Subcutaneous dirofilariasis caused by *Dirofilaria repens*

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ABSTRACT

Human dirofilariasis caused by *Dirofilaria repens* (*D. repens*) is a common zoonosis in the Mediterranean countries and parts of South Asia. During the last decade, it has been reported from countries previously considered non-endemic. This is likely due to the increased awareness regarding *Dirofilaria* infection. In some such cases however, dirofilariasis correlated with the travel of the patient to the endemic areas. We present the case of a Saudi male who had *D. repens* infection in the subcutaneous tissues of the forearm. The patient had traveled to Iraq, Syria, United Arab Emirates and Kuwait in the last 2 years. However, the known *Dirofilaria* endemic countries were not visited. Any prior occurrence of the human dirofilariasis in the Kingdom of Saudi Arabia is not documented. Lack of epidemiological studies or incidence reports in the Arabian region precludes any factual evaluation of *Dirofilaria* prevalence, which requires increased awareness amongst health workers regarding its potential occurrence in the native population.

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Dirofilariasis is a zoonotic disease sporadically affecting the humans. Subcutaneous nodular disease caused by *Dirofilaria repens* (*D. repens)* is the most frequently reported manifestation of human dirofilariasis compared to the human pulmonary dirofilariasis caused by *Dirofilaria immitis* and subcutaneous nodular disease caused by other *Dirofilaria* species (*D. tenuis and D. ursi*).[1,2] The endemic areas for *D. repens* infection have been identified in South Asia, and in the parts of Eastern and Southern Europe including the Mediterranean regions.[1-3] Infrequently this human infection has been identified outside the endemic regions in the parts of Asia other than its Southern countries, Middle East and Northern Europe. Some of such dirofilariasis cases were found to be autochthonous; and in some, the travel to an endemic area was incriminating.[2,4-8]

As for the Medline search, the occurrence of dirofilariasis has not been reported before in the native human population of the Kingdom of Saudi Arabia (KSA), and the only case of animal dirofilariasis has been reported recently in Western Saudi Arabia.[9] The first documented case of subcutaneous dirofilariasis in the Arabian region was reported from Kuwait, and the present is the second case of its kind in the region.[5]

Case Report. A 60-year-old Saudi male presented at our hospital with a painful forearm swelling of one-month duration. The swelling was slightly tender, firm, nodular and measured 2x2x2cm. Biopsy examination of the nodule showed a subcutaneous chronic abscess containing transverse and longitudinal sections of a dead worm

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associated with abundant inflammatory granulation tissue including dense infiltrate of lymphoid cells and eosinophils (**Figure 1**). Prominent palisading histiocytic reaction along with giant cells and epithelioid granulomas surrounded the worm. The worm measured 350μm in largest diameter and had thick multilayered cuticle with low pointed external longitudinal ridges, which numbered approximately 100 per worm circumference and measured approximately 2-4μm in height (**Figure 2 & 3**). The gap between these external ridges varied slightly in different transverse sections of the worm; however, this distance measured more than the width of the ridges. The cuticle was also characteristic in having prominent lateral internal ridges in some sections. The worm possessed thick somatic musculature, 2 lateral chords, single gut tube and single genital duct. Slight to marked degenerative changes were manifested in the worm's body. Based on the morphological criteria described under the review studies, the worm infection in this case was consistent with subcutaneous dirofilariasis caused by *D. repens*.[1,2] The patient's blood examination showed normal cell counts and was negative for microfilaremia. Patient's history revealed regarding his journey dating 6 months back to Iraq (20 days); and 18 months back to Syria (15 days), Kuwait (one month) and United Arab Emirates (one month). The patient did not travel to any of the known *Dirofilaria* endemic regions. Professionally, the patient had been maintaining a farmhouse in the Al-Hassa region.

Discussion. *Dirofilaria repens* is a natural parasite of dogs and some other carnivorous animals (cats and foxes) in which it causes the subcutaneous nodular disease. Aedes and Culex species of mosquitoes are the chief vectors of dirofilariasis. The humans acquire the infection by mosquito bite containing infective larvae; these larvae fail to reach the maturity in humans, the latter being their unnatural hosts. The incompletely matured worm dies localized in subcutaneous sites, which initiates the typical host immune tissue reaction. The reported time interval between probable acquisition of infection and clinical presentation has been variable ranging from few months to years. In the majority of human dirofilariasis the microfilaremia does not occur and the biopsy examination of symptomatic nodule remains the mainstay of diagnosis.[1,2]

Dirofilaria infection has not been reported in the human population in KSA, and the lone case of such infection in the Arabian region was reported as a likely autochthonous infection in 1994 from Kuwait.[5] Single instance of animal dirofilariasis as dermatitis due to *D. repens* larvae in 3 dogs has been reported from Western Saudi Arabia, the same

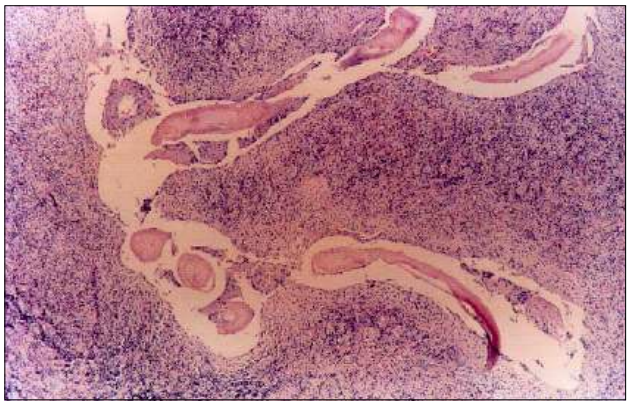

Figure 1 - Microphotograph depicting the worm in the chronic abscess. Hematoxylin & eosin stain x 40.

