

**ANAPHYLACTIC DEATH CAUSED BY LIVER HYDATID CYST RELYING ON THE IMPORTANCE OF AUTOPSY – A CASE REPORT**Sajjad Sadeghi<sup>1,2\*</sup> <sup>1</sup>Department of Forensic Toxicology, Legal Medicine Research Center, Legal Medicine Organization, Tehran, Iran. <sup>2</sup>Food and Drug Administration, Semnan University of Medical Sciences, Semnan, Iran. E-mail: sajjadsasa@gmail.com

Received: 15 May 2024, Revised and Accepted: 23 June 2024

**ABSTRACT**

Hydatid cyst is a common disease between humans and dogs as the main host and sheep as the intermediate host with the parasitic agent *Echinococcus*. There have been reports of hydatid cyst rupture spontaneously or following trauma. Autopsy, as the best way to determine the cause of death, can be the witness of the occurrence of a crime or an event. In the current study, a child death, that occurred as a result of a collision with another child at school, was investigated after his father complained to the school principal, and an autopsy was performed by forensic medicine. In forensic reports, the cause of death was anaphylactic shock due to a cyst in the right lobe of the liver. According to the pathology report, the cause of the liver cyst was a parasitic infection of *Echinococcus granulosus*.

**Keywords:** Hydatid cyst, *Echinococcus granulosus*, Liver cyst, Autopsy, Case report.

© 2024 The Authors. Published by Innovare Academic Sciences Pvt Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>) DOI: <http://dx.doi.org/10.22159/ijms.2024v12i4.51549>. Journal homepage: <https://innovareacademics.in/journals/index.php/ijms>

**INTRODUCTION**

The most prevalent and serious human cestode infection in the world is the hydatid cyst. In terms of the prevalence of this disease, Iran is located in the hyperendemic region [1,2]. Hydatid cyst is a parasitic disease of *Echinococcus* species that is common between humans and animals [3]. Humans are random hosts and the most common organs involved in humans are the liver and lungs [4]. Humans are typically infected through ingestion of *Echinococcus granulosus* eggs excreted in dog feces [2]. In hepatic hydatid cysts, symptoms such as abdominal discomfort, jaundice, and weight loss are common [3]. Cyst rupture can occur spontaneously or following a trauma [2]. It can sometimes be accompanied by systemic symptoms of *Echinococcus* and a fatal anaphylactic reaction. It usually remains asymptomatic until the cyst grows large enough and complicated [2]. In a sensitive person, a threatening anaphylactic response appears within a few minutes after exposure to a specific antigen and shows itself with respiratory distress, laryngeal edema, or severe bronchospasm followed by vascular collapse or shock without previous respiratory distress [2]. In all countries, suspicious deaths need forensic examination, the intervention of the police, the law enforcement, and the judiciary [5]. Hard and severe deaths, which take the form of a crime, suicide, or incident, demand an autopsy [5]. The current study aims to increase the awareness of hydatid cyst infection as a health problem in North Khorasan province and also to count the importance of autopsy to determine the cause of death.

**CASE REPORT**

An 8-year-old boy, inhabitant of Raz and Jargalan in North Khorasan province, Iran, had a seizure a few minutes later due to a collision with another child from the right side of his body at school. He was unable to speak and he had a bowel movement, a large amount of foam came out of his mouth and he died at the scene before the emergency team arrived. After his father complained to the school principal due to negligence and the death of his child as a result of collisions with another child, the body was referred to forensic medicine to determine the cause of death. An autopsy, which was performed at Bojnourd Forensic Medicine Center, reported that the child had abrasions on the lower right side of the chest – the 10<sup>th</sup> and 11<sup>th</sup> ribs – and on the outside of the right knee. There was also a slight subcutaneous and subgaleal hemorrhage in the middle of the forehead. At the autopsy, the liver appeared larger

than normal without rupture. After making an incision on its surface, 40–50 cc of clear fluid was extracted and a small cyst with a diameter of 2 cm and a large circular cyst with a diameter of approximately 6 cm, in which a large number (more than 10) of smaller white oyster cysts with different diameters of 0.5–4.5 cm were visible, were observed.

A slight hemorrhage was visible on the outer surface of the right kidney capsule. In the pathology examination of the liver sample, it was reported that three-layered cysts with a thick fibrotic outer layer that is highly inflamed and bloody appear to be ruptured and injured in areas, along with inflamed peripheral tissue of the liver and a membrane layer inside the germinal layer with a number of protoscolices daughter cysts on its surface which indicates a highly inflamed and injured hepatic hydatid cyst of the liver and inflamed echinococcal cysts.

**DISCUSSION**

Human hydatidosis is endemic in the northeast of Iran [6], and hydatid cyst is still a major health problem in North Khorasan province. Thiabi et al. (2017) reported a case of a large hydatid cyst (117 × 96 mm) in a 26-year-old woman, an inhabitant of Esfarayen in North Khorasan province [3]. Shahkaram and Sabzevari (2017) reported a hydatid cyst (48 × 39 mm) in a 46-year-old woman, an inhabitant of Maneh and Semelghan in North Khorasan province [7]. In Iran, the prevalence rate of human hydatid cysts has been reported from 1.1% to 13.7% [8]. Thus, WHO has identified Iran as a hyperendemic region [8]. Regarding the genotype of *E. granulosus* isolated from humans in Khorasan province, Berenji et al., in a study on 60 human hydatid cysts (58 lungs and two livers) reported that 91.6% were sheep or G1 strains and 6.6% were G6 strains and one was not detected. Rupture of hydatid cysts can occur spontaneously or after a trauma [9]. Kök et al. reported the sudden death of a 19-year-old boy due to a rupture of a liver hydatid cyst following blunt trauma with a possible mechanism of anaphylactic shock [10].

It is therefore recommended that emergency and primary care physicians must perform a complete physical examination on all admitted patients with vague symptoms and a high index of suspected hydatid cyst rupture, even following minor trauma, especially in endemic areas [9]. Furthermore, in necropsy and postmortem studies, which is a practical method and perhaps the best one in determining the cause of death [2], it is recommended to study traumatized bodies for

