Prevalence of fascioliasis (liver flukes) infection in cattle and buffaloes slaughtered at the municipal abattoir of El-Kharga, Egypt

Nagwa T. Elshraway¹ and Wafaa G. Mahmoud²

¹. Department of Food Hygiene, Faculty of Veterinary Medicine (New Valley), Assiut University, Assiut, Egypt; ². Department of Parasitology, Faculty of Veterinary Medicine (New Valley), Assiut University, Assiut, Egypt.

Corresponding author: Nagwa T. Elshraway, e-mail: dr.nagwa2004@yahoo.com
Co-author: WGM: nognagy@yahoo.com

Received: 13-02-2017, Accepted: 24-07-2017, Published online: 14-08-2017
doi: 10.14202/vetworld.2017.914-917 How to cite this article: Elshraway NT, Mahmoud WG (2017) Prevalence of fascioliasis (liver flukes) infection in cattle and buffaloes slaughtered at the municipal abattoir of El-Kharga, Egypt, Veterinary World, 10(8): 914-917.

Abstract

Aim: The main objectives of this study were to determine the prevalence of fascioliasis infections in cattle and buffaloes, slaughtered in El-Kharga city slaughterhouse at New Valley Governorate.

Materials and Methods: The slaughtered animals were daily inspected for liver fascioliasis allover 2016. Macroscopic fascioliasis was detected from a total of 2251 basing on animals specie, sex, season, and Fasciola spp. in addition to microscopic examination of blood, fecal samples which collected from female cattle and buffalo (50 each).

Results: The total prevalence rate of Fasciola sp. infection occurs in the study area were about 695/2251 (30.88%) from the total cattle and bovine slaughtered carcasses. The incidence of fascioliasis was 4/12 (33.33%) and 678/2200 (30.82%) for females and males cattle carcasses, respectively, while the infection rate in buffalo carcasses was 1/4 (25.00%) and 12/35 (34.29%) for females and males buffalo carcasses, respectively.

Conclusion: The moderate fasciolosis infection in cattle and buffaloes slaughtered at the municipal abattoir of El-Kharga, Egypt. The highest fascioliasis infection was recorded during winter and autumn. It constitutes a major cause of economic losses at El-Kharga abattoir and threat public health.

Keywords: Fasciola gigantica, Fasciola hepatica, foodborne disease, liver fluke, slaughterhouse, snails, zoonosis.

Introduction

Slaughterhouses provide an excellent meat inspection place where many zoonotic diseases observed but meat poor handling in or out the abattoir can leading to both economic losses and a lot of public health hazardous [1,2].

Fascioliasis considered the top of all the domestic ruminants’ parasitic zoonotic worldwide infection that is endemic in a tropical area and Egypt [3-5]. Genus Fasciola “liver fluke” is belonging to trematode helminths which containing two main species; Fasciola gigantica and Fasciola hepatica in Egypt [6-8].

Fascioliasis reduces animal productivity, weight gain, and the production of meat and milk. In addition, it causes moderate icterus, metabolic disorders, and secondary infections due to decrease immunity by chronic fascioliasis and liver condemnation during postmortem inspection in slaughterhouses while the acute fascioliasis may lead to mortalities [9-11].

Human fascioliasis infection occurs accidentally after ingestion of eggs/larvae while ruminant ingestion of forage containing metacercarial cyst [12]. Ingested parasite lives in hepatic parenchyma or in bile duct, which causing liver hemorrhagic black tunnels [13].

Diagnosis is depend on the history of snail habitats or fascioliasis on the farm, symptoms, postmortem examinations, feces, and blood examination for Fasciola eggs [14]. There is not enough information on the ruminants’ fascioliasis in El-Kharga, New Valley Governorate, Egypt. Therefore, this study was designed with the aims of determining the prevalence of fascioliasis infections in cattle and buffaloes, slaughtered in El-Kharga city slaughterhouse at New Valley Governorate.

Materials and Methods

Ethical approval

This study has been approved by the Animal Rights and Ethical Use Committee of Assiut University.

