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Case report

Sub-internal limiting membrane hemorrhage associated with Weil's disease

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ABSTRACT

Purpose: Leptospirosis is a rare, typically tropical disease associated with water sources infected with rat urine. Symptoms can range from asymptomatic to a severe, deadly form known as Weil's disease, and ocular manifestations can arise. As global temperatures continue to rise, leptospirosis will become a larger problem worldwide. Here we describe the first case to our knowledge of foveal sub-internal limiting membrane (sub-ILM) hemorrhage due to Weil's disease.

Observations: A 56-year-old female presented with floaters and decreased vision to 20/200 in the right eye after being hospitalized for Weil's disease. Funduscopic examination and optical coherence tomography (OCT) demonstrated a foveal sub-ILM hemorrhage in the right eye. The patient was treated with pars-plana vitrectomy with internal limiting membrane removal and blood aspiration, and her best corrected visual acuity improved to 20/60.

Conclusions and Importance: Here we report the first case of sub-ILM hemorrhage following Weil's disease. Patients with leptospirosis and Weil's disease can develop retinal complications and therefore should be followed with fundoscopic eye examination after resolution of systemic symptoms. For those with retinal hemorrhages, OCT evaluation should be used to differentiate sub-hyaloid and sub-ILM hemorrhages.

1. Introduction

Leptospirosis is a zoonotic bacterial disease caused by the water borne spirochete Leptospira.[1] The disease is most prevalent in tropical climates, though it is found throughout the world.[1] In the United States, around 100–150 cases of Leptospirosis occur each year, but the worldwide incidence is approximately 1 million, with 59,000 yearly deaths attributed to the disease.[2] Infection occurs from contact with contaminated water infiltrated with urine of infected hosts, most commonly rats.[1] Humans become infected via mucosal contact or abraded skin, resulting in bacteremia and dissemination into various organs such as the kidneys and liver.[1] Human infections can range from asymptomatic to a severe life-threatening type known as Weil's disease, with the majority of cases presenting as a mild influenza-like disease.[3] Clinical features of the acute illness include fever, headache, photophobia, non-productive cough, myalgia, and conjunctival suffusion.[1] Following the initial symptomatic period, the illness can resolve or progress to Weil's disease, which typically involves jaundice, renal failure, neurologic symptoms, and hemorrhagic diathesis.[4] In the majority of the cases, spirochetes are quickly eliminated from all organs except from sites of immunological privilege such as the eye.[5]

Leptospirosis is associated with several retinal manifestations, which can present anywhere from 2 weeks to 6 months following the initial infection.[5] These include vasculitis, venous dilatation, Roth spots, and superficial and sub-hyaloid hemorrhages.[5,6] Treatment for these hemorrhages in the setting of leptospirosis infection has consisted of observation with rapid improvement of symptoms.[5,6] Herein, we describe the first case to our knowledge of foveal sub-internal limiting membrane hemorrhage associated with Weil's disease and treated with pars-plana vitrectomy.

2. Case report

A 56-year-old Hispanic female presented to the clinic with a 2-week history of blurred vision and floaters in both eyes (OU), worse in the right eye (OD). One month prior to presentation, the patient was hospitalized in an intensive care unit due to septic shock and bilateral pneumonia from leptospirosis. She had no previous history of any systemic illnesses and was not on any medications. The patient had elevated bilirubin and liver enzymes, anemia, and severe thrombocytopenia with a platelet count of 37,000. She was treated for Weil's disease with blood transfusions and intravenous ceftriaxone. An exam by a general ophthalmologist during the end of the patient's hospital course described retinal hemorrhages at the time of visual loss. Upon

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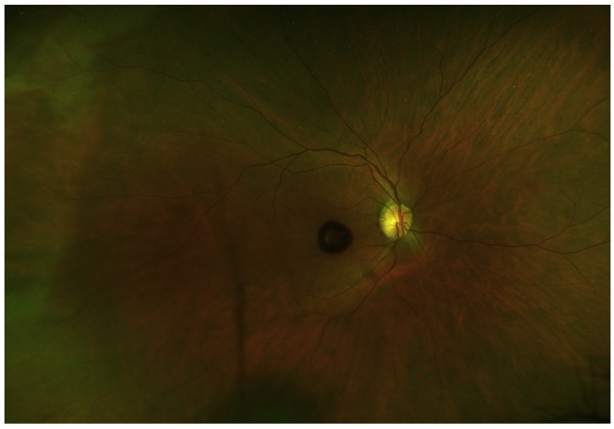

Fig. 1a. Fundus photo of the right eye (OD) at presentation showing a sub-internal limiting membrane (sub-ILM) hemorrhage in the fovea and a dot hemorrhage in the superior retina.

