



Clinical case

Value of Fundus Examination in Screening for HIV Infection

Intérêt de l'examen du fond d'œil dans le dépistage de l'infection par le VIH

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Résumé

La microangiopathie rétinienne est l'une des manifestations connues de l'infection par le VIH, parfois trompeuse car elle ressemble beaucoup à celle observée dans la rétinopathie diabétique ou hypertensive. Elle reflète une microangiopathie systémique pour laquelle la rétine offre une véritable fenêtre sur la microcirculation. Elle peut révéler une infection jusqu'alors méconnue ou permettre un suivi évolutif. Nous rapportons deux observations où la découverte de signes de microangiopathie rétinienne a conduit au diagnostic de séropositivité VIH.

Le premier cas est celui d'un homme de 34 ans, sans antécédent d'hypertension artérielle, de diabète ni de séropositivité connue, se présentant pour une rougeur oculaire gauche correspondant à une hémorragie sous-conjonctivale temporale et inférieure. L'examen du fond d'œil a révélé quelques rares taches cotonneuses, des microanévrismes et des hémorragies punctiformes au pôle postérieur. La pression artérielle et la glycémie étaient normales, et la sérologie VIH était positive. Le patient, adressé en consultation spécialisée, a été perdu de vue.

Le second cas concerne une femme de 26 ans, sans

antécédent particulier, adressée pour un ptérygion de stade 2 de l'œil droit. L'examen systématique du fond d'œil a mis en évidence quelques taches cotonneuses au pôle postérieur, sans hémorragie rétinienne. La pression artérielle et la glycémie étaient normales, la sérologie VIH était positive. Elle a également été perdue de vue.

Ces observations soulignent l'importance de l'examen du fond d'œil comme outil de dépistage précoce. Toute microangiopathie rétinienne inexpliquée, en particulier chez le sujet jeune sans facteurs de risque cardiovasculaire, doit faire rechercher une infection par le VIH.

Mots-clés : examen du fond d'œil, hémorragie rétinienne, microangiopathie rétinienne, tache cotonneuse, VIH.

Abstract

Retinal microangiopathy is one of the known manifestations of HIV infection, sometimes misleading as it closely resembles that observed in diabetic or hypertensive retinopathy. It reflects a systemic microangiopathy for which the retina offers a true window into the microcirculation. It may

reveal a previously unknown infection or allow for evolutionary monitoring. We report two observations where the discovery of signs of retinal microangiopathy led to the diagnosis of HIV seropositivity. The first case is that of a 34-year-old man, with no history of arterial hypertension, diabetes, or known seropositivity, presenting with left ocular redness corresponding to a temporal and inferior subconjunctival hemorrhage. Fundus examination revealed a few rare cotton-wool spots, microaneurysms, and punctate hemorrhages at the posterior pole. Blood pressure and blood glucose were normal, and HIV serology was positive. The patient, referred for specialized consultation, was lost to follow-up. The second case concerns a 26-year-old woman, with no particular history, referred for a stage 2 pterygium of the right eye. Systematic fundus examination revealed a few cotton-wool spots at the posterior pole, without retinal hemorrhage. Blood pressure and blood glucose were normal, HIV serology was positive. She was also lost to follow-up. These observations highlight the importance of fundus examination as a tool for early screening. Any unexplained retinal microangiopathy, particularly in young subjects without cardiovascular risk factors, should prompt investigation for HIV infection.

Keywords: Fundus examination; Retinal hemorrhage; Retinal microangiopathy; Cotton-wool spot; HIV.

