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CASE REPORT

Branch Retinal Artery Occlusion as the First Manifestation of *Bartonella henselae* Infection

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ABSTRAK

Bartonella henselae ialah bakteria rod gram-negatif yang menyebabkan penyakit calar kucing (CSD) pada manusia, dengan manifestasi yang paling biasa ialah sindrom okuloglandular Parinaud. Seorang lelaki berumur 37 tahun yang tidak mempunyai sejarah masalah kesihatan atau mata mengalami skotoma akut tanpa rasa sakit pada penjuru nasal mata kanan selama 1 minggu selepas dicakar oleh kucing, 2 minggu sebelum mengalami kabur penglihatan. Ketajaman penglihatannya adalah 6/12 pada mata kanan (RE) dan 6/9 pada mata kiri (LE), dengan pemeriksaan segmen anterior yang normal secara dua hala. Pemeriksaan fundus menunjukkan tompok retinitis pada arteri cawangan inferotemporal mata kanan dengan retina yang pucat di sekelilingnya. Retinitis terpencil turut dilihat di kawasan superior makula kiri. Angiografi fundus fluorescein menunjukkan kebocoran dari tempat retinitis dan pengisian saluran darah yang abnormal pada arteri inferotemporal RE. Perubahan radang melibatkan saluran darah dilihat pada kawasan parafoveal LE. Cecair intraretinal di atas makula kanan dikesan melalui tomografi koheren optik. Ujian makmal menunjukkan IgM Bartonella henselae positif, dengan peningkatan titer IgG melebihi 1:512. Pesakit mempunyai tindak balas klinikal yang sangat baik dengan rawatan azithromycin secara oral selama 6 minggu. Oklusi arteri retina cabang yang disebabkan oleh penyakit CSD adalah sangat jarang ditemui. Diagnosis awal dan rawatan segera adalah penting untuk memulihkan fungsi visual dan mencegah komplikasi yang lain.

Kata kunci: *Bartonella henselae; penyumbatan arteri; retinitis*

ABSTRACT

Bartonella henselae is a gram-negative rod bacterium that causes cat scratch disease (CSD) in humans, with the most common manifestation being Parinaud's oculoglandular syndrome. A 37-year-old healthy man with an unremarkable ocular history presented with an acute painless scotoma over the superonasal visual field of the right eye (RE) for 1 week following a cat scratch two weeks before presentation. His visual acuity was 6/12 over the RE and 6/9 over the left eye (LE), with a normal anterior segment examination bilaterally. Fundus examination showed a retinitis patch occluding the right inferotemporal branch with a surrounding pale retina and isolated retinitis was seen superior to the left macula. Fundus fluorescein angiography of RE showed a non-filling defect along the inferotemporal artery branch with the absence

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of flow distal to the filling defect which signified an occlusion area. Parafoveal vasculitis changes were seen over the LE. Intraretinal fluid over the right macula was detected on optical coherence tomography. Laboratory testing revealed positive *Bartonella henselae* IgM with IgG titers greater than 1:512. The patient received oral azithromycin for 6 weeks and demonstrated good clinical response. Branch retinal artery occlusion is an uncommon presentation of CSD. Early diagnosis and prompt intervention are essential to restore visual function and prevent further complications.
Keywords: Artery occlusion; *Bartonella henselae*; retinitis

INTRODUCTION

Cat scratch disease (CSD) is a zoonotic illness caused by the gram-negative bacillus *Bartonella henselae*, which is transmitted by cats or kittens to humans through bites, licks or scratches (Biancardi & Curi 2014). The most common systemic manifestation of CSD consists of lymphadenitis involving the lymph nodes draining sites of inoculation. Ocular involvement in CSD ranges from 5% to 10%, representing the most common non-lymphatic organ involvement (Ghazi & Sams 2012). Numerous ocular manifestations of Bartonella have been reported. This includes Parinaud's oculoglandular syndrome, which is represented by pre-auricular lymphadenopathy and conjunctival granulomas that typically are restricted to the palpebral conjunctiva (Tey et al. 2020). In a study reported by Tan et al. in 2017, the common ocular manifestations of CSD in Malaysia are neuroretinitis (62.5%), followed by optic disc edema (42.1%), anterior uveitis (31.6%), and retinal infiltrate (10.5%). We reported a case of a healthy 37-year-old man presenting with branch retinal artery occlusion (BRAO) as the initial manifestation of *Bartonella henselae* infection.

