



## A Rare Cause of Visual Loss Following Spider Bite

Authors

**Ashok Jha, Alok Sati, Rishi Sharma**

Command Hospital (EC)

Corresponding Author

**Ashok Jha**

Email: [ashokjha1973@rediffmail.com](mailto:ashokjha1973@rediffmail.com), Mobile: 9419231735

### Abstract

A 25 year old male suddenly woke up early in the morning with pain following a spider bite on the left lower eyelid in desert area. Subsequently, he noticed swelling along with a dermonecrotic lesion on the left lower eyelid. His visual acuity was 20/20 in the right eye and absent light perception in the left eye. Relative afferent pupillary defect (RAPD) and retinal edema were present in left eye in addition to extinguished electroretinogram (ERG) and increased P<sub>100</sub> latency on visual evoked potential (VEP). In spite of administering intravenous methyl prednisolone and oral steroid, patient's visual acuity persisted as absent light perception, and on follow up fundus showed optic atrophy and generalized constriction of vessels. Herein, for the first time, to the best of our knowledge, we are reporting a rare ocular manifestation following a spider bite, in form of unilateral neuroretinal involvement leading to complete loss of vision.

### Introduction

Thar desert, in contrast to the general belief, exhibits a spectacular faunal diversity. Ghosh *et al* <sup>[1]</sup> reported the existence of about 2043 species, ranging from protozoa to mammalia. Of these, 1035 species under phylum arthropoda form a significant group and mainly comprises of spiders, scorpions, crabs, millipedes, centipedes and insects. <sup>[2]</sup> Bites from spiders in desert area is quite common, however, MEDLINE search reveals scarce literature related to their bites on eyelids. Herein, based on epidemiological features, history, symptoms and signs, we report a rare isolated ocular manifestation following a spider bite in the Thar Desert. To the best of our knowledge, no such ocular presentation has ever been described in literature.

### Case Report

A twenty five years old male, while sleeping in a tent in Great Indian desert during scheduled professional duty, suddenly woke up early in the morning due to severe pain in left lower eyelid. The individual saw a spider scuttling away across the floor of the tent, however, he could not grab or kill it. He was immediately rushed to the primary care centre where he was administered first aid in form of cleaning of the wound, tetanus prophylaxis and topical and systemic antibiotics. Within an hour of the bite, he developed swelling of both lower and upper eyelids along with marked diminution of vision in the left eye. He was then airlifted to a tertiary care centre.

At the tertiary care centre, the individual was alert and oriented and was not showing any sign of

systemic envenomation. His vital parameters were within normal limits. Systemic examination revealed no abnormalities. On ocular examination, the visual acuity was 20/20 in the right eye and absent light perception in the left eye. Examination of the right eye was within normal limits. Left eye showed a marked swelling in both the upper and lower eyelids. The lower eyelid showed an elongated necrotic hemorrhagic lesion of about 10x5mm. (Figure 1) Extraocular movements were restricted. Severe chemosis was present. Cornea was clear with a quiet anterior chamber. A grade 4+ RAPD was present. Fundus examination showed retinal edema around the fovea giving an impression of a cherry red spot. (Figure 2) Intraocular pressure as recorded by applanation tonometer was 14 mmHg in both eyes.

