JIVS JOURNAL OF ISTANBUL VETERINARY SCIENCES

Determination of the parasitic stages in the faeces of some laboratory and pet animals by using flotation technique in Istanbul, Turkey

Research Article

Volume: 1, Issue: 2
August 2017
Pages: 35-39

Handan ÇETİNKAYA[1]*, Tuba TAŞ[1], Cem VURUŞANER[1]

1.Istanbul University, Faculty of Veterinary Medicine, Department of Parasitology, Istanbul, Turkey

ABSTRACT

The aim of this study was to determine the parasites of laboratory and pet animals in Istanbul, Turkey. A total of 128 cages including 279 animals as 115 rabbits from 82 cages, 75 mice from 5 cages, 28 rats from 7 cages, 26 guinea pigs from 23 cages and 35 hamsters from 11 cages were used. Faecal samples were obtained from 8 commercial pet shops in 6 different districts of Istanbul and 2 laboratory animal suppliers. All samples were examined by flotation technique using saturated salt solution. *Eimeria* spp. oocysts were found in the faeces of rabbits, hamsters and mice, and the prevalence of the infections were 29.6%, 28.6% and 20%, respectively. Two of 115 rabbits were infected with *Passalurus ambiguus* (1.7%). Trichurid eggs were determined in 2 of 35 hamsters (5.7%). Mice were infected with *Syphacia* spp., *Aspiculuris* spp. and the infection ratios were 20% and 40% respectively. Out of 28 rats, 20 were infected with only *Syphacia* spp. (71.4%). No parasites were observed in guinea pigs' faeces. Laboratory animals were used not only as experimental animals but also as pets. Therefore coprological examinations for parasite eggs and oocysts are important for treatment and control of the infections in these animals and for protecting the human health because of zoonotic potential of some species.

Keywords: laboratory animals, parasites, prevalence, pet, Turkey

Article History

Received: 21.06.2017
Accepted: 16.08.2017
Available online: 18.08.2017

DOI:10.30704/http-www-jivs-net.322964

To cite this article: Çetinkaya, H., Taş, T., & Vuruşaner, C. (2017). Determination of the parasitic stages in the faeces of some laboratory and pet animals by using flotation technique in Istanbul, Turkey. *Journal of Istanbul Veterinary Sciences*, *1*(2), 35-39.

Abbreviated Title: *J Ist Vet Sci*

Introduction

Laboratory animals are used as biological models in many experimental investigations. Environmental conditions and health of the animals have to be standard for clear outcomes of the experiments. Infections including in parasitic can affect the results of the investigations by inducing physiological and immunological alterations in host's body (Hsu, 1980). Besides, these animals could be used as pet in house by many people. These animals can have some zoonotic diseases that treat human health, especially pet owners and researchers. In this regard, some parasites of these animals are known to be zoonotic (Baker, 1998).

Giardiosis, coccidiosis, cryptosporidiosis, toxoplasmosis, encephalitozoonosis are the common protozoal infections in laboratory animals. Some more common helminth parasites of mice and rats are *Hymenolepis nana*, *Hymenolepis diminuta*, *Syphacia muris, Syphacia obvelata*, *Aspiculuris tetraptera*, *Capillaria hepatica*, *Gongylonema neoplasticum*, and *Trichosomoides crassicauda (Griffiths, 1971). Syphacia obvelata* and *Aspiculuris tetraptera* are refered as mouse pinworms. The other pinworms *Syphacia muris*, *Syphacia mesocricetus* and *Denstomella translucida* are seen in rat, hamster and gerbil respectively (Baker, 1998). Of these pinworm species, *S. obvelata* has been reported to infect humans (National Research Council, 1991).

Hymenolepis nana infects man, and transmission occurs by direct (eggs) or indirect (with an intermediate host) routs. In addition, *H. diminuta* is transmitted to human by taken the intermediate hosts accidentally (Medeiros, 2012). In Turkey, *H. diminuta* has been reported in a child as case report (Kılınçel et al., 2015). Paraspidodera

* Corresponding Author: Handan Çetinkaya, Istanbul University, Faculty of Veterinary Medicine, Department of Parasitology, Istanbul, Turkey, E-mail: handan@istanbul.edu.tr

uncinata and *Passalaurus ambiguus* are the more common nematode of the guinea pig and rabbit, respectively. They inhabit in caecum and colon, and could be diagnosed by detection of eggs or adults in faeces (Griffiths, 1971).