Introduction

Infection with the Human Immunodeficiency Virus (HIV) remains a systemic pathology with polymorphous manifestations. While major opportunistic infections have declined thanks to antiretroviral treatments, microvascular involvement remains of significant clinical relevance. Among these, retinal microangiopathy occupies a singular place: it often constitutes the earliest and most frequent ocular manifestation of the disease [1]. From a semiological standpoint, this involvement is characterized by the presence of cotton-wool spots, microaneurysms, or

retinal hemorrhages. Although often asymptomatic for the patient, it represents a true diagnostic “window” on the state of systemic microcirculation [2]. Its appearance can, however, be misleading, sometimes simulating early diabetic or hypertensive retinopathy, which may delay etiological diagnosis. The interest in recognizing these early signs is twofold: they may reveal previously unknown seropositivity or testify to the degree of immunosuppression of the patient [3]. Through two clinical observations, we emphasize the crucial importance of fundus examination as a screening tool, allowing for the diagnostic orientation of HIV infection in patients without particular systemic history.

Clinical cases

Case n°1

A 34-year-old patient, with no notable medical or surgical history, consulted for sudden onset left ocular redness, without decreased visual acuity or pain.

Ophthalmological examination revealed visual acuity of 20/20 in both eyes. Anterior segment examination revealed an extensive subconjunctival hemorrhage in the temporal and inferior sectors of the left eye, without signs of trauma. Intraocular pressure was normal (14 mmHg). Posterior segment examination after pupillary dilation revealed the presence of three peripapillary cotton-wool spots, associated with a few microaneurysms and punctate retinal hemorrhages disseminated along the vascular arcades. The vitreous was quiet, without any inflammatory reaction.

Faced with this picture of retinal microangiopathy, an etiological workup was initiated. Blood pressure (120/70 mmHg) and fasting blood glucose (0.92 g/L) were normal. Biological workup, however, revealed moderate lymphopenia (1,100/mm³; normal: 1,500–4,000/mm³). HIV serology returned positive, while other workups, particularly syphilis serology, were negative. Although informed of the diagnosis and referred to an infectious disease unit for immunological workup and therapeutic management, the patient did not attend follow-up appointments and was declared lost to follow-up.

Case n°2

A 26-year-old female patient was referred by a colleague for surgical management of a stage 2 pterygium of the right eye, causing aesthetic discomfort and induced astigmatism. History-taking revealed no history of systemic pathology, chronic medication use, or cardiovascular risk factors.

Visual acuity was 20/25 in the right eye and 20/20 in the left eye. Systematic fundus examination, performed as part of the preoperative workup, fortuitously revealed the presence of four small cotton-wool spots, localized at the posterior pole of the right eye, without hemorrhage or papilledema. Examination of the left eye also showed two isolated cotton-wool spots.

Cardiovascular (blood pressure, auscultation) and metabolic (blood glucose, lipid profile) workup was strictly normal. Due to the patient's age and the unexplained nature of these retinal signs, an etiological investigation was conducted. HIV serology proved positive and syphilis serology was negative. After the diagnosis was announced, the patient was referred for specialized consultation. Despite social mediation efforts, she did not return for her immunological extension workup or treatment, illustrating the difficulty of post-diagnostic follow-up for some asymptomatic patients.

Discussion

HIV-related retinal microangiopathy is a major clinical entity, affecting between 50% and 70% of infected patients at an advanced stage of the disease [4]. In the pre-antiretroviral era, this prevalence was even higher, reaching nearly 70% to 80% of patients with CD4 counts below 200 cells/mm³. Since the introduction of highly active antiretroviral therapies (HAART), the frequency and severity of retinal microangiopathy have significantly decreased in high-resource countries [3]. However, in contexts with limited access to ARVs—such as Madagascar where our observations were collected—this pathology retains all its clinical relevance. Our two observations

illustrate the inaugural and often fortuitous nature of this involvement, reminding us that the eye constitutes a privileged “window” on the vascular disorders induced by the virus.

