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Eye to Eye with Loa Loa: A Rare Subconjunctival Encounter in a Non-Endemic Region

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Abstract: ***We report an unusual case of adult Loa loa infection found in the subconjunctival space of an 80 - year - old female from Navi Mumbai. She complained of foreign body sensation, itching, watering and redness in her left eye, with no history of travel to endemic areas and absence of microfilariae in her blood. Upon slit lamp examination, an indistinct, coiled, motile structure was observed near the lateral canthus, which was surgically removed through a nick in the conjunctiva. Subsequent identification confirmed it as a live female Loa loa. Although Loiasis is endemic to African countries, sporadic cases affecting the Indian population have been reported over a span of 36 years. Among these, five cases have emerged in the last decade, with four of them originating from Maharashtra. Given the recent increase in cases, understanding the evolving epidemiology of the parasite is crucial.***

Keywords: *Loa loa*, Loiasis, Eye worm, Microfilaria, Subconjunctival space

1. Case Report

An 80 - year - old - female from Mumbai presented with complaints of foreign body sensation, redness, and itching in her left eye. Her best - corrected - visual - acuity was 6/9 in both eyes. Upon slit lamp examination, a long, slender and coiled structure exhibiting motility was noted in the bulbar conjunctiva near the lateral canthus. **[Fig.1]**

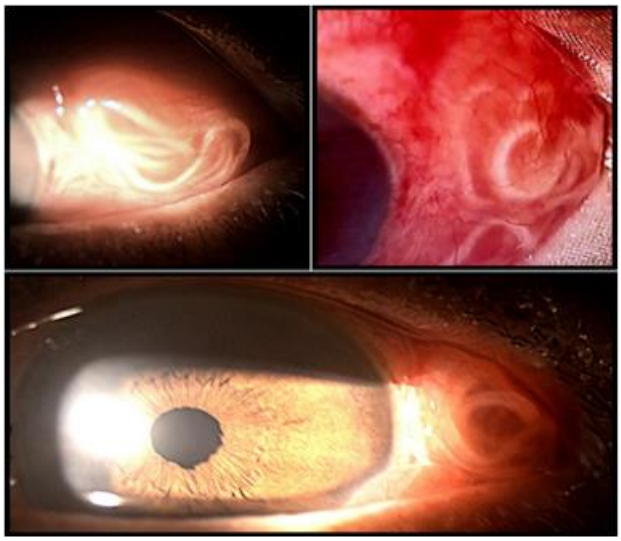

Figure 1: Slit lamp examination

The patient denied any history of travel to endemic areas and followed a non - vegetarian diet. Under topical anaesthesia, a nick was given in the conjunctiva to remove the structure, which unravelled through it. **[Fig.2]**

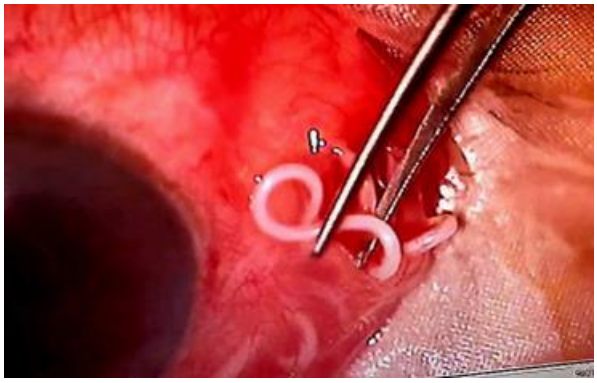

Figure 2: The worm uncoiling itself through the nick

The structure was extracted in - toto using McPherson forceps and sent to microbiology for identification. Naked examination revealed a long, white, living worm measuring 10.5cm in length and 0.5mm in breadth, with straight caudal and tapering cephalic ends. **[Fig.3]**

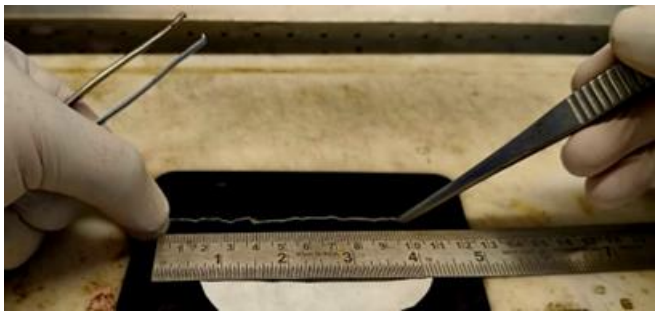

Figure 3: Naked eye examination.