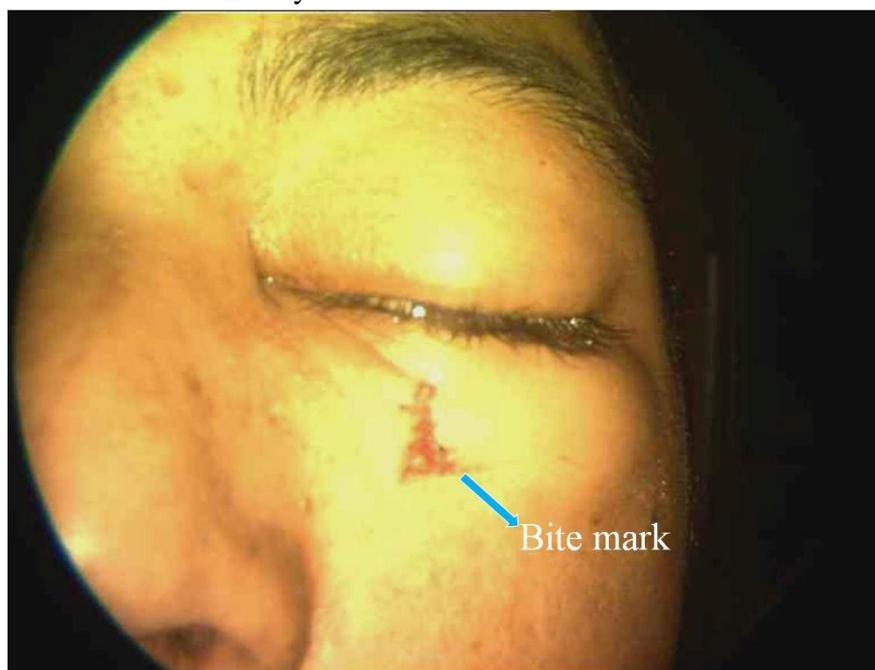
At this stage, fundus fluorescein angiography (FFA) was normal, suggesting normal flow in the chorio retinal vasculature. Electroretinogram (ERG) was extinguished and Visual Evoked Potential (VEP) showed increased P<sub>100</sub> latency. Both ERG and VEP parameters were suggestive of neuroretinal involvement. Complete blood count, urinalysis, coagulation profile, liver and renal function tests, was within normal limits. The

normal profile of these tests proved absent systemic envenomation.

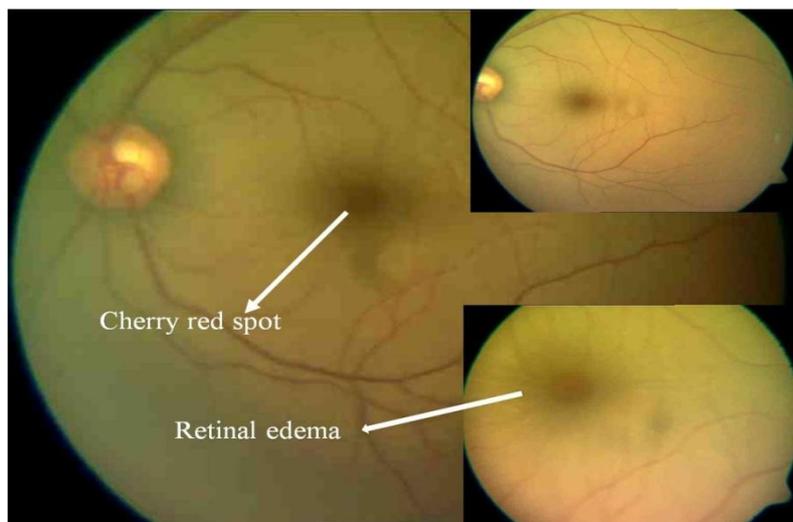
At the tertiary care centre, patient was administered intravenous methyl prednisolone 250 mg four times a day followed by tapering dosage of oral prednisolone. He was also administered systemic (Tablet Ampicloxacin 500mg four times a day for seven days) and topical (eyedrop moxifloxacin 0.5% six times per day) antibiotics along with an ocular lubricant.

In spite of the above treatment, the patient did not regain useful vision and the visual acuity persisted as absent light perception in the left eye. This highlights the importance of an early administration of steroid at a primary level in order to save vision. At the last follow up i.e. at two months following the spider bite, the lid swelling had subsided and the dermonecrotic lesion had scarred. Optic atrophy had developed with generalized constriction of retinal vessels in the left eye. (Figure 3) FFA of the left eye showed reduced perfusion in retinal vasculature along with background mottled appearance suggestive of generalised retinal pigment epithelial atrophy. (Figure 4) The ERG was extinguished and the VEP showed enhanced P<sub>100</sub> latency in the left eye, findings in the right eye being normal.

