

Surgery for Chronic Glaucoma by the Technique of Non-perforating Deep Sclerectomy at the Bartimée Ophthalmological Clinic: About 50 Cases

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Abstract

Purpose: Contribute to improving the management of Primary Open Angle Glaucoma.

Patients and Methods: This was a prospective descriptive study of 6 months. Patients included in the operative report register. Were not included, as patients did not consent and those operated on but followed elsewhere. Our variables were sociodemographic, clinical, therapeutic and evolutionary.

Results: The mean age was 45.20 ± 14 years, sex ratio 1.21. The most frequent comorbidity was arterial hypertension 54.76%. Preoperative visual acuity was $<1/10$ in the right eye in 71.43% and between 1-2/10 in the left eye in 57.14%. Fundus glaucomatous excavation was the most common lesion, 92.5% in the right eye and 85.7% in the left eye. Intraocular pressure was normal in 52.3% in the right eye and in 71.4% in the left eye, the visual field was impaired in 85.71% in the right eye and in 88.1% in the left eye. 'left eye. The surgical act was performed by the same surgeon in 100% of cases. On D25 postoperative, visual acuity without correction was $\geq 3/10$ in 67.85% in the right eye and in 68.18% in the left eye; the Intraocular Pressure was between 9-21 mm Hg in 96.43% of cases in the right eye and in 95.45% of cases in the left eye; there were no complications in 100% of cases. Vision was unimproved in 52.0%.

Conclusion: Deep non-perforating sclerectomy allows a lasting reduction of intraocular pressure with the formation of filtration bubbles and fewer complications.

Keywords: Non-perforating Deep Sclerectomy; Bartimaeus; Guinea

Abbreviations

POAG: Primary Open Angle Glaucoma; IOP: Intraocular Pressure; NPDS: Deep Non-Perforating Sclerectomies; AH: Aqueous Humor; <: Lower; \geq : Greater than or Equal; =: Equal; \pm : More or Less; HTA: Hypertension Arteriole; VA: Visual Acuity; RE: Right Eye; LE: Left Eye; VF: Visual Field; n: Number of Cases; Day 25: 25 Days After the Operation; mm hg: Millimeter of Mercury

Introduction

Primary open-angle glaucoma (POAG) is a chronic, long- asymptomatic optic neuropathy [1]. It corresponds to a loss of

retinal ganglion cells and characterized by morphological changes in the head of the optic nerve associated with a typical impairment of the visual field [2]. Its overall prevalence worldwide is estimated at 3.05% in subjects aged 40 to 80 years; the number of people affected by glaucoma will increase in the coming years, reaching 111.8 million in 2040 [3]. Elevated intraocular pressure is the main risk factor. The only effective treatment to slow the progression of primary open-angle glaucoma is to reduce intraocular pressure (IOP), through hypotonic eye drops, laser or surgical treatments [4]. Non-perforating deep sclerectomy (NPDS) has become the reference filter surgery for CAPM because it lowers eye pressure

as effectively as trabeculectomy, but with fewer complications, since it is a closed globe surgery [5]. The key point of surgery is the selective removal of the external trabeculum at which 75% of the resistance to the flow of the aqueous humor (AH) is located [6]. Typical complications are perforation of the trabeculo-descemet membrane, postoperative hypertension requiring gonio puncture, fibrosis of the filtration bubble treated with anti-metabolites or the formation of a polycystic bubble reduced by needle needling [7]. In France, out of 106 eyes operated on NPDS, the average decrease in IOP for each patient was $23.3 \pm 28.1\%$ and the complications encountered were of the gonio puncture, needling and Irian extrication type [8]. In Morocco, in 477 NPDS -operated eyes with CAPM not controlled by medical treatment, the total success rate defined as IOP < 21 mm Hg was 61% at 60 months and 92% with post-operative medical treatment; no classic complications were observed [9]. In Cameroon, Dohvoma, *et al.* in 2015 reported that out of 35 patients who consulted for POAG, 51% were female, with a sex ratio of 0.94 and an average age of 56.6 ± 13.7 years [10]. In Mali in 2014, Kane R., *et al.* found out of 200 patients aged 40 years and older with POAG, an average age of 57.6 years and a sex ratio of 1.74 [11]. In Guinea, we did not find data on the NPDS. The importance of this theme in surgical practice, the increasing frequency of POAG worldwide and its possible complications related to management modalities, motivated the choice of this theme entitled: "Surgery for primary open-angle glaucoma by the technique of non-perforating deep sclerectomy at the Bartimée Ophthalmological Clinic: about 50 cases".