The study area

A cross-sectional study was conducted in El-Kharga abattoirs to detect the prevalence of the fascioliasis (liver flukes) slaughtered cattle. El-Kharga city is the capital of New Valley Governorate. It is a part of the oasis, which is located to the west of the Nile Valley between 25.26°N latitude and 30.32°E longitude. New Valley Governorate is located 232 km to the South of Assiut Governorate.

1. Department of Food Hygiene, Faculty of Veterinary Medicine (New Valley), Assiut University, Assiut, Egypt; 2. Department of Parasitology, Faculty of Veterinary Medicine (New Valley), Assiut University, Assiut, Egypt.
caws) bovine animals during 2016. According to the Egyptian legislations of meat inspection, slaughtering of cattle, and bovines female never been allowed before all teeth are changed (over 5 years) while male bovines and cattle approved for slaughtering after about 2 years.

Samples collection
A total of 2212 (2200 bulls and 12 caws) local breed cattle and 39 (35 male and 4 females) local breed buffaloes, slaughtered at El-Kharga abattoir, were daily inspected for the presence of liver fascioliasis allover 2016 which efficiently inspected by naked eye and palpation for the presence of gross lesion and the worms then further examinations. All data samples recorded before transported in an icebox to the laboratory to the Central Laboratory, Faculty of Veterinary Medicine, New Valley, Assiut University, for further examinations within 24 h.

Samples preparation for postmortem inspection
Liver and gall bladder postmortem inspection by making multiple cuts and subcuts about 1 cm thick to check the presence of fascioliasis, which made gritty sounds and bile duct thickness, palpation pressure, exerted brownish fluid, and immature Fasciola. Identification of the species based on the morphological features of the agent and classify into F. gigantica and F. hepatica [15,16].

To calculate the total sample size, the following assumptions were made: 5% desired level of precision, 95% level of confidence, and 60% expected the prevalence of cattle fascioliasis in El-Kharga abattoirs, the sample size was determined using the formula given below [17].

\[ n = \frac{1.96^2 \times P_{exp} \times (1 - P_{exp})}{d^2} \]

n=Required sample size, Pexp=Expected prevalence, d=Desired absolute precision.
Therefore, based on the above formula, the total sample size of cattle was calculated to be 2.80.

Statistical analysis
The obtained results were encoded and recorded in an excel database analyzed by descriptive statistics survey were performed using GraphPad Instant version 3 for determination of means and the analysis of variance between the different data. The treatment, in this study, was determined using standard error and analysis of variance (p<0.05).

Results
Prevalence of liver fascioliasis in examined cattle and buffaloes samples
The results obtained in Table-1 indicated that the total prevalence rate of Fasciola sp. infection occurs in the study area were about 695/2251 (30.88%) from the total cattle and bovine slaughtered carcasses.

The incidence of fascioliasis was 4/12 (33.33%) and 678/2200 (30.82%) for females and males cattle carcasses, respectively, while the infection rate in buffalo carcasses was 1/4 (25.00%) and 12/35 (34.29%) for females and males buffalo carcasses, respectively.

Seasonal liver fascioliasis condemnation rates in examined cattle and buffaloes samples
As illustrated in Figure-1, results revealed that buffaloes fascioliasis is higher during winter and autumn than cattle fascioliasis while vice versa condition reported during spring and summer. The highest fascioliasis infection found in winter followed by autumn, spring, and summer. There was a significant difference in between different seasons while there was not any significance between caws and buffaloes rates.

The buffaloes rates were (46.15%, 15.38%, 7.69%, and 30.77%) during winter, spring, summer, and autumn, respectively, whereas in case of cattle, it were (35.04%, 22.73%, 18.48%, and 23.75%) during winter, spring, summer, and autumn, respectively.

Macroscopic liver fascioliasis in examined cattle and buffaloes samples
Grossly regarding fascioliasis infection during slaughterhouse postmortem inspection (Figure-2a) showing the external smooth liver surface declared several white or creamy tunnels ranged from few millimeters to nearly 3 cm (Figure-2b), represented the postmortem liver fibrosis appear from external liver surface. Fascioliasis tunnels which observed from intact liver surfaces oozing grassy blackish hemorrhagic exudate, and declared different took photos of

![Table-1: Prevalence of liver fascioliasis in examined cattle and buffaloes slaughtered at the municipal abattoir of El-Kharga.](Available at www.veterinaryworld.org/Vol.10/August-2017/13.pdf)

![Figure-1: Seasonal liver fascioliasis condemnation rates in examined cattle and buffaloes slaughtered at the municipal abattoir of El-Kharga. Means followed by a different letter in the line are significantly different (p>0.05).](Available at www.veterinaryworld.org/Vol.10/August-2017/13.pdf)
creamy leaf-like *Fasciola* spp. about 1.5-2.0 cm in length and about 1.0 cm in width (Figure-2c).

