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Prevalence of Sheep Liver Hydatid Cyst in the Northwest Region of Iran

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Abstract: Iran is one of the endemic areas of echinococcosis and as Northwest region of Iran is one of the biggest territories for rearing domesticated animals, the present aim was to determine the prevalence of hydatid cysts in slaughtered sheep in northwest region of Iran. In this study sheep livers were investigated pathologically at the municipal slaughterhouse of Tabriz, Northwest region of Iran, with prevalence value of 23.57%, being recorded. Prevalence was higher in under 1 year old sheep compared with over 1 year old sheep. This study showed sheep are the most important intermediate hosts for *Echinococcus granulosus* in this area. The high prevalence of the cysts in sheep suggests that sheep clearly have an important role to play in the continuation of the *E. granulosus* life cycle in Northwest Iran.

Key words: *Echinococcus granulosus*, histopathology, liver, sheep, Iran

INTRODUCTION

Echinococcosis is a zoonotic infection caused by *Echinococcus granulosus*, which is a small tapeworm and in the natural cycle, dogs and other canids are typical definitive hosts and ungulates, including sheep, goats, pigs and horses, are intermediate hosts in which hydatid cysts occur. The latter stage can also develop in humans (Eckert and Deplazes, 2004). Although *E. granulosus* penetrates deep between the villi of the small intestine of the definitive host, there are no pathogenic effects even in heavy infections (Eckert *et al.*, 2001), suggesting that infected definitive hosts are asymptomatic carriers of the parasite. Furthermore, infections with *E. granulosus* cysts in the intermediate host are typically asymptomatic, except for a small number of cases with chronic and heavy infections. In sheep and other herbivores the cysts can reach 4 cm in size. They contain watery fluid and material called hydatid sand, which looks like sand but consists of the young stages of the parasite. Old cysts can look like tuberculosis lesions or abscesses. The most common site for the cysts is the liver, less commonly brain, lungs and kidneys are affected. The heart and bone are uncommonly affected.

There are no reliable methods for the routine diagnosis of infections in living animals, but in rare cases cysts have been identified by ultrasonography alone or in conjunction with serum antibody detection (Eckert *et al.*, 2001). A new ELISA with a high specificity and a sensitivity of 50-60% might be useful for detecting *E. granulosus* cysts in sheep on a flock basis but cannot be used for a reliable diagnosis of infected individuals (Kittelberger *et al.*, 2002). The most reliable diagnostic method is cyst detection during meat inspection or at post-mortem examination. Cystic echinococcosis in farm animals causes considerable economic problems due to loss of edible livers. Significant losses of meat and milk production and fleece values from infected sheep may also occur. These losses are of special significance in countries with low economic outputs where sheep production is of particular importance (Torgerson *et al.*, 2001).

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This disease is an important zoonosis. It represents a serious public health problem and has an important effect on the economy and social welfare in Iran. On the other hand, economical losses are also very important. The cost was estimated to about US\$ 1500 for one surgical operation.

Iran is one of the endemic areas of echinococcosis and as Northwest region of Iran is one of the biggest territories for rearing domesticated animals, the present aim is to determine the prevalence of hydatid cysts in slaughtered sheep in northwest region of Iran.

MATERIALS AND METHODS

In this study sheep livers were investigated pathologically at the municipal slaughterhouse of Tabriz, Iran. All sheep were on semi intensive system and originated from small farms in the villages. Most of these sheep were males. The study was conducted from July 2004 to September 2004. Samples was collected from 140 sheep slaughtered (Systematic Random Sampling) at the municipal slaughterhouse of Tabriz, Iran. All samples were fixed in 10% formalin buffer, processed with H and E routine techniques at the histopathology lab of Islamic Azad University, Shabestar Branch, Iran.

RESULTS AND DISCUSSION

In present study, in Tabriz, hydatid cyst was found in 23.57% out of 140 sheep livers. The highest prevalence value was found in sheep (34.21%) under 1 year old (Table 1).

Macroscopic Features

The majority of sheep harboured 1-10 cysts in the liver, although heavy infections (10 cysts) invariably occurred in the liver. The highest offal condemnation was seen in the livers of sheep. The cysts were 4 cm in size and they contained watery fluid.

Microscopic Features

Epithelial Lining

The epithelium that most frequently formed the lining of cyst was cuboidal. The adjacent cysts the walls contained bile duct tissue. As to the hydatid cysts, all had the characteristic inner germinative layer and a connective tissue and various cellular elements (Fig. 1).