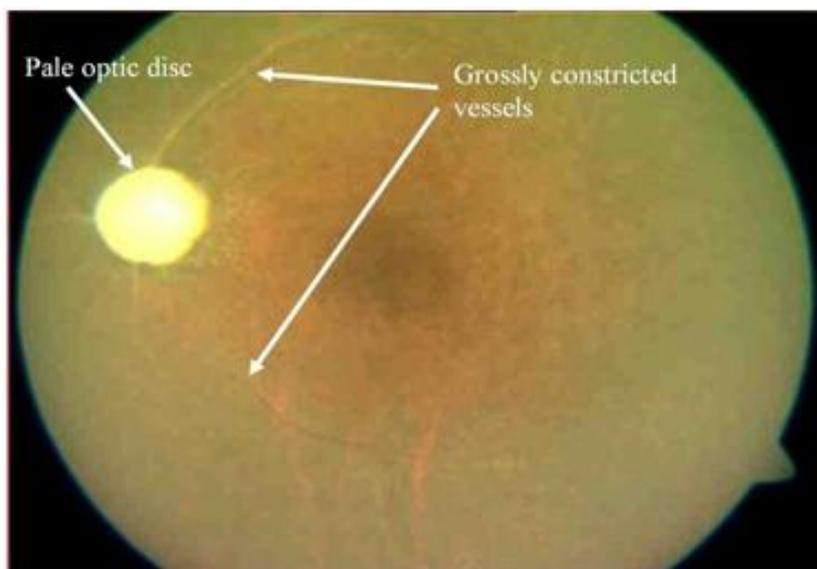
**Figure 1:** A spider bite mark at the lower eyelid



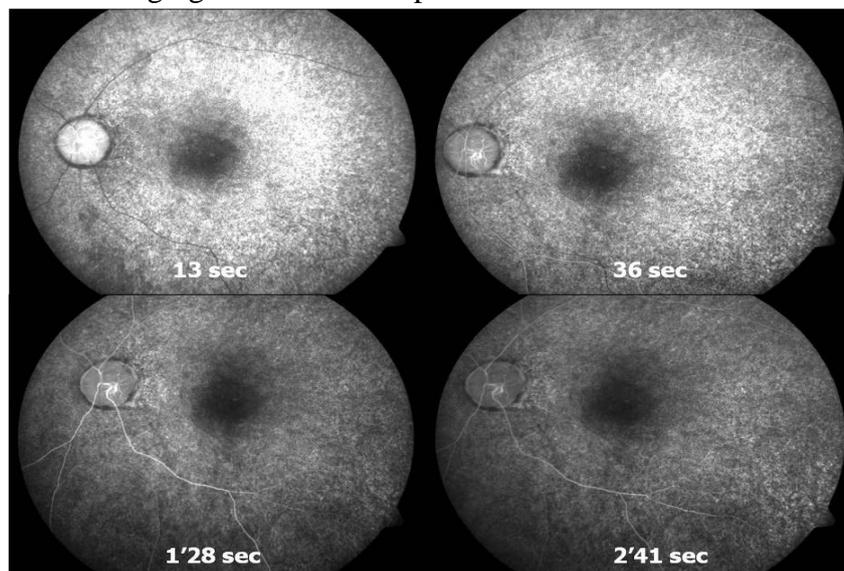
**Figure 2:** Fundus examination shows retinal involvement in form of retinal edema



**Figure 3:** Fundus on follow- up



**Figure 4:** Fundus fluorescein angiogram on follow-up



## Discussion

The Thar desert hosts 28 species of spiders including the newly identified species such as *Lycosa madani*, *Uroctea indica*, *Drassodes parvidens*, *Zelotes desioi* and *Drassodes luridus*.<sup>[3]</sup> Spider bites are common in the desert, however, only a few of them are of medical importance leading to either localized or systemic envenomation.<sup>[5]</sup>