**Discussion**

*Fasciola* spp. is a parasite threatening domestic ruminants and public health. Transmission of this trematode infection is depending on the presence of intermediate "lymnaea snail" host and final host. This snail host commonly presents in high density during rainfall period annually and/or in highly moist pastures soil [13,18].

The overall prevalence rate of fascioliasis in the examined cattle and bovine slaughtered in El-Kharga municipal abattoir was about 695/2251 (30.88%) which nearly agreed with Morsy et al. [19], who previously found 25.5% in Egypt. On the other hand, higher incidences of fascioliasis have been recorded by Pfukenyi and Mukaratirwa [20], who reported 37.1% in Zimbabwe and Abraham and Jude [13] recorded 44.8% in Nigeria. However, there were some remarkable lower results reported by Mellau et al. [21], who found 16.3% in Tanzania, Haridy et al. [22] noted 21.8% in Gahrbi Governorate, Afrakhosravi [23] reported 11.09% in Iran, and Mungube et al. [24] recorded 26% in Kenya.

Human fascioliasis was been occurred after the consumption of encysted cercaria and not by eating of animal livers infected by adult *Fasciola* spp. the ingestion of watercress vegetables grown along contaminated water by snails and domestic ruminant fecal matters with adult parasites [25].

Our reported seasonal liver fascioliasis condemnation rates revealed that buffaloes fascioliasis is higher during winter and autumn than cattle fascioliasis while vice versa condition reported during spring and summer. The buffaloes rates were (46.15%, 30.77%, 15.38%, and 7.69%) during winter, autumn, spring, and summer, respectively, whereas in case of cattle, it were (35.04%, 23.75%, 22.73%, and 18.48%) during winter, autumn, spring, and summer, respectively. This finding might be attributed to raining season and presence of fresh green grazing pasturing. This finding was supported by the previous findings reported by Adedokun et al. [26] who reported in winter (52.3%) and in dry season (21%) in Nigerian cattle, while, fascioliasis was highest in winter (around the raining periods) and/or dampness area due to spreading of the snails host [13,23,27,28].

Fascioliasis occurs mainly not only in children living in rural settings but also in people living in urban areas by metacercarial of the fluke is ingested along with water cress salad and vegetables grown along banks of water reservoirs inhabited by potential snail hosts. About 2.4 million people infected worldwide and 180 million are at risk of the infection fascioliasis commonly asymptomatic children infection with mild anemia. Humans’ fascioliasis is mainly correlated with highly eggs excreted areas and not related with highly animals’ fascioliasis and sometimes infection transmitted by human stool contamination [29].

In this study, the routine macroscopic postmortem fascioliasis inspection revealed that infected liver is very hard may have numerous injuries with congestion, enlargement with very hard fibrosis. Postmortem visually examination of intact liver also showing the presence of different sizes (1.5-2.7 cm) of *Fasciola* spp. impeded on the hepatic tissue with characteristic white or creamy color. Hepatic postmortem incision is showing thick wall fibrosis by fascioliasis tunnels which oozing grassy blackish exudate and debris. The trials to opening this tunnel exerted leaf-like liver flukes that diminished infected liver and carcass value and resulted in rejection of liver by consumers. Similar lesions were observed by authors in Bangladesh [18] and in Nigeria [2,13].

According to Egyptian veterinary authorities, detection of fascioliasis in liver should be removed total liver condemnation or partial affected lobes after performing boiling tests and rapid phase according to parasitic infestation density and extension. The rest carcass was been released for human consumption [25].

Controlling fascioliasis mainly by anthelmintics, which act against mature stages only. Triclabendazole is the only drug, which affects against both immature and mature stages fascioliasis. Anthelmintic administered during December/January and from April/May for controlling chronic fascioliasis, a third dose should be given in August. However, molluscicides were been recommended for snail control [20,30].

