

## BEWARE OF FOREIGN BODY SENSATION” THIS LIVE WORM CAN SWIM THROUGH YOUR EYE! - A CASE SERIES ON INCREASING PREVALANCE OF OCULAR DIROFILARIASIS IN TROPICAL INDIA: A DISEASE OF TRAVEL TO FOREIGN LANDS

Sruthi S Guptha<sup>1\*</sup>, Ranjakumar TC, Lalith Sundaram\*, Rahana M Ashraf\*, Syed Adil\*, Mohammad Hisham\*,

<sup>1\*</sup> Resident, Department of Ophthalmology, Kannur medical college, Kerala, INDIA, email: srutz27@gmail.com

\* Department of Ophthalmology, Kannur medical college, Kerala, INDIA

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**ABSTRACT:** - The purpose is to report a case series of increasing prevalence of ocular Dirofilaria in tropical areas of South India and the importance of the disease with travel to tropical areas. Human Dirofilaria, caused by *Dirofilaria repens*, have been reported to occur widely throughout Asia, Europe, and Africa. The *Dirofilaria* are natural parasites of mammals and are transmitted to man by zoonophilic mosquitoes. It is emphasized that both clinicians and microbiologists should have an increased awareness of this entity and include dirofilaria in the differential diagnosis of patients presenting with subcutaneous nodules. Excision of the lesion is both diagnostic and therapeutic.

**KEYWORDS:** – *Dirofilaria*, Ocular Dirofilaria, *D.Repens*, *D.Tenius*

### INTRODUCTION:

Dirofilaria is a parasitic infection transmitted in humans by *Culex* and *Aedes* mosquito, with Primary host as dogs and cats, Man as dead end. Common ocular infection sites in humans are eyelids, subconjunctival, sub-tenons or intraocular. *D.Tenius* and *D.Repens* mainly involve eye.

### MATERIALS AND METHODS:

Four patients who presented to us who were not improving with topical and oral steroids treated from elsewhere for conjunctivitis. Detailed history was taken for all patients. All were assessed for Visual Acuity with Snellens Chart, Slit lamp evaluation and Fundus evaluation with 90D lens. A snap shot study was done. Slit lamp videos records of the mobile worm and its site were noted after anterior segment evaluation under slit lamp.

Patients were planned for excision of the worm under local anesthesia under operating microscope after routine blood investigations and general examination. Excisional biopsy and histopathological report was studied and reported. In all cases the entire tissue was processed using routine technique and sections were examined using haematoxylin and eosin stain. Consent was taken from all patients. All patients were followed up within a week to confirm resolution of all symptoms and requested to come back to us in case of similar symptoms.

**Case 1:** A 65-year-old female from Kannur district, Kerala, presented with acute onset of pain, redness and swelling in her right eye. It was associated with watering and foreign body sensation in the eye. There was no history of any injury, allergic

manifestations, fever or recent travel. There was no other skin nodule anywhere on the body. Complete blood count and erythrocyte sedimentation rate (ESR) were within normal limits with no evidence of eosinophilia. Peripheral smear was unremarkable. Slit-lamp examination revealed conjunctival chemosis with a coiled live worm in the subconjunctival space at temporal limbus.

**Case 2:** 32 year old male, treated from elsewhere for conjunctivitis presented with similar complaints of foreign body sensation in his left eye. He presented to us on day 4 of his treatment with no improvement.

**Case 3:** 63 year old housewife with foreign body sensation and no other ocular complaints in her right eye since one week.

**Case 4:** 32 year old male, industry worker, presented with sudden onset redness and foreign body sensation in the temporal limbus right eye. Coiled worm was found in on slit lamp examination. Excision with conjunctival peritomy was advised.

## **RESULTS**

Slit-lamp examination revealed conjunctival chemosis with a coiled live worm in the subconjunctival space (case 1, 3 & 4), at the temporal limbus, sub tenons space (case 2)

All patients had their visual acuity. Both eye - Visual Acuity 6/6 and Fundus normal.

Worm was removed under the operating microscope, topical anesthesia (lignocaine) given. Conjunctival peritomy (2mm) was done and whole of live-coiled worm was removed without snapping. It measured between 10-12 cm in length in all cases. Histopathology revealed female *Dirofilaria* species.

