

**Table 1.** Distribution of patients by age group.

Age range	Workforce	Percentage
≤20	8	3
20 - 40	66	25.1
<b>40 - 60</b>	<b>128</b>	<b>48.7</b>
>60	61	23.2
Total	263	100

**Table 2.** Breakdown of patients by medical history.

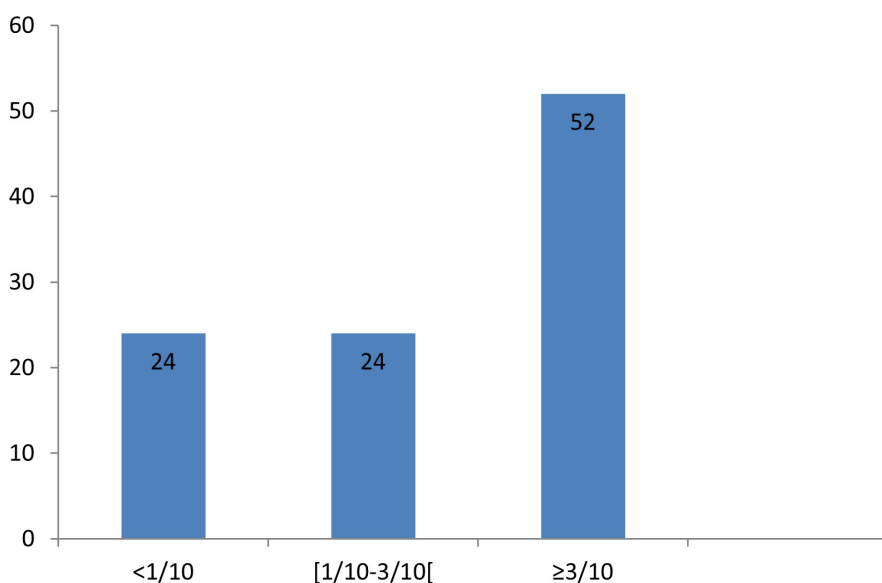
Medical history	Workforce	Percentage
HTA	38	14.4
<b>Diabetes</b>	<b>124</b>	<b>47.1</b>
sickle cell disease	54	20.5
none	45	17.1
Other to be specified	1	0.4
Intravitreal haemorrhage	1	0.4
Total	263	100

**Table 3.** Breakdown of patients by type of lesion.

Types of lesions	Workforce	Percentage
<b>Neo-vessels</b>	<b>180</b>	<b>68.4</b>
Retinal ischaemia	38	14.4
Contralateral DDR	30	11.4
Horseshoe	2	0.8
Retinal hole	9	3.4
Palisading	2	0.8
Opeculum	1	0.4
Macular hole	1	0.4
Total	263	100

**Table 4.** Presents the distribution of patients according to the presence of associated retinal damage and the method of treatment employed.

Treatment method	focal		PPR		Total
	Workforce	%	Workforce	%	
Myopic choroidosis	2	0.8	3	1.1	5
DDR	0	0	21	8	21
Retinal tear	1	0.4	0	0	1
Diabetic maculopathy	1	0.4	2	0.8	3
OBVR	24	9.1	6	2.3	30
RRVO	1	0.4	18	6.8	19
Diabetic retinopathy	13	4.9	109	41.4	122
Retinopathy + diabetic maculopathy	0	0	2	0.8	2
Diabetic retinopathy + OBVR	1	0.4	0	0	1
Sickle cell retinopathy	14	5.3	43	16.3	57
Retinal disorder	2	0.8	0	0	2
Total	59	22.5	204	77.5	263

**Figure 1.** Breakdown of patients by visual acuity.

#### 4. Discussion

The age group with the highest representation was that of 40 to 60 years old, comprising 48.7% of the total sample. The results obtained in this study are higher than those reported by T. Coulibaly, who found a prevalence of 30.9% in the 45-to-60-year age group. This discrepancy can be attributed to the size of the sample.

The male predominance, with a male-to-female ratio of 1.12, is consistent with the findings of D. Kassoum *et al.* (M/F ratio of 2.3), G. Kokou *et al.* (4M/3F), and

Coulibaly T. *et al.* (M/F ratio of 1.8).

The most frequently identified antecedent was diabetes, accounting for 47.1% of cases. This same observation was reported by Coulibaly T., who found a prevalence of 9.52% (5). This discrepancy can be attributed to the size of the sample.

The most prevalent form was contralateral DDR, accounting for 11.4% of cases. This finding is consistent with the existing literature, which indicates that prophylactic treatment of flap tears and palisade degeneration should be considered in cases of DDR. This is due to the elevated risk of retinal detachment in the contralateral eye, which is estimated to be approximately 10% in phakic patients and between 20% and 36% in aphakic or pseudophakic patients [5] [6].

The most frequently observed discovery circumstance was BAV, representing 76% of cases. This indicates that the majority of our patients present at a stage where complications have already developed. Similarly, Napo *et al.* observed a similar trend, with 75% of their patients exhibiting complications at the time of presentation [1]. Coulibaly T also noted a high prevalence of complications, with 69.1% of their patients displaying complications at the time of diagnosis [7]. These findings are in line with the existing literature [8].

In the absence of correction, distance visual acuity was found to be greater than or equal to 3/10 in 52% of cases. It was observed that in the majority of cases, visual acuity remained intact until the disease had reached an advanced stage. These findings are in accordance with the existing literature, which indicates that visual function is only impaired in cases of advanced proliferative retinopathy [9] [10].

New vessels constituted the majority of lesions, representing 68.4% of cases, a figure that exceeds that reported by D. Kassoum *et al.* (43.9%). The formation of new vessels is a significant source of complications regardless of whether the underlying condition is diabetic or sickle cell retinopathy. In the event of unilateral neovascularisation in sickle cell retinopathy, it is recommended that the ischemic areas of the adnexal eye be treated as a preventive measure [11].

The present study revealed that macular involvement was observed in 41.8% of cases, indicating that OM was a significant complication. These findings are in line with those of previous studies [12] [13].

In the present study, pan-retinal photocoagulation was performed in 77.5% of cases, exceeding the results reported by D. Kassoum *et al.* (43.9%). This may be attributed to the larger sample size used in the present study. The efficacy of this therapeutic approach in averting retinal detachment is optimal when specific guidelines are adhered to. Conversely, the aforementioned measures do not offer protection against DDR [6] [9].

## 5. Conclusion

The presence of a considerable number of retinal lesions represents a significant risk factor for functional visual loss. The evidence base indicates that retinal photocoagulation is an effective treatment for vascular pathologies with an ischaemic

component. Furthermore, it has been demonstrated to exert a preventive effect in the context of peripheral retinal lesions, thereby reducing the risk of retinal detachment.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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