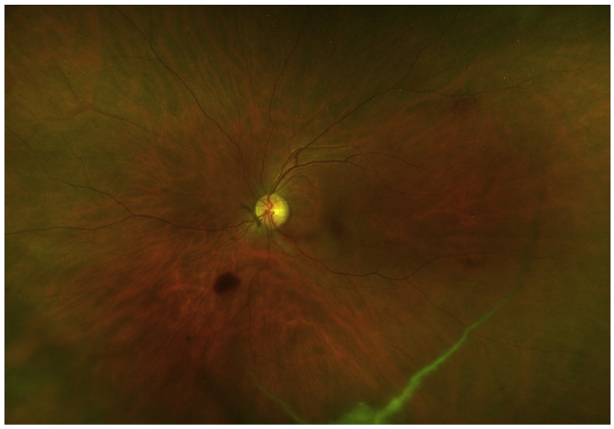

Fig. 1b. Fundus photo of the left eye (OS) showing a sub-ILM hemorrhage inferonasal to the optic nerve as well as retinal hemorrhages in the temporal arcades.

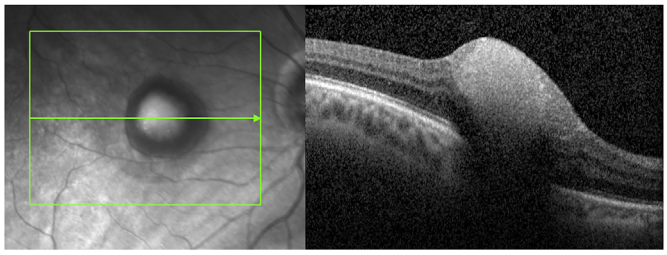

Fig. 2a. Optical coherence tomography (OCT) of OD at presentation showing a foveal sub-ILM hemorrhage.

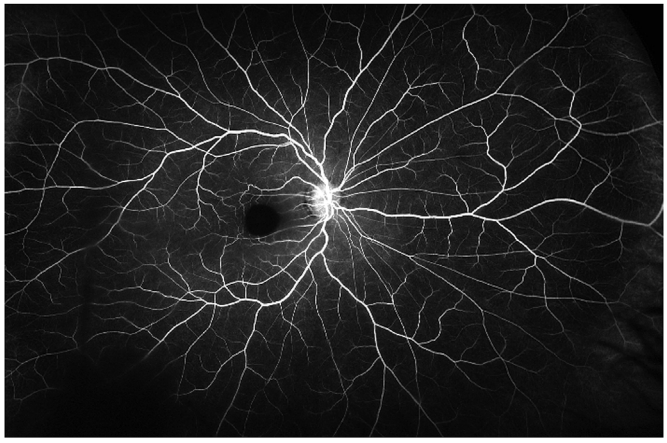

Fig. 2b. Fluorescein angiogram OD showing blockage of fluorescence in the foveal region from the sub-ILM hemorrhage.

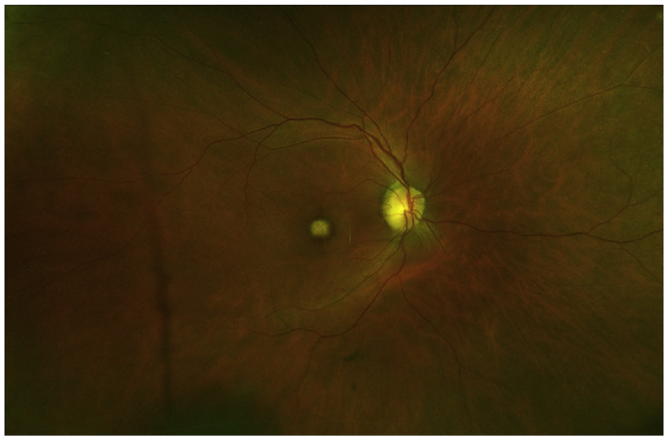

Fig. 3a. Fundus photo of right eye 2 months post presentation showing minimal resolution of sub-ILM hemorrhage.