Cystic Fluid

The fluid from the cysts was usually clear and yellow. The hydatid cysts contained fluid that was under higher pressure, colorless and alkaline. The cysts contained watery fluid and material called hydatid sand, which looks like sand but consists of the young stages of the parasite (Fig. 2).

Hydatid disease is an important medical and veterinary problem in Iran. Domestic intermediate hosts (cattle, sheep, goats and buffaloes) are major reservoirs for the disease in humans. The widespread distribution and nature of the life cycle of *E. granulosus* suggest that there will always be a risk of re-introducing the cestode as long as live animals are imported. One of the territories from which Tehran (the capital city of Iran) imports live ruminants is Northwest Iran where hydatidosis

Table 1: The prevalence rate (%) of hydatid cyst in slaughtered sheep

Age (year)	Sheep		
	No. of examined sheep liver	No. of infected sheep liver	Percent of infected sheep liver
<1	38	13	34.21
>1	102	20	19.60
Total	140	33	23.57

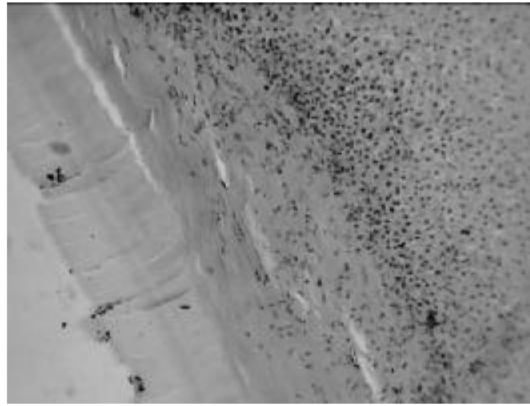


Fig. 1: Photomicrograph of hydatid cyst in a sheep liver. Thick fibrous pericyst, hyaline ectocyst (x660 H and E)

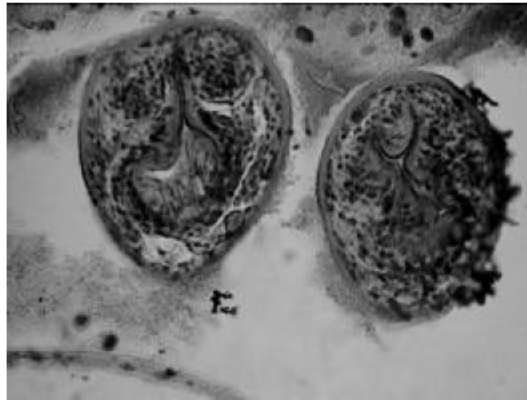


Fig. 2: Photomicrograph of hydatid sand in a sheep liver (x660 H and E)

is widespread in domesticated farm animals. Diagnosis of hydatid in intermediate hosts is hindered by the absence of reliable tests for use in live animals. Although various imaging techniques have been used for the diagnosis of cystic hydatid disease in humans, there are problems associated with their application to ruminants. Most prevalence studies have relied on slaughter data (Macpherson, 1981; Baldock *et al.*, 1985), as these are an economical way of collecting and analysing information on livestock disease, particularly subclinical conditions. Also, lesions of hydatid cyst usually remain for the life of the animal and so, at post-mortem it is possible to tell whether or not an animal is infected (Njoroge *et al.*, 2000). Considering the Iran as one of the endemic area of echinococcosis, three cycles of *E. granulosus* have been suggested there; a domestic cycle between dogs and livestock, a desert cycle between dogs and camels and a sylvatic cycle between wild carnivores and wild ruminants. Dalimi *et al.* (2002) reported that the mean prevalence of hydatidosis of sheep in various parts of Iran was 8.1% with a range of 1 to 27.5%. The prevalence in cattle was 38.3%, with a mean prevalence of 12% (1-28%) in cattle in different parts of Iran. Up to 20% of goats were infected with a mean prevalence of 6.5% (0.5-20%). Up to 11.9% of buffaloes were infected with a mean prevalence of 17.3% (1.5-57.8%). According to our results, 23.57% of the sheep were found infected with hydatid cyst. The cysts were, pleomorphic either unilocular or multilocular forms of similar rates.

