

Anatomopathology study of Echinococcosis in slaughtered sheep in the region of Batna (East Algeria)

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Abstract : *Echinococcosis is a disease that causes public health problems and economic losses directly by the organ seizures made at the slaughterhouses or indirectly through fall of productivity in affected animals. The cycle of the parasite threatens the human health because its persistence in the dog facilitates its transmission. It seemed useful to conduct this survey in order to establish an estimate of the prevalence of pulmonary hydatid cysts through the study of infested lungs examined at the slaughterhouse of Batna. The present study was conducted in the municipal abattoir, to determine the prevalence of hydatid cysts in lungs of sheep slaughtered from March to September 2013. A total of 7420 sheep including 7289 males (less than 01 year of age) and 131 females (more than 03 years of age) were slaughtered and examined for the prevalence echinococcosis.*

The prevalence of echinococcosis was 0.013% for males (01/7289) and 37.40% for females (49/131). The prevalence of the hydatid cysts in lungs of females varied significantly according to season and host age ($P < 0.001$). The sheep play an important role in maintaining of the parasite cycle especially females because they are kept for a longer time for breeding and slaughtered only after the reform age, which increases the possibility of the development of hydatid cyst.

Key words: *Hydatid cysts, Prevalence, Sheep, Algeria.*

Introduction Echinococcosis is a major zoonotic disease. The common sheep/dog cycle is usually considered as a major source of human contamination. Cyst echinococcosis, which is found in small intestine of the dog (Ould Ahmed and al., 2010), is present in Algeria, with a

prevalence ranging from 09 to 41%. (Bentounsi and al., 2009). Hydatidosis is a cosmopolitan disease; it is endemic in most state countries. Lack of infrastructure in the endemic areas of poor countries for monitoring and controlling these diseases makes a serious public health problem (Eckert., 2007). Pulmonary hydatid disease is the consequence of the presence and development of the larval form of a small tapeworm called *Echinococcus granulosus*. The adult is usually found in dogs (Jaiem., 1984). The *Echinococcus granulosus* is a cestode. This parasite is present in the adult stage in the dog's small intestine. Following the ingestion of infested organs by *Echinococcus granulosus*.

herbivores develop the hydatid cyst after feeding by grass or water contaminated with the eggs of the parasite that are eliminated in feces of dogs (Gourreau and Guillot. 2008).

2. Materiel and Methods

Study area: The present work was performed in Batna abattoir and the laboratory of veterinary pathology of the University of Batna-Algeria. Batna city is situated in north-east of Algeria. This region is a semi-arid area characterized by cold and humid winters, hot and dry summers.

Study animal: Data were collected on the sample of slaughtered animals that come from different farms and even regions surrounding Batna city. A total of 7420 sheep were examined to record hydatid cysts during two seasons' spring and summer from March to September 2013. The study of seasonal prevalence of echinococcosis in sheep during 2013 was conducted from statistical register of the slaughterhouse (Figure 03).

Postmortem examination

During this study a plan had been established with three visits per week to examine the lungs of slaughtered sheep for the presence of hydatid cysts. Following slaughter and evisceration, lungs were first examined in situ and thoroughly screened by visual examination, palpation and incision.

Microscopic study

Tissue samples of 4 cm³ in thickness were fixed in 10% neutral-buffered formalin for histopathological examination. The samples were then dehydrated in graded Ethanol and embedded in Paraffin wax. Section of 5mm in thickness were stained with Hematoxylin and Eosin and examined an ordinary light microscope (Luna., 1968).

Statistical analysis

The influence of the risk factors (season and age) on the presence of pulmonary hydatid cyst in slaughtered sheep was evaluated by the Chi-square test (X²) in the software R. The differences are considered statistically significant if the P value is lower than 0.05 (p<0.05).

3. Results and discussion

Out of 7420 sheep slaughtered 50 (0.67%) harbored one or more hydatid cyst in their lungs. The prevalence of pulmonary hydatid cysts was more important in female animals (ewes) with 37.40% (49/131) than in lung of males (lambs) 0.013% (01/7289).

