

## Indications for Intravitreal Anti-Vegf Injections (IVT) at the Teaching Hospital of Bouake, Côte D'ivoire

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### ABSTRACT

**Introduction:** Intravitreal anti-vascular endothelial growth factor (anti-VEGF) injections have become a cornerstone in the management of neovascular and exudative retinal and choroidal pathologies. This study aimed to determine the indications and demographic patterns associated with intravitreal aflibercept injections at the Teaching Hospital of Bouaké.

**Patients and Methods:** A prospective descriptive study was conducted from August 1, 2023, to March 1, 2025, at the Teaching Hospital of Bouaké. The study included 40 patients who received intravitreal aflibercept injections during this period. Data collected included sociodemographic characteristics, ocular history, clinical findings, visual acuity, and indications for injection.

**Results:** A total of 40 patients were included, with a mean age of 54.65 years (range: 30–76 years). Males predominated with a sex ratio of 2.07. Civil servants and traders accounted for 32.5% (n=13) and 30% (n=12), respectively. The most common comorbidities were diabetes mellitus (45%, n=18) and primary open-angle glaucoma (30%, n=12). Injections were administered unilaterally in 87.5% (n=35), predominantly in the left eye (52.5%, n=21). Uncorrected distance visual acuity before injection ranged from hand motion to counting fingers in 45% (n=18). Clinical signs included retinal hemorrhages (40%, n=16) and drusen (20%, n=8). The main indication for intravitreal aflibercept was diabetic macular edema (DME) in 45% (n=18), followed by macular edema secondary to retinal vein occlusion (RVO) in 22.5% (n=9), and age-related macular degeneration (AMD) in 20% (n=8).

**Conclusion:** Intravitreal anti-VEGF therapy remains an effective therapeutic modality for managing neovascular and exudative retinal diseases. Our findings reflect the growing burden of diabetic eye disease and vascular pathologies in our setting.

### Keywords

Intravitreal injection (IVT), Anti-VEGF, Aflibercept, Diabetic Macular Edema (DME), Age-related Macular Degeneration (AMD).

### Introduction

Intravitreal injection of anti-VEGF agents allows direct action of the drug on retinal lesions such as edema and neovascularization.

It is a minor surgical procedure aimed at inhibiting the activity of vascular endothelial growth factor (VEGF). VEGF is synthesized by endothelial cells, retinal pigment epithelial cells, and Müller glial cells in response to local ischemic events [1].

The introduction of anti-VEGF IVT has significantly improved the prognosis of many neovascular retinal and choroidal diseases, becoming an essential therapeutic tool in their management [2].

Since the introduction of the first anti-VEGF drugs to the market, the rate of blindness has decreased by half in industrialized countries [3-5].

Indications for anti-VEGF IVT are numerous and varied, including diabetic macular edema (DME), age-related macular degeneration (AMD), intravitreal hemorrhages complicating retinal neovascularization, macular edema associated with retinal vein occlusions, iris rubeosis, myopic choroidal neovascularization, and idiopathic choroidal neovascularization in young individuals [6-9]. Anti-VEGF IVT is a recent practice at the Teaching Hospital of Bouaké, and no prior studies have been conducted on this subject. Therefore, this study aimed to identify the indications for anti-VEGF IVT in the ophthalmology department of the Teaching Hospital of Bouaké.

### Materials and Methods

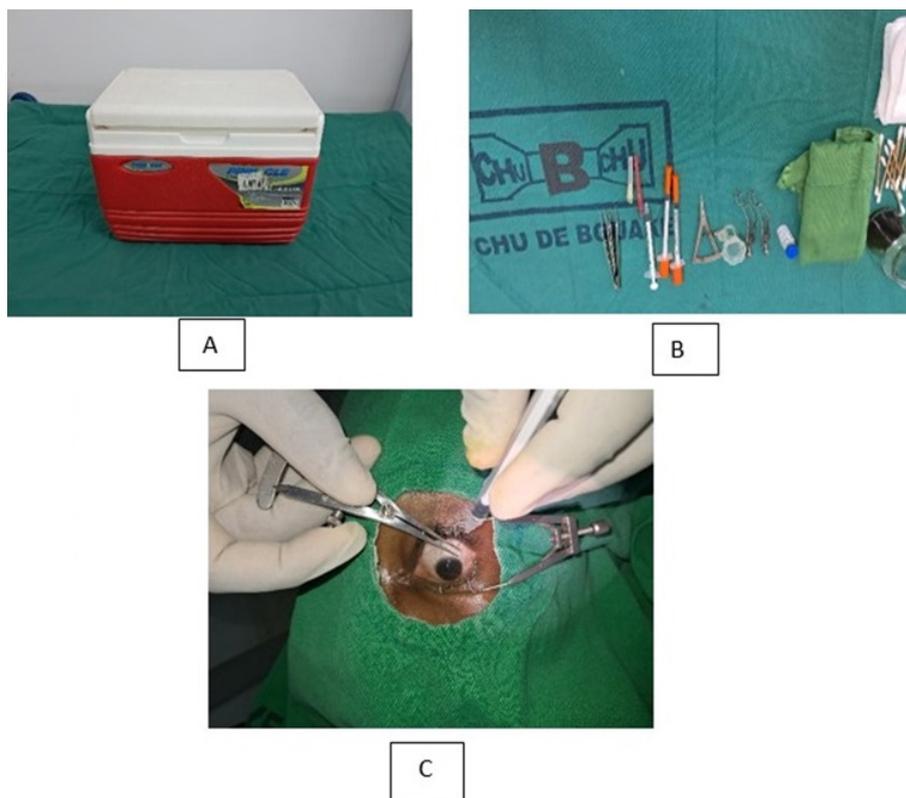
This was a prospective, descriptive study carried out in the ophthalmology department of the Teaching Hospital of Bouaké from August 1, 2023, to March 1, 2025, spanning 19 months. It included 40 patients diagnosed with vitreoretinal pathologies for which anti-VEGF IVT was both prescribed and administered. Patients for whom IVT was prescribed but not performed were excluded. The anti-VEGF agent used throughout the study was aflibercept.

