

## A Case Report of Human Infection with *Diocotophyma Renale* from Iran

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A 75-year-old man from Kurdistan province, western part of Iran was diagnosed with a mass in the right kidney by ultrasound and computed tomography. In operation, a parasitic helminth, 30 cm long and 1.2 cm in diameter consistent with *D. renale* was found in the right kidney. Microscopic examination revealed that the male *Diocotophyma renale*. Following removal of worm, the symptoms completely resolved within a few hours. Generally, parasitism by *D. renale* in human is a necropsy finding, nevertheless imaging techniques as ultrasound and computed tomography have been proven to be important tool to achieve diagnosis.

### INTRODUCTION

*Diocotophyma renale* (giant kidney worm), parasitic roundworm, has been reported in many mammalian species, including canines, mink, wolves, foxes, jackals, coyotes, skunks, ferrets, weasels, rats, raccoons, wolverines, pumas, cats, seals, pigs, horses and humans, although only rarely.<sup>(1,2,3)</sup> In its evolutionary cycle, the intermediary is an aquatic oligochaete annelid (*Lumbriculus variegatus*) that ingests eggs of the first stage containing larvae of the parasite and the primary host is infected by ingesting the infected annelid or paratenic host, which can be a fish or frog.<sup>(2)</sup> It inhabits temperate regions worldwide, particularly areas with freshwater streams and lakes. In these cases, worms were found in various body parts such as the kidneys, scrotum, breasts, thoracic cavity, peritoneal cavity, bladder, and subcutaneous layer.<sup>(4,5)</sup> Female worms can be over 100 cm long and male worms 35 cm, although their size may vary according to the affected species.<sup>(1)</sup> Male worms have a bell-shaped copulatory bursa that does not present rays and has one spicule, but adult female worm that does not present copulatory bursa.<sup>(1)</sup> Humans can also be definitive accidental hosts, and diocotophymatosis is a zoonotic disease, but in the case of humans, locations outside the kidney are frequent.<sup>(6,7)</sup> Although animal infection with this parasite occurs in Iran, but human infection rarely in this country. Diocotophymatosis has been reported from Iran<sup>(8)</sup> and other parts of the world.<sup>(4,6,7,9,10,11)</sup> In this study, we report a case of human infection with *D. renale* in an old man from the Bijar city of Kurdistan Province, Western part of Iran.



**Figure 1.** Adult male *Diocotophyme renale* (30 cm long) removed from in the right kidney of a 75-year-old man

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**Figure 2.** A bell-shaped copulatory bursa of adult male worm

### CASE REPORT

A 75-year-old man from Bijar city, Kurdistan province, Iran, with hematuria and a specific intermittent pain in the right kidney area that persisted for 10 days, presented to the Imam Hassan hospital, Kurdistan, Iran on May 2015. He had always lived in an urban habitat, and there was suspicion of ingestion of dirty water. Clinical signs suggested nonspecific symptoms including hematuria, nephritis and intermittent pain in the right kidney. The complementary studies, including urine analysis, blood analysis, abdominal X-ray films, and abdominal ultrasonography were carried out. In the urine sample many red blood cells and white blood cells were observed but no eggs were not found in the urinary sediment. The hemogram showed leukocytosis by neutrophilia with left shift toxic granulation neutrophils, lymphopenia, eosinophilia and basophilia. In ultrasound and computed tomography, a mass in the right kidney was demonstrated. In operation, a parasitic helminth, 30 cm long and 1.2 cm in diameter was found in the right kidney. The parasite was placed in a 10% formalin solution. The worm was identified using microscopic examination

as the male *Diectophyma renale* (**Figure 1**). The adult male worm had a bell-shaped copulatory bursa that did not present rays and had one spicule (**Figure 2**).

Following removal of worm, the symptoms completely resolved within a few hours and remained asymptomatic two week later.

