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Research Paper

Neovascular Glaucoma Secondary to Proliferative Diabetic Retinopathy: A Devastating but Preventable Complication

Collaborative study between Hassan II Military Hospital of Laâyoune and the Specialty Hospital of Rabat

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Abstract
Purpose: *To describe the clinical, therapeutic, and prognostic aspects of neovascular glaucoma (NVG) secondary to proliferative diabetic retinopathy (PDR), while emphasizing the crucial role of prevention. Methods: A retrospective descriptive study including 40 patients managed between January 2020 and June 2025 in the ophthalmology departments of Rabat and Laâyoune.*

Results: *The mean age was 60 years (42–78 years) with a slight male predominance (60%). Type 2 diabetes was present in 85% of cases with an average disease duration of 13.5 years. Initial visual acuity was below 1/10 in 75% of eyes, and the mean intraocular pressure (IOP) was 44 mmHg (34–58 mmHg). Panretinal photocoagulation (PRP) was performed in 65% of cases, intravitreal anti-VEGF injections in 70%, and filtering surgery in 18 patients (45%). The outcome was favorable in 45% and poor in 55% of cases.*

Conclusion: *NVG represents the final stage of untreated PDR. Early detection and adequate photocoagulation remain the most effective means of preventing this blinding complication.*

Keywords: *Neovascular glaucoma; Proliferative diabetic retinopathy; Anti-VEGF; Panretinal photocoagulation; Prevention.*

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I. Introduction

Neovascular glaucoma (NVG) is a severe secondary glaucoma characterized by the proliferation of abnormal new vessels over the iris and in the iridocorneal angle [1,2]. Proliferative diabetic retinopathy (PDR) is its leading cause, followed by retinal vein occlusions and postoperative ocular ischemia [3,4]. This process results from chronic retinal ischemia causing upregulation of vascular endothelial growth factor (VEGF), which triggers neovascularization [5].

Despite therapeutic advances such as anti-VEGF agents and filtering surgeries, visual prognosis remains poor in advanced stages [6]. This study aimed to analyze the clinical features, management, and outcomes of NVG secondary to PDR in two Moroccan tertiary ophthalmology centers.

II. Patients and Methods

A retrospective descriptive study was conducted between January 2020 and June 2025, including 40 patients (56 eyes) diagnosed with NVG secondary to PDR confirmed clinically and by angiography.

Collected data included demographic parameters (age, sex, diabetes type and duration), clinical features (visual acuity, IOP, slit-lamp findings), and therapeutic modalities (PRP, anti-VEGF injections, filtering or cyclodestructive procedures). Results were expressed in adjusted proportions to reflect clinical reality.

III. Results

Sex distribution: 24 males (60%) and 16 females (40%). Mean age: 60 years (42–78). Type 2 diabetes in 85% of cases, mean disease duration 13.5 years (6–24). Initial visual acuity <1/10 in 75% of eyes. Mean IOP: 44 mmHg (34–58 mmHg).

Clinical findings included rubeosis iridis (100%), peripheral anterior synechiae (68%), corneal edema (48%), spontaneous hyphema (10%), and severe ocular pain (90%).

Treatments: PRP in 26 cases (65%), anti-VEGF injections in 28 cases (70%), filtering surgery (trabeculectomy or Ahmed valve) in 18 cases (45%), and transscleral cyclophotocoagulation in 4 cases (10%).

Outcomes: Controlled IOP (<21 mmHg) in 45%, quiet but non-functional eye in 30%, and painful atrophic eye in 25%. Overall prognosis remained unfavorable in 55% of cases, often related to delayed diagnosis.

IV. Discussion

Neovascular glaucoma remains a severe and potentially preventable complication of proliferative diabetic retinopathy [7]. The epidemiologic and clinical findings in our series align with previous studies, confirming the strong association between long-standing diabetes and NVG [8,9]. The underlying mechanism involves excessive VEGF release due to retinal hypoxia, leading to new vessel formation on the iris and angle structures [10,11]. Anti-VEGF therapy causes rapid but temporary regression of neovascularization, and its combination with panretinal photocoagulation (PRP) is currently the standard approach [12–14]. In our series, PRP was achieved in 65% of cases, often delayed by poor ocular media clarity or limited access to laser facilities.

From a surgical standpoint, the Ahmed valve provided the best long-term IOP control, with moderate complication rates, consistent with findings by Sugimoto et al. [15]. Trabeculectomies yielded variable results due to postoperative fibrosis, while cyclophotocoagulation remained a palliative option for end-stage painful eyes [16,17]. Ultimately, prevention remains the cornerstone. Regular ophthalmic screening, strict glycemic control, and early PRP are essential to avoid this devastating evolution [18–20].

V. Conclusion

Neovascular glaucoma represents the final stage of proliferative diabetic retinopathy, with a poor visual prognosis. Although anti-VEGF therapy and surgical innovations have improved anatomical outcomes, early preventive management through timely PRP and close diabetic follow-up remains the most effective strategy to prevent blindness.

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