

## Rare cause of floaters: A motile live worm in vitreous cavity

Renu P Rajan, Soumya Jena, N Obuli Ramachandran,  
Piyush Kohli

Ocular filariasis commonly presents as subconjunctival or eyelid nodules. We report a rare case of a live, motile worm causing

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Vitreo-Retinal Services, Aravind Eye Hospital and Post Graduate Institute of Ophthalmology, Madurai, Tamil Nadu, India

**Correspondence to:** Dr. Piyush Kohli, Vitreo-Retinal Services, Aravind Eye Hospital and Post Graduate Institute of Ophthalmology, Madurai - 625 020, Tamil Nadu, India. E-mail: [kohli119@gmail.com](mailto:kohli119@gmail.com)

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floaters. The worm was isolated from the vitreous cavity and revealed to be *Dirofilaria repens*. Correct recognition of the worm is necessary as human dirofilariasis does not present as microfilaremia and does not require systemic therapy; in contrast to other causes of ocular filariasis, which require systemic therapy. As ophthalmologist may be the first physician to encounter such patients, a high index of suspicion is required for timely and adequate management.

**Key words:** Digitally assisted vitreoretinal surgery, floaters, ocular dirofilariasis, vitreous, zoonosis

The most common cause of floaters is posterior vitreous detachment. However, it may be caused by any opacity in the vitreous cavity. Rarely, worms may reach the vitreous cavity, casting a shadow on the retina.<sup>[1]</sup>

The nematodes infesting humans include *Brugia malayi*, *Wuchereria bancrofti*, *Loa loa*, *Onchocerca volvulus*, and *Dirofilaria* species.<sup>[2]</sup> Ocular filariasis, most commonly, presents as subconjunctival or eyelid nodules.<sup>[2]</sup> We report a rare case of

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live motile worm causing floaters, which was later removed from the vitreous cavity.

## Case Report

A 53-year-old male from Kerala, India presented to our tertiary eye care hospital in South India with complaints of sudden onset of floaters in his left eye for the last 5 days. His systemic history was unremarkable. Best-corrected visual acuity in both eyes was 20/20. Ocular adnexal examination was bilaterally normal. His both pupils were round and normal reacting with no relative afferent pupillary defect. Anterior-segment examination in both the eyes was unremarkable. Intraocular pressures in both eyes were within normal limit. While right eye posterior-segment examination was normal; left eye showed a whitish-colored, coiled, slender, motile worm located in the posterior vitreous. There were no associated vitritis, retinal, or choroidal lesions.

He had a pet cat at his home. His systemic examination was normal. There were no subcutaneous nodules. Complete blood count, erythrocyte sedimentation rate, peripheral blood smear, stool, and urine examinations were normal. Neither was eosinophilia present nor could any parasite be identified from the peripheral blood samples. Clinical and various imaging modalities did not reveal evidence of parasitic involvement of any other organ.

A 23-gauge pars plana vitrectomy with digitally assisted vitreoretinal surgery system (NGENUITY® 3D Visualization System, Alcon Fort Worth, Texas, USA) was performed the next day. The worm showed wriggling movements inside the vitreous cavity, especially when the light pipe was taken near it [Fig. 1 and Video 1]. After performing a careful vitrectomy around the worm, it was extracted via the sclerostomy site and transferred to a 2 mL saline filled syringe while it was still alive. The peripheral retina was examined carefully and the live worm was sent to the parasitology department for further evaluation. The worm continued its wriggling movements even under the microscope on the wet mount preparation. The worm was found to be approximately 6 cm in length and 1 mm in width. However, it accidentally broke during the manipulations



