HEALTH RESEARCH IN AFRICA
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Research Article

Fluorescein Retinal Angiography in Newly Diagnosed Type 2 Diabetic Patients at the Yaoundé Central Hospital

Angiographie rétinienne à la fluorescéine chez les patients diabétique de type 2 nouvellement diagnostiqués à l'Hôpital Central de Yaoundé

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Keywords: type 2 diabetes, retinopathy, maculopathy, angiography, Yaoundé.

Mots clés : diabète de type 2, rétinopathie, maculopathie, angiographie, Yaoundé.

ABSTRACT

Aim. To describe retinal complications of diabetes on retinal angiograms in newly diagnosed type 2 diabetic patients at the Yaoundé Central Hospital. **Methods.** A cross-sectional descriptive study was carried out between January 8th and May 31st 2018. Consenting newly diagnosed type 2 diabetic patients were recruited from the 2 diabetic clinics and the ophthalmology unit of the Yaoundé Central Hospital. Retinal angiography was done after history-taking, visual acuity measurement and slit lamp examination. **Results.** We included 82 patients (45 males and 37 females). Ages spanned 31 and 82 years, with a mean of 53.6 ± 11.5. Hypertension was present in 30.5% of patients (n=25). Glycated haemoglobin was available for 44 patients (53.66%), amongst whom, 72.7% had values >8%. The prevalence of diabetic retinopathy was 9.8% (n=8) and all were non-proliferative. Diabetic maculopathy was present in 50% of those with diabetic retinopathy. **Conclusion.** Despite the low prevalence of diabetic retinopathy amongst newly diagnosed diabetic patients, half of the patients with diabetic retinopathy present with diabetic maculopathy, which could compromise visual outcome. Ophthalmic examination is necessary at the time of diagnosis of type 2 diabetes as a baseline for future screenings and to manage retinal complications which may already be present.

RÉSUMÉ

But. Décrire les complications rétiniennes du diabète à partir des angiographies des patients diabétiques de type 2 nouvellement diagnostiqués à l'Hôpital Central de Yaoundé. **Méthodes.** Nous avons mené une étude transversale et descriptive du 08 janvier au 31 mai 2018. Les patients diabétiques de type 2 nouvellement diagnostiqués ayant donné leur consentement ont été recrutés dans les 2 centres de prise en charge de diabète et dans le service d'ophtalmologie de l'Hôpital Central de Yaoundé. L'angiographie à la fluorescéine était réalisée après l'interrogatoire, la mesure de l'acuité visuelle et l'examen du segment antérieur à la lampe à fente. **Résultats.** Nous avons colligé 82 patients (45 de sexe masculin et 37 de sexe féminin). La moyenne d'âge était 53,6 ± 11,5 (extrêmes : 31 et 82 ans). L'hypertension artérielle était présente chez 30,5% des patients (n=25). Le taux d'hémoglobine glyquée avait été réalisé chez 44 patients (53,66%), parmi lesquels 72,7% avaient une valeur >8%. La prévalence de la rétinopathie diabétique était de 9,8% (n=8) et tous les cas étaient au stade non proliférant. La maculopathie diabétique était présente chez 50% de ceux-ci. **Conclusion.** Malgré la faible prévalence de la rétinopathie diabétique au moment du diagnostic du diabète, la moitié des patients avec la rétinopathie ont une maculopathie qui peut compromettre le pronostic visuel. L'examen ophtalmologique dès la découverte du diabète de type 2 est indispensable comme référentiel pour le suivi et pour dépister et traiter les complications qui peuvent déjà être présentes.

HIGHLIGHTS OF THE STUDY

What is already known on this topic

Diabetic retinopathy may be present at the time of diagnosis of type 2 diabetes.

