Comparative studies of prevalence of the hydatid cysts, as well as viability and fertility of the protoscoleces depending on the location of different organs in ruminants in the Middle Atlas region of Morocco

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Abstract

Hydatidosis cystic is highly endemic parasitic zoonosis in Morocco, affects humans and various animal species. This study concerned hydatid disease infestation prevalence, and shows the relationship between cyst localization in organs and the fertility of cysts as well as viability of their protoscoleces. A post mortem examination of 1834 ruminants (342 cattle, 805 sheep and 687 goats) was carried out at slaughterhouses in the province of Khénifra, 926 hydatid cysts (359 cattle, 507 sheep and 60 goats) were collected for the fertility and viability test, by microscopic analysis using 0.2% eosin staining. Results indicated a high prevalence of E. granulosus accounting for 29.82% in cattle, 13.29% in sheep and 2.36% in goats, with a highly significant association (P = 0.00) between prevalence and age. The most frequent site of cysts is lung for cattle and liver for sheep and goats. Location at the right lung (54.63% cattle, 53.72% sheep and 52% goat) is slightly higher than at the left lung (45.37% cattle, 46.28% sheep and 48% goats) with a favored location at the caudal lobe for the three examined species. Cysts favored location at the right and left liver lobes was also recorded for the three species. The large-sized cysts were recorded in cattle which were found to harbor hydatid cysts than sheep and goats. The fertility percentage in cysts was very high in sheep compared to goats and cattle (liver: 52.17%, 23.81%, 5.41%; lung: 55.28%, 16.67%, and 1.61%, respectively). Protoscolex viability was high in sheep and goats compared to cattle (liver: 84.97%, 74.55%, 53.54%; lungs 78.59%, 72.62%, 45.83%, respectively) with a higher average number of protoscolex per ml in sheep (572 in liver and 738 in lung). Among the three examined species, sheep are the most important transmission source of the disease to dogs and therefore indirectly to humans. This result may be explained by the dominance of the ovine strain in Morocco.

Key words: Hydatid disease, cattle, sheep, goats, prevalence, protoscolex, fertility/viability.
Objectively verifiable indicators for maintaining the level of incidence of hydatidosis in Morocco

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Abstract

Hydatidosis is a parasitic disease caused by Echinococcus granulosus. It is one of the most frequent parasitic diseases in Morocco, and is a major public health problem, that has a considerable socio-economic impact. In 2005, a national hydatidosis control program has been established to reduce the impact of the disease through the application of several prophylactic measures; and an interministerial committee formed by decision-makers from the Ministry of Health, Ministry of Agriculture and the Ministry of the Interior. This work reveals the result of the control program and presents effective intermediate solutions adapted to the Moroccan context. In 2007, the national disease control program was founded. The target set for 2015 is to reduce by 50% the incidence of hydatid disease, it’s mean a rate of 2,8 cases per 100 000 inhabitants. This program is based on three axes: 1) The application of preventive measures to interrupt the life cycle within hosts and between the final host and the intermediate hosts 2) Early detection of people with hydatid cyst 3) The availability of appropriate legislative and regulatory arsenal. Field investigations show that, to date, these objectives are far from being achieved, as the results of a retrospective survey carried out among the various services and with the actors involved in this program, revealed that since then 2007 until 2017 the incidence of the hydatid cyst in humans is maintained constant mainly in the province of Khénifra with an incidence rate of 8,62 per 100 000 inhabitants. This result is explained by the lack of coordination between the various services involved in this struggle and by the lack of awareness of the population in rural areas. As in humans, the incidence in animals is stagnant, and the prevalence is very high. Moreover, field-generated results in some slaughterhouses in Khénifra province have shown a high prevalence of E. granulosus infestation in animals, estimated at 29,82% in cattle, 13,29% in Sheep and 2,36% in goats and even higher prevalence in older animals, prevalence of 62,5% in cattle, and 46,72% in sheep, while in dogs the average prevalence is 23,7%, this prevalence is less than that of stray dogs that are still abundant in several sites and have easy access to infested offal at slaughterhouses. We found that in stray dogs, one dog in two, hosts the parasite of E. granulosus with a prevalence of 49%. This can only be explained by the lack of hygiene and infrastructure in these premises and the fight against the adult stage in the definitive host. Co-operation between the different stakeholders is recommended in order to make the right decisions in a possible new hydatidosis control program, which needs to be reinforced by new and more effective control measures, integrating the human factor that remains crucial for the success of any program. Vaccination of the intermediate host (a field trial is under way), regular monitoring of the preventive chemoprevention in the final host and even companions of dogs sterilization (to reduce the canine population) which are the main source of human and animal contamination.

Keywords: hydatidosis, Morocco, incidence, prevalence, control.