Spider bites, though common on extremities;<sup>[3]</sup> are rarely seen on eyelids.<sup>[6,7,9]</sup> Localised envenomation has varied manifestations on eyelids. Taskesin *et al*<sup>[9]</sup> reported severe edema on eyelids and periorbital region with necrotic hemorrhagic lesion. The lesion healed with scarring and led to corneal irritation. Bilgili *et al*<sup>[7]</sup> reported necrotic serohemorrhagic plaque on the right upper eyelid. However, this lesion healed without scarring. Jarvis *et al*<sup>[6]</sup> gave photographic description of the natural course of the lesion following a spider bite. According to them, initially, periorbital edema develops along with chemosis and raised intraocular pressure, followed by development of classic red, white, and blue sign by fourth day, necrotic lesion by day nine, eschar by day thirty and scarring at sixth month with absence of significant ectropion. Similar to the above mentioned reports, our case too developed periorbital edema and dermonecrotic lesion on the eyelid. However, unlike our report, none of these cases developed significant ocular sequelae like optic atrophy and gross constriction of retinal vessels.

The above mentioned pathophysiologic features result from the cytotoxic effect of spider venom. Rekow *et al*<sup>[9]</sup> had attributed these cytotoxic effects secondary to various enzymes including sphingomyelinase D2. Patel *et al*<sup>[10]</sup> proposed a sequence of events that led to formation of the dermal lesion. According to them, the venom led to formation of cytokines causing activation of neutrophils. Neutrophils on degranulation cause tissue destruction. We believe a similar mechanism was responsible for the sequelae in our case. The venom probably diffused across the

orbital tissue from the eyelid and reached the retina through the sclera and caused ganglion cell destruction thereby leading to the development of consecutive optic atrophy and generalized gross constriction of vessels.

In addition to localised envenomation, spider venom may lead to systemic manifestations including fever, chills, rigors, body ache, hemolysis, renal failure, disseminated intravascular coagulation and even death.<sup>[9]</sup> However; none of the above mentioned systemic features were reported in our case.

The diagnosis of spider bite is usually difficult. In the majority of the cases, the relatives or the patient are unable to bring the spider to the medical fraternity. In such a scenario, the diagnosis is solely based on epidemiology, clinical features, and configuration of the skin lesion.<sup>[8]</sup> Such a situation did not arise in our case as the patient gave a firm history of seeing the spider moving across the tent. Moreover, the desert location, the bite at night, symptoms, signs and a typical dermonecrotic lesion further complemented our diagnosis. Literature<sup>[12]</sup> has reported the confirmation of the diagnosis by venom analysis using enzyme linked immunosorbent assay (ELISA). However, due to logistic constraints, we did not subject our patient to ELISA for confirmation of the diagnosis.

Various treatment options have been described including ice compress, local wound care, tetanus prophylaxis, systemic antibiotic, analgesic, antihistaminic, dapsone, systemic steroid and hyperbaric oxygen.<sup>[5,7,8]</sup> We subjected our patient to some of the above options including tetanus prophylaxis, systemic antibiotic and systemic steroid in form of intravenous methylprednisolone followed by tapering dosage of oral steroid. However, inspite of our best efforts, the patient lost vision due to consecutive optic atrophy. This could perhaps be attributed to rapid diffusion of the venom across the orbital tissue and sclera in addition to slightly delayed administration (three hours) of intravenous methylprednisolone following the spider bite. Hence, we feel it is

advisable to administer systemic steroid at the earliest specially at the primary level.

The importance of the current case lies in its unique ocular manifestation. For the first time, we are reporting a unilateral neuroretinal involvement following a spider bite. Moreover, it is the first reported case showing significant ocular sequelae in the form of complete loss of vision secondary to consecutive optic atrophy and generalized constriction of retinal vasculature.

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