Data collected included age, gender, occupation, medical history, uncorrected distance visual acuity before injection, fundus findings, and indication for IVT. Data were entered and analyzed using Microsoft Excel.

The injection procedure began with pre-procedural counseling and prescription of the medication after obtaining informed consent from the patient. On the day of the injection, the drug was transported from the pharmacy to the ophthalmology department using a cooler with cold accumulators to maintain the cold chain.

Upon arrival, patients were prepared for the procedure (explanation of the intervention, wearing of surgical attire) before entering the operating room. The operating room was set up with a surgical table equipped with a speculum, cotton swabs, forceps, sterile gauze, and the injection product, previously drawn into 30G insulin syringes at a volume of 0.05 mL.

After surgical hand disinfection and donning of sterile gowns, masks, and caps, the physician admitted the patient into the operating room and placed them in supine position. Following instillation of topical anesthetic drops in the target eye, antisepsis was performed using 10% yellow povidone-iodine. A sterile drape with an opening and an eyelid speculum were then applied.



**Figure 1:** Procedure for anti-VEGF intravitreal injections at the Teaching Hospital of Bouaké.

(A) Cooler containing cold accumulators for product transportation;

(B) Surgical table setup;

(C) Anti-VEGF intravitreal injection after measurement with calipers.

Photo collection of the Teaching Hospital of Bouaké.

The injection was performed superior temporally, 3.5 mm from the limbus in phakic eyes or 4 mm in aphakic eyes. A fine needle (insulin needle in this context) was inserted through the sclera slightly angled from front to back to avoid the zonules and lens.

Immediately after injection, gentle pressure was applied at the injection site using a cotton swab or forceps to ensure hemostasis and prevent vitreous prolapse.

Postoperative care included topical antibiotics and nonsteroidal anti-inflammatory drugs (NSAIDs). A follow-up appointment was scheduled one month later for possible repeat injection.

## Results

During the 19-month study period, 50 IVTs of aflibercept were performed in 40 patients diagnosed with retinal and choroidal vascular pathologies confirmed by ancillary tests (OCT and/or retinal angiography). The mean age was 54.65 years, ranging from 30 to 76 years. Males predominated (68%, n=27), resulting in a sex ratio of 2.07. Civil servants and traders accounted for the majority of procedures, with proportions of 32.5% (n=13) and 30% (n=12), respectively.

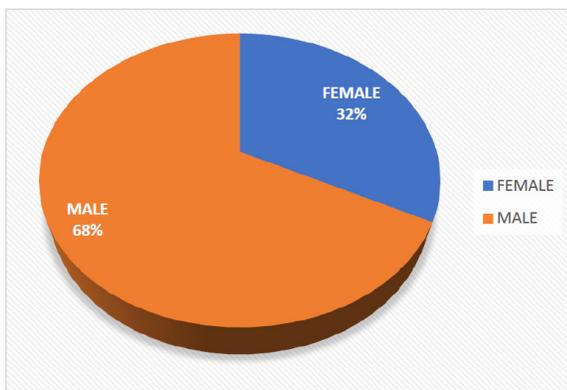


Figure 2: Distribution of cases by gender.

Table 1: Distribution of Patients by Occupation.

Profession	Number of Patients	Percentage (%)
Trader	12	30
Civil servant	13	32,5
Housewife	11	27,5
Laborer	3	7,5
Professional driver	1	2,5
Total	40	100

Table 2: Distribution of patients according to initial visual acuity.

Initial Uncorrected Distance Visual Acuity	Number of Patients	Percentages (%)
PL+ to CF	18	45
1/10 to 3/10	14	35
4/10 to 8/10	7	17,5
PL-	1	2,5
Total	40	100

PL- : Negative Light Perception; PL+ : Positive Light Perception; CF: Counts Fingers.