Histopathological examination unvieled a sheathed parasite with coarse nuclei near the tail end, identified as an adult female *Loa loa*. **[Fig.4]**

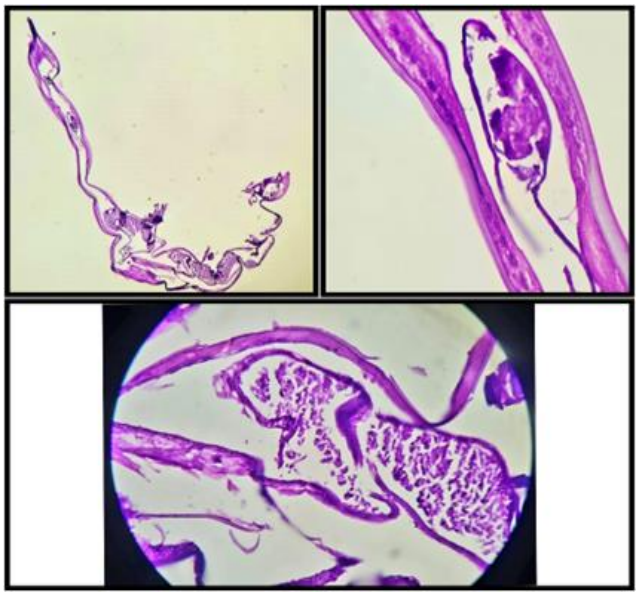

Figure 4: Histopathological examination.

Systemic investigations were unremarkable, and peripheral blood smear did not reveal any microfilariae. The patient was initiated on oral Diethyl - carbamazepine (DEC) 100mg twice daily for 14 days, and further follow - ups were uneventful.

2. Discussion

Loa loa, the African eye worm, is a filarial nematode transmitted by Tabanidae (deer flies) of the genus Chrysops, primarily ***C. silaceus*** and ***C. dimidiata***. When taking a blood meal, deer flies deposit L3 larvae at the bite site, which then penetrate the wound. These larvae undergo two molts to mature into adults in the subcutaneous tissues; occasionally, adult worms migrate to the eye. **[Fig.5]**