Parasites of some laboratory animals were searched in the worldwide (Gilioli et al., 2000; Lv et al., 2009; Tanideh et al., 2010; Chen et al., 2011; Dammann et al., 2011). In Turkey parasites of rats and mice were investigated (Göksu et al., 1972; Burgu et al., 1986; Bıyıkoğlu, 1996; Yazar et al., 2002; Şenlik et al., 2005; Beyhan et al., 2010). Also some researchers have been studied on parasites of rabbits and guinea pigs (Bıyıkoğlu, 1996; Buluş and Öğe, 1999; Gürler and Doğanay, 2007; Beyhan et al., 2013), and a study was on parasites of hamsters in Turkey (Sürsal et al., 2014).

Parasites of laboratory animals should be investigated for both proper experimental results, and for researchers and pet owners' health. For this purpose this study was conducted in some rodents from pet shops and laboratory animal suppliers in different districts of Istanbul.

Materials and Methods

The study was conducted on laboratory and pet animals from November 2014 to February 2015 in Istanbul. A total of 128 cages including 279 animals were examined. The animals were 115 rabbits (*Oryctologus cuniculus*) from 82 cages, 75 mice (*Mus musculus var. albinos*) from 5 cages, 28 rats (*Rattus norvegicus var. albinos*) from 7 cages, 26 guinea pigs (*Cavia porcellus*) from 23 cages and 35 hamsters (*Mesocricetus auratus*) from 11 cages. All animals were adult. Faecal samples of animals were obtained from 8 commercial pet shops in 6 different districts of Istanbul and 2 laboratory animal suppliers. The faeces samples of the animals were randomly collected from the cages. The sample sizes were variable according to the number of the animals in the cages. The collected samples were brought to Parasitology Department of Veterinary Faculty at Istanbul University for the parasitological examinations. Flotation technique using saturated salt (NaCl) solution applied to all faeces samples (Kaufmann, 1996). Prepared slides were examined under a light microscope by using a magnification of 10X and 40X and identification of parasite eggs and oocysts were performed according to the guidelines as described by Hendrix, (2006).

Results

Helminth eggs and protozoon oocysts were found in faecal samples of investigated animals. *Eimeria* spp. oocysts were found in the faeces of rabbits, hamsters and mice and the prevalence of the infection were 29.6%, 28.6% and 20.0%, respectively. Mice were infected with *Syphacia* spp., *Aspiculuris* spp. and the infection ratio was 20% and 40% respectively. Out of 28 rats, 20 were infected with only *Syphacia* spp. (71.4%). The eggs of *Syphacia* and *Aspiculuris* species were shown in Figure 1 and Figure 2.

Figure 1. *Syphacia* spp. egg (microscopy at ×10 magnification).

Figure 2. *Aspiculuris* spp., eggs

Two rabbits were infected with *Passalurus ambiguus* (1.7%) eggs as shown in Figure 3. Trichurid eggs

were determined in 2 hamsters (5.7%) (Figure 4). *Eimeria* spp. oocysts were shown in Figure 5. No parasite eggs or protozoon oocysts were observed in guinea pig's

Figure 3. *Passalurus ambiguus* eggs in rabbit faeces

faeces. The total infections rates in all animals except guina pig with *Eimeria* spp., *Syphacia* spp. *Aspiculuris* spp., *Passalurus ambiguus*, *Trichuris* spp. were 21.1%, 12.5%, 10.8%, 0.7%, 0.7%, respectively. The species

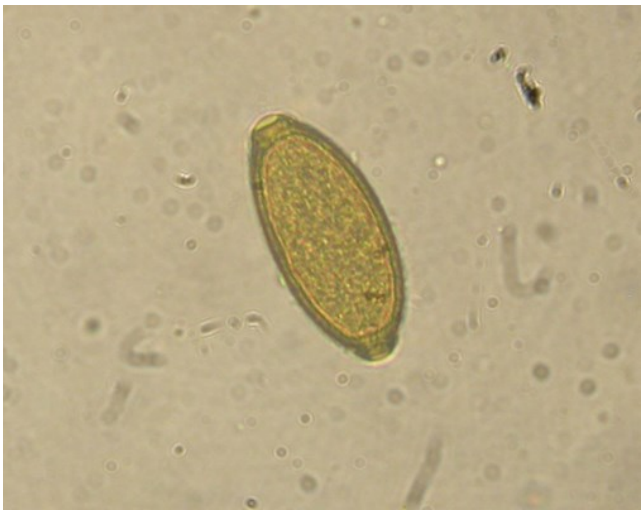

Figure 4. Trichurid eggs in hamsters faeces.

of nematodes and *Eimeria* spp. oocysts and the number of the positive samples according to the animal species were shown in Table 1.

