

Article type : Research Article

Date Received : 09/04/2021

Date Accepted : 28/04/2021

Date published : 01/06/2021



: www.minarjournal.com

<http://dx.doi.org/10.47832/2717-8234.2-3.19>



IMMUNOLOGICAL AND EPIDEMIOLOGICAL STUDY OF HYDATID CYSTS DISEASE IN ADULT PATIENTS

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Abstract

Hydatid cysts disease is considered one of the important common diseases between humans and animals that have pathological effects with serious complications. The current study was conducted during the period from February 2020 to August to investigate hydatid worm infections and the associated environmental factors, and the current study was concerned with evaluating the number of cases of disease in hydatid cysts in general hospital of Al-Diwaniyah governorate, and identifying the organs that were targeted by the infection. The current study was also conducted to investigate the extent of the immune responses that the body develops against the hydatid cysts. 40 patients (11 males and 29 females) infected with confirmed cystic echinococcosis and 10 apparently healthy as a control group, that the most affected member is (Liver), as the rate of infection (42,5), and (30%) in kidney and (27,5%) in spleen. IgG ELISA was performed to assess humoral immune responses. the results showed the sensitivity of the ELISA test to detect anti-hydatid antibodies was be 82.45%.

Keywords: Hydatid Cysts, Echinococcosis, ELISA.

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1. Introduction

Parasites are considered important pathogens that cause diseases ranging from serious to fatal, some of which kill life, Hydrocysts is one of the most important parasitic diseases common to humans and animals, and the main cause is the complete tapeworm *Echinococcus granulosus*. Both humans and animals are infected by transferring the tapeworm eggs to them through contaminated food and water (1,2). Hydatid disease - a parasitic disease that affects herbivorous animals such as sheep, goats, cows and camels, as well as infects humans and is considered an intermediate host for this parasite. The infection is transmitted by adult tapeworm eggs to humans and animals as a host. Larvae grow in the tissues of the body organs, especially the liver and lungs. The adult worm lives in the intestines of dogs, wolves, and foxes, which is a major factor for them (2,3).

The cause of cysts is the adult tapeworm, *Echinococcus granulosus*, and ranges from 3 to 6 mm in length. The body of the worm consists of three pieces and the last piece contains the eggs, which number an average of 6000 eggs. The adult worm has the ability to stay in the intestines of dogs for a year or more, which leads to pollution of the environment with this disease (4,5). The stool of dogs infected with the adult tapeworm, which is considered one of the main sources of infection, in addition to pasture, feed and water contaminated with the feces of these dogs, and cystic disease is a health, social and economic problem in the countries of the Eastern Sea Region average. The spread of infection is normal in these areas because dogs are used extensively in caring for flocks Cattle and sheep have direct contact with humans, which leads to the continuation of the chain of infection that includes dogs, Sheep as well as cattle, camels, goats and other animals (carnivores) (6,7). As for Iraq, the disease is epidemic and is a serious health problem, especially in the central regions the southern border, between the Euphrates and the Tigris, and these areas are inhabited by many productive farmers for grains and sheep breeders, as well as the presence of factors contributing to the spread of hydatidiform cyst as lack of hygiene and the presence of the middle host. The current study was conducted to investigate hydatid worm infections and the associated environmental factors, and was concerned with evaluating the number of cases of disease in hydatid cysts in Al-Diwaniyah governorate.

Materials and Methods

The study targeted forty patients (11 males and 29 females) who were surgically confirmed with cystic echinococcosis, whose ages ranged from 15-50 years. Their cases ranged from a liver cyst, a lung cyst, a muscle cyst and a spleen cyst. 10 healthy individuals were also included and used as a control group. Venous blood samples were collected from the patients for the purpose of performing the immunological study.

The indirect ELISA immunohistochemistry method was used to investigate the IgG4 antibody according to the method approved by (7). Initially, the values of all concentrations of the optimal antigen, serum, and comparator were identified and determined after the initial checkerboard titration according to (8). The optimum conditions are created which are a 10: coating solution, as well as a 1: 100 dilution of serum, as well as 1: 3000 anti-human peroxidase, plus Mg ml⁻¹ for paramyosin antigen, and (Sigma) with 1 mg of nitrophenyl phosphate (-NPP) dissolved in buffer at a value of 1 mL as substrate as in (9). The results of the study were analyzed with the following statistical by Percentage, the arithmetic mean, and Standard deviation (10).

