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1. Overview on echinococcosis

Echinococcosis is a zoonotic helminth disease. First, description goes back to 1684 when Francesco Redi has first described the scolex. Then, in 1700s, Philip Jacob Hartmann has defined in an adult form. Since intercontinental travelling is very common, it has been an important health problem in the last decades. Although it has been known for many years, it keeps its peculiarity [1–3].

_Echinococcus_ belongs to Cestoda (class) and the Taeniidae (family). There are four most common species: _Echinococcus granulosus_, _Echinococcus multilocularis_, _Echinococcus vogeli_ and _Echinococcus oligarthrus_. The most common one is _E. granulosus_, causing cystic echinococcosis (CE), whereas _E. vogeli_ is the rarest species. _E. multilocularis_ is also rare; however, it is the most violent species causing alveolar echinococcosis (AE). _E. vogeli_ and _E. oligarthrus_ cause polycystic echinococcosis (PE). There are other species of _Echinococcus_; _Echinococcus canadensis_, _Echinococcus equinus_, _Echinococcus ortleppi_ and _Echinococcus shiquicus_. There are also many different genotypes of each species; _E. granulosus_ has 10 genotypes (G1–G10), whereas _E. multilocularis_ has two genotypes (M1–M2) [4, 5].

Echinococcosis is very widely distributed in all over the world; CE is found in North Pole, Asia, Europe, Africa, Australia and South America. AE is found in Alpine and sub-Arctic or Arctic regions, including Canada, the United States and Central and Northern Europe, China and Central Asia. PE is found in Central and South America [4, 6, 7].

Humans are not definitive hosts; however, two forms of echinococcosis important in humans are CE and AE. Although most people with the disease are asymptomatic, CE causes slowly growing cysts in the liver, lungs and other organs that can be undiagnosed for many years. AE, however, poses a much greater risk than CE, causing parasitic tumors in many organs and can be fatal, if left untreated [4, 6].
The diagnosis of echinococcosis is based on clinical findings, pathology, imaging and serology. There are numerous diagnostic methods for lab diagnosis of echinococcosis. The diagnosis of echinococcosis is based on clinical findings, imaging (radiology, ultrasonography, computed axial tomography, magnetic resonance imaging) [8, 9] and serology tests such as indirect hemagglutination (IHA) [10], enzyme-linked immunosorbent assay (ELISA), IgG-ELISA [11–13] or IgE-ELISA [14], immunoblotting (IB), Western blot 7 kDa and/or 18 kDa for CE and 28 kDa for AE [15] and E. multilocularis for diagnosis of Em2plus-ELISA [16], Em18 [17, 18], Em70 and Em90 [19]. On the other hand, various techniques such as random amplification of polymorphic DNA (PCR-RAPD), restriction fragment length polymorphism (PCR-RFLP) [20, 21] and multiplex PCR for a quick identification were used to determine genetic variations [22, 23].

Therapy for echinococcosis depends on the size, location and symptoms of the cysts and the overall health of the patient. There are medical and surgical approaches; however, medical approach—basically albendazole—is a neoadjuvant and adjuvant therapy. It reduces the risk of recurrent disease by the inactivation of the protoscolices. Surgery is the principle treatment modality [24, 25].

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