CASE REPORT

A 37-year-old healthy man with an unremarkable ocular history presented with an acute painless scotoma over the superonasal visual field of the right eye (RE) for a week. There was no associated eye pain, eye redness, ocular trauma or fever. He also denied any metamorphopsia or blurring of central vision. The patient developed a skin rash over his left thigh following a cat scratch two weeks before presentation. His vision was 6/12 over the RE and 6/9 over the left eye (LE), with normal anterior segment examinations bilaterally.

Dilated fundus examinations of the RE revealed a retinitis patch over the inferotemporal artery with an area of pale retina in a vascular distribution along the artery distal to the lesion with an isolated focus of retinitis were seen over the superior temporal quadrant of the RE (Figure 1). Similar foci of retinitis were seen over the LE with parafoveal vasculitic changes (Figure 2). No intra-arterial plaque, retinal hemorrhages, macular star or optic disc swelling were observed. Clinical examination did not reveal any granulomatous follicular conjunctivitis or lymphadenopathy.

Fundus fluorescein angiography (FFA) of the RE showed a non-filling defect along the inferotemporal branch of artery with absent of flow distal to the filling defect signifying area of occlusion (Figure 3). There was also leakage type of hyperfluorescence from the area of the retinis (Figure 4). The FFA of the LE demonstrated staining of the retinitis spot with parafoveal vasculitis changes (Figure 5). Optical coherence tomography of the RE showed increase hyperreflectivity of the inner retinal layers in the presence of intraretinal fluid, resulting in loss of the foveal contour (Figure 6).

Laboratory workup revealed mild leukocytosis of 8.2 with a predominantly neutrophil count of 77% and positive serology for *Bartonella henselae* immunoglobulin M (IgM) with a immunoglobulin G (IgG) titer of more than 1:512. Uveitis, hematologic, autoimmune and vascular workups were negative. Carotid Doppler ultrasonography showed no stenosis of the carotid arteries, and echocardiography revealed no thrombus or

FIGURE 1: Colored fundus photograph of the right eye showed a BRAO involving the inferotemporal arcade (inferior arrow) with surrounding pallid retinal edema associated with an area of focal retinitis (superior arrow)

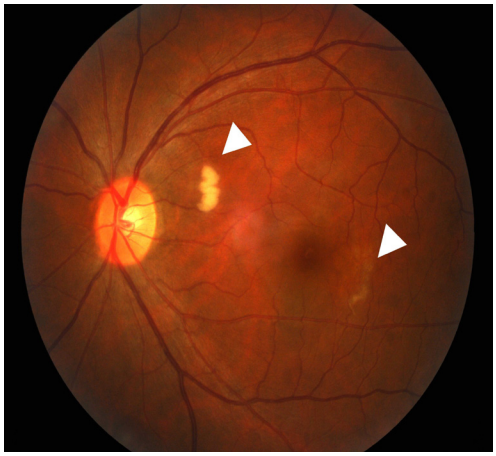

FIGURE 2: Colored fundus photograph of the left eye demonstrated area of retinitis temporal to the optic disc (left arrow) with parafoveal vasculitis changes (right arrow)

FIGURE 3: FFA at presentation showed a non-filling defect seen along the inferotemporal branch of artery (arrow) with absent of flow distal to the filling defect signifying area of occlusion

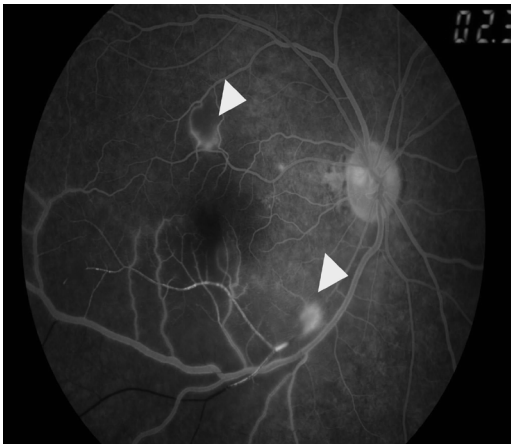

FIGURE 4: FFA of the right eye in venous phase showed complete filling along the STA, leakage type hyperfluorescence from the retinitis spot (superior arrow) and masking due to a non-filling defect of the right inferotemporal arcuate (inferior arrow) resulting from occlusion by the retinitis patch