Methods

This was a descriptive prospective study lasting 6 months from 01 May to 31 October 2021. It took place in the Bartimée Ophthalmological Clinic which is a second-degree hospital specialized in ophthalmology. It is in the Nongo district, sector I, commune of Ratoma, Conakry. There was a total of 42 glaucoma patients in whom 50 eyes including 20 on the right, 14 on the left and 8 bilateral were operated by NPDS. All glaucoma patients undergoing medical treatment during the study period, whose operative indication had been posed by the NPDS technique and were included in the operative report register, were included in this study. Not included were patients in whom free and informed consent was not obtained and those operated on whose postoperative follow-up was carried out elsewhere. We had conducted an exhaustive recruitment according to the selection criteria. We have used as a support sheet of investigation

established for this purpose. Our variables were epidemiological (Frequency, Age and Sex), clinical (Family history, Eye History, Medical history and Reason for consultation) therapeutic (Fundus abnormalities, Visual field) and evolutionary (vision improvement and IOP). The Epi info version 7.4.0 software was used for data analysis, the Word and Excel software of the Office 2013 pack were used for the input of text, tables; the khi square of Person was used to compare variables and a value of $P < 0.05$ was considered statistically significant, Zotero version 5.0.96.2 was used for bibliographic references. The confidentiality and anonymity of the persons interviewed were respected in accordance with the principles of ethics and medical deontology.

Results

During our study, the number of patients operated on for POAG by NPDS was 42 or a frequency of 12.17%.

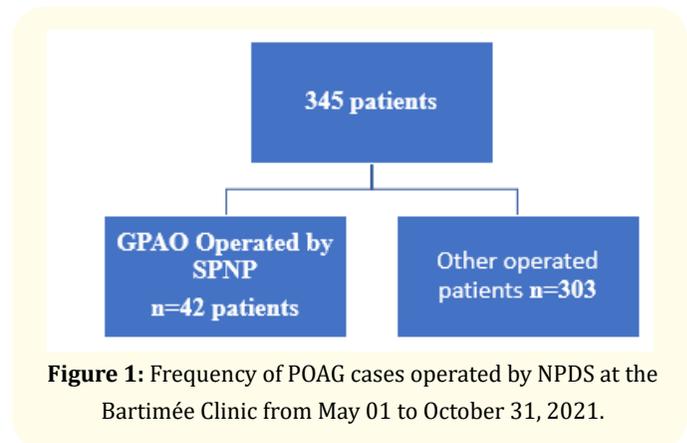


Figure 1: Frequency of POAG cases operated by NPDS at the Bartimée Clinic from May 01 to October 31, 2021.

The table below summarizes the sociodemographic data of the patients and shows us that more than half at an age < 40 years with a male predominance.

Socio-Demographic variables	Actual (n = 42)	Percentage (%)
Age		
< 40 ans	22	52,4
≥ 40 ans	20	47,6
Sexe		
Masculin	23	54,8
Feminine	19	45,2

Table 1: Distribution of patients by sociodemographic variables.

Average age = 45.20 years ± 14.57 years;

Extremes: 18 years and 70 years.

Sex-ratio = 1,21.

The most common medical history was high blood pressure (hypertension) followed by eye history of glaucoma and the notion of familial glaucoma. The majority consulted for lower VA and the right eye was the most affected (see Table 2). The LO was the most reached 20 cases or 47.6% followed by the OG 14 cases or 33.3% and then the bilateral involvement 8 cases or 19.1%.

	Actual (n = 42)	Percentage (%)
Family history		
Familial glaucoma	14	33,3
Eye History		
Glaucoma	16	38,1
Cataract	14	33,3
Myopia	10	23,8
Amétropie	6	14,3
Medical history		
HTA	23	54,8
Diabetes	7	16,7
Reason for consultation		
Decrease in VA	24	57,1
Visual fog	13	31,0
No reason	10	23,8
Headache	8	19,1
Colorful halos	5	11,9
Visual blurring	5	11,9

Table 2: Distribution of patients by clinical variables.

Table 3 summarizes the preoperative results and shows us that glaucomatous excavation was the most encountered lesion at the fundus (FO), IOP was normal in more than half of the cases as well as impaired Visual Field (CV).

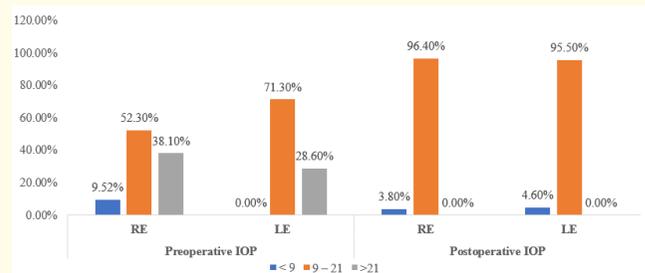
	Right eye		Left eye	
	Actual (n = 50)	Percentage (%)	Actual (n = 50)	Percentage (%)
Fundus abnormalities				
Excavation glaucomatouse	36	72,0	37	74,0
Macular degeneration	9	18,0	9	18,0
Cauldron	4	8,0	0	0,0

Optical atrophy	2	4,0	5	10,0
Choroïdose diffuse	1	2,0	0	0,0
Visual field				
Altered	36	72,0	37	74,0
Normal	6	12,0	5	10,0

Table 3: Distribution of patients by preoperative outcomes.