What question this study addressed

Retinal complications of diabetes on retinal angiograms in newly diagnosed type 2 diabetic patients at the Yaoundé Central Hospital

What this study adds to our knowledge

In our setting, 10% of newly diagnosed type 2 diabetic patients present with diabetic retinopathy among whom 50% present with diabetic maculopathy

How this is relevant to practice, policy or further research

Foster multidisciplinary team approach in the management of diabetes such that at the time of diagnosis of type 2 diabetes, ophthalmic assessment be systematically

INTRODUCTION

Type 2 diabetes mellitus (T2DM) is a major public health burden worldwide. Its global prevalence is estimated by the International Diabetic Federation at 10.5% (1). A continued rise is expected across all regions of the world (2). The rising prevalence in low and middle-income countries is of concern due to insufficient resources to manage the disease and its complications. A meta-analysis of studies carried out in both urban and rural settings in Cameroon reported a prevalence of 5.8% in adults (3).

Late diagnosis of T2DM is common, with microvascular complications present at the time of diagnosis in some patients; including neuropathy, nephropathy, retinopathy and peripheral arterial disease (4,5). Diabetic retinopathy (DR) is the retinal microvascular complication of diabetes and a leading cause of visual impairment and blindness. It is the 5th cause of blindness globally in adults aged 50 years and above (6).

DR affects 25% of patients with T2DM (7). In Cameroon, studies on its prevalence are not available. One study evaluating retinal angiograms in diabetic patients requested after a clinical suspicion of DR, reported a prevalence of 42% (8). DR may occur before the diagnosis of T2DM and remain asymptomatic for several years. To the best of our knowledge, there are no studies in our setting on DR in newly diagnosed T2DM patients. We therefore carried out this study to describe the retinal complications of diabetes on retinal angiograms in newly diagnosed T2DM at the Yaoundé Central Hospital.

METHODS

A cross-sectional descriptive study was carried out between the 8th of January and the 31st of May 2018 at the Yaoundé Central Hospital. This study was carried out in respect of The Helsinki Declaration. Ethical clearance was obtained from the institutional ethical review board of the Faculty of Medicine and Pharmaceutical Sciences of the University of Douala. Administrative authorization was sought and obtained from the hospital administration. Written informed consent was obtained from participants. Anonymity was respected.

All patients were seen within 2 weeks of their diagnosis of T2DM. Data on diabetes control was obtained from patients' records. Ophthalmic examination was done as follows: distant visual acuity was measured and slit lamp examination of the anterior segment was done. Pupillary dilatation was obtained by instilling a total of 3 drops of tropicamide 0,5% at 5 minutes intervals. Retinal angiography was done after 3ml of 10% fluorescein was injected into a vein on the inner face of the elbow. Fundus photographs were taken in all the 9 positions of gaze using the Canon CF-1 digital mydriatic fundus camera (Canon Inc, Tokyo, Japan). A late angiogram was obtained 5 minutes after the injection. The International classification and severity scale of DR was used.

Variables studied included age, sex, comorbidities, glycated hemoglobin (HbA1c) levels, presence and stage of diabetic retinopathy and maculopathy.

RESULTS

A total of 82 patients newly diagnosed with T2DM were included in this study, amongst whom were 45 males (54.9%) and 37 females (45.1%). The mean age was 53.6±11.5 years. The most represented age group was that of 51 – 60 as shown in table I. Comorbid conditions included hypertension in 30.5% of cases (n=25) and obesity in 26.8% of cases (n=22).

Table I: distribution of the study population according to age group

Age (years)	N	%
[30-40]	11	13.4
[41-50]	22	26.8
[51-60]	24	29.3
[61-70]	20	24.4
>70	5	6.1
Total	82	100.0

Recent values for glycated hemoglobin (less than 3 months before the examination) were available for 44 patients (53.7 %). Values greater than 8% were found in 32 patients (72.7%).

Table II: distribution according to stage of diabetic retinopathy

Stage	Eyes (n)	%
Mild NPDR	7	50.0
Moderate NPDR	2	14.3
Severe NPDR	5	35.7
Total	14	100

NPDR: non proliferative diabetic retinopathy

DR was present in 8 patients (9.8%). The distribution according to stages for the eyes involved is shown in table II. Severe non proliferative DR (figure 1) which is at greater risk of proliferation was found in 35.7% of eyes. Diabetic maculopathy was found in 4 eyes (4.9%). All eyes with maculopathy had DR. Amongst eyes with DR, 50% had maculopathy.

