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Case report

A puppy with *toxocara canis* in pets shop from Saudi Arabia

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ABSTRACT

Toxocara canis (*T.canis*) is the common roundworm of dogs with particular concern in the human population. It is inhabit fundamentally the small intestine of their mammalian definitive hosts, and causes variable clinic pictures from asymptomatic to have typical digestive clinical symptoms. We present a case of helminthic zoonotic agents in a puppy from Saudi Arabia. This puppy had been healthy with no significant preceding symptoms or past medical history, a round body with spiky cranial and caudal parts, covered by yellow cuticula was seen passed in the vomition. Whoever, stool test revealed this parasite as *Toxocara canis.* Routine treatment of mebendazole® and ivermectin® to limit the spread of this resilient group of parasites was recommended. This case underlines that *Toxocara canis* should also be considered in pet's shops as a possible source of human infection particularly for pet ownerships and/or public in Saudi Arabia.

1. Introduction

Toxocara spp. is one of the most prevalent intestinal round-worm of pet dogs and cats, with zoonotic potential for human beings. It has extraordinary abilities to survive for many years in the tissues of diverse vertebrate species and the clinical term used to describe human infection with either the dog ascarid Toxocara

canis (*T.canis*), or the feline ascarid *T. cati* is toxocariasis (Maizels, 2013). Toxocariasis is the most common helminthes infection in many temperate countries; the disease has a global distribution occurring in areas wherever dogs coexist with humans. It is predominantly caused by migration of the roundworm *T. canis* larvae to organs and tissues (Mirzaei and Fooladi, 2012). *T. canis* in the canine host represents an important epidemiological reservoir and humans act as an accidental host in whom Toxocara larvae will not develop but migrate and survive for a long time. Humans are infected by oral ingestion of infective embryonated Toxocara eggs from contaminated soil, unwashed hands or raw vegetables and under-cooked organs (Wolfe and Wright, 2003). Chronic skin infections in adults and children have also been found associated with toxocarosis (Gavignet et al., 2008). In addition to that, infection with *T. canis* might pre-dispose human beings towards development of asthma (Cooper, 2008). Whoever, the propensity to invade the eye and the brain has given rise to particular concern in the human population, with ocular toxocariasis (OT), ocular toxocariasis with consequent visual impairment remains the most devastating sequel of human infection (Good ,2004), and neurological toxocariasis (NT) Toxocara larvae in brains, with higher prevalence among epilepsy cases (Quattrocchi et al., 2012). Fortunately, treatment of *T. canis* is usually accomplished by using a multidose schedule of anthelminthics drugs for dogs. Whoever, young puppies should be treated with appropriate antiworms at the age of 2 weeks and repeated treatments are necessary because milk transmission occurs continuously for at least 5 weeks post partum (Deplazes et al., 2011). Despite the importance of *T. canis* in both veterinary and zoonotic contexts, there is relatively little information available at the pets shop levels from Saudi Arabia. Although, the involvement of pet shops in scattering of this parasite to public has yet to be directly demonstrated, this case strongly suggests that this is the case. Whoever, this is the first report on *T. canis* infection in a puppy obtained for sale to public in pet shop in Riyadh, Saudi Arabia.

2. Materials and methods

2.1. Public health concern

Almost all pets' shops are ideally situated in Riyadh city for public; neither care of deworming is not of great importance issue. This parasite uses the bodies of pets to lay its eggs, which are then passed through the dog's feces to cause toxocariosis to humans. Toy puppy behaviors often encourage clients to attend kids to pets' shops, and make dogs one of the best gifts for the families, whoever, even small breeds such as this puppy are produce about 100g of feces per day; compared to all dogs which could be available under one roof and/or to big breeds, which can produce as much as 1kg of feces per day. Furthermore, another real story of risk shows while children playing with dogs that have licked fur contaminated with *T.canis* eggs stuck to it, then kissing, or being licked by dogs (Fig 1). In Saudi Arabia, public may avoid dogs for religious reasons, but in pets shops they often play with them particularly children; even though, if they prefer cats more than dogs, they must bear in their mind the fact that both can transfer the same round worm and may causes human toxocariasis. Thus, most importantly, the use of antihelmentics for pets' animals including cats and dogs should not be underestimated whatever the circumstances, to minimize, if not altogether eradicate, this important infection. Hence widespread toxocariasis remains of great public health concern in most parts of the world. This case should spotlight the highly focused the state of a helminthes zoonoses in pet shops, and the importance of education that fosters responsible pet-ownership is a high priority and awareness of the health risks associated with domestic pets in Saudi Arabia. In this way, future work could pave the way for other zoonotic helminthes of pet dogs, or rational preventive and diagnostic tools for such transmitted diseases.

