Archives of Razi Institute, Vol. 69, No. 1, June (2014) 77-81

DOI: 10.7508/ari.2014.01.011

Full Article

A Survey on the Gastrointestinal Parasites of Rabbit and Guinea Pig in a Laboratory Animal House

Motamedi[*1], G., Moharami[2], M., Paykari[1], H., Eslampanah[3], M., Omraninava[4], A.

1. Department of Parasitology, Razi Vaccine and Serum Research Institute, Karaj, Iran
2. Department of Research, Production & Breeding of Laboratory Animals, Razi Vaccine and Serum Research Institute, Karaj, Iran
3. Department of Pathology, Razi Vaccine and Serum Research Institute, Karaj, Iran
4. Department of Emergency Medicine, Aja Medical University, Tehran, Iran

Received 13 Oct 2013; accepted 10 Dec 2013

ABSTRACT

There is documented evidence that infection in laboratory animals can often influence the outcome of experiments. All infections, apparent or inapparent, are likely to increase biological variability. As a research project concerning the diversity and distribution of parasites of rabbit and guinea pig in a conventional laboratory animal house, about 87 rabbits (from 700) and 105 guinea pigs (from 1500) were selected randomly from a Research, Production & Breeding of Laboratory Animals Department. Samples were collected between 19.02.2010 and 20.05.2011. The samples and animals were examined by dissection and flotation methods. In this study only one species of nematodes (*Passalorus ambiguus:* 6.9%); one species of protozoa (*Eimeria spp.:* 21.8%) in rabbits and one species of nematodes (*Paraspidodera Uncinata:* 24.7%); one species of protozoa (*Balantidium coli:* 11.4%) in guinea pigs were identified. However, there was not any cestodes or trematodes identified from this group of laboratory animals.

Keywords: Gastrointestinal parasites, Rabbit, Guinea pig

INTRODUCTION

Laboratory animals are used extensively in the safety evaluation of different therapeutic drugs, food, chemicals and in broad variety of biological investigations. They are also used for the diagnosis of infectious diseases, in the production of vaccines and other biological substances of public health and veterinary importance (Henry 1971). Around 1300 establishments (including universities, pharmaceutical and chemicals companies) use a total of 12 million animals in experiments each year across the European Union Countries. One of the most common problems regarding the health conditions of laboratory animals has been the endoparasites. These enteric parasites include cestodes, nematodes, trematodes, and protozoa. These enteric parasites cause serious destruction of the laboratory animals as they lead to intestinal perforation, peritonitis, enteritis, ulceration, diarrhea, constipation, abdominal distension, chronic weight loss and may lead to death (Nicklas *et al* 1999, Perec−Matysiak *et al* 2006). The parasitic infections can affect investigations

*Author for correspondence.Email: g.motamedi@rvsri.ir

by inducing physiological and immunological changes in the hosts, increasing or reducing host susceptibility to experimental stress, inducing tissue damages, stimulating abnormal tissue growth, competing with the host for nutrients, decreasing the volume of host's blood and body fluids (Clough 1982). Considering the importance of healthy condition of living laboratory animals for research and researcher periodical monitoring of these animals for evaluation and presence of parasites, viruses, bacteria, fungi and genetic disorders are very important. Therefore, the study was carried out to identify and determine the existence of gastrointestinal parasites of laboratory animals in the rabbits and guinea pigs.