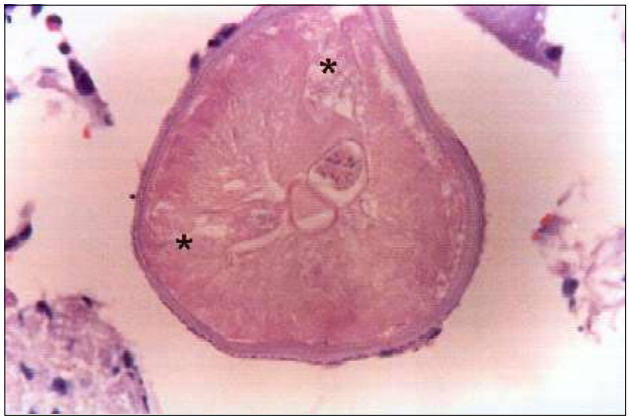

Figure 2 - Microphotograph of the worm's transverse section showing thick cuticle with slightly prominent external longitudinal ridges, thick somatic musculature and 2 vacuolated frothy lateral chords (*). Hematoxylin & eosin stain x 200.

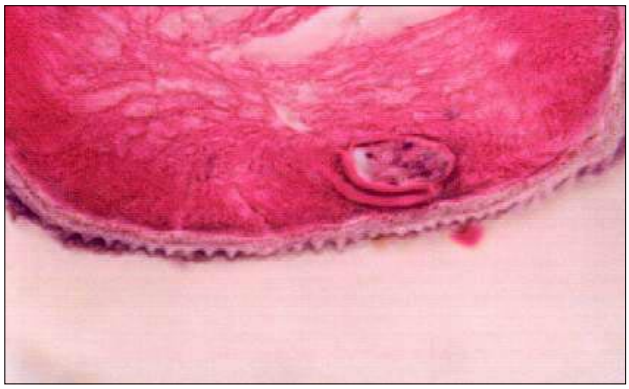

Figure 3 - Microphotograph of the worm wall depicting thick cuticle with external longitudinal ridges. Hematoxylin & eosin stain x 1000 oil immersion.

author has reported the similar condition in a dog from Dubai.[9,10] The rarity of reported human dirofilariasis and only scanty reports of animal dirofilariasis raises questions of its epidemiology and prevalence in KSA and in the whole Arabian region.

In the *Dirofilaria*-endemic areas, it has been observed that the human infection exists in the background of endemic animal (dogs and cats) dirofilariasis accompanied by significant inhabitation by mosquito vectors. The human *D. repens* infection in the non-endemic regions has been reported mainly among the persons who had traveled to the endemic areas.[2,4,6,7] However, in the few cases reported from such regions, the human infection was found to be an autochthonous one; which had then signaled an emergent need for increasing the awareness regarding the possibility of native dirofilariasis existence in such previously non-endemic considered areas.[2,3-5,8] There are plentiful cats but dog population is scarce in the Al-Hassa region, KSA, where the patient lived most of the time. Mosquitoes do not significantly inhabit the urban areas in this region; however, significant numbers do exist in farmhouses and rural areas.

Occasional reports have found the dogs in KSA and Dubai, affected by *D. repens* larvae; however, any report on the existence of such affliction in cats has not been reported.[9,10] It is likely that the cat population being significant may act as the main host in the causation of dirofilariasis in this region. To the best of our knowledge, no case of human and animal dirofilariasis has been reported either from Iraq and Syria. In the only case report concerning human dirofilariasis in Kuwait, the authors had opined that infection to be autochthonous; however, any data concerning human and animal dirofilariasis in the Arabian region is at present very insignificant.[5] Due to the unavailability of any study concerning human and animal dirofilariasis and lack of its incidence reports in the Arabian region, it is not possible to make any rational observation regarding the probable mode of infection in the present case. The patient may have had *Dirofilaria* infection during his travel to the aforementioned countries but, the possibility of this infection being autochthonous in KSA is likely, especially in the light of recently described *D. repens* infection in dogs from Western Saudi Arabia. It is possible that cats may play significant role in the epidemiology of dirofilariasis in this region because of their predominant population; however, such hypothesis needs further supportive evidence of regional animal dirofilariasis and mosquito patterns in order to be credible.

Any evaluation of the true dirofilariasis prevalence in KSA or the Arabian region therefore requires increased awareness and documentation of such infections by health care staff in these regions. The incidence of human dirofilariasis cases may not be rare in the Arabian population as many of the previously thought non-endemic populations. The frequent travel of Arabs to the international destinations, which include the areas reported dirofilariasis-endemic, may also play a role on dirofilariasis epidemiology.

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