**Conclusion and Recommendation**

The present study revealed a moderate fasciolosis infestation in cattle in the maniacal abattoir in El-Kharga, New Valley, Egypt, and the study is recommended that the importance to increasing the
public health fascioliasis awareness should be taken seriously to enhancing snail and fasciolosis control at farm levels to diminish the economic losses due to infection. Thoroughly meat inspection should also be taken on abattoir.

**Authors’ Contributions**

NTE: Corresponding author of the manuscript, study design, collection of the samples, photography, collection of data from the slaughterhouse, drafted and revised the manuscript, and data analysis. WGM: Helped in laboratory examination. Both authors shared laboratory examination and data analysis. Both authors have read and approved the final manuscript.

**Acknowledgments**

The authors gratefully thank the managers of El-Kharga abattoirs for their help in the examination of the slaughtered animals and providing the samples under the study. This study was funded by the corresponding author.

**Competing Interests**

The authors declare that they have no competing interests.

**References**

1. Oladele-Bukola, M.O. and Odetokun, I.A. (2014) Prevalence of bovine fasciolosis at the Ibadan municipal Abattoir, Nigeria. *Afr. J. Food Agric. Nutr. Dev.*, 14(4): 9055-9070.
2. Kalu, E., Akpabio, U. and Gloria, D.I. (2015) A case of chronic fascioliasis in cattle slaughtered at Ubakala Abattoir. *J. Vet. Adv.*, 5(6): 1017-1022.
3. Haridy, F.M., Morsy, T.A., Gawish, N.I., Antonios, T.N. and Abdel, G.A. (2002) The potential reservoir role of donkeys and horses in zoonotic fascioliasis in Gharbia governorate. *Egypt. J. Egypt. Soc. Parasitol.*, 32(2): 561-570.
4. Dietrich, C.F., Kabaalioglu, A., Brunetti, E. and Richter, J.Z. (2015) Fascioliasis. *Z. Gastroenterol.*, 53: 285-290.
5. Amer, S., ElKhatam, A., Zidan, S.H., Feng, Y. and Xiao, L. (2010) Fascioliasis. *Afr. J. Food Sci.*, 4(4): 156-160.
6. Farag, H.F. (1998) Human fascioliasis in some countries of the Eastern Mediterranean region. *East Mediterr. Health J.*, 4(1): 156-160.
7. Walker, S.M., Makundi, A.E., Namuba, F.V., Kassuku, A.A., Keyyu, J., Hoej, E.M., Prodohl, P., Stothard, J.R. and Trudgett, A. (2008) The distribution of Fasciola hepatica and Fasciola gigantica within southern Tanzania-constraints associated with the intermediate host. *Parasitology*, 135(4): 495-503.
8. Bazh, E.K., Beder, N.A., Ayoub, M. and Sadek, K. (2012) Fasciola infection among cattle and buffaloes at Behera Governorate, Egypt. *Zagazig Vet. J.*, 40: 125-136.
9. Mason, C. (2004) Fascioliasis associated with metabolic disease in a dairy herd, and its effects on health and productivity. *Cattle Pract.*, 12: 7-13.
10. Phiri, I.K., Phiri, A.M. and Harrison, L.J. (2006) Serum antibody isotype responses of Fasciola-infected sheep and cattle to excretory and secretory products of Fasciola species. *Vet. Parasitol.*, 141(3-4): 234-242.
11. Eman, K.A., Sherif, M.B. and Reda, S.F. (2016) Molecular characterization of Fasciola hepatica infecting cattle from Egypt based on mitochondrial and nuclear ribosomal DNA sequences. *Res. J. Parasitol.*, 11: 61-66.
12. Bii, A.A., Ahmed, M.I. and Mshelia, S.S. (2006) Economic assessment of losses due to parasitic diseases common at the Muidaguri Abattoir, Nigeria. *Afr. Sci.*, 7(3): 143-145.