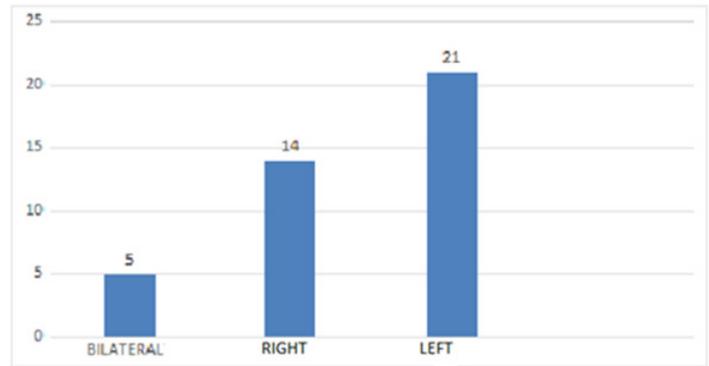


Figure 3: Distribution of anti-VEGF intravitreal injections by laterality.

Table 3: Distribution of cases based on fundoscopic clinical findings.

Clinical Signs	Number of Patients	Percentages (%)
Hemorrhages	16	40
Macular drusen	8	20
Exudates	7	17,5
Macular edema	4	10
Iris neovascularization	5	12,5
Total	40	100

Table 4: Distribution of patients by indication for anti-VEGF intravitreal injection.

Indications	Number of Patients	Percentages (%)
Retinal vein occlusion	18	45
Branch retinal vein occlusion (BRVO)	5	12,5
Central retinal vein occlusion (CRVO)	4	10
Age-related macular degeneration (AMD)	8	20
Subretinal neovascular membrane / Neovascular glaucoma	5	12,5
Total	40	100

## Discussion

The advent of anti-VEGF IVT has marked a major breakthrough in the management of numerous neovascular retinal and choroidal pathologies, representing a significant therapeutic advancement in ophthalmology. The demand and performance of anti-VEGF IVT have increased as these medications become more widely available.

Over the 19-month study period, 50 IVTs of aflibercept were performed in 40 patients. Our sample size was smaller than that reported by Sidibé in Mali [10] and Agbahoung in Benin [11], where IVT included antibiotics, corticosteroids, and anti-VEGF agents. The lower number of IVTs in our series may be attributed to the limited duration of the study and the high cost of aflibercept, which is not covered by universal health coverage in our country.

The average age of 54.65 years aligns with current literature data. Koki in Cameroon [7] reported a mean age of 59.6 years, ranging from 14 to 88 years. This is consistent with the typical onset of neovascular retinal and choroidal pathologies around age 50, often linked to cardiovascular risk factors such as advanced age,

diabetes, hypertension, and smoking.

Male predominance (sex ratio 2.07) was also observed, corroborating findings by Rajae El Aouni [12] in Morocco (sex ratio 1.33). This may reflect higher exposure of men to smoking, a known cardiovascular risk factor contributing to retinal vascular disease requiring IVT.

Civil servants and traders accounted for the highest proportion of IVTs, likely due to better financial capacity or private insurance coverage, given the high cost of aflibercept in our setting.

Diabetes was the most common comorbidity (45%), followed by open-angle glaucoma (30%). Diabetes is a major cardiovascular risk factor implicated in several retinal pathologies requiring anti-VEGF therapy, including DME, proliferative diabetic retinopathy with intravitreal hemorrhage, and retinal vein occlusions.

Unilateral IVT was performed in 87.5% of cases, with left-eye dominance (52.5%), and bilateral in 12.5%. These results align with Koki's findings in Cameroon [7], where unilateral IVT was reported in 71.17% and bilateral in 28.83%. Unilateral involvement may indicate early-stage disease, where delayed treatment can lead to bilateral involvement.

Uncorrected visual acuity before injection was PL+ to CF in 45% of cases. Fundus examination showed posterior pole involvement, primarily retinal hemorrhages (40%) and drusen (20%). These findings correlate with macular involvement and vascular manifestations typical of anti-VEGF-responsive conditions.

DME was the leading indication for IVT (45%), followed by RVO-related macular edema (22.5%) and AMD (20%). These results align with Alamou et al. [8], who found DME in 53.06% of cases, followed by RVO in 26.53% and AMD in 2.04%. However, they differ from Angulo et al. [9], who reported AMD as the primary indication (93%) in France. This discrepancy likely reflects socioeconomic differences between developing and developed countries. In low-resource settings, poor glycemic control often leads to late presentation with proliferative diabetic retinopathy and macular complications. Conversely, in industrialized nations, AMD remains the leading cause of vision loss among individuals over 50 years of age [13,14].

## Conclusion

Anti-VEGF intravitreal injections have become an effective therapeutic strategy in the ophthalmologist's arsenal. They have demonstrated efficacy in treating various neovascular retinal pathologies and macular edema. Although new indications continue to emerge with the development of novel molecules, the main indications in our hospital setting remain DME and macular edema associated with retinal vein occlusions, followed by AMD.

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