Discussion

Nematode eggs of *Syphacia* spp., *Aspiculuris* spp., *Passalurus ambiguus*, *Trichuris* spp., and oocyst of *Eimeria* spp. were determined in this study. The more common nematodes of rats and mice are *Syphacia* and *Aspiculuris* species in worldwide. No parasites eggs were found in guinea pigs faeces in this study similar with Beyhan et al. (2013). The prevalence of *S. obvelata* was reported as 86.6% and 90.0% in mice, and *S. muris* was reported as 80.0% and 83.3% in Brazil and Iran respectively (Gilioli et al., 2000; Tanideh et al., 2010). In Ethiopia, the infection ratio of *S. obvelata* was 7.1% in rats and 1.4% in mice (Gudissa et al., 2011). Chen et al. (2011) reported the infection rate of *S. obvelata* as 75.0% and 47.4% in mice keeping in different laboratory animal houses (Chen et al., 2011). In Germany prevalence of *Syphacia* spp. was found to be as 57.1% in mice (Dammann et al., 2011). The other more common nematode species, *Aspiculuris tetraptera*, has been reported with the ratio of 21.4%, 60% and 90% in mice in Ethiopia, Brazil and Iran, respectively (Gilioli et al., 2000; Tanideh et al., 2010; Gudissa et al., 2011). *A. tetraptera* in rats has been reported as 83.3% (Tanideh et al., 2010). In this study, *A. tetraptera* was not determined in rats but in mice with 40% ratio. Lv et al. (2009) reported *Syphacia* spp. and *Aspiculuris* spp. also in hamsters with the ratios of 41.8% and 7.2% (Lv et al., 2009). Coccidiosis agent *Eimeria* spp. oocyst was reported as 10% in mice in Ethiopia (Pam et al., 2013) which was lower than the ratio of 20% that found in this study. In Turkey, a few studies have been conducted in some laboratory animals. Infection rate of *Syphacia* obvelata and *Syphacia muris* in rats were reported

Figure 5. *Eimeria* spp., oocyst

Table 1. The species of parasite species and the distribution of them according to the laboratory and pet animal species.

			The species of nematodes and the number of positive animals				Protozoon oocyst and number of positive animals
Animal species	Number of cages (n)	Number of animals (n)	*Sphacia* spp. n (%)	*Aspiculuris tetra* n (%)	*Passalurus ambiguus* n (%)	*Trichuris* spp. n (%)	*Eimeria* spp. n (%)
Mice	5	75	15 (20)	30 (40)	-	-	15 (20)
Rat	7	28	20 (71. 4)	-	-	-	-
Hamster	11	35	-	-	-	2 (5. 7)	10 (28. 6)
Rabbit	82	115	-	-	2 (1. 7)	-	34 (29. 6)
Guinea pig	23	26	-	-	-	-	-
Total	128	279	35 (12. 5)	30 (10. 8)	2 (0. 7)	2 (0. 7)	59 (21. 1)

as 5.5-14.4% (Göksu et al., 1972; Yazar et al., 2002; Şenlik et al., 2005) and 12.2-100% respectively (Burgu et al., 1986; Bıyıkoğlu, 1996; Şenlik et al., 2005; Beyhan et al., 2010). Furthermore, *S. muris* was reported with the ratio between 2.5% and 18.3% in mice (Göksu et al., 1972; Şenlik et al., 2005). Beyhan et al. (2010) have been reported coinfection with *S. obvelata* and *S. muris* percentage in mice as 27.3% (Beyhan et al., 2010). Meanwhile, *A. tetraptera* infection ratio was reported as from 2.3% to 47.7% in rats (Göksu et al., 1972; Burgu et al., 1986), and from 54.5% to 74.3% in mice (Göksu et al., 1972; Şenlik et al., 2005; Beyhan et al., 2010) in some cities of Turkey.