13. Abraham, J.T. and Jude, I.B. (2014) Fascioliasis in cattle and goat slaughtered at calabar Abattoirs. *J. Biol. Agric. Health.*, 4(18): 34-41.
14. Rokni, M., Mirhendi, H., Behnia, M., Harandi, M. and Jalalizadeh, N. (2010) Molecular characterization of Fasciola hepatica isolates by RAPD-PCR and ribosomal ITS1 sequencing. *Iran. Red Crescent Med. J.*, 12: 27-32.
15. Soulsby, E.J. (1982) Helminths, Arthropods and Protozoa of Domesticated Animals. 7th ed. Bailliere, Tindal and Cassel Ltd., London, p1-300.
16. Urquhart, G.M., Duncan, J., Armour, L., Dunn, J. and Jennings, A.M. (1996) Veterinary Parasitology. 2nd ed. Blackwell Science, UK, p103-113.
17. Thusfield, M. (2005) Veterinary Epidemiology. 3rd ed. University of Edinburgh, Blackwell Sciences Publishing, Oxford. p626.
18. Talukder, S., Bhuivan, M.J., Hossain, M.M., Viddin, M.M., Paul, S. and Howlader, M.M. (2010) Pathological investigation of liver fluke infection of slaughtered black bengal goat in a selected area of Bangladesh. *Bangladesh J. Vet. Med.*, 8(1): 35-40.
19. Morsy, T.A., Salem, H.S., Haridy, F.M., Rifaat, M.M., Abo-Zenadah, N.Y. and Adel El-Kadi, M. (2005) Farm animals’ fascioliasis in Ezet El-Bakly (Tamria center) Al-Fayoum governorate. *J. Egypt. Soc. Parasitol.*, 35: 825-832.
20. Pfiokenyi, D.M. and Mukaratiwe, S. (2004) A retrospective study of the prevalence and seasonal variation of Fasciola gigantica in cattle slaughtered in the major Abattoirs of Zimbabwe between 1990 and 1999. *Onderstepoort J. Vet. Res.*, 71: 181-187.
21. Mellau, L.S.B., Nonga, H.E. and Karimuribo, E.D. (2010) A slaughterhouse survey of liver lesions in slaughtered cattle, sheep and goats at Arusha, Tanzania. *Res. J. Vet. Sci.*, 3: 179-188.
22. Haridy, F.M., El-Sherbiny, G.T. and Morsy, T.A. (2006) Some parasitic flukes infecting farm animals in Al-Santa center, Gharbia governorate, Egypt. *J. Egypt. Soc. Parasitol.*, 36: 259-264.
23. Afrahosravi, E.B. (2011) Epidemiology of Fasciola hepatica in Iran. *Int. J. Biol.*, 4(4): 87.
24. Mungube, E., Bauni, S., Tenhagen, B.A., Wamae, L., Nginyi, J. and Mugambi, J. (2006) The prevalence and economic significance of Fasciola gigantica and Stiltesia hepatica in slaughtered animals in the semi-arid coastal Kenya. *Trop. Anim. Health Prod.*, 38: 475-478.
25. Soliman, F.M. (2008) Epidemiological review of human and animal fascioliasis in Egypt. *J. Infect. Dev. Ctries.*, 2(3): 182-189.
26. Agedokun, O.A., Ayinmode, A.B. and Fagbemi, B.O. (2008) Seasonal prevalence of Fasciola gigantica infection among the sexes in Nigerian cattle. *Vet. Res.*, 2(1): 12-14.
27. Oryan, A., Maryam, M., Mozzeni, M., Nikahval, B. and Barbhand, S. (2011) Liver flumoliosis in cattle, sheep and goats of Northeastern Iran. *Glob. Vet.*, 6(3): 241-246.
28. Mochkaneh, M.A. and Robertson, I.D. (2016) A retrospective study of the prevalence of bovine fasciosis at major abattoirs in Botswana. *Onderstepoort J. Vet. Res.*, 83(1): a1015.
29. WHO. (2007) Report of the WHO Informal Meeting on use of Triclabendazole in Fasciolosis Control. WHO, Geneva, Switzerland.
30. Spithill, T.W., Smooker, P.M. and Copeman, D.B. (1999) Fasciola gigantica: Epidemiology, control, immunology and molecular biology. In: Dalton JP, editor. Fasciolosis. CABI Publisher, Wallingford, Oxon, UK, p465-525.

**********