In more than half of our patients, vision could not be improved on day 25 post-operative.

Figure 2 : Distribution of patients according to vision improvement.



Preoperative mean IOP: 19 ± 5.73; Extremes 10 and 46 mm hg. Postoperative mean IOP: 11.6 ± 1.86; Extremes 8 and 22 mm hg.

Figure 3: Comparison of pre- and post-operative IOP.

Discussion

In our study, glaucomatous excavation was the most common lesion at the fundus, while IOP was normal in more than half of the cases as well as impaired CV. Postoperatively, IOP was normal in almost all cases. From our observation, vision has not been improved at day 25 post-operative in most of our patients. However,

our difficulties were related to the pandemic context related to covid-19 making it difficult to recruit patients, by the refusal of the surgical procedure because this sample would certainly have been larger or the context. The other difficulty is the difficult access to Mitomycin C and 5-fluoro-uracil in our country.

During the study, the number of patients operated on for POAG by NPDS was 42 or a frequency of 12.17%. According to the literature, the prevalence of CAPM increases with age, it is less than 0.5% between the ages of 40 and 50 to about 10% after the age of 85 [12]. Our results are lower than those of Dvohoma VA., *et al.* [10] in Douala in 2015 who regained an average age of 56.6 ± 13.7 years, with extremes of 18 and 80 years. The high proportion of subjects under the age of 40 in our context could be explained by the level of awareness of young subjects in relation to the early detection of this disease because of its congenital and hereditary nature. Regarding gender, there does not seem to be a difference in prevalence [4]. Our result corroborates with that of Atipo-Tsiba PW [13] which reported sex ratio of 1.8. Nearly half of the patients had a medical history of hypertension, followed by those with an ocular history of glaucoma and those with a family history of glaucoma. Our results corroborate with those of Kane R., *et al.* [11] in Mali at the Institute of African Tropical Ophthalmology but different from those of Atipo-Tsiba PW [13] on the profile of the glaucomatous patient at the University Hospital of Brazzaville. This proportion of previous family glaucoma antecedents confirms the high number of subjects under 40 years of age given its hereditary nature. Compared to the reason for consultation, our result is similar to that of Kane R., *et al.* [11] who reported that decreased visual acuity was the main reason for ophthalmological consultation 55.9%. The delay experienced by patients before arriving at the consultation could explain this situation. Speaking of fundus, it is an examination that helps in the diagnosis of glaucoma by visualizing the atrophy of the optic nerve, abnormal excavation of the papilla [14]. In our series, at the fundus glaucomatous excavation was the most frequent of the lesions encountered. According to the literature, one of the main risk factors for POAG is increased IOP [15]. Nearly a quarter of our study population had an IOP > 21mmhg or an average of 19 ± 5.73 with extremes of 10 and 46 mmhg preoperatively. Chakib A., *et al.* [9] in their study on non-perforating deep sclerectomy with 5 FU report that the preoperative mean IOP was 28 ± 4 mmhg. According to the literature, glaucoma is responsible for a gradual decrease in CV, starting at the periphery and ending at the center; when VA

decreases, it usually means that much of the CV has disappeared, patients feel like they are looking into a pipe [16]. The examination of the visual field is essential for the diagnosis of glaucoma, it is the only examination that makes it possible to know if the disease has already affected peripheral vision [17]. The CV was carried out in all of our patients and in the majority of cases it was altered. Our results corroborate (these details are not reflected in your results. please put the lesions seen in the visual field in your results) with those of Atipo-Tsiba PW [13] who reported that the main perimeter alterations encountered were Bjerrum's scotoma 50% and total scotoma 26.8%. Glaucoma is manifested by abnormalities of the optic papilla and irreversible and subsequent alterations in cv [18]. Patients should therefore understand that the vision they have already lost cannot be restored by surgery. In our series, we did not observe an improvement in postoperative vision in more than half of the cases. As for IOP, it has dropped considerably in almost all cases after surgery. Our result corroborates with those of Chakib A., *et al.* [9] in Morocco who reported that the total success rate defined as an IOP < 21 mm Hg was 61% in their study. PPS is a surgical technique that nowadays is the most appropriate filtering surgery with fewer complications, since it is a closed globe surgery. It effectively reduces IOP, the main risk factor for the occurrence of CAPM. With the use of Mitomycin C as an antimetabolic, there was no fibrosis of the bleb in almost all of our patients.

Conclusion

NPDS is the reference surgical technique for the management of POAG. Well done, this technique makes it possible to permanently lower the IOP with the constitution of filtration bubbles. Fewer complications occur to type of postoperative eye pain and conjunctival hemorrhage in rare cases, with improved quality of vision in less than half of patients. However, early management as well as the holding of training or sub-specialization workshops in the field of the practice of this technique could improve its results.

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