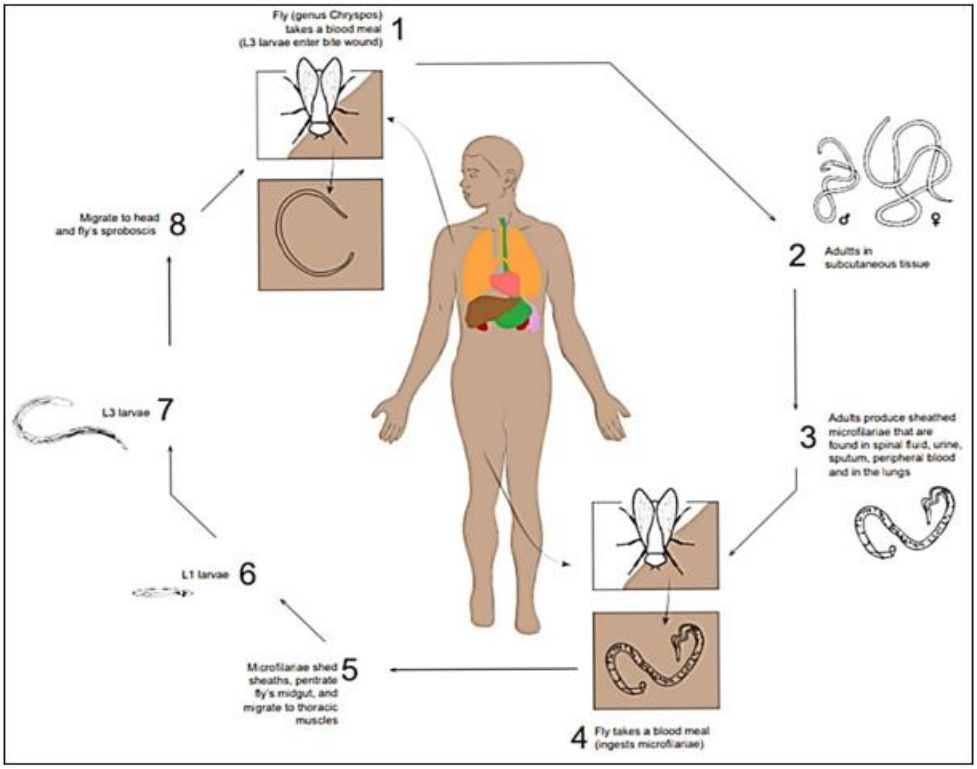

Figure 5: Life cycle of *Loa loa*

Fertilized female worms release microfilariae into the bloodstream, where they circulate during the day, exhibiting diurnal periodicity. This coincides with the peak activity hours of the Chrysops vector, underscoring the significance of timing blood collection for accurate diagnosis. [1]

Endemicity and Epidemiology

Loiasis, a disease endemic to a Sub - Saharan Africa, has plagued indigenous populations since time immemorial. Its stronghold in rural rainforest areas exerts substantial morbidity and excess mortality. Furthermore, repeated forest exposure involving multiple bites from infected flies, coupled with travel to endemic areas, amplifies the risk of infection and disease transmission in non - endemic regions. [2]

To the best of our knowledge, there have been 10 sporadic cases reported in India over a period of 36 years. Among these cases, 5 have been reported in the last decade, with 4 of them originating from Maharashtra. **[Table 1]**

Table 1: Previously reported cases pf *Loa loa* in India [3]

Region	Site of isolation	Year	History of travel to endemic areas
Tirupati, Andhra Pradesh	Subconjunctival space	1988	Nigeria
Kakinada, Andhra Pradesh	Anterior Chamber of the eye	1993	-
Dhule, Maharashtra	Subconjunctival space	2007	None
Mumbai, Maharashta	Left upper eyelid	2011	Israel
Kolkata, West Bengal	Subconjunctival space	2013	None
Kolkata, West Bengal	Vitreous cavity of eye	2016	-
Nagpur, Maharashtra	Anterior Chamber of the eye	2016	None
Talegaon, Maharashtra. [4]	Calabar swelling in the infraorbital area.	2018	None
Bokaro, Jharkhand	Anterior Chamber of the eye	2019	None
Guwahati, Assam	Anterior Chamber of the eye	2021	None

Based on the data provided, it's evident that the majority of patients lacked a history of travel to endemic areas, similar to our case. This highlights the parasite's ability to adapt and thrive in non - endemic regions, reflecting its evolving epidemiological traits. According to the geographical distribution outlined in **Table.1**, a significant number of cases were documented in villages situated in coastal areas characterized by extensive moist, bushy landscapes and cattle rearing. This observation along with possible history of non - vegetarian diet hints at the presence of a potential animal reservoir for the parasite. Nevertheless, there is currently no available literature supporting this hypothesis, indicating a need for further research in this area.

Clinical Presentation and Diagnosis

Loiasis presents with a diverse range of symptoms, spanning from characteristic manifestations like eye worm migration and calabar swelling to more generalized symptoms such as fever, chills, fatigue, and itching. [1] Additionally, it can entail cutaneous and visceral allergic reactions. Furthermore, rare but potentially life - threatening complications such as immune - mediated glomerulonephritis, angioedema, endomyocardial fibrosis due to prolonged eosinophilia, encephalitis may occur. [1] The fertilized female worms release up to 22, 000 microfilariae/day, [5] which accumulate in the pulmonary circulation and subsequently invade the systemic circulation. As a result, they can be detected on peripheral blood smear.

Ophthalmological manifestations include foreign body sensation, itching, and redness, with complications like chronic uveitis, cataract, glaucoma, and corneal edema. [1] However, infections in endemic areas could be asymptomatic.