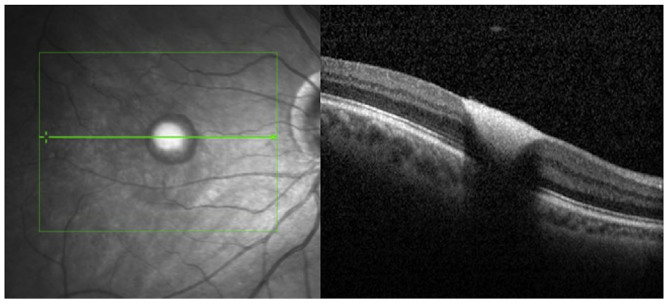

Fig. 3b. Optical coherence tomography of OD showing sub-ILM hemorrhage 2 months post presentation.

our examination one month following her initial diagnosis of Weil's disease, visual acuity was 20/200 OD and 20/30 in the left eye (OS). Intraocular pressure was 14 OU. The anterior segment was quiet and 2 + nuclear sclerosis was noted bilaterally. On funduscopic examination, there was a sub-internal limiting membrane (sub-ILM) hemorrhage concentrated in the macula as well as dot hemorrhages in the superior retina in the right eye (Fig. 1a). The left eye revealed a retinal hemorrhage in the macula and dot hemorrhages in the superior and inferior retina (Fig. 1b). A posterior vitreous detachment was present OU. Optical coherence tomography (OCT) and fluorescein angiography confirmed the findings (Fig. 2a and b). The patient was examined bi-weekly with no improvement in visual acuity and minimal hemorrhage resolution (Fig. 3a and b). Two months after the initial visit, the sub-ILM hemorrhage was surgically treated with pars-plana vitrectomy with internal limiting membrane removal and blood aspiration OD. One month following the procedure, best corrected visual acuity (BCVA) had improved to 20/60 OD and the other dot hemorrhages had resolved in both eyes (Fig. 4a and b). At last follow-up 8 months post vitrectomy BCVA remained 20/60 OD.

3. Discussion

Bleeding complications are common in patients with leptospirosis. Petechiae and hemorrhage are seen in multiple organs including lung, skin, GI tract, and the eye.[1,7] The exact pathogenesis of the bleeding

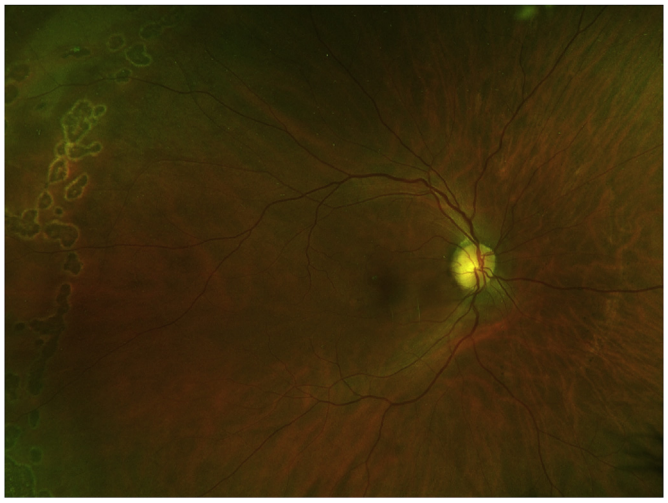

Fig. 4a. Fundus photograph of OD 1 month post vitrectomy after the sub-ILM hemorrhage was removed. Laser was applied to areas of lattice degeneration during the surgery.