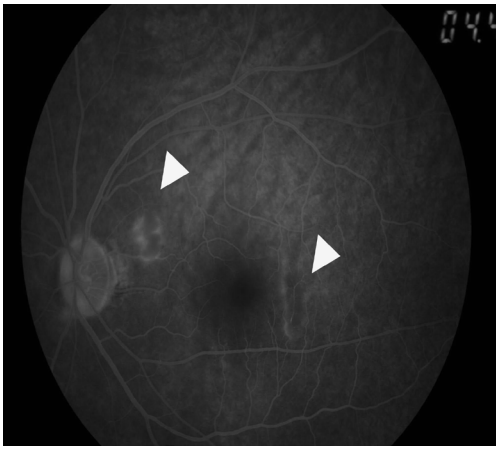

FIGURE 5: Staining of focal retinitis over left eye (left arrow) with parafoveal vasculitis changes (right arrow)

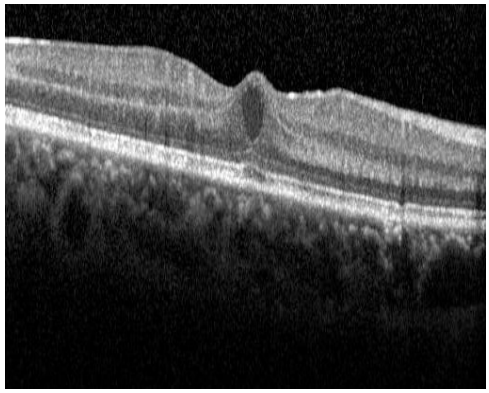

FIGURE 6: Optical coherence tomography at initial presentation of right eye demonstrated intraretinal fluid involving fovea

vegetation seen with normal chamber size and ejection fraction. The patient was diagnosed to have right inferotemporal branch artery occlusion with macula edema secondary to CSD and LE retinitis secondary to CSD.

The patient was treated with oral azithromycin 500 mg daily for 6 weeks. Tapering doses of oral prednisolone (0.5 mg/kg) were administered over 6 weeks to treat the associated inflammation. He initially received Prednisolone 30 mg daily for 1 week, followed by a weekly taper of 5 mg. This patient also received topical nepafenac 0.1% three times daily for 6 weeks for the treatment of macula edema.

This patient developed macular edema in the RE, which was supported by evidence of intraretinal fluid leading to loss of foveal contour. However, due to the RE visual acuity of 6/12 and the patient denied central scotoma or metamorphosis, intravitreal injection of anti-vascular endothelial growth factor (VEGF) was not administered. In addition, there was a notable response to topical nepafenac 0.1% and oral steroids, with complete resolution of macular edema observed one month later (Figure 7). One month after treatment, the patient reported improvement in bilateral vision to 6/9. Repeated fundus photography at 1 month (Figure 8) and 3 months after completion of treatment showed resolution of the retinitis and the area of pale retina (Figure 9).

DISCUSSION

Bartonella henselae has been reported to have tropism in the retinal vessels and erythrocytes. It has a propensity to penetrate the vascular endothelium and cause damage, which can trigger a localised reaction that results in vascular blockage (Solley et al. 1999). Eiger-Moscovich et al. (2016) described the clinical course of BRAO

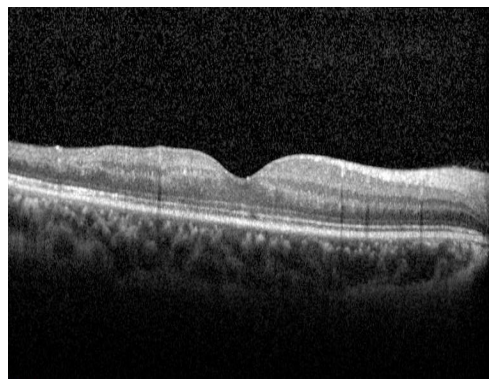

FIGURE 7: Repeated OCT macula 1 month after the treatment showed complete resolution of intraretinal fluid