The diagnosis of *Loa loa* typically involves microscopic examination followed by histopathological examination, revealing a sheathed parasite with coarse nuclei at the caudal end. Blood investigations include complete blood count, erythrocyte sedimentation rate, C - reactive protein, and detection of antibodies against the parasite. Additionally, the presence of microfilariae in peripheral blood smear confirms the diagnosis, but their absence does not negate the infestation. Ultrasound of the calabar swelling may reveal the parasite underneath. **[Fig.6]**

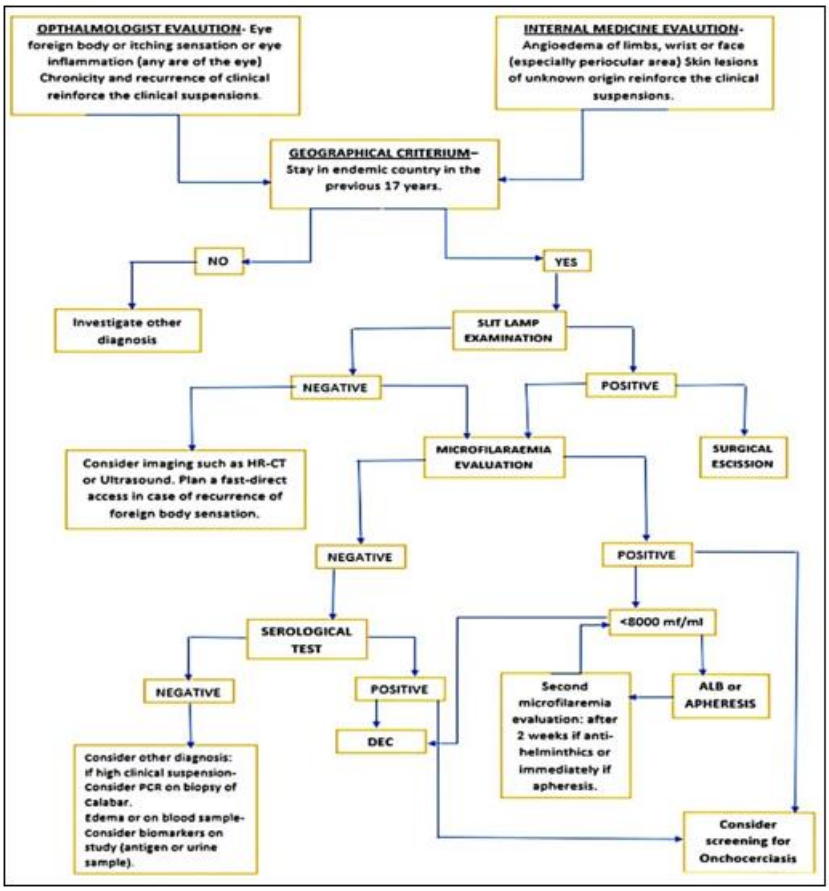

Figure 6: Flowchart for diagnosis and management

Treatment

The treatment of loiasis typically involves collaboration between experts in tropical diseases, ophthalmologists, and parasitologists. Surgical removal of the worm is the primary approach. Centre for Disease Control and Prevention (CDC) recommends oral DEC at 8 - 10mg/kg/day for 21 days—an effective macrofilaricidal and microfilaricidal drug. However, administering DEC to patients with blood microfilaremia levels > 8, 000 microfilariae/mL may risk fatal encephalopathy due to microfilarial lysis - induced inflammatory response, requiring apheresis procedures to decrease circulating microfilaremia. Reducing microfilariae counts to < 8, 000 microfilariae/mL before DEC treatment is recommended, using albendazole or cytapheretic methods. Albendazole, endorsed by the CDC, involves a dosage of 200 mg twice daily for 21 days to reduce Loa loa microfilariemia and prevent DEC's neurological adverse effects. Additionally, albendazole at this dosage may have embryotoxic and macrofilaricidal effects. [1]

3. Conclusion

Based on the data, most patients lacked a history of travel to endemic areas, as seen in our case. This suggests that the parasite can adapt and thrive in non - endemic regions, indicating its evolving epidemiological traits. Many cases were documented in coastal villages with moist, bushy landscapes and cattle rearing, hinting at a potential animal reservoir. The possible link to a non - vegetarian diet also supports this. However, there is no literature currently supporting this hypothesis, highlighting the need for further research.

The emergence of Loa loa in non - endemic regions, including India, necessitates further epidemiological investigation and public health measures. Spreading awareness, strengthening vector - borne disease control programs, and exploring potential animal reservoirs are essential for future research and prevention. A systematic approach is imperative to pinpoint potential hotspots for future investigations.

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