In this study, *Eimeria* spp. oocyst and trichurid eggs were found with the ratio of 28.6% and 5.7% in pet hamsters. Lv et al. (2009) has been reported the ratio of same parasites as 2% and 18.3% in pet hamsters. In Turkey, in a study conducted on parasites of hamsters , trichurid eggs were reported with the ratio of 28.1% in Syrian hamsters and 51.5% in Dwarf hamsters. In the same study, *Eimeria* spp. oocysts were found to be as 15.4% that was lower than the current study (28.6%) (Sürsal et al., 2014).

Passalurus ambiguus, the rabbit pinworm, was found in 2 of 115 rabbits (1.7%) in this study. In two different studies conducted in Iran, the prevalences of this nematode were reported as 6.9% (Motamedi et al., 2014) and 40% (Tanideh et al., 2010) in laboratory rabbits. *Passalurus ambiguus* in rabbits were reported with the ratio between 0.9% and 58.3% in different cities of Istanbul (Bıyıkoğlu, 1996; Buluş and Öğe, 1999; Gürler et al., 2007). Also *Eimeria* spp. oocyst were determined with the ratio of 29.6% in this study. Pam et al. (2013) have been reported the infection ratio of eimeriosis as 96.6% in rabbits which is higher than this study (Pam et al., 2013). In another study the prevalence of *Eimeria* spp. was reported with the ratio of 21.8% in rabbits from Iran (Motamedi et al., 2014).

Conclusion

This study is the first extensive research on parasites of laboratory animals that used in research laboratories and animals sold in pet shops in Istanbul, Turkey. Diagnosis of the parasites before beginning of the experimental research or buying as pet animals is important for treatment and prevent of these parasites not to risk researchers and pet owners health.

References

Baker, D. G. (1998). Natural pathogens of laboratory mice, rats, and rabbits and their effects on research. *Clinical Microbiology Reviews*, *11*, 675-266.

Beyhan, Y. E., Gürler, A. T., Bölükbaş, C. S., Açıcı, M., & Umur, Ş. (2010). Bazı laboratuvar hayvanlarında nekropsi ve dışkı bakısı ile saptanan helmintler. *Türkiye Parazitol Dergisi 34*(2), 98-101.

Beyhan, Y. E., Özkan, A. T., & İde, T. (2013). Laboratuvar fare, sıçan ve kobaylarında dışkı bakısı ile helmintlerin araştırılması. *Etlik Veteriner Mikrobiyoloji Dergisi, 80*, 33 -36.

Bıyıkoğlu, G. (1996). Bazı laboratuvar hayvanlarında dışkı bakılarında saptanan helmintler. *Etlik Veteriner Mikrobiyoloji Dergisi*, *8*(8), 57[1]-146.

Buluş, F., & Öge, H. (1999). Değişik kurumlardaki tavşanlarda (Oryctolagus cuniculus) dışkı bakısına göre saptanan helmintler. *Ankara Üniversitesi Veteriner Fakültesi Dergisi*, *46*(6-3), 309-312.

Burgu, A., Doğanay, A., & Yılmaz, H. (1986). Laboratuvar beyaz fare ve ratlarında Syphacia obvelata ve S.muris enfeksiyonları. *Ankara Üniversitesi Veteriner Fakültesi Dergisi*, *33*(7), 878-451.

Chen, X. M., Li, X., Lin, R. Q., Deng, J. Y., Fan, W. Y., Yuan, Z. G., Liao, M., & Zhu X. Q. (2011). Pinworm infection in laboratory mice in southern China. *Laboratory Animals, 45*, 9[2]-60.

Dammann, P., Hilken, G., Hueber, B., Köhl, W., Bappert, M. T. & Mahler, M. (2011). Infectious microorganisms in mice (Mus musculus) purchased from commercial pet shops in Germany. *Laboratory Animals, 01*, 271-275.

Gilioli, R., Andrade, L. A. G., Passos, L. A. C., Silva, F. A., Rodrigues, D. M., & Guaraldo, A. M. A. (2000). Parasite Survey in mouse and rat colonies of Brazilian laboratory animal houses kept under different sanitary barrier conditions. *Arquivo Brasileiro de Medicina Veterinária e Zootecnia (Brazilian Journal of Veterinary and Animal Science), 52*, 576[1]-1334.