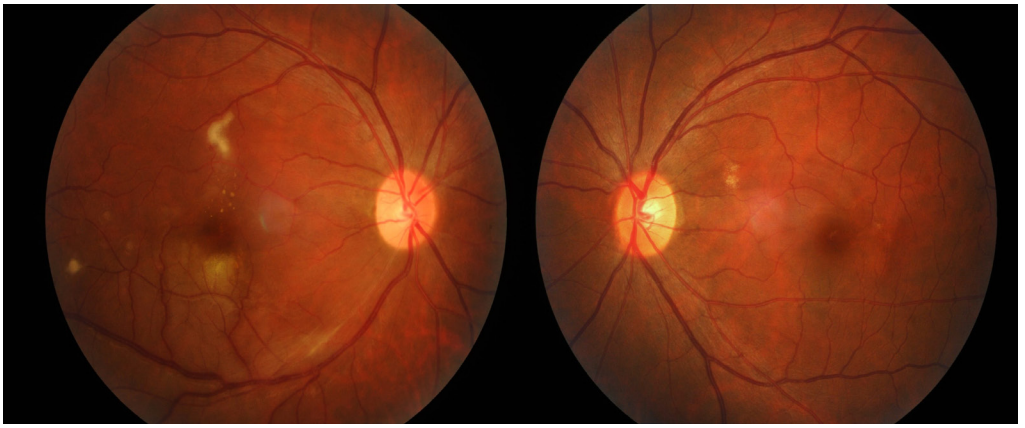

FIGURE 8: Fundus photograph at 1 month after completion of treatment showed resolving area of retinitis bilaterally

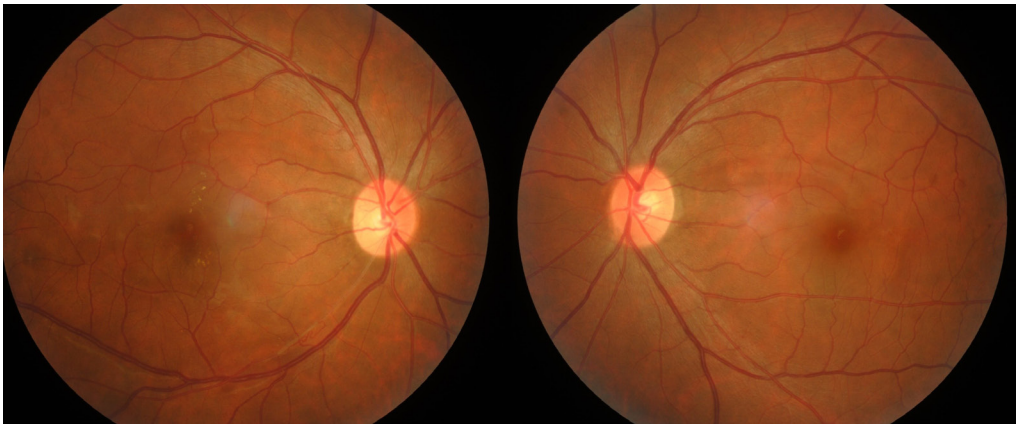

FIGURE 9: Repeated fundus photograph at 3 months after completion of treatment showed resolved area of pale retina over the RE and complete resolution of the retinitis bilaterally

in six individuals with ocular CSD who presented at four tertiary medical centers in Israel, Turkey and Saudi Arabia between 2008 and 2014. Another case series from Turkey (Acar et al. 2023) reported 19 patients treated for CSD with ocular manifestations. However, only two (8%) of the patients had BRAO. Our patient depicted a BRAO located distal to an area of focal retinitis. This occlusive event could be presumably caused by direct compression on the artery by the focus of retinitis, leading to the interruption of blood flow (Kahloun et al. 2013). This finding highlights the importance of considering the diagnosis of CSD in cases of retinal vessel occlusion, particularly in young patients with no other known risk factors for vascular occlusion.