Kim U, Gupta M, Vidhya N et al reported different sites of ocular *Dirofilaria* as per following :

Reported ocular sites are anterior chamber , periorbital region , subcutaneous orbital mass, subconjunctival , orbital rim, as lid tumour & eyelids . *Dirofilaria* due to *Dirofilaria repens* is also seen involving buccal mucosa in a patient who presented with a facial swelling in literature (12).

**Microscopy:** Each worm was received intact in 10% formaldehyde. The specimens were 11-12cm in length. It was examined under light microscopy. Histopathological examination was also done. Both the worms were identified as female *D. repens* based on morphology, geographical location from where they were recovered and clinical presentation. Under the microscope, the outer surface of the worm's cuticle shows fine transverse striations and prominent longitudinal ridges. Histopathological examination of transverse section shows the characteristic arrangement of the longitudinal muscles and the multilayered cuticle, which is expanded in the region of the large lateral chords (1).

## **DISCUSSION**

The mature *D. repens* live in the tissues and organs of vertebrates, while their immature stages prefer the blood and lymph vessels. *D. repens* is a subdermal parasite in dogs. Pamplione S, Canestri TG et al mentioned that the parasite, called *D. conjunctivae* and normally found in humans, is a form of *D. repens*. (1,2).

*Dirofilaria* species may be divided into two groups:

- a) Subgenus *Dirofilaria* represented by *Dirofilaria immitis*, which is characterized by a relatively smooth cuticle and normally found in the right heart and pulmonary vessels of dogs, the natural hosts. Pulmonary lesions are the most common findings in humans infected with *D. immitis* (1,2).

b) Subgenus *Nochtiella*, which parasitize the subcutaneous tissue. Species of this group have longitudinal ridges on the cuticle. Representative species are *Dirofilaria (Nochtiella) repens* found in dogs and cats, and *Dirofilaria (Nochtiella) tenuis* found in raccoons (1,2)

Human *Dirofilaria* infection is a rare helminthic infection. This may be due to the fact that the diagnosis of *Dirofilaria* infection in human beings remains difficult, as symptoms exhibited by the patient are diverse. Symptoms vary in severity.

In most cases the infections are asymptomatic or mild and uncomplicated, especially until the worm dies. Only after their death in situ painful inflammatory reactions occur around the worms causing subcutaneous nodular lesions, necessitating excision. During the migration of the worm through subcutaneous tissue, inflammatory reactions may develop like mild fugitive swelling or subcutaneous nodule which can be painful and tender. (3).

Orihel TC, Eberhard MC et al said the most common symptoms in ocular *dirofilariasis* are localized pruritus, pain, swelling, oedema, hyperemia of the conjunctiva, sensation of movement under the skin of the conjunctiva. (4).

Pamplione S, Canestri TG et al found allergic reaction with fever, urticaria and facial oedema may occur (2). In majority of instances, parasites are found in excised nodule and tissue biopsy specimens. Less frequently they are removed from the tissues intact. Bruijing et al also mentions about the predominance of female worms are found more frequently than male. (3,4).

Simon F, Morchon R et al studied the most important risk factors regarding human infections are mosquito density, warm climate with extended mosquito breeding season, outdoors human activities and the abundance of microfilaraemic dogs (5).

Diagnosis is usually established with the surgical removal of the adult worm (4,13). Ruiz–Moreno JM, Bornay–Lineros FJ et al studied the serological tests for management of this condition. *Microfilaria* have never been reported in humans (6). Eosinophilia occurs in less than 15 % cases with *D. immitis* and rarely with *D. repens* (6). In this case also, blood smears were negative for microfilaria and there was no eosinophilia. All *dirofilaria* have fine transverse striations on the cuticle and abundant somatic musculature. *D. repens* is a nematode with a long thin filiform appearance All except *D. immitis* and few others have prominent external longitudinal ridges. Longitudinal ridges of *D. repens* are broader and less distinct.

The number of reproductive tubes and their contents (eggs, microfilariae or sperm) help to determine the sex of the parasite and the reproductive state of female worm. They have rounded anterior end with buccal cavity. In contrast to the rounded short tail of female worm the male worms have a coiled tail.