2.2. Case report

A German Spitz puppy (3months-old), had been vaccinated the first and the booster shots against viral diseases, using modified live virus vaccine "Duramune® Max 5 for Dodge, Iowa, USA". A recommended vaccination schedule for puppies start at 6 weeks of age, then revaccinated after 4 weeks at 10 weeks of age. This young puppy had been presented for sale with full vaccination as guarantee of health. This puppy had severe gastroenteritis symptoms that had developed during the previous three days. The veterinary doctor had successively diet changed (adding plain boiled white rice to food) and prescribed symptomatic and antibiotic treatments (Betamox®, Loperamide®) but without any improvement. On admission to the Emergency Unit, abdominal pains, loss of appetite, mild intermittent vomiting and more than five liquid greenish stools per day were still present. During routinely monitor of vital signs including body temperature, pulse rate and respiratory rate were all within normal

limits except for a mild abdominal tenderness and increased sounds of intestine. Whoever, a round body with spiky cranial and caudal parts, covered by yellow cuticula was seen passed in the vomit of this puppy, which was approximately 15 cm long. We did not obtain any abnormalities in abdominal X-ray. Fecal sample was obtained from the puppy for laboratory test. The stool samples were examined and this organism was diagnosed as a female round worm *Toxocara canis* (Fig 2).

2.3. Management

Consequently, we diagnosed this organism as *T. canis.* The dog was kept in individual cage, and the treatment recommendations commonly involve using a multidose schedule of appropriate anthelminthics drugs including injection of Ivermectin® subcutaneously (SC). In addition to that, mebendazole® tablet was administered orally to relieve more chronic symptoms of nausea, vomiting and to limit the spread of this resilient group of parasites to the other pets around. Injecting Ivermectin and mebendazole tablet had been repeated after 2 weeks. Following the treatment, the symptoms rapidly and completely resolved. Re-examination of a stool sample from this puppy before soled, however, did not reveal the presence of any organism. Whoever, more aggressive treatments including de-worming programmes for all other dogs in the pets shop were recommended and repeated after 2 weeks.

3. Discussion

Privately owned pets can play an important role in the transmission of pet's parasites and helminthic zoonoses such as toxocarosis worldwide. However, the close relationship of people to their companion animals, recognized as a fruitful relation known as the human–animal bond, provides benefits with regard to socialization, mental health and even physical wellbeing (Paul et al., 2010). Although, pet owners who obtain pets from pet shops usually are an important risk factor for human toxocariosis. Whoever, the early shedding of this parasitic infection by puppies refers to the fact that puppies can get the infection from the mother before birth or from her milk, and T.canis egg shedding into the environment by infected puppies begins a few weeks after birth (Despommier, 2003). New puppies generally excrete large numbers of T. canis eggs and appear to be the greatest hazard to humans. Accordingly, pet feces should be picked up and disposed of or buried, because transmission of this parasite to humans is usually through ingestion of infective eggs which passed in the feces of a host, and *T. canis* can lay around 200,000 eggs per day (Cheprasov, 2012). Furthermore, the infectious stage of this parasite can survive for at least one year under optimal circumstances depending on soil type and environmental conditions such as temperature and humidity (Deplazes et al., 2011). On the other hand, adult dogs also had been involved in the transmission of infection; however they are frequently shed eggs (Fahrion et al., 2011).

Children are more frequently infected by human toxocariasis than adults. Whoever, one of the very important risk factors and the most commonly routes of infection by this disease in human occur in children due to their behavior, as young children play more often and thus have closer contact with potentially contaminated soil in yards and sand-pits, In addition, children may often put contaminated objects and their fingers into their mouth and in some cases such as geophagia when children eating dirt or soil (Macpherson,2005; Deplazes et al., 2011). Moreover, recent studies regarding toxocariasis, have found embryonated *T. canis* eggs on the coat of dogs which suggests that direct contacts of pet ownership with dogs may be a much more important risk factor than previously thought (Wolfe and Wright, 2003; Aydenizoz-Ozkayhan et al., 2008; Nagy et al., 2011). Whoever, regular anthelminthic treatment and monitoring are two recommended for all dogs particularly puppies and nursing bitches to control the parasite. Furthermore, in Islamic countries such as Saudi Arabia, where dogs are avoided for religious reasons while cats are favored pets, the seroprevalences of human toxocariasis is considerable as well (Smith and Noordin, 2006). The large common antigenic fractions and the similarity in the mode of infection between *T. canis* and *T. cati* are indications risk that there is no difference in the zoonotic (Cardillo et al., 2009). Moreover, close physical contact with pets may increased risk for domestic transmission of *Toxocara* spp. Whoever, among the ways that toxocariasis can be transmitted to humans, a recent studies identified *Toxocara* spp. eggs on the fur and in the feces of both cats and dogs respectively (Overgaauw et al., 2009; Lee et al., 2010). However, severe cases and/or more zoonotic pathogens including toxocariasis, is certainly of major concern when it comes to human type of behavior such as kissing or being licked by cats and dogs have been identified, especially when these animals are displayed in public settings (Chomel and Sun, 2011). Therefore, the role of pets in human toxocariasis should not be underestimated. Whoever, both species are of zoonotic

importance causing human toxocariasis, and usually stay under one roof in all pets' shops which can be highly pathogenic. Thus, children should be taught not to eat soil and to wash their hands after playing with pets in animal shops or after outdoor activities, and raw foods should be washed before eating. Furthermore, families may also consider postponement the acquisitions of a new pet until children are past the toddler stage. Moreover, pet's feces and access should be removed from areas where children play.