Hydatidosis is a common disease in the Middle East, especially in countries neighbouring Iran. In Iraq, prevalence values of 4.5-44% in sheep, 3.1-26.7% in goats and 4.3-13.9% in cattle have been reported (Molan, 1993; Saeed *et al.*, 2000). In Turkey, 26.6% of sheep, 22.1% of goats and 13.5% of cattle were infected with this disease (Umur, 2003). In Kuwait, 0.2-11.2% of sheep, 5% of goats, 32.5-40.2% of cattle (Hassounah and Behbehani, 1976) and in Pakistan, 5.5-9.6% of cattle, 8.3% of sheep, 7.5% of goats and 12.3-49% of buffaloes were infected (Munir *et al.*, 1982; Khan and Haseeb, 1984). Prevalence values in India were 8.9-69.0% of buffaloes, 9.7-68.9% of cattle, 2.3-93.3% of sheep and 1.1-72.7% of goats (Mathur and Khanna, 1977; Prasad and Mandal, 1978; Abraham *et al.*, 1980; Kosalaraman and Ranganathan, 1980; Prabhakaran *et al.*, 1980; Islam, 1981; Deka *et al.*, 1983, 1985; Rao, 1985) and in Syria, 4.5% of sheep, 2.3% of goats and 5.2% of cattle were infected (Dajani, 1978). In the present study, sheep, apart from being the most frequently infected, are the most slaughtered animals for human consumption in abattoirs in this locality in Iran followed by cattle, goats and buffaloes. Furthermore, offal, especially the liver is usually offered to domestic dogs or is dumped in rubbish bins, outside houses, where stray dogs can easily feed on it.

Farm animals, especially in sheep and cattle, is likely to be related to the presence of green pastures, an abundance of animals, a shortage of industrial animal husbandry and the presence of stray dogs infected with *E. granulosus*. There is only one industrial animal husbandry, Keshtosane Moghan in Northwest region of Iran and unpublished data showed that the prevalence in industrial animals is less than that in traditional animal husbandry, i.e., cattle 0.7%; sheep 4.1% and goats 0%. The low prevalence of hydatidosis in industrial animal husbandry may be explained by using grass cultivated in surrounded farms, where dogs are prohibited. Gusbi *et al.* (1987a and 1990b) and Ibrahim and Craig (1998) also reported that the liver was the predominant infected site in sheep, goats and cattle. In the Middle East, the most common location of hydatid cysts in sheep is the liver followed by the lungs (Al-Yaman *et al.*, 1985; Abdel-Hafez and Al-Yaman, 1989; Abo-Shehada, 1993; Kamhawi *et al.*, 1995).

In conclusion, sheep clearly have an important role to play in the continuation of the *E. granulosus* life cycle in Northwest Iran. Therefore the safe disposal of infected offal, especially of sheep, will significantly reduce the transmission of cysts from slaughterhouses to potential hosts in this region.

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REFERENCES

- Abdel-Hafez, S.K. and F.M. Al-Yaman, 1989. Spleen hydatidosis in sheep from north Jordan. *Vet. Parasitol.*, 30: 191-196.
- Abo-Shehada, M.N., 1993. Some observations on hydatidosis in Jordan. *J. Helminthol.*, 67: 248-252.
- Abraham, J., K.M. Pillai and R.P. Iyer, 1980. Incidence of hydatidosis in animals slaughtered in Kerala. *Kerala J. Vet. Sci.*, 11: 247-251.
- Al-Yaman, F.M., L. Assaf, N. Hailat and S.J. Abdel-Hafez, 1985. Prevalence of hydatidosis in slaughtered animals from North Jordan. *Ann. Trop. Med. Parasitol.*, 79: 501-506.
- Baldock, F.C., R.J. Arthur and A.R. Lawrence, 1985. A meatworks survey of bovine hydatidosis in southern Queensland. *Aust. Vet. J.*, 62: 238-242.

