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COMPARISON OF HAEMATOLOGICAL AND BIOCHEMICAL PARAMETERS IN SHEEPS AND MICE BALB\C STRAIN INFECTED WITH HYDATID CYST

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ABSTRACT
The paper reviews Human hydatid cyst or cystic echinococcosis is a life-threatening zoonotic disease that occurs in most countries worldwide and is recognized as a major public health problem. Following, ingestion of Echinococcus granulosus eggs, hydatid cysts which is the larval stage of the worm are formed mostly in liver and lungs, and occasionally in other organs of human,the infection with hydatid disease effect on the liver and lung function after examination of some biochemical parameters that related to liver and lung function,. Aspartate Total Protein, Total Bilirubin, Aminotransferase (AST), Lactate Dehydrogenase (LDH) were decrease while aspartate Blood Urea Nitrogen (BUN), Creatinine, Albumin has increase,Values of hemoglobin and red blood cells and packed cell volume in sheep infested by E. granulosus, appear low compared with reference values. While hyper eosinophilia, lymphocyte and monocyte was high, and this typical of parasitic diseases. In mice Balb\c strain and sheep found that the number of white blood cell has increase (eosinophilia, lymphocyte and monocyte) and decrease of neutrophils after counting the differential WBC of positive group and increase of MCV, MCH, MCHC.

KEYWORDS: *hydatid cyst,haematological parameters,biochemical indicators,sheeps, mice balb\c.*

INTRODUCTION

Hydatid disease is a wide spread in all countries of the world, and for large numbers of dogs and adults' worms (1). It is one of the chronic diseases in humans to continue having a cyst for long time (2) Cystic echinococcosis is a zoonotic disease caused by the larvae of the *Echinococcus granulosus (E. granulosus*) infecting the intermediate hosts, and the disease represents a significant threat for human and animal health all around the globe (3,4,5,6). The disease infected by E. granulosus most often spreads to the liver (50%-70%) and less frequently the lung and in other parts of the body. (7)

EPIDEMOLOGY

The hydatid cyst remains a significant public health hazard in endemic areas such as Iraq, Turkey, the Middle East, South America, New Zealand, Africa, China, northern Kenya, Australia, and other sheep-raising areas (8). As an endemic disease, it causes social and economic losses for countries. WHO reports stated that approximately100,000 people in the world are infected with this disease every year (9) which is common in rural populations of underdeveloped countries because of their close association with domestic and wild animals (10).The incidence of infestation by E. granulosus in endemic areas rangesfrom 1 - 220 cases per 100,000 inhabitants. Diagnosis of hydatid disease is based on the epidemiological background of patients, clinical signs and symptoms, and radiographic and related imaging studies. Serodiagnostic assays can be particularly helpful and detection of antibody to specific echinococcal antigens has the highest degree of specificity.

PATHOGENESIS

Hydatid cysts are generally asymptomatic until expanding cysts gradually effect in the liver and elicit pressure symptoms. Cysts may grow for a period of 5-20 years, and may be discovered incidentally on a routine ultrasound or CT examination. Expanding cysts present with abdominal pain or palpable mass in the right upper abdomen. (11) HCs may compress the bile ducts and result in obstructive jaundice and cause fever, pruritus, eosinophilia, dissemination, or fatal anaphylaxis after a cyst ruptures into the peritoneum or biliary tract. Infection of the cyst can facilitate the development of liver abscesses and mechanic local complications, such as mass effect on bile ducts and vessels that can induce cholestasis, portal hypertension, and Budd-Chiari syndrome. (12-16) As a result, the diagnosis of HCs should be as fast as possible because of the relevant complications that may arise with disease progression.

HOSTS AND TRANSMISION

A special feature of the liver, as a body, is the fact that its pathologies, in most cases, are not manifested clinically, and the damage that comes from their health and animal production, is great (17). Touching the body will affect systemic change and ultimately causes a decrease in production. The disease is known as many labels, including Hydatidosis , echinococcosis or cystic echinococcosis (18-21)Carnivorous definitive host for the parasite and include the canine (Dogs, hyenas, wolves, vanity and some For other fierce animals) while animals are Herbivorous such as (sheep, cows, camels, buffalo, horses and others) Intermediate Host for parasite (22-24) The disease affects parts that exsist in human and the intermediate host, especially liver and lung, followed by the rest of the parts, such as spleen, brain and other muscles except for hair and nails (25-28). The most important source of infection for humans and animals that are the intermediate hosts are the infected dogs. The vegetables, fruits, and drinking waters contaminated with the dog feces form the source of infection (29). The parasite is

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reported to be capable of settling into almost every organ, including lungs, kidneys, spleen, brain, and heart (30).