Table 01: Prevalence of *Echinococcus granulosus* in the abattoir of Batna.

	Total	(male) lambs	(femal) Ewes	
Animals examined	7420	7289	131	
Animals infected	50	01	49	
Prevalence (%)	0.67%	0.013%	37.40%	
P value	-	-	<0.001	

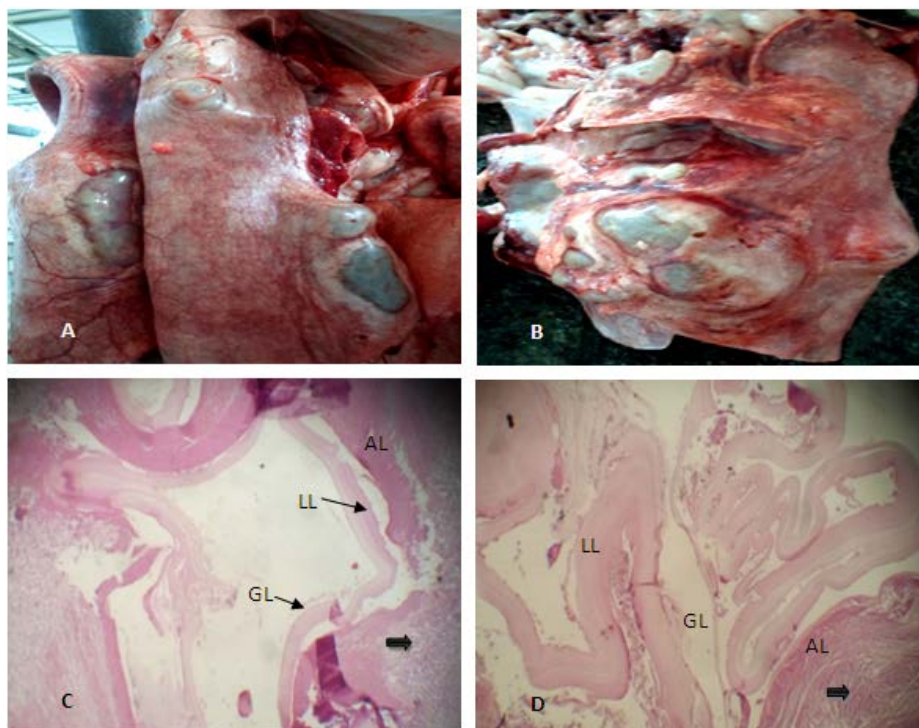


Fig 01: (A) Presence of multiple hydatid cysts with water under pressure in the pulmonary parenchyma with different seize in two lobes of lung. (B) hydatid cysts give a bumpy appearance to the lung surrounded by a fibrous capsule.

Fig 02: (C) and (D) Histological section of hydatid cyst showing that it was composed of an inner germinal layer (GL), a laminated layer (LL) produced by the GL cells, and an adventitial layer (AL) composed of the inflammatory reaction of the host tissue, compressed alveolar parenchyma (thick arrow). (x10) hematoxylin-eosin staining.

These results are higher than those reported by Elemayehu in 2013 (0.2% prevalence of pulmonary hydatid cyst in Ethiopia) (Elemayehu., 2013) and Magaji, 2011 (rate of 0.14% at abattoir in Niger) (Magaji and al., 2011).

Such a result contradicts with the results of Seimenis, who reported a higher incidence of hydatid cysts in sheep in Algeria 69.8% (Seimenis. 2003), Haridy, 2000 reported that the prevalence in Egypt was 04.8% (Haridy and al., 2000), Blaise 02.10% (Blaise. 2001), Cabrera 08% (Cabrera and al., 2003) Jibat in Ethiopia 03.3% (Jibat and al., 2008), a prevalence value of 03.19% is reported from a study in many abattoirs in East of Algeria realized by (Kayouche., 2009), Ibrahim showed 12.61% prevalence in slaughterhouse in Al Baha region - Saudi Arabia (Ibrahim., 2010), Belkhiri found 13.06% prevalence at abattoir in west Algeria (Belkhiri., 2010), Gab-Allah in Egypt 03.93% (Gab-Allah and Sahar., 2010), 19.2% rate showed by Mellau in Tanzania (Mellau and al. 2010), Ould Ahmed in Mauritania 5.6% (Ould Ahmed and al., 2010), Parsaei and Mojtaba in Iran found a prevalence of 09.47% and 47.32% respectively (Parsaei and al., 2012; Mojtaba and al., 2013), Kouidri in Tiaret (west of Algeria) with a prevalence of 06.94% (Kouidri and al., 2013), and Tasawar in Pakistan with 07.39% (Tasawar and al., 2014).