### DISCUSSION

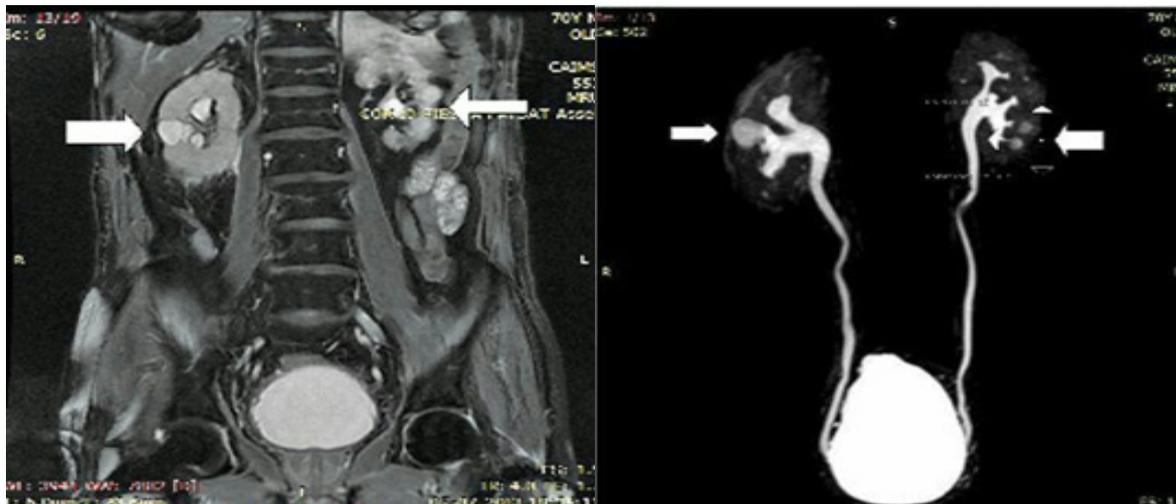
*Diectophyma renale*, the giant kidney worm, is the largest known parasitic nematode.<sup>(12)</sup> In its evolutionary cycle, the intermediary is an aquatic oligochaete annelid (*Lumbriculus variegatus*) that ingests eggs of the first stage containing larvae of the parasite and the primary host is infected by ingesting the infected annelid or paratenic host, which can be a fish or frog.<sup>(13,14)</sup>

Human infections by *D. renale* have been very rare, and seem to have occurred accidentally. No more than 20 confirmed human cases have been reported worldwide, in which worms were found in various body parts, e.g. the kidneys and peritoneal cavity. These include 4 cases of diectophymatid larvae found in the subcutaneous nodules.

In the case reported here, the patient was a 75-year-old man who lived in a small village, near a lake that was used for daily activities, such as bathing, washing clothes, and defecation (both humans and cattle). The etiology of this case was not clear, but it was suspected that he became infected by drinking water. In the context of this zoonosis, several factors in this location pose a risk to the health of the inhabitants: high prevalence of infected canines, high level of surface contamination, and use of the river as a means of transport, recreation and fishing for food (fish, frogs and eels). The continuation of the life cycle of *D. renale* is directly related to water temperature and egg embryonation.<sup>(12)</sup>

Other studies state that this parasitic infection is not very frequent infection in humans, considered to be accidental hosts of the parasite<sup>(4)</sup>. However, according to Le Bailly et al.<sup>(15)</sup>, parasite has been found in archaeological material dating from 3384 to 3370 BC.

Although animal infection with this parasite occurs in Iran, but human infection rarely in this country. Diectophymatosis has been reported from Iran<sup>(8)</sup> and other parts of the world.<sup>(4,6,7,9,10,11)</sup>



**Figure 3.** MR urogram showing worm in right kidney of a 75-year-old man

The latest publication the parasitism of a domestic dog by *D. renale* in Hamedan, Iran reported by Zolhavarieh et al.<sup>(16)</sup>

While the nematode has been mainly reported from temperate regions of other parts of the world, the presence of diocotophymatosis in human Kurdistan province as a cold region is unusual but the parasitism of a domestic dog by *D. renale* is very frequent in Iran and Kurdistan. Therefore high prevalence of infected canines and use of the river as a means of transport are several factors in this location pose a risk to the health of the inhabitants.

### CONCLUSIONS

*D. renale* infestation in canine and other mammals is high prevalence and transmission of the parasite to human is easy, especially urban region, veterinarians and physicians should consider *D. renale* infestation in the differential diagnosis of urological disorders and unknown abdominal cystic masses regardless of ecological condition.

### CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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