DIAGNOSIS

Imaging studies, combined with immunodiagnostic techniques, often help to make a diagnosis (31,32). Ultrasonography (USG) is the initial imaging modality of choice because it is easy to perform, widely available, and inexpensive and can help define the number, site, size, and vitality of cysts (33). Antibody assays can add weight to the presumptive imaging diagnosis. However, a negative serologic test rarely rules out echinococcosis (34). Computed tomography (CT) scan and magnetic resonance imaging can help diagnose deep-seated lesions and determine the extent and condition of the avascular fluid-filled cysts (31,35).

All cases have hydatidosis disease according to identification of the parasite's structures by imaging techniques, including ultrasound, x-ray diagnosis and accentuated surgery operation of each patient. Cysts also contain 'daughter cysts' which, if released, may diffuse to other areas of the body3 (36). Many substances have recently been used to activate and modify the host's immune system in order to control the growth and development of the cyst (37).The clinical manifestation of Echinococcosis infection depends on the site and size of the cyst. The infection may remain asymptomatic in earlier stages when the cyst is small (38). Eventually, as the disease progresses, HCL can present with epigastric or right upper quadrant abdominal pain, nausea, vomiting, and hepatomegaly (39-40).

BLOOD PARAMETERS

In sheep and mice Balb\c strain injected by hydatid cyst protoscoleses. it was found that the numbers of WBC, lymphocytes, eosinophils and monocyte have increased while the number of neutrophils decreased in the positive group compared with the control group,these results agreed with the study of (45,46), who found an increase in the number of leukocytes, lymphocytes and eosinophils and a decrease in the number of neutrophils. They, however, disagree with (42) who found an increase in the number of neutrophils. Increases in numbers of WBC, lymphocytes and eosinophils were observed in the present study which may be considered as a defense mechanism against the inflammatory processes in the body especially in the liver, spleen and kidneys where the inflammation stimulates the bone marrow to produce a large number of WBC. The increase of the eosinophil count could be attributed to the long period of the disease (47) explained that eosinophilia was produced due to the ability of parasites to infect the tissue and this agreed with (40). PCV, HB, MCV, MCH and MCHC had decrease of positive group comparison with control groups in sheep and mice Balb\c strain injected by hydatid cyst protoscoleses. Our values compared to the reference, indicate for significant anemia of sheep. HB, PCVlevel was significantly lower than the reference value by (48,49,50). Elevated levels of eosinophils, neutrophils and lymphocytes particularly, and the early period of the infection encountered in this study is in conformity with the findings of (51) that elevated eosinophils, neutrophils and lymphocytes participate in the defense against F. hepatica. This significant increase in the number of eosinophils, hipereosinophilia, shows high parasitic burden of these animals since the increase in the number of these cells in peripheral blood is characteristic of parasitic infestation and is cited by some authors (52). Significant changes reportedly occur in blood parameters of animals exposed to the parasitic invasion (53,54,55). Parasitic infections seem to cause increased hepatic enzyme activity and decreased trace element levels by causing liver damage (56-58). The determination of blood parameters is further important as the rate of success in the treatment increases with early diagnosis of the disease (59).

BIOCHEMICAL ANALYSIS

HCs also plays a definitive role in the metabolism,physiology and immunology of cystic echinococcosis (60), radiologic appearance of HCs depends on the stage of maturity and ranges from completely liquid type to com.pletely solid type (61). Some researchers report that investigating the hepaticenzyme activities and total bilirubin, protein, and albumin levels are helpful in theevaluation of the liver functions (62), minerals, on the other hand, have an importantrole in maintaining normal physiological functions and protecting organisms againstdisease. substances are found in the structure of cofactors that These are necessary forenzymatic activity (63).

Biochemical profile in sheep infested naturally by CE and comparison these value with the biochemical value in mice Balb\c strain injected by hydatid cyst protoscoleses, and investigate the value of biochemical profile for infected group and comparison with control group. after examination of some biochemical parameters that related to liver and lung function, Aspartate Total Protein, Total Bilirubin, Aminotransferase (AST), and Lactate Dehydrogenase (LDH) had decrease while aspartate Blood Urea Nitrogen (BUN), Albumin and Creatinine, has increase, comparison with control group in sheep,While in mice aspartate Total Protein, Total Bilirubin, Aminotransferase (AST), and Lactate Dehydrogenase (LDH) had decrease while aspartate Blood Urea Nitrogen (BUN), Creatinine and Albumin has increase, comparison with control group.