The prevalence of pulmonary hydatid cysts in lambs was lower in this study 0.013%. This result was in accordance with the observations made by Azlaf and Dakkak in Morocco, who found a lower rate of hydatid cyst in young sheep.

Such outcome is explained by the fact that North African populations prefer meat of young sheep. (Azlaf and Dakkak., 2006).

In fact; Bussieras and Chermette (1997) assert that cysts develop in 8 months.

The slaughtering of young sheep generally occurs before the larvae have been fully developed (Jaiem., 1984).

The development of the larva is very slow, and its fertility is only acquired in 12 to 18 months after ingestions of eggs (Euzéby, 1971; Soule. 1994).

For these reasons, the inspection of slaughtered young sheep (aged 12 months and under) shows no observable hydatid cysts.

In sheep, the maturation of cysts is slow (Gammel., 2001). However, they are more

frequently observed in old sheep than in young ones (Cabrera and al., 2003; Zanini and al., 2006; Esatgil and Tuzer, 2007).

Older sheep are generally represented by ewes that are more susceptible to the hydatid cyst infestation than males (lambs), because the infestation is proportional to the animal's age.

Females are kept for breeding and are slaughtered only after the reform age, which increases the possibility of the development of hydatid cyst, thus the importance of older animals for parasitic cycle maintenance (Euzéby, 1971; Soule. 1994).

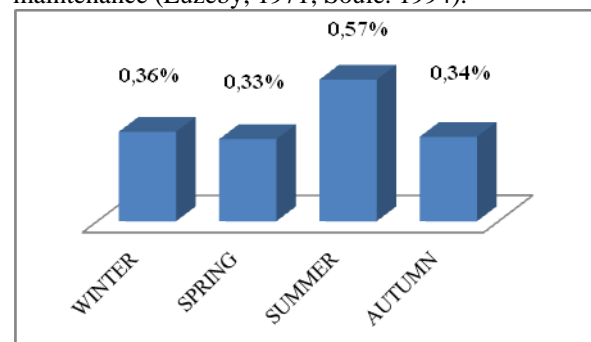


Figure 03: Seasonal prevalence of hydatidosis in slaughtered sheep during 2013.

The highest incidence of hydatid cyst was found in summer (0.57%), followed by autumn (0.34%).

The lowest was noticed in spring (0.33%).

These seasonal variations were statistically significant ($P < 0.005$) (Fig.03).

In 2013, 44150 sheep were slaughtered 710 (1.61%) were found harbored hydatid cyst. Seasonal prevalence was recorded in sheep, it was statistically different during all the four seasons ($P < 0.005$) of the year 2013. Seasonal analysis showed the highest prevalence in summer and the lowest prevalence of infection in spring (0.57% and 0.33%, respectively). The hydatid cyst is responsible of considerable economic losses, especially if we refer to the organ seizures made at the slaughterhouses, and to the decrease in the quality of such productions such as milk, meat and wool (Acha and Szyfres., 1989; Soule, 1994) and increased mortality rates and also weight loss (Neghita and al., 2010).

In summary it can be concluded that sheep play an important role in the dissemination of the hydatid cyst especially ewes due to their high infection. To break the parasite cycle, we must reduce the contact of dogs with livestock, and deworm the dogs regularly. Control the transmission of hydatid

cyst at the slaughterhouse, and that by the safe disposal of infectious waste, especially of sheep to reduce the infestation of definitive hosts by the larvae of echinococcosis in this region.

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