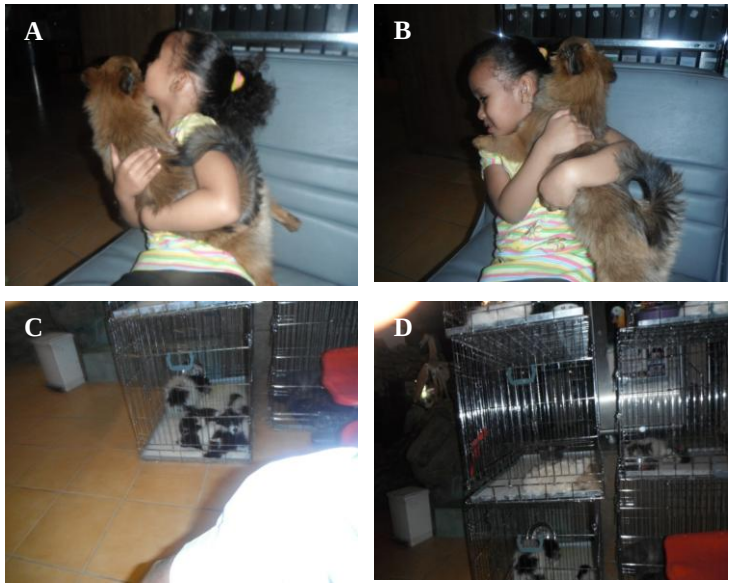

Fig. 1. Roundworms (*T. canis*) appear to be the greatest hazard to humans. (A-B) A puppy before deworming was playing with 5 years-old girl. Children behavior to comfort their pets by kissing, hugging and approaching their dogs head and fur, actually may causes them more susceptible to the infection. (C-D) New arrivals cats and dogs for sale without deworming in the same area, usually children play with dogs then cats or vice-versa and both with zoonotic importance of human toxocariasis; assume a significant number of these pets are infected with *Toxocara* spp.

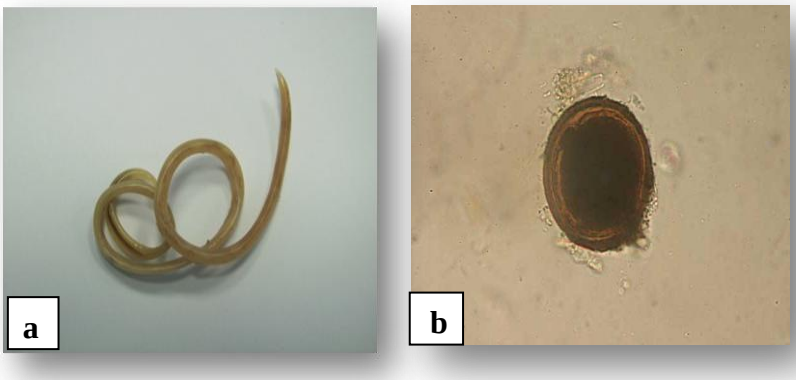

Fig. 2. An adult female Round worm, *Toxocara canis* (*T.canis*) passed in the vomit of a healthy puppy (3ms-old) in pets shop from Saudi Arabia (a). Laboratory examination of the stool sample showing the *T.canis* egg (b).

Further studies will provide valuable information of pets' diseases, where much remains unknown regarding the zoonotic infections in pet's animals, particularly in dogs. That might be of great importance in the field of public health. Finally, people in contacts with pets' animals should take precaution to avoid human infection; particularly, pets' owners should still be encouraged and required to deworming and clean up after their animals.

Also, pet dogs be on a leash will reduce the use of dedicated or exercise areas and contain dog feces within the area as one of a simple safety aspects. This case underlines that *T. canis* should be considered as a possible pathogen in dogs with severe diarrhea, and should not be allowed to contact with humans or other pets around without treatment. However, higher rates of this neglected parasitic infection are reported in developing countries and communities with poor hygienic concepts.

4. Conclusion

Based on the fore running discussion, this report underlines that dogs should be considered as a possible source of human toxocariosis in pet shops, and could play a role in the epidemiology of zoonotic helminthes infections. Thus, personal hygiene, deworming protocols, routine investigations, proper sanitary infrastructures, recommendations, and children exhibiting pica must be specifically focused and should be taken into account as the easiest tools to prevent toxocariosis. Whoever, vaccination is required for all dogs in order to keep pets healthy and protected, it seems justified to implement anti worms treatment in all dogs in pet shops, because the efficacy of treatment in humans is not easy due to non-characteristic symptoms.

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