**Figure 1:** The coiled worm seen during vitrectomy using digitally assisted vitreoretinal surgery (DAVS) system

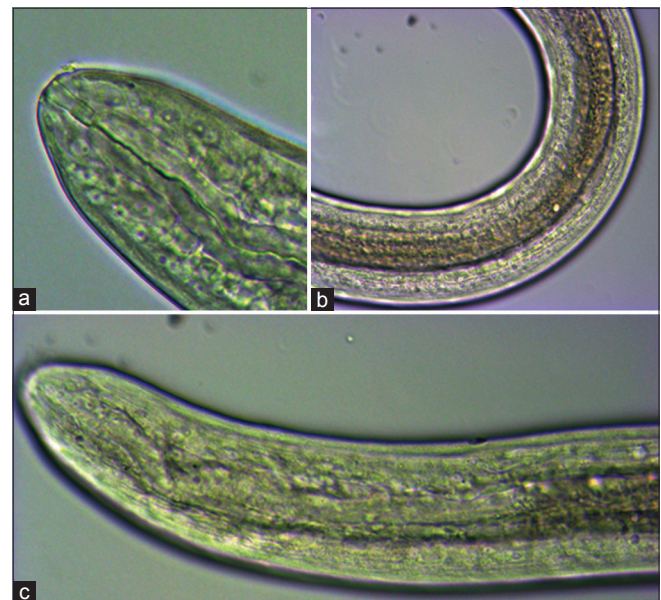
in the laboratory. Microscopic examination showed that it had a blunt rounded head with a small mouth [Fig. 2a]; a thick laminated cuticle, longitudinal cuticular ridges, transverse cross-striations, and a thick muscular layer under the cuticle throughout its length [Fig. 2b]; and a tapering tail [Fig. 2c]. Based on the macroscopic and microscopic features, the worm was identified to be *Dirofilaria repens*.

He was not given any systemic antiparasitic medications. Postoperatively, his complaint of floaters resolved. He maintained his vision of 20/20 in both eyes and there was no recurrence of the worm till 3 months of follow-up.

## Discussion

Filariasis is an arthropod-transmitted parasitic infestation caused by several species of nematodes, which commonly affect the lymphatic and dermal systems. Rarely, they breach the blood-retinal barrier.<sup>[2]</sup>

After a thorough search on Pubmed, we found only five reports where the dirofilaria worm was extracted live from the vitreous cavity.<sup>[1,3-6]</sup> Posterior segment inflammation in the form of multifocal choroiditis and inflammatory mass over optic disc due to worm in anterior chamber has also been reported.<sup>[7,8]</sup> We hereby report the first case of intravitreal *D. repens* from the Indian subcontinent. Although ocular dirofilariasis has been reported previously from India, most of these cases had subconjunctival manifestation.<sup>[9]</sup> Majority of patients with human dirofilariasis have been reported from South India, especially the state of Kerala. This may be attributed to the high prevalence of microfilaremic dogs as well as the warm and humid climate of the state, which allows long mosquito breeding season. Studies have found that around 7 to 24 percent of the



**Figure 2:** Photomicrography of *Dirofilaria repens* (40x) (a) blunt anterior end with a small mouth (white arrow), (b) body showing thick cuticle (white arrow), longitudinal ridges with transverse striations and thick muscular layer under cuticle (red arrow), and (c) tapering caudal end

domestic dogs of Kerala have dirofilariasis infection. It is estimated that the prevalence in stray dogs would be even higher.<sup>[10]</sup>

Human dirofilariasis is a zoonotic disease most commonly caused by *D. repens* and *Dirofilaria immitis*. The primary hosts and natural reservoirs are dogs, foxes, cats, and rarely raccoons. It is transmitted to humans by mosquitoes (intermediate hosts) of genera *Anopheles*, *Culex*, and *Aedes*. Humans are accidental dead-end hosts as the worms fail to reach maturity. Most common manifestations in humans are subcutaneous nodules and lung parenchyma disease.<sup>[2]</sup> Treatment of choice is immediate surgical removal of the live worm from the vitreous cavity as it is capable of migrating to other parts of the eye. In case it migrates, it not only becomes difficult to locate the worm but it can also cause severe intraocular reactions. As seen during in the surgical video, the worm is very light-sensitive and keeps writhing whenever an attempt is made to take the light probe near it. Hence, care has to be taken to prevent its accidental aspiration into the vitreous cutter during these movements.<sup>[6]</sup> It is necessary to remove the worm intact because of two reasons. Firstly, dead worm can cause reaction in the eye leading to endophthalmitis due to the bacterial endosymbionts present in nematodes.<sup>[1]</sup> Secondly, it is important to correctly identify the worm. While other causes of ocular filariasis require systemic therapy, human dirofilariasis does not present as microfilariaemia and does not require systemic therapy.<sup>[2]</sup>

The manipulations during surgery and in the laboratory may alter the morphological characteristics of the worm, making it difficult to identify the species of the worm.<sup>[6,10]</sup> In such situations, polymerase chain reaction can help clinch the diagnosis accurately.<sup>[2]</sup> Identification of the parasites can also be closely correlated with its geographic distribution and the area where the infection was acquired.<sup>[10]</sup>

As ophthalmologist may be the first physician to encounter such patients, a high index of suspicion should be maintained in case of any patient presenting with floaters and residing or visiting an endemic area. This will ensure timely diagnosis and adequate management for not only ocular but also systemic manifestations of the worm.

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#### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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#### Conflicts of interest

There are no conflicts of interest.

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