MATERIALS AND METHODS

A study was conducted on gastrointestinal parasites of laboratory animals in a breeding and research conventional system animal house from November 2010 to March 2011. Totally 192 adult laboratory animals (Including 105 Pirbright guinea pigs and 87 Dutch rabbits) of both sexes and different age groups were randomly chosen in a breeding and research conventional system animal house. The average weights of mentioned animals were 600±50 gram, and 2000±200 gram respectively. The animals were housed at a temperature of 24±2 °C. They were fed ad libitum with diet of concentrate pellets by their attendants and potable water was provided adlib. The supplier was not identified by name, because of ethical reasons. three gram of faecal samples were collected using cleanly kept test tubes for parasitological examination. All animals and faecal samples were transported to the parasitology laboratory of Razi institute and sacrificed by placing them in a small container with ether. The animals were autopsied and then, the alimentary tracts were dissected. They were cutted into pieces which soaked in water or in sodium chloride solution. Finally the supernatant liquids were poured off and the sediments were examined over a black surface. Any visible helminthes was picked out with a brush or a hooked needle. Collected worms were transferred into the small glass bottles containing 10% formalin with 5% of glycerin. Worms were cleared by lactophenol. Collected fecal samples were examined by flotation technique. Briefly, a sample of faeces was weighed and mix with water in the proportion of three gram per 42cc in a washing bottle and then strained through a sieve. The 15cc of mixture was poured into a centrifuge tube and centrifuge for 3 minutes and poured off the supernatant. The saturated Nacl or Zinc sulfate solution was added and resuspended the sediment by four or more inversions, Centrifuged for five minutes. The surface film containing ova and cysts were Picked up by touching surface gently with a coverglass. The coverglass with adherent fluid was removed and placed wet side down on a slide for microscopic examination. The isolated parasite cysts, oocysts, and adult worms were diagnosed by light microscopy (Eslami 1997). Identification of worms and protozoa were performed by keys (Roberts et *al* 2010, Mehlhorn 2008).

RESULTS

The study was carried out on the total of 192 laboratory animals of which 87 rabbits (*Oryctolagus cuniculus*) and 105 guinea pigs (*Cavia porcellus*). Out of 192 dissected animals and fecal samples examined, 63(32.8%) were found positive for gastrointestinal parasites. The highest prevalence of helminthes was recorded in guinea pigs with prevalence of 24.7% (26 of 105) followed by rabbits 6.9% (6 of 87). The highest prevalence of protozoa was found in rabbits 21.8% (19 0f 87) followed by guinea pigs 11.4% (12 of 105). The nematode parasite in rabbits was *Passalorus ambiguus* (Male: 4-5mm and Female:9-11mm), (Figures 1-3) and in guinea pigs *Paraspidodera uncinata* (Male: 11-22mm and Female: 16-27mm), (Figures 4-6) respectively. The protozoa parasite in rabbits was *Eimeria spp.* (Figure 7), and the only protozoa identified in guinea pigs was *Balantidium coli* (Figures 8-9). However, there were not any cestodes or trematodes identified from this group of laboratory animals.

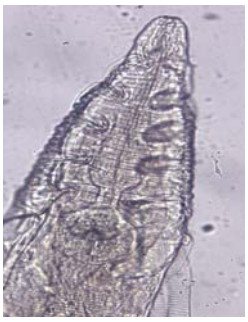

Figure 1. *Passalorus ambiguus* in rabbit (male anterior part).

Figure 2. *Passalorus ambiguus* in rabbit (male posterior part).

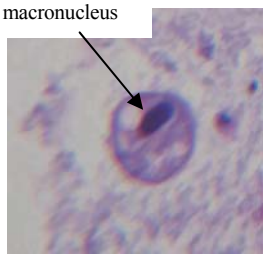

Figure 8. *Balantidium coli* trophozoite in guinea pig.

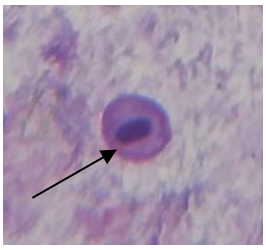

Figure 9. *Balantidium coli* cyst in guinea pig.

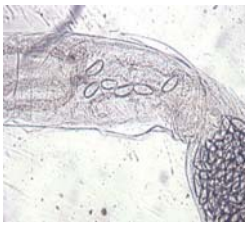

Figure 3. *Passalorus ambiguus* (female ovary part) in rabbit.

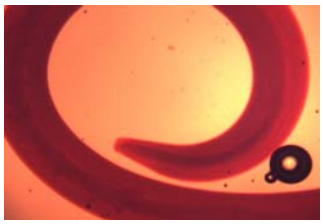

Figure 4. *Paraspidodera uncinata* (male anterior part) in guinea pig.

Figure 5. *Paraspidodera uncinata* (male posterior part) in guinea pig.

Figure 6. *Paraspidodera uncinata* (female posterior part) in guinea pig.