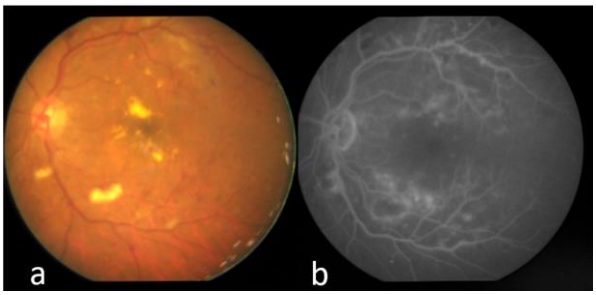

Figure 1: severe non proliferative diabetic retinopathy on retinal photography (a) and angiography (b)

DISCUSSION

To the best of our knowledge, this study is the first in our setting to study DR in newly diagnosed T2DM patients. The Yaoundé central hospital has 2 centers for diabetic patient care. Patients were recruited from both centers, giving a larger and representative sample size.

The prevalence of DR in this study was close to that reported by several other authors. Al-Zuabi et al (9) as well as Jammal et al (10) reported values of 7.6% and 7.9% respectively in Kuwait and Jordan. Khalil et al (11) reported 10.4% from Ethiopia and Thapa et al (12) reported 13% from Nepal. The minor differences could be due to diagnostic techniques used in these studies. Fundus photography, ophthalmoscopy and fluorescein angiography can be used to diagnose DR. Fundus photography has a lower sensitivity, but is a good tool for use by non-ophthalmologists in peripheral health facilities (13,14) as it allows for early screening and quick referral. A study comparing DR grading obtained from a slit lamp biomicroscopy and fundus fluorescein angiography reported the sensitivity of ophthalmoscopy to be at 91.2% (15). Slit lamp biomicroscopy may significantly underdiagnose DR, particularly for milder stages (16). Although angiography is an invasive technique, it was chosen for this study because it remains the gold standard for the study of retinal vasculature and captures peripheral lesions best (17).

Higher prevalence values of DR in newly diagnosed T2DM patients have however been reported by some authors. Wahab et al (18) reported 15% in Pakistan meanwhile Nkumbe et al (19) reported 30% in Kenya. These differences can be explained by the definition of "newly diagnosed' T2DM in these studies. In our study, we examined patients within 2 weeks after their diagnosis was made. Wahad et al included patients within two months of diagnosis while Nkumbe et al included patients within one year of diagnosis.

Amongst eyes with DR, 35.7% had severe non proliferative DR in this study. These eyes are at great risk of progression to proliferative DR in poorly controlled patients and those with other cardiovascular risk factors. In our setting, we recommended pan-retinal photocoagulation for such eyes. Although pan-retinal photocoagulation is indicated for retinal neovascularization in proliferative DR, it is recommended in severe non proliferative DR in patients not likely to be compliant to follow up (20).

Diabetic maculopathy was found in 4.9% of eyes and in 50% of eyes with DR. Nkumbe et al (19) found maculopathy to be present in 8.7% of cases. Maculopathy amongst patients with DR represented 28.6% and 40% of cases respectively in the studies of Al-Zuabi et al (9) and Jammal et al (10). The presence of diabetic maculopthy influences clinical management. It is a leading cause of visual impairment in diabetics; therefore, treatment should be sought when necessary. Options to treatment diabetic maculopathy include laser (focal or grid) and anti-vascular endothelial growth factor intravitreal injections. Recommendations for treatment are based on the type of maculopathy (central-involving or non-central-involving), the best-corrected visual acuity, the level of service provision and the compliance of the patient (20).

CONCLUSION

At the time of diagnosis, one in ten patients with T2DM present with DR, with half of them presenting diabetic maculopathy. Ophthalmic examination at the time of diagnosis of T2DM is necessary to screen for retinal complications which for some may require treatment for sight-threatening retinopathy and/or maculopathy.

Disclosure of conflicts of interest:

The authors declare no conflicts of interest.

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