- Dajani, Y.F., 1978. Prevalence of hydatid disease in Syria and Jordan: Preliminary results. Trans. Royal Soc. Trop. Med. Hyg., 72: 320-321.
- Dalimi, A., G.H. Motamedi, M. Hosseini, B. Mohammadian, H. Malaki, Z. Ghamari and F.G. Far, 2002. Echinococcosis/hydatidosis in western Iran. Vet. Parasitol., 105: 161-171.
- Deka, D.K., G.C. Srivastava and R.C. Chhabra, 1983. Incidence of hydatidosis in ruminants. Indian J. Anim. Sci., 53: 200-202.
- Deka, D.K., M.R. Borkakoty and B.C. Lahkar, 1985. Cysticercosis in domestic animals in Northeastern region of India. Indian J. Parasitol., 9: 83-85.
- Eckert, J., P. Deplazes, P.S. Craig, M.A. Gemmell, B. Gottstein, D. Heath, D.J. Jenkins, M. Kamiya and M. Lightowers, 2001. Echinococcosis in Animals: Clinical Aspects, Diagnosis and Treatment. In: WHO/OIE Manual on Echinococcosis in Humans and Animals: A Public Health Problem of Global Concern. Eckert, J., M.A. Gemmell, F.X. Meslin and Z.S. Pawlowski (Eds.), World Organisation for Animal Health, Paris, pp: 72-99.
- Eckert, J. and P. Deplazes, 2004. Biological, epidemiological and clinical aspects of Echinococcosis, a zoonosis of increasing concern. Clin. Microbiol. Rev., 17: 107-135.
- Gusbi, A.M., M.A.Q. Awan and W.N. Beesley, 1987. Echinococcosis in Libya. II. Prevalence of hydatidosis (*Echinococcus granulosus*) in sheep. Ann. Trop. Med. Parasitol., 81: 35-41.
- Gusbi, A.M., M.A.Q. Awan and W.N. Beesley, 1990. Echinococcosis in Libya. IV. Prevalence of hydatidosis (*E. granulosus*) in goats, cattle and camels. Ann. Trop. Med. Parasitol., 84: 477-482.
- Hassounah, O. and K. Behbehani, 1976. The epidemiology of *Echinococcus* infection in Kuwait. J. Helminthol., 50: 65-73.
- Ibrahim, M.M. and P.S. Craig, 1998. Prevalence of cystic Echinococcosis in camels (*Camelus dromedarius*) in Libya. J. Helminthol., 72: 27-31.
- Islam, A.W.M.S., 1981. Echinococcosis in goats. Indian Vet. J., 58: 999-1000.
- Kamhawi, S., N. Hijjawi, A. Abu-Ghazaleh and M. Abbas, 1995. Prevalence of hydatid cysts in livestock from five regions in Jordan. Ann. Trop. Med. Hyg., 89: 621-629.
- Khan, D. and M.A. Haseeb, 1984. Hydatidosis of livestock in Pakistan. Folia Parasitologica, 31: 288.
- Kittelberger, R., M.P. Reichel, J. Jenner, D. Heath, M.W. Lightowers, P. Moro, M.M. Ibrahim, P.S. Craig and J.S. O'Keefe, 2002. Evaluation of three enzymelinked immunosorbent assays (ELISAs) for the detection of serum antibodies in sheep infected with *Echinococcus granulosus*. Vet. Parasitol., 110: 57-76.
- Kosalaraman, V.R. and M. Ranganathan, 1980. A survey of disease condition of lungs of buffaloes. Cheiron, 9: 281-284.
- Macpherson, C.N.L., 1981. Epidemiology and strain differentiation of *Echinococcus granulosus* in Kenya. Ph.D Thesis, University of London.
- Mathur, K.M. and V.K. Khanna, 1977. Incidence of hydatid disease in sheep and goats in the city of Jaipur. Sci. Cult., 43: 371-372.
- Molan, A.L., 1993. Epidemiology of hydatidosis and Echinococcosis in Theqar province, Southern Iraq. Jap. J. Med. Sci. Biol., 46: 29-35.
- Munir, M.A., A.H. Anwar and A.H. Chaudhry, 1982. The nature and organ specificity of hydatid disease in buffalo (*Bubalus bubalis*). Pak. Vet. J., 2: 12-14.
- Njoroge, E.M., P.M.F. Mbithi, J.M. Gathuma, T.M. Wachira, J.K. Magambo and E.E. Zeyhle, 2000. Application of ultrasonography in prevalence studies of hydatid cysts in goats in Northwestern Turkana, Kenya and Toposaland, Southern Sudan. Onderstepoort J. Vet. Res., 67: 251-255.

- Prabhakaran, P., M. Soman, R.P. Iyer and J. Abraham, 1980. Common disease conditions among cattle slaughtered in Trichur municipal slaughterhouse: A preliminary study. *Kerala J. Vet. Sci.*, 11: 159-163.
- Prasad, B.N. and L.N. Mandal, 1978. Hydatidosis in goats in India. *Philippine J. Vet. Med.*, 17: 191-196.
- Rao, G.K., 1985. Hydatidosis of animals. *Livestock Advisor*, 10: 40-41.
- Saeed, I., C. Kapel, L.A. Saida, L. Willingham and P. Nansen, 2000. Epidemiology of *Echinococcus granulosus* in Arbil province, northern Iraq, 1990-1998. *J. Helminthol.*, 74: 83-88.
- Torgerson, P.R., P.M. Dowling and M.N. Abo-Shehada, 2001. Estimating the economic effects of cystic Echinococcosis. 3. Jordan, a developing country with lower-middle income. *Ann. Trop. Med. Hyg.*, 95: 595-603.
- Umur, S., 2003. Prevalence and economic importance of cystic Echinococcosis in slaughtered ruminants in Burdur, Turkey. *J. Vet. Med. B, Infect. Dis. Vet. Public Health*, 50: 247-252.