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Chapter 1

# Introductory Chapter: Overview on Echinococcosis

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http://dx.doi.org/10.5772/intechopen.70583

## 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].

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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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