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Alveolar Echinococcosis (AE): An Important Neglected Foodborne Pathogen Threatening Community Health

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Alveolar echinococcosis (AE) caused by Echinococcus multilocularis can infect humans as a dead-end host. They matured in canid's intestine (e.g. foxes, jackals, wolves, dogs, cats, etc.). AE is seen across the world. It has a high prevalence in the central and northern parts of Europe, North America and Asia. The prevalence of AE was low in the past, even in hyper endemic regions. But in recent decade, unfortunately, it seems to increase and spread rapidly. One of the most important reasons is the development and expanding of cities and villages, which lead to jackals and foxes colonization and migration to urban locations. This helps them to have closer connection with human population, canids and other appropriate hosts for dispreading the infection. In the present study, we discuss about the life cycle of *E. multilocularis* and its etiology and epidemiology as an important neglected zoonotic parasite. In canid as final hosts, infection is not malignant and significant clinical signs are usually never seen, unless in very unusual heavy infections. However, in contrast, infection in humans is very dangerous, and even more serious than another widespread species, Echinococcus granulosus that causes cystic echinococcosis (CE) [(1)].

Although human infected cases are less than cystic echinococcosis, but due to the dangerous nature of this disease with a high mortality, it has a special place in public health. Actually, alveolococcosis is highly lethal and is one of the most fatal human parasite. For 20 years from 1990 to 2010, it caused close to 1200 cases of human deaths [(2)]. Development of alveolar hydatid cyst takes several months and even years. It often occurs in vital organs causing a cancer-like destruction, especially in the liver which is called white liver cancer, but it can metastasize and spread to other parts of intermediate host tissues. Separation of a part of cyst's germinal layer and moving through the blood stream to other organs is the cause of the severity of this chronic disease and its poor prognosis. Slow growth without representing specified symptoms is a bad problem for intermediate host. Although in the progressive level of the disease, it causes pains and discomfort in right abdominal region with some symptoms such as cirrhosis.

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In Iran, for the first time in 1964, the presence of alveolococcosis in rodents was reported by Alavi and Maghami [3]. Thereafter, several reports have been reported by different researchers from red fox, jackals and wild cats from Ardebil province, especially in Mugan plain. Also, the first human case reported in Iran was from the liver of a 35 years old man from Mugan [4]. Unfortunately after that, several human cases not only from Ardebil province but also from another part of the country were reported. Recently, Berenji et al (2007) and Raiesolsadat et al (2010) both from Khorasan Province reported two human cases for the first and second time in this region, respectively [5, 6]. The presence of this parasite in new provinces along with different reports from the whole country could represent the spreading of infection in Iran like other parts of the world and can be a serious warning for more comprehensive surveys.

Human infection by AE mostly occurred as a result of eating fruits and vegetables especially grapes and raspberries which are contaminated with stools of infected host. In Iran, the cycle of *E.* multilocularis is predominantly sylvatic and foxes and jackals are the most important definitive host which mostly contaminate vineyards, raspberries, strawberries and blueberries when they visit these locations for hunting rats thereby spreading the eggs of the *E.* multilocularis. Also, another way the infection can be contracted is through contact with infected dogs or cats which is caused by accidentally swallowing the eggs by “hand-to-mouth" especially by children when playing with infected pet [7].

The best way to completely treat AE is removal surgery of alveolar cysts with chemotherapy and monitoring the patients for two years after surgery. So like other diseases, prevention is more logical than treatment. Then it seems thorough washing and disinfection of vegetables and fruits is a very simple but important primary solution for preventing AE [8].

Control and prevention of alveolococcosis because of two wild and domestic cycles is very complex. In domestic cycle, regular antihelminthic drugs such as appropriated taenicides for domestic carnivores could help reduce the infection. On the other hand, Japanese and European studies results show that deworming of wild final hosts with anti-taenia baits in wild cycle has significant effect on reducing the prevalence in human population [9]. Also reducing the number of wild definitive host is advisable, although this method is controversial due to issues such as animal rights. Therefore, there is need to be more cautious about carrying out that procedure. Finally, due to increase prevalence of the disease in the world and especially in Iran compared to previous years, more measures and studies by health organization on this important neglected emerging threat to our public health seem necessary.

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