Results and Discussion

It is evident from Table (1) that shows the relationship between age and sex for the injured that the most age group increases in which the infection with this disease is the age range between (10) to (50) years, of females and males, as is evident from the same table, females were affected more than males, as the rate of females was 72,5%, and in my arithmetic mean an amount of (3.1) and a standard deviation of (2.2). The male infection rate was 27,5%, with an arithmetic mean its amount is (2.4) and a standard deviation of (1.3), this results is identical to study (11,12). These results indicate that most of the infected people are females, so it requires attention and work to discover the disease in them more Of the males by carrying out health education campaigns to familiarize them with the symptoms of the disease and how to prevent it, especially how to wash, wash and sterilize vegetables and fruits, and cook meat well in order to kill worms, if any, in addition to by early screening campaigns to discover the disease.

Table No. (1): shows the relationship between age and gender for the person injured

Gender	No. patients	Infection percentage
Male	11	27,5% arithmetic mean its amount is (2.4) and a standard

		deviation of (1.3),
Female	29	72,5% The arithmetic mean (3.1) Standard deviation (2.2)
total	40	100%

Table No. (2), showed that the most affected member is (Liver), as the rate of infection (42,5) with Arithmetic mean 9.1 and Standard deviation 0,9, and (30%) in kidney with arithmetic mean 7.1 and standard deviation 0,8 and 27,5% in spleen with arithmetic mean 5.5 Standard deviation 0,4, this is identical to the study of (12,13).

Table No. (2): shows the relationship between site of infection and the organs in patients

Site of infection	NO.	Infection percentage
liver	17	42,5% Arithmetic mean 9.1 Standard deviation 0,9
Kidney	12	30,00% Arithmetic mean 7.1 Standard deviation 0,8
Spleen	11	27,5% Arithmetic mean 5.5 Standard deviation 0,4

Immunofluorescence testing for antibodies in serum or in antigens gives evidence of echinococcosis. The use of the enzyme-associated immune absorption test is considered a first step in diagnosing hydatid antibody (14). In this study, the IgG ELISA test gave a sensitivity of 82.45%. This result is relatively lower than the result reported on before (15). and (16) also indicated the use of antigens from the purified 8 KDa Hydatid and scored a sensitivity of 77%. It seems that the negative results are due to several factors, including the difference in the parasite strain, which affects the immune response and thus affects the results obtained upon diagnosis. The ELISA test is one of the most frequently used tools in clinical research and diagnostics in the field of serology. This test aims to detect any substance in the patient's blood by binding specific antibodies to the same substance or antibodies in the patient's blood by binding it to the specific protein that you are targeting, Screening for the parasite using this immunological method is considered useful in the case of detection of previous infections due to high IgG antibodies in infected patients, and IgM antibodies are considered the most used in the case of detecting the occurrence of infection shortly after infection, this means that the ELISA method is dependent IgM antibodies do not give false results using rheumatoid factor (RF), and it is worth noting that there are many studies and studies that have indicated that IgM persists for many years after the occurrence of infection (17,18).

The symptoms and clinical signs of Hydatid disease differ on the site of the affected organ, the size of the cyst, the stages of cyst development, the fertility of the components of the cyst and the cysts that may reach the neighboring organs, especially in the case of liver vessels and the bile ducts (19,20). The liver is the human organ most vulnerable to this disease and the growth of cysts, at a rate of 70-60%, followed by the lungs with an infection rate of 22-20%, then the rest of the body organs represented by the spleen, eyes, muscles, heart, and thyroid gland and all these organs reach the rate of injury to 6%, followed by injury to the brain, kidneys and bones by 1%. In general, the injury can occur in all parts of the body and the water sacs grow, causing damage to the organ except for nails, teeth and hair (19,21).

Acknowledgment

This sciatic work has been depended and supported From patients coming to general hospital of Al-Diwaniyah governorate and the medical staff specializing in internal surgery and the laboratories of the Faculty of Science, Al-Qadisiyah University, and they provided with support role for completing this work.

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