Surgical removal of the worm not only establishes the diagnosis in most cases but also presents a definitive cure. Simple extraction of the worm or complete surgical excision of the *Dirofilaria* lesion is the treatment of choice for human *Dirofilaria*. (4,5,7,12).

Gendelman et al described use of a cryoprobe can be used for immobilizing the worm in case of excessive motility (7). There is no need for chemotherapy as microfilaraemia is extremely rare (8). In a small number of cases, Ivermectin and/or Diethylcarbamazine has been tried with good results (9).

The symbiosis of filarial nematodes and intracellular *Wolbachia* bacteria has recently been exploited as a target for antibiotic therapy of

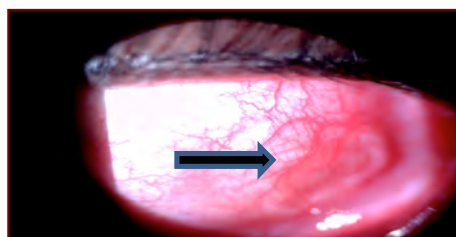
filariasis. Antibiotic treatment of filarial nematodes results in sterility and inhibits larval development and adult worm viability. In the first trial on human onchocerciasis, depletion of bacteria following treatment with Doxycycline resulted in a complete and long-term block of embryogenesis (10). Precise identification of *Dirofilaria* species may be achieved with DNA analysis, based on polymerase chain reaction but the large number of specific probes required limits, the usefulness of this method (11).

Increasing prevalence of this infection is seen more in tropical parts of India especially South India. The first two cases of human ocular dirofilariasis in India were reported by Joseph et al & George and Kurian in same part of India (Kerala) in 1976 and 1978 respectively (13,14). In 1989, Badhe and Sane reported the first case of subcutaneous infection with *Dirofilaria* showed a child manifesting portal cavernoma with pulmonary dirofilariasis from India (15). Nadgiret al in 2001 and Gautam et al in 2002 reported subconjunctival dirofilariasis due to *Dirofilaria repens* in several reports from various parts of India (16). Sekhar et al reported several other incidences of ocular dirofilariasis from India in 2000 and similar report by Ittyerah in 2003 mentioned about *Dirofilaria repens* and *Dirofilaria tenuis* cause subconjunctival dirofilariasis (17).

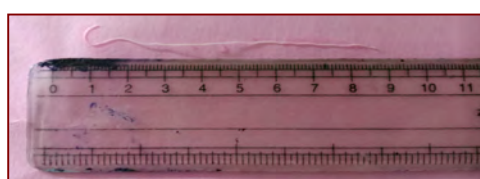
In 2005, Padmaja et al reported subcutaneous dirofilariasis due to *D repens* in a 35-year-old male (18).

Sabu et al identified twelve worms from different human patients as *Dirofilaria repens* based on morphology from southern part of India (19). In order to predict the natural history of dirofilariasis infection in this region, 160 blood smears of dogs. In 2013, Kim et al reported three cases of ocular dirofilariasis, sites being preseptal and orbital

region. Patients were treated with parenteral and oral steroids and not improving. Excisional biopsy



**Figure Legend 1:** Case 2: Subconjunctival *Dirofilaria* at temporal limbus (B) - live motile worm was noticed at the temporal limbus under slit lamp



**Figure Legend 2:** Case 1: 10 cm long worm



**Figure Legend 3:** Transverse section through a mature female *Dirofilaria repens* removed from the temporal limbus of a 65-year-old female (Case1). Characteristic features are the arrangement of the longitudinal muscles and the multilayered cuticle, which is expanded in the region of the large lateral chords.

and subsequent removal of the worm resolved the symptoms (12).

In 2014, Gupta V et al reported bilateral intraocular dirofilariasis in Delhi, North India (21). Because of the variety of locations of the worm and the symptoms produced, cases of dirofilariasis in humans and animals may attract the attention of veterinarians, ophthalmologists, dermatologists, radiologists and general practitioners. Based on the present observations, it may be concluded that dirofilariasis in humans due to *D. repens* infection is a fast emerging zoonosis in India (12,20).