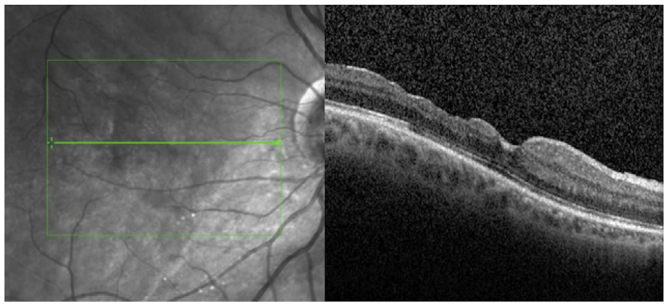

Fig. 4b. OCT of OD 1 month after vitrectomy. Foveal contour shows some irregularity.

complications is unknown although coagulation disorders, thrombocytopenia, and platelet dysfunction have been reported as causes.[1,7,8] The platelet dysfunction is thought to be caused by products of Leptospira binding to and inhibiting von Willebrand factor-mediated platelet aggregation.[8] This not only results in platelet dysfunction but also increased platelet clearance. Our patient, with no previous medical conditions, presented in septic shock with multiple organ involvement secondary to leptospirosis infection. She had no risk factors for bleeding prior to the leptospirosis infection. She reported loss of vision while hospitalized for treatment of leptospirosis and had thrombocytopenia at the time.

Sub-ILM hemorrhages, which occur between the internal limiting membrane (ILM) and the nerve fiber layer, are more likely to occur in the macular region resulting in a tendency to cause visual impairment.[9] Sub-ILM hemorrhages are caused by multiple conditions including Valsalva retinopathy, blood dyscrasias, Terson syndrome, and ocular trauma.[9] Treatment most commonly involves vitrectomy, as it leads to immediate improvement in visual acuity. Without treatment, the blood can take several months to resolve causing retinal damage in the process, including epiretinal membranes, retinal detachment, and proliferative vitreoretinopathy.[9]

In contrast to sub-ILM hemorrhage, sub-hyaloid hemorrhage occurs when there is bleeding between the posterior hyaloid surface and the ILM.[10] One fundamental difference between the two is that blood in sub-ILM hemorrhages spontaneously clears at a significantly slower rate than in sub-hyaloid hemorrhages, often requiring surgical treatment to restore vision and prevent complications.[10] Meanwhile, sub-hyaloid hemorrhages can often be observed for spontaneous improvement. Differentiating between the two types of hemorrhages clinically is a challenge and OCT remains the mainstay for accurate diagnosis.[11]

Our patient was found to have a sub-ILM hemorrhage 1 month after being diagnosed with Weil's disease with minimal resolution by 2 months. There has been one previous report of pre-retinal hemorrhage associated with leptospirosis, though it was diagnosed as sub-hyaloid hemorrhage, observed, and spontaneous resolution was achieved.[5] There have been no previous published reports to our knowledge of sub-ILM hemorrhage following leptospirosis infection. Our patient was initially closely followed with observation and not treated surgically because she was still recovering from her hospitalization. Ideally, the patient would have been treated with pars-plana vitrectomy promptly to allow for earlier improvement in visual acuity and quality of life. We suggest that patients with posterior pole hemorrhages following leptospirosis infections should be evaluated with OCT for sub-hyaloid and sub-ILM differentiation, as the treatment modality varies.

4. Conclusion

In summary, we present a case of a patient who presented with sub-ILM hemorrhage following Weil's disease and was treated with pars-plana vitrectomy. We suggest patients with leptospirosis and Weil's disease should be followed with fundoscopic eye examination after resolution of systemic symptoms, as they may have retinal hemorrhages. For those with hemorrhages, they should be evaluated with OCT to distinguish between sub-ILM and sub-hyaloid etiologies, as treatments differ. The incidence of Leptospirosis infections, although low in the United States, will likely increase as temperatures continue to rise. Areas in warmer climates affected by flooding are likely to present the greatest risk. Ophthalmologists should therefore be vigilant of the potential ocular complications of leptospirosis infection and know how to treat them effectively.

Patient consents

Consent to publish the case report was not obtained. This report does not contain any personal information that could lead to the identification of the patient.

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Conflicts of interest

Maria H. Berrocal, has obtained speaker fees from Allergan and Alcon. The following authors have no financial disclosures: EA, LA.

Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

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