The hallmark sign of this pathology is the cotton-wool spot. Histologically, it corresponds to an infarct of the retinal nerve fiber layer by occlusion of pre-capillary arterioles, leading to blockage of axoplasmic flow and accumulation of cellular debris called cytooid bodies [5]. While in elderly subjects these signs immediately suggest hypertensive or diabetic retinopathy, their discovery in our 34 and 26-year-old patients, without systemic history, constitutes a major serological warning sign. Several mechanisms explain this vascular aggression:

- Direct infection of the endothelium by the virus
- Deposition of immune complexes
- Increased plasma viscosity [6].
- It is now established that retinal microangiopathy is only the ophthalmological manifestation of a systemic vasculitis. The literature emphasizes a close correlation between retinal lesions and other target organs:
 - Central Nervous System: As the retina and brain share a similar blood-tissue barrier, the presence of retinal microangiopathy may reflect underlying cerebral microangiopathy. It may precede the appearance of HIV-associated neurocognitive disorders [6].
 - Renal and Cardiac Function: Similarities have been noted between retinal capillary involvement and the glomerular lesions of HIV-associated nephropathy (HIVAN) [7]. Similarly, persistent immune activation induces coronary microvascular dysfunction, increasing the risk of ischemic events [8].

The presence of these lesions is also a marker of severity. It is statistically correlated with CD4 T-lymphocyte counts below 200 cells/mm³ [3,9]. Although our patients were lost to follow-up before their immunological workup, the severity of the signs (particularly the microaneurysms in the first case) suggested advanced immunosuppression.

Unlike Cytomegalovirus (CMV) retinitis, which is a devastating necrotizing retinitis, microangiopathy does not immediately threaten visual acuity (20/20 in our patients). However, it announces an imminent risk of major opportunistic complications and requires urgent management [9].

The outcome of our two observations highlights a public health problem in developing countries: the rupture of care after the announcement of a positive diagnosis. The ophthalmologist finds themselves on the front line for announcing seropositivity to a patient believing themselves to be in good health. This requires not only diagnostic rigor but also immediate referral to a multidisciplinary care circuit to guarantee therapeutic adherence [10].

From an ethical and psychosocial standpoint, the ophthalmologist's position as the bearer of seropositivity news is particularly delicate. In our two cases, the patients were lost to follow-up after diagnosis, illustrating well-documented obstacles in the literature: social stigmatization, fear of community rejection, geographic and financial difficulties in accessing care structures, and lack of knowledge about the disease. The announcement of fortuitous seropositivity during a routine ophthalmological consultation represents a psychological shock that can lead to a denial mechanism. To improve adherence to follow-up, it is recommended to immediately integrate a social worker or health mediator into the care circuit, and to schedule a short follow-up consultation within 48-72 hours after the announcement [11].

From a practical standpoint, we propose the following algorithm for any ophthalmologist confronted with unexplained cotton-wool spots in a young subject without cardiovascular risk factors: measurement of blood pressure and fasting blood glucose; prescription of a biological workup including complete blood count, and screening for syphilis and HIV; in case of HIV positivity, immediate referral to an infectious disease unit for immunological workup (CD4 count, viral load) and initiation of antiretroviral treatment; implementation of a psychosocial support device from the announcement of the diagnosis; in case of

negativity, orient exploration toward the search for connective tissue diseases and other vasculitides. This simple algorithm, applicable even in limited-resource contexts, would reduce diagnostic delay and improve retention in care.

Conclusion

HIV-associated retinal microangiopathy constitutes a first-order clinical marker. The interest extends beyond the ocular framework: the retina acts as a true mirror of systemic vasculitis, potentially signaling subclinical involvement at the cerebral, renal, or cardiac level. The ophthalmologist thus occupies a strategic «sentinel» position in the care pathway, a role all the more crucial in limited-resource countries where access to systematic immunological workups remains insufficient. Systematic practice of fundus examination in any young subject presenting with unexplained microangiopathy should be integrated as a diagnostic reflex, including during routine or preoperative consultations. However, diagnosis is only the first step. The high rate of patients lost to follow-up after fortuitous discovery underscores the urgency of close multidisciplinary collaboration between ophthalmologists, infectious disease specialists, and social workers. Formalized collaboration protocols between ophthalmology departments and HIV care units are necessary to guarantee continuity of care. Only comprehensive, immediate, and humane management can guarantee adherence to antiretroviral treatment and prevent progression to severe opportunistic complications.

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Conflict interest : None

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