BRAO in a younger age group without medical comorbidity requires a thorough investigation of the inflammatory and infectious etiology in addition to a detailed history and physical examination. The presence of rashes over the right thigh with a recent history of contact with the cat aids in the workup and establishing the diagnosis. Other hematological, uveitis, autoimmune and vascular investigations, such as carotid Doppler ultrasonography and

echocardiogram were normal in this case.

Serologic evaluation play an important role in supporting the diagnosis. IgM positivity indicates an acute disease. IgG titers between 1:64 and 1:256 suggest possible CSD, and it is recommended to repeat after 10-14 days (Ksiaa et al. 2019). In most cases, empirical treatment is started before the serological results become available, typically ranging up to 4-6 weeks. In some cases, patients who presented late to the clinic would have missed the optimum window period for testing (Tey et al. 2020). In our case, early treatment was commenced based on a high index of suspicion, a positive history of contact with cats, and clinical features that were suggestive of infective retinitis.

Early antimicrobial treatment for ocular bartonellosis may hasten the recovery and improve the final visual outcome. Antibiotic treatment options include rifampicin, gentamicin, cotrimoxazole, ciprofloxacin and doxycycline (Reed et al. 1998). In adults, azithromycin is the preferred choice due to its better compliance and safe gastrointestinal profile compared to doxycycline. Despite better ocular and central nervous system penetration, doxycycline is less preferred in patients of 8 to 12 years old due to dental staining (Cunningham & Koehler 2000). The patient in this case received oral azithromycin 500 mg daily for 6 weeks and a tapering dose of oral prednisolone to treat the associated inflammation. The role of systemic corticosteroids is still debatable where there is no association between usage of systemic corticosteroids and the visual outcomes (Chi et al. 2012). Meanwhile, Kodama et al. (2003) in Japan reported a case series of 14 patients who received systemic steroids (93% of cases) and achieved visual acuity of 0.6 or better.

Studies have found that damaged endothelial cells and elevated levels of pro-inflammatory cytokines play a role in vascular leakage (Kabasele 2013). A damaged blood retinal barrier leads to the accumulation of fluid and increased retinal thickness, thus resulting in decreased visual acuity. In this case, the patient had RE macula edema, supported by the evidence of intraretinal fluid resulting in the loss of the foveal contour. In view of the visual acuity of the RE during the initial presentation was 6/12, absence of central scotoma or metamorphosia and there was a remarkable response to topical Nepafenac 0.1% and oral steroid, this patient was not subjected to intravitreal VEGF injection. Repeated OCT macula after 1 month showed complete resolution of the macula edema. Combined therapy with corticosteroid and nepafenac 0.1% provides synergistic effects in reducing the inflammatory component, resulting in the successful treatment of macula edema (Paz et al. 2017).

Cats are also becoming popular as household pets in many nations. In Malaysia's Federal Territory of Putrajaya, a cross-sectional study by Debbra et al. (2019) found that 47% of homes had pets, with cats making up the majority (72%) followed by fish (14%). Despite the ability of cats to provide psychological support, the danger of CSD should not be forgotten. Humans contract the disease by the bites, scratches, or licks of an infected cat. Additionally, an infection may develop if the saliva of an infected cat comes into direct contact with an open cut or abrasion wound (Pal 2018). A few days after exposure, a papule or wheal may develop followed by regional lymphadenopathy 1-2 weeks later (Zangwill 2021). The presence of rashes over the left thigh following a cat scratch was seen in this case. Cats are a significant reservoir for *Bartonella henselae*, therefore it's also critical to educate them about the risk of CSD, mechanism of transmission and preventive measures. This includes vaccination of the cats, hand hygiene following contact with cats and flea control.

CONCLUSION

BRAO is an uncommon presentation of CSD. This case depicts BRAO occurring distal to an area of focal retinitis, likely from direct compression on the artery by the retinitis and the ability of the organism to invade vascular endothelium. A thorough history taking, increased awareness of diverse posterior segment manifestations

and serologic testing help to establish an early diagnosis of ocular bartonellosis. Hence, timely diagnosis and prompt intervention are essential to restore visual function and prevent further complications.

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