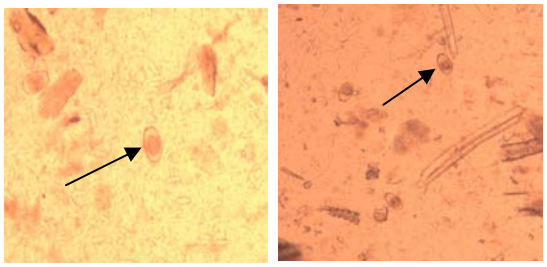

Figure 7. *Eimeria* oocysts in rabbit.

DISCUSSION

The application of laboratory animals that will be totally free of pathogens is important especially in breeding and research area where these animals are used for research purposes. Parasitic infections in laboratory animals, even in the absence of clinical signs, may act as an important variable during experimental assays as well as a potential of infecting personnel and researchers (Patton *et al* 2008). Animal care staff must be adequately trained. The day-to-day observations of the animal care staff are the first and most important part of a health monitoring program. Disease monitoring should involve routine submission of adult animals for autopsy, histopathology, parasitology, bacterial culture and virus serology (Noonan 1994, Baker 1998). This study shows that endoparasites are common in laboratory rodents, and the laboratory animals in the study area are infected with 4 parasites. We therefore advise that the personnel working with laboratory animals need to be aware of the problems of parasitic infection and that veterinary control is essential to get quality control, welfare and health of research animals (Rico & Rivas 2003). The highest prevalence enteric parasites were recorded in the course of this research, were *Eimeria spp.* with 19(21.8%) in rabbits. This observation agrees with the report of others (Pam *et al* 2013, Garedaghi & Hashemzade farhang 2011). *Balantidium coli* is widely distributed in hogs, monkeys, rats, guinea pigs and human infection is found sporadically and in institutionalized groups with low levels of personal

hygiene. In areas where pigs are the main domestic animal, the incidence of human infection can be quite high. Although human infection is fairly rare but if the infection established, it can develop into an epidemic particularly where poor environmental sanitation and personal hygiene are found. Since the mode of transmission is ingestion of infective cysts through contaminated food or water, preventive measures involve increased attention to personal hygiene and sanitation measures. The results of the current study indicate the need for massive investment in laboratory animal science and technology (physical environment, equipment, human resources and sanitary monitoring) in the animal houses for enhancement of quality of living for laboratory animals for biomedical research and decrease of infection transmission to human as well as other laboratory animals. Furthermore, quarantine programs are also needed for new animals or biological materials. The possibility of human infection with the parasites of laboratory animals can be greatly reduced by a period of quarantine immediately following arrival, during which examination is made for the presence of parasites and appropriate treatment given to remove any microorganisms (Gibson 1967). The guinea-pig is seldom infected by nematodes, with the exception of *Paraspidodera uncinata.* This inhabitant of the cecum may be present in large numbers but does not appear to produce significant lesions or pathology. In this study From 192 laboratory animals, the most prevalent nematode parasites in guinea pigs were *Paraspidodera uncinata*. This observation agrees with the report of others (Pinto *et al* 2002, Medeiros 2012). Prevention of parasite infection is far cheaper and preferable to treatment. The best preventive measures are sanitation, good housing, adequate food ration, and understanding of potential parasite problems. Where good husbandry is the rule, rabbits and guinea pigs rarely are infected with parasites in significant numbers. Modern pens are constructed so that they can be kept clean and free from the infective forms of parasites. Proper cleaning of cages and use of good disinfectants, together with a good diet, are the keys to parasite control (Hsu 1980). The present study indicated that every person working with animals should be aware of the potential danger from animal bites and/or other hazards such as self injections, needle sticks, other sharp injuries and mucous membrane exposures from urine, feces, blood and other bodily secretions. Therefore there is need to design the occupational health and safety program according to the Federation of European Laboratory Animal Science Association and documented to prevent unnecessary occupational hazards in the work environment and maintain a safe environment for personnel working with or around laboratory animals (Rehbinder *et al* 1996). Maintaining sanitary conditions in your pens is a major preventative measure for controlling disease in lab animals. This therefore educate and aware the producers and breeders on the prevalence of enteric parasites in laboratory animals and also consultation on the control measures against the parasites (Proverbs & Hutson 1992).

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