Low serum urea concentrations have been recognized previously in association withliver failure and have been suggested to indicate reduced hepatic synthesis of urea from ammonia. The decreased serum urea is associated with more severe hepatopathies and has prognostic relevance. on the other hand, it may be absorbed by the hydatid cystsince (65) detected a large number of carbohydrate, Aspartate aminotransferase (AST) was also measured showed an increase among the positive group compared to the negative control group; a result agreed with (64) who found that the liver infection with cestoda tapeworms led to hepatocyte destruction and enzyme release, therefore, the concentration of AST increased.

The values of these indicators vary; several indicators are in normal limits and somechange. Determination of the activity of some enzymes in serum gives us a more complete picture of activity and functional status of the liver. We have selected some enzymes, but also can serve as biological markers with diagnostic value. It has been reported that host biochemistry shows some alterations from normal physiology in animals with

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parasitic infections (66,67,62). In studies conducted on parasite infested animals (68,69), changes in total serum protein levels, and the levels of certain vitamins, enzymes, and minerals were reported, while the parasitic diseases were reported to make infected animals susceptible to vitamin and study conducted by (66) found that there were some increases in some biochemical parameters including total protein,globulin, amylase, chlor, and vitamin B12 levels, and some decreases in albumin,magnesium, and phosphorus levels of sheep diagnosed with cyst hydatid (66). In the physiopathology of the liver, AST, ALT, ALP, GGT, CPK, bilirubin and albumin,globulin protein tests are important parameters (70). Increased AST activity in the serum is a sensitive. marker of liver damage (71,72) report that the ALP and ASTactivities of sheep infected with end parasites are higher compared to healthy animals and that the increase is caused by the necrosis or cholestasis of the hepatic cells. It is believed that the increase in AST activity and bilirubin levels might be due to hepatocytes, while the increase in total protein and necrosis and/or cholestasis of the globulin levels might be attributed to the deterioration of the protein metabolism.

TREATMENT

Medication

Small, superficial cysts in one location may respond to antiparasitic drugs called benzimidazoles. Benzimidazoles destroy parasites and shrink cysts. Your healthcare provider may combine medication with aspiration or surgery.

PAIR

(puncture, aspiration, injection, re-aspiration): The PAIR technique uses a needle or catheter to drain the cyst. A parasite-fighting chemical is injected into the cyst before it's drained again. Your healthcare provider repeats the process until the cyst is completely emptied.

SURGERY

Furthermore, despite the availability of novel therapeutic options, surgery remains the most prevalent treatment option for this condition, resulting in significant economic and health consequences for nations (41), hydatid cysts, according to certain research, have distinct clinical-radiological features and treatment approaches, clinicians frequently struggle to make a solid diagnosis for this condition (42) Parasitic infection seem to cause increased hepatic enzyme activity and decreased trace element levels by causing liver damage (43,44)

PREVENTION

Control measures discussed above are directed toward prevention of infection. In relation to such measures, the prevention of human infection by E. granulosus eggs is based primarily on health education. It is important to determine the per-sonal, socioeconomic, and environmental risk factors involved in the transmission of human hydatidosis in each country or region .One risk is the lack of potable water and the use of rural water tanks that collect rainwater from the ground surface and roofs . All personnel handling dogs in endemic areas should be aware of the health risk of acquiring hydatidosis and must take safety precautions. At a personal level, the prevention is mainly based on simple rules of personal hygiene, such as avoiding contact with unknown dogs that may be infected, washing hands before eating, and washing vegetables before eating them raw. Dog owners should treat the dogs regularly with pra-ziquantel and avoid feeding them with raw offal potentially infected with cysts.

CONCLUSION

The number of eosinophils shows interest because it can be used routinely as a biological indicator for establishing a preliminary diagnosis which is likely accurate for parasitic. Hematological indicators with diagnostic value, resulted HB, PCV, eosinophils. Their evaluation, can be used as a routine screening test from districts laboratories determining preliminary diagnosis in sheep and mice infested of liver parasites. The change of hepatic enzymes level serves to monitor the progress of parasitic infection in animals and as a sensitive diagnostic aid in field infections. Albumin, BUN,creatinine and total bilirubin are reliable indicators of the stage and severity of parasiticliver naturally infested sheep and in doing so, and constitute an important diagnostic tool in determining of the official diagnosis and an efficient treatment process. The results of the study indicate that the determination of the changes in AST, total protein, total bilirubin levels of the animals infected with cystic echinococcosis could be used as assistive laboratory analyzes to determine the physio pathological changes in their livers and the prognosis of the diseased animals.

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