**CONCLUSION:**

Dirofilariasis is associated with travel to 'Foreign' lands. Literature shows predominance in South India especially Kerala, Karnataka, Tamil Nadu. Kerala is studded with a network of backwaters serving breeding ground of mosquitoes for transmission. World literature reviews diversity in Italy, Sri Lanka, Russia, Romania and Mediterranean regions. Surgical removal of the worms is the treatment of choice.

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**REFERENCES:**

- Jariya P, Sucharit S. Dirofilaria repens from the eyelid of a woman in Thailand. *Am J Trop Med Hyg* 1983; 32:1456-7.
- Pamplione S, Canestri TG, Rivasi F. Human dirofilariasis due to Dirofilaria (Nochtiella) repens: a review of world literature. *Parasitologia* 1995;37:149-93
- Brujijng CFA. Human dirofilariasis. A report of the first case of ocular dirofilariasis in Netherlands and a review of the literature. *Trop Geogr Med* 1981; 33:295-305.
- Orihel TC, Eberhard MC. Zoonotic filariasis. *Clin Microbiol Rev* 1998; 11:366-81.
- Simon F, Morchon R, Gonzalez-Miguel J, Marcos-Atxutegi C, Siles-Lucas M. What is new about animal and human dirofilariasis? *Trends Parasitol* 2009; 25:404-9.
- Ruiz-Moreno JM, Bornay-Lineros FJ, Maza GP, et al. Subconjunctival infection with D.Repens. Serological confirmation of cure following surgery. *Arch Ophthalmol* 1998; 116 :1370-2.
- Geldelman D, Blumberg R, Sadun A. Ocular Loa Loa with cryoprobe extraction of subconjunctival worm. *Ophthalmology* 1984;91:300-3.
- Sabu L, Devada K, Subramanian H. Dirofilariasis in dogs and humans in Kerala. *Indian J Med Res* 2005; 121:691-3.
- Jelinek T, Schulte-Hillen J, Loscher T. Human dirofilariasis. *Int J Dermatol* 1996; 35:872-5.
- Taylor MJ, Hoerauf A. A new approach to the treatment of filariasis. *Curr Opin Infect Dis* 2001; 14:727-31.
- Favia G, Lanfrancotti A, della Torre A, Cancrini G, Coluzzi M. Advances in the identification of Dirofilaria repens and Dirofilaria immitis by a PCR-based approach. *Parassitologia* 1997; 39:401-2.
- Kim U, Gupta M, Vidhya N, Shani Ocular Dirofilaria repens: not rare. *DJO* 2013;24:34-36
- Joseph A, Thomas PG, Subramanian KS. Conjunctivitis by Dirofilaria conjunctivae. *Indian J Ophthalmol* 1977; 24:20-2.
- George M, Kurian C. Conjunctival abscess due to Dirofilaria conjunctivae. *J Indian Med Assoc* 1978;71:123-4
- Badhe BP, Sane SY. Human pulmonary dirofilariasis in India: A case report. *J Trop Med Hyg* 1989;92:425-6
- Nadgir, S., Tallur, S.S., Mangoli, V., Halesh, L.H. & Krishna, B.V. (2001). Subconjunctival dirofilariasis in India. *Southeast Asian J Trop Med Public Health*. 32(2),244-246
- Sekhar, H.S., Srinivasa, H., Batru, R.R., Mathai, E., Shariff, S. & Macaden, R.S. (2000). Human ocular dirofilariasis in Kerala Southern India. *Indian J Pathol Microbiol*. 43(1),77-79.
- Padmaja P, Kanagalakshmi, Samuel R, Kuruvilla PJ, Mathai E.(2005). Subcutaneous dirofilariasis in southern India: a case report. *Ann Trop Med Parasitol*. 99(4),437-40.
- Sabu, L., Devada, K. & Subramanian, H.(2005).Dirofilariasis in dogs and humans in Kerala. *Indian J Med Res*. 121(5), 691-693
- T Dam, P Das. The Importance Of Dirofilariasis In India. *The Internet Journal of Parasitic Diseases*. 2005 Volume 1 Number 1
- Gupta V, Sankaran P et al Bilateral intraocular dirofilariasis. *Indian J Ophthalmol*. 2014 Mar;62(3):357-8

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