Göksu, K., Alibaşoğlu, M., & Dinçer, Ş. (1972). Beyaz fareler (Mus musculus var. albinos) ve beyaz kemelerde (Rattus norvegicus var. albinos) helminthiasis'ler. *Ankara Üniversitesi Veteriner Fakültesi Dergisi*, *1-2*(5[3]),55[1]- 126.

Griffiths, H. J. (1971). Some common parasites of small laboratory animals. *Laboratory Animals, 1*, 123-135.

Gudissa, T., Mazengia, H., Alemu, S., & Nigussie, H. (2011). Prevalence of gastrointestinal parasites of laboratory animals at Ethiopian Health and Nutrition Research Institute (EHNRI), Addis Ababa. *Journal of Infectious Diseases and Immunity*, *3*(5), 5-5.

Gürler, A. T., & Doğanay, A. (2007). Ankara ve civarında bulunan tavşanlarda solunum ve sindirim sistemi helmintlerinin yaygınlığı. *Ankara Üniversitesi Veteriner Fakültesi Dergisi*, *54*, 549-109.

Hendrix, C., M. (2006). *Diagnostic Veterinary Parasitology*. *2nd ed. St louis,* USA, Mosby Inc..

Hsu, C. K. (1980). Parasitic diseases: how to monitor them and their effects on research. *Laboratory Animals*, 1*0*, 48-53.

Kaufmann, J. (1996). *Parasite infection of domestic animals. A diagnostic manual*. Basel, Switzerland, Birkhause Verlag.

Kılınçel, Ö., Öztürk, C. E., Gün, E., Öksüz, Ş., Uzun, H., Şahin, İ., & Kılıç, N. (2015). A Rare case of hymenolepis diminuta Infection in a small child. *Mikrobiyoloji Bülteni*, *49*(5), 135-138.

Lv, C. C., Feng, C., Qi, M., Yang, H. Y., Jian, F. C., Ning, C. S., & Zhang, L. X. (2009). Investigation on the prevalence of gastrointestinal parasites in pet hamsters. *Zhongguo Ji Sheng Chong Xue Yu Ji Sheng Chong Bing Za Zhi*, *27*, 6[13]-280.

Medeiros, V. B. (2012). Endo and ectoparasites in conventionally maintained rodents laboratory animals. *Journal of Surgical Research, 3*(5), 6[1]-40.

Motamedi, G., Moharami, M., Paykari, H., Eslampanah, M. & Omraninava, A. (2014). A Survey on the gastrointestinal parasites of rabbit and guinea pig in a laboratory animal house. *Archives of Razi Institute*, *69*(5), [11]-81.

National Research Council (1991). *Infectious diseases of mice and rats: a report of the institute of laboratory animal resources committee on infectious diseases of mice and rats*. Washington, D.C. US: National Academy Press.

Pam, V. A., Golu, M., Igeh, C. P., & Ashi, R. D. (2013). Parasitic infections of some laboratory animals in Vom, Plateau State. *Journal of Veterinary Advances*, *3*(6), [21]-91.

Sürsal, N., Gökpinar, S., & Yildiz, K. (2014). Prevalence of intestinal parasites in hamsters and rabbits in some pet shops of Turkey. *Türkiye Parazitoloji Dergisi*, *38*, 546-105.

Şenlik, B., Diker, A. İ., & Küçükyıldız, F. (2005). Bazı laboratuvar hayvanlarında dışkı muayenesi ile saptanan helmintler. *Türkiye Parazitoloji Dergisi*, *29*, 567-125.

Tanideh, N., Sadjjadi, S. M., Mohammadzadeh, T. & Mehrabani, D. (2010). Helminthic infections of laboratory animals in animal house of shiraz university of medical sciences and the potential risks of zoonotic infections for researchers. transgenic. *Iranian Red Crescent Medical Journal, 12*(6), 595-157.

Yazar, S., Hamamcı, B., Ünver, A. C., & Şahin, I. (2002). Ratlarda bağırsak parazitlerinin araştırılması. *Türkiye